WWF CONSERVATION MEASURES PILOT PROGRAM

2007-2008

Final Report

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This report was written by the WWF-US Measures Team, based on contributions from participants in the WWF Conservation Measures Pilot Program. Program participants included: Armindo Araman, WWF-Mozambique; Bijan Gurung, WWF-Nepal; Cristina Eghenter, WWF-Indonesia; Robecca Jumin, WWF-Malaysia; Nalimi Madata, WWF-Tanzania; Cyprian Malima, WWF-Tanzania; Bruce Robson, Independent consultant for WWF-US Bering Sea project; Greg Stuart-Hill, WWF-Namibia; Hanna Tobing, WWF-Indonesia; Stephan Wulfraat, WWF-Indonesia; The Measures Team was directed by John Morrison and included Bronwyn Llewellyn, Sheri Stephanson, Mike Mascia, and Aurelie Shapiro.

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Acknowledgements

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We are deeply grateful to all of them.
-John Morrison, Mike Mascia, Bronwyn Llewellyn, Sheri Stephanson, and Aurelie Shapiro

The Conservation Measures Team, WWF-US

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    - What is that estimation based on?
- How much peat forest is currently in protected areas in HoB?
    - Is that enough?
- How economically dependent on forests are local communities?
    - What conservation strategies make the most sense in this social context?
- What is the logic of the HoB sector reform strategies?
    - How do we know that they are working to reduce threats?

Are you able to answer these questions? Where would you go for this information? Not to pick on one particular WWF priority place, but until very recently these questions could not be answered by WWF staff in WWF-US, WWF-Indonesia, or WWF-Malaysia. These questions had never been asked.

There are a number of reasons to understand current conservation status relative to conservation goals, and to have some sort of program to coordinate the effort. Measuring conservation status:

- Allows adaptive management (i.e. where should we now focus our efforts?);
- Provides public and donor accountability;
- Facilitates streamlined and rolled up reporting;
- Opens the door to new funding;
- Answers critical basic science questions;
- Is integrated with solid conservation planning methods.

The 2008 WWF-US Board Strategic Review affirmed as much, citing the need for both consistent planning methodologies (the WWF Program Standards) and consistent measurement of outcomes: "the task ahead is to ensure that we follow through on our collective commitment to more consistent planning, strategy development, and measurement."

A prerequisite for truly effective conservation is knowing where we stand and where we want to go. This report outlines a 1½- year pilot effort to understand current conservation status relative to conservation goals and strategy effectiveness in six WWF geographies across globe. This measures pilot was initiated in the Spring of 2007 and ends in February 2009.

In the six pilot geographies, the objectives of the effort were to:

- Implement a conservation status measures system;

- Develop strategy effectiveness measures to the extent possible;
- Capture the lessons learned during the first year of implementation;
- Solicit feedback and consensus on methods from the WWF Network;
- Develop guidance to implement similar programs in other places.

The six pilot geographies were:

- Bering Sea marine ecoregion;
- Heart of Borneo (HOB);
- Coastal East Africa (CEA);
- Tun Mustapha marine protected area (Coral Triangle);
- Etosha to Skeleton Coast landscape (Namibia);
- Terai Arc Landscape (Nepalese portion only).

The hope was that by building upon experience in these six geographies, the Conservation Measures program would eventually scale up to support learning and adaptive management across all WWF priority places.

As the workplan was being conceived, two principles were kept in mind. The first was that whatever was developed should be in line with the WWF Program Standards. The second was that a prerequisite for adequate implementation would be to have at least one dedicated staff person in each place.

Considering the capacity and the state of conservation planning in the places, the focus of the initial 1½ year was to measure *conservation status* in four dimensions:

- Biological
- Threats
- Conservation Management
- Social Well-Being

Measuring conservation status across these four dimensions would allow the WWF programs to track progress towards goals, understand the challenges and opportunities we face, and describe the context for our work. An essential element of the measures effort was to put the collected data in context. For most indicators, field teams were asked to develop "viability criteria" at four levels (with criteria for Poor, Fair, Good, and Very Good) specific to that indicator. Additionally, the effort would be directed towards assembling **existing** datasets from government agencies, universities, other NGOs, etc.

The program was designed as a collaborative initiative that draws upon prior WWF conservation planning efforts:

- A core measures team in the WWF-US Conservation Science Program (CSP) led the development of foundational analytic frameworks, protocols, guidance documents, and other basic program elements. The measures team also assisted the field programs with development of appropriate indicators, design and implementation of monitoring systems, data analysis, and communication of results.
- Field staffers had the primary responsibility for program implementation – indicator selection, data collection and analysis, and communication.

- Finally, the core measures team worked with the program and field staff to identify cross-cutting themes that emerged from the pilot process, synthesize lessons learned and develop program recommendations.

The program is an extension of earlier, unsuccessful efforts to create a measures framework for WWF-US' priority places. The intervening development of the WWF Program Standards provided the framework to avoid duplicative reporting, and the provision of a generous and far-sighted donation from the Sall Family Foundation provided the targeted and sufficient funds to make the effort a funded mandate.

The general scope of activities for the conservation measures program was:

- development of the program structure and guidance by the WWF-US core team;
- a series of short 23 day kickoff workshops in each place involving local experts and partners wherein:
    - the WWF Program Standards were introduced;
    - indicators were developed;
    - prospective data sources were identified;
    - the work was handed off to field teams to implement.
- data collection and synthesis;
- encouragement and technical support of the field teams by the WWF-US core measures team;
- a week-long November 2008 lessons learned workshop of the field staff and key WWF Network staff;
- development of an overall lessons learned document (this report);
- development of guidance for inclusion in the WWF Program Standards.

Within the consistent overall framework, each place chose its own indicators and each place implemented the work in a slightly different way. All of the places gained significant insights into the status of their own geographies, as well as how best to structure such learning in the future. The details of this information can be found in the body of the report and the attached appendices (one for each place). Beyond the individual place-based lessons, the November 2008 workshop provided a venue for the participants to learn from each other, and synthesize overall lessons for measures in the WWF Network.

The overall conclusion of the effort is that given adequate time to initiate a measures effort (~ 6 months), it is possible to establish a measures programs and baseline conservation status measures in priority places over the course of a year, with the support of a core team, provided that:

- leadership at all levels of the organization are supportive;
- there is a consistent and reliable source of technical support and leadership;
- field teams are in place and understand the WWF Program Standards;
- there is alignment between the field and larger (NI) goals.

The baseline status measures will improve over time, and strategy effectiveness measures can follow. Strategy effectiveness measures could be implemented first, but that would mean that baselines would not be established before strategies are implemented. Both

sets of measures could be done simultaneously if the commitment and capacity is in place. The threshold for engaging in a comprehensive measures effort is probably a collection of landscapes in an ecoregion or NI or an ecoregion, either alone or as part of an NI.

Further specific conclusions about program measures work at WWF can be drawn along the themes of capacity, methods, resources, time, and programmatic considerations. The following is a top-line summary of conclusions and recommendations.

Capacity

Individual place teams desire support for measures. A small team 1-3 FTEs in any given NO can support several priority places. A Network coordinating and advisory body for measures would be very helpful to reach consensus on methods, to help organize core capacity among the donor NOs, and to make sure that place teams get the support that they need.

- **Recommendation:** The Network should organize a distributed support team of measures staff from donor NOs, with WWF-I taking the overall coordination lead, so that all WWF priority places have support.

The experience of the pilot was that for any given place, a team of staff who are integrated into the program is generally required to get the work done. The team should include a central coordinator(s) with in-depth knowledge of the place, other staff (or partners) to assist in data collection and analysis, and access to specialized technical skills, especially GIS and remote sensing. If social well-being measures are a priority for the team, social science expertise is needed. Some data is available centrally, including both remote sensing information as well as some online data, but the majority of indicators identified are often only available in-country. Of course, the preference would be for all data to be collected in-country using in-country capacity.

- **Recommendation:** If they have not already done so, WWF priority place teams need to identify the staff capacity within their program to undertake adaptive management measures as part of the WWF Program Standards process.

Methods

Field familiarity with the WWF Program Standards and buy-in and leadership from relevant NI managing directors and conservation directors are important preconditions for undertaking measures work – both of which are generally lacking in WWF.

- **Recommendation:** Priority WWF programs need more familiarity with the WWF Program Standards, and NI managing directors and NO conservation directors should strive to use the adaptive management framework outlined in the Program Standards to manage programs and staff.

Logic dictates tackling status measures first, in order to establish a baseline, but there is eagerness on the part of field staff to develop effectiveness measures.

- **Recommendation:** Ideally, programs would initiate a conservation status measures effort before engaging with strategy effectiveness measures, but many programs are already going, and will need to make the decision for themselves.

There is consensus that biological and threat indicators are important, but less shared understanding of how to apply conservation management and social well-being measures.

- **Recommendation:** Programs undertaking a conservation status measures effort will certainly want to establish biological viability and the quantitative status of key threats. They must decide for themselves if conservation management and social well-being status is a priority for them.

There was not enough time in the pilot process to complete a peer review of the assembled datasets for data quality. However, as data quality is always a concern, conducting peer reviews is an important next step.

- **Recommendation:** Participants of the pilot as well as all program measures teams should seek outside peer review of both the indicators selected and the datasets collected.

Resources

WWF-I cannot be solely responsible for supporting conservation measures across the Network, but can help to organize Network staff. Donor NOs should have the staff to support WWF's priority places through provision of technical assistance. Salary for 1-3 core staff, a reasonable travel budget, and a budget for data acquisition (e.g. $10,000 for remote sensing per place every 2-3 years) to supplement place-based budgets is sufficient to get a conservation measures program up and running in a donor NO – this team can support several WWF programs as part of a distributed network of Network measures support.

- **Recommendation:** Donor NOs that wish to ensure that their own priority programs are being managed adaptively should either make sure that other donor NOs are supporting measures in their priorities, or assist with the necessary resources.

Conservation measures is a core function of any program, and WWF is responsible to its donors to assure the programs track progress toward stated conservation goals. NI's and other priority programs need the resources to measure progress and manage adaptively. Leveraging the data already collected by governments, universities, and other organizations is a viable strategy, but some information (i.e. remote sensing) may need to be collected by WWF programs themselves, and attention should be paid to proprietary concerns with partners and concerns about the quality of data collected by others.

- **Recommendation:** Measures budgets should be should be built into NI core budgets as part of WWF Program Standards and funded by donor NOs. Data rights must be respected and partners' work properly acknowledged.

Time

Aligning measures work to WWF's program in a place requires at least 6 months, and was seen as a critical phase by field participants in the November 2008 measures workshop. This includes identifying or hiring staff, building partnerships, ironing out data sharing arrangements, etc.

- **Recommendation:** Measures programs should be built up slowly, so that the measures work is well-integrated into programs, staff are on board, data collection responds to management and data-sharing partnerships are not strained.

Once alignment has occurred, one year is enough time to establish a measures program and develop baseline measures of conservation status – *if* leadership is bought in, core and field staff are in place, and there is alignment between field staff and larger

organizational (NI) goals. The next emphasis should be on effectiveness measures, with improvements in status measures happening concurrently.

- **Recommendation:** Allow a year to develop baseline conservation status measures. Strategy effectiveness measures can either wait until baselines are established or, with adequate staffing, proceed simultaneously.

Programmatic

Alignment of the conservation measures work with the WWF Program Standards is critical to promote consistency and avoid confusion. Conservation measures is simply one field of emphasis within the WWF Program Standards.

- **Recommendation:** Any measures program in the Network should align with the WWF Program Standards.

Alignment of country office initiatives with larger Network Initiative (NI) goals is not part of conservation measures per se but certainly affects how smoothly a measures effort will run. A primary lesson about sharing data across countries is that success depends largely on the strength of working relationships across program/country offices. Lack of cross-border collaboration presents an impediment to large scale conservation planning and measurement.

- **Recommendation:** As part of the 6-month lead up (see "Time" above) to the initiation of any cross border measures program, any lingering cross-border NI management issues need to be worked out so that measures work is seamless across national and ecoregion boundaries.

The mandate and push for conservation measures must come from WWF program leadership at all levels (WWF Conservation Committee, donor NOs, and managing and conservation directors), since core measures support staff cannot effectively advocate for measures while providing objective technical support to field programs. Leadership from NI managing directors and in-country conservation directors is especially critical, since field measures staff are generally reporting to these people, either directly or indirectly.

- **Recommendation:** Responsibility and broad direction for measures should be with NI managing directors and conservation directors, who should require that their staff report back on objectives and goals developed during WWF Program Standards planning.

The six pilot geographies clearly benefitted from their participation in the conservation measures pilot. Before the pilot the geographies had a wide range of experience monitoring conservation status. Those that had little to no data about their geographies now have a balanced assessment of the state of biodiversity in their places (with one exception). Those that had gathered some information now have organized that information into a consistent, recognized framework that is aligned with the WWF Program Standards. None of the places had assessed monitoring information relative to long-term viability and conservation goals.

The WWF Network has benefitted from the pilot in that there is now a proof of concept, warts and all, of a comprehensive conservation measures effort. There is more work to be done to complete the task, and there are ample opportunities for constructive criticism, but there is now a solid example to criticize and improve. For the reasons above and

more, WWF needs a robust program that allows it to evaluate how places are doing relative to conservation goals, and whether strategies are progressing according to the theories that spawned them. Now there is an example to learn from.

I. Introduction

- How much tropical rainforest remains in the Heart of Borneo (HoB)?
    - Is that viable for the long-term?
- What are the top 3 threats in HoB?
    - What is that estimation based on?
- How much peat forest is currently in protected areas in HoB?
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Are you able to answer these questions? Where would you go for this information? Not to pick on one particular WWF priority place, but until very recently these questions could not be answered by WWF staff in WWF-US or WWF-Indonesia or WWF-Malaysia. These questions had never been asked. Clearly there is a need for both the field and for organizational management to have access to the answers to such critical questions.

A prerequisite for truly effective conservation is to know where we stand and where we want to go. This report outlines a 1½- year pilot effort to begin to understand current conservation status relative to conservation goals and strategy effectiveness in six WWF geographies across globe.

In the six pilot geographies, the objectives of the effort were to:

- Implement a conservation status measures system;
- Develop strategy effectiveness measures to the extent possible;
- Capture the lessons learned during the first year of implementation;
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The six pilot geographies were:

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- Etosha to Skeleton Coast landscape (Namibia);
- Terai Arc (Nepalese portion only).

WWF's programmatic work in the six pilot geographies was at varying stages of planning and implementation when the Measures pilot began. For example, the Terai Arc Landscape program had been in operation since 2001 (with conceptual discussions dating back to 1998), whereas the Heart of Borneo was a new program when the

Measures effort began in 2007. This led to significant variation in Measures outcomes, as well as challenges and opportunities unique to each geography.

A. Rationale

There are a number of reasons to understand current conservation status relative to conservation goals, and to have some sort of program to coordinate the effort. Measuring conservation status:

- Allows adaptive management (i.e. where should we now focus our efforts?);
- Provides public and donor accountability;
- Facilitates streamlined and rolled up reporting;
- Opens the door to new funding;
- Answers critical basic science questions;
- Is integrated with solid conservation planning methods.

The WWF-US Board Strategic Review affirmed as much citing the need for both consistent planning methodologies (the WWF Program Standards) and consistent measurement of outcomes: "the task ahead is to ensure that we follow through on our collective commitment to more consistent planning, strategy development, and measurement."

B. Structure and Activities

In the spring of 2007 a Conservation Measures program was created in WWF-US. The thrust of the program was a pilot effort to measure the conservation status and strategy effectiveness of six WWF priority places. The effort was intended as a first step towards measuring strategy effectiveness in those same six places.

The six places were the Bering Sea marine ecoregion, Heart of Borneo, a large Namibian landscape, the Nepalese portion of the Terai Arc, two landscapes in Coastal East Africa, and one protected area in the Coral Triangle. The hope was that by building upon experience in these six geographies, the Conservation Measures program would eventually scale up to support learning and adaptive management across all WWF priority places.

As the workplan was being conceived, two principles were kept in mind. The first was that whatever was developed should be in line with the WWF Program Standards. The second was that a prerequisite for adequate implementation would be to have at least one dedicated staff person in each place.

Considering the capacity and the state of conservation planning in the places, the focus of the initial 1½ year was to measure *conservation status* in four dimensions:

- Biological
- Threats

- Conservation Management
- Social Conditions

Additionally, the effort would be directed towards assembling existing datasets from government agencies, universities, other NGOs, etc. If key indicators were lacking data from any source, a plan could be developed (hopefully with partners) to eventually acquire the necessary information, though not likely during the timeframe of the initial pilot.

Measuring conservation status across these four dimensions allows us to track progress towards goals, understand the challenges and opportunities we face, and describe the context for our work. Measuring conservation management and social condition measures are novel elements that the Conservation Measures core team hopes to integrate into the WWF Program Standards.

An essential element of the measures effort was to put the collected data in context. For most indicators, field teams were asked to develop "viability criteria" at four levels (Poor, Fair, Good, and Very Good) specific to that indicator. These are perhaps easiest to understand for biological indicators.

- *Poor = Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., it will be too complicated, costly, and/or uncertain to reverse the alteration);*
- *Fair = the indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation;*
- *Good = the indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance;*
- *Very Good = The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to "natural" as possible and has little chance of being degraded by some random event).*

Similar criteria were developed for the threat and conservation management indicators. More details are available in the conservation measures guidance manual that is being developed. In addition, a system was created to benchmark some of the social well-being indicators against global averages produced by the United Nations. At this point in time, the benchmarking system is limited to those indicators for which there are comparable, reliable global data sets. More information about this system is provided in the Social Well-Being concept document, as well as the guidance manual referenced above.

The program was designed as a collaborative initiative that draws upon prior WWF conservation planning efforts:

- A core measures team in the WWF-US Conservation Science Program (CSP) led the development of foundational analytic frameworks, protocols, guidance documents, and other basic program elements. The measures team also assisted the field programs with development of appropriate indicators, design and

implementation of monitoring systems, data analysis, and communication of results.
- Field staffers in each of the six conservation geographies have the primary responsibility for program implementation – indicator selection, data collection and analysis, and communication.
- Finally, the core measures team works with the program and field staff to identify cross-cutting themes and synthesize lessons learned.

The program is an extension of earlier, unsuccessful efforts to create a measures framework for WWF-US' priority places. The first, tentative attempt to develop a comprehensive monitoring effort at scale in WWF was driven by the "Ecoregion Task Force" during 2004. This cross-Network management team asked CSP to develop and test a methodology for monitoring conservation status. The basic system, adapted from The Nature Conservancy's Conservation Action Planning (CAP) system (before the WWF Program Standards had been fully developed), was applied approximately 10 ecoregion programs. The ecoregion programs were generally receptive to the effort and representative biodiversity indicators were efficiently and successfully developed. Unfortunately, there were no funds provided to actually assemble data.

When the results of the effort were presented at the WWF Global Ecoregion Conservation Workshop in Antalya, Turkey in February 2005, there were three clear points of feedback:

1. Measures as a concept is valued by staff, but any request to engage in monitoring not accompanied by adequate funding is seen as an unfunded mandate.
2. There was resistance around the lack of clarity from management about how such a measures effort might duplicate existing reporting frameworks, including the WWF "Global Monitoring System," as well as reporting frameworks from donors.
3. Finally, while staff see the importance of measures, they are under tremendous pressure to respond to many pressing needs with chronically underfunded programs, and an additional $50-100,000 would often sooner be spent on program needs rather than monitoring.

The intervening development of the WWF Program Standards provided the framework to avoid duplicative reporting, and the provision of start-up funds from a generous and far-sighted donation from the Sall Family Foundation provided the targeted and sufficient funds to make the effort a funded mandate.

The general scope of activities for the conservation measures program was:

- development of the program structure and guidance;
- a short 2-3 day kickoff workshop involving local experts and partners wherein:
    - the WWF Program Standards were introduced;
    - indicators were developed;
    - prospective data sources were identified;
    - The work was handed off to field teams to implement.
- data collection, synthesis, analysis, and mapping;

- The core measures team encouraged, guided and received updates from the field teams;
- a week-long workshop/summit of the field staff, along with key WWF Network staff;
- development of an overall lessons learned document;
- development of guidance for enshrinement in the WWF Program Standards.

C. Goal and organization of document

The purpose of the document is to

- explain the rationale of the effort;
- summarize the progress made in approximately 1½ years;
- explore the way forward for conservation measures.

The intended audience is

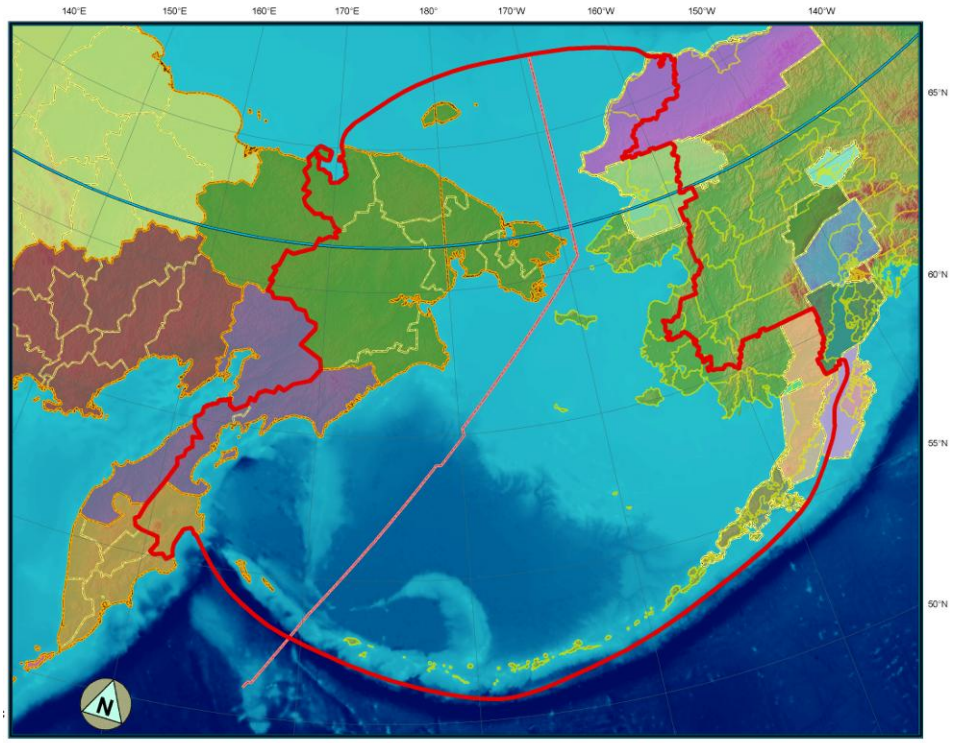
- executive leadership at WWF-US, WWF-International, other WWF NOs;
- executive leadership / conservation directors in the six measures pilots
- WWF Network Initiative leaders;
- leaders of other place-based programs;
- other WWF program staff, and the program staff of other conservation NGOs.

Following this brief introduction, the document is organized by each of the six places that participated in the pilot. The history of the project, status of activities, assessment of in-place capacity, methods used, time available, and programmatic issues for each place are discussed. Near the end of the report, the measures team summarizes the experience from their perspective. This is followed by a section that attempts to summarize the lessons learned from the entire experience and places, and makes recommendations for moving forward. Finally, appendices for each of the places detail the indicators and map and/or graph each indicator over time.

Where there is not a consensus or a clear difference of opinion between the core measures team, the field team, or leadership, this is noted.

Throughout the main document, look for "Lessons Learned" and "Development Needed" at the end of each section. These points are summarized in the final chapter.

II. Bering Sea



A. Introduction

The Bering Sea was chosen to be one of the conservation measures pilot places. While the Kamchatka Peninsula had been added to the Bering Program recently, it was decided to focus on the Bering Sea and associated coastlands because there was already a solid foundation for measures – a detailed conservation action plan (CAP) had been prepared jointly by The Nature Conservancy and WWF in 2005. There was already a partial list of biological targets and indicators, but data were not systematically collected for all of the indicators selected. It was expected that this would be one of the most straightforward geographies, since what remained was to first update and as necessary supplement the previous list of targets and threats, and then develop new social and conservation management indicators. However, several complications caused the Bering Sea to be more difficult and labor intensive than expected during the early stages of the project. The end solution has been to hire a very knowledgeable short-term consultant with a detailed knowledge of regional data sources whose cross-disciplinary work in the region spans three decades.

Conservation Status (based on the information collected during the measures pilot):
Biological

A preliminary evaluation in Miradi resulted in a overall rating of Fair for the Bering Sea. However, not all of the biological target ranking criteria have been fully specified, including the long-term climate indices which are important ecosystem drivers. Most of the indicators that received lower ranking (fair and poor) were at upper trophic levels (e.g. marine mammals and seabirds), many of which resulted from Endangered Species Act listings for large whales and pinnipeds. Most of the indicator rankings based on fishery stock assessments received higher ratings (good and very good); however there is widespread concern over declining trends in several important species such as Walleye pollock and Pacific cod. The preliminary rating of Fair appears to accurately reflect widespread concern on the part of stakeholders about the status and vulnerability of the Bering Sea ecosystem.

Threats

Threat indicators that reflect some of the direct anthropogenic influences in the Bering Sea (e.g. shipping and oil and gas development) are in the baseline stages of data collection. Other direct effects such as direct interaction between fisheries and marine mammals (e.g. bycatch or entanglement) are currently at relatively low threat levels. However threats such as bycatch of Steller sea lions are known to have had a greater impact in previous decades. Similar to the biological status indicators for species that comprise major fisheries, overfishing indicators based on stock status reflected the current single species management system evaluation. As such these may not completely reflect current concern over the indirect effects of commercial fisheries on the ecosystem. There was discussion at the measures summit as to whether threshold levels for stock status ratings set by management agencies were precautionary enough in this regard. This should be considered as threat ranking categories are developed for fishery exploitation rates. It should also be noted that, in the current formulation of the biological and threat indicators, the long-term climate indices for the Bering Sea were shifted to biological indicators and as such may not fully represent the threat that climate change represents to the ecosystem.

Conservation Management

The principal conservation management indicators that can be evaluated for the Bering Sea in the near-term are the Representation of Habitats in Management and Protected Areas and Protected Area Representation in Priority Areas. Large amounts of the continental shelf, slope and basin of the Bering Sea currently receive some management protection ranging from no-trawl zones to time-area-closures. With the implementation a suite of new research and management areas during 2008, these areas exist in all of the significant habitat areas of the Bering Sea. However, this analysis is complicated by the complexity of the management structure in that few of these areas are true MPAs that prohibit all fishing, rather most are fishery and gear-specific closures. To address these issues, the next stage of analysis will need to stratify the analysis of protected areas and priority habitats according to the type of protection afforded by each management area.

Social

Preliminary analysis of the Bering Sea social indicators compiled to date produced some interesting results. At present, 70% of the 94 Communities for which we obtained data were members of one of the 6 Community Development Quota (CDQ) Groups. These communities should derive economic benefits from the fishing industry. Based on U.S. census data, we found that the mean per/capita income for the 94 communities was $11,329 in 1999. Employment patterns in the small rural communities of the Bering Sea region were difficult to interpret. For example, on average, 16% of the adult workforce in 2000 was unemployed; however 48% of the workforce on average at the time of the census was not working. The potential importance of collecting data on subsistence harvest practices was underscored by the fact that an average of 22% of the people in each community were below the poverty level in 2000. Measures program staff are currently using the Bering Sea Social Indicators as in a benchmarking exercise to attempt to derive regional ranking criteria through comparison with national and global trends.

B. Project Analysis

1. Capacity

The large geographical and cross-disciplinary scope of the measures project in the Bering Sea region presented several noteworthy challenges. The international focus of the project required the ability to bridge cultural differences and parallel institutions in each country. The diversity of indicators (e.g. fisheries and wildlife, oceanography, oil and gas development, shipping, demography) required the ability to synthesize data from a wide range of sources, while still keeping sight of the connectivity between categories. Due in part to these challenges, skilled staff was difficult to identify for this project, even given the location in a mid-sized American city. The initial person hired had appropriate technical skills including proficiency with GIS and graduate training in ecology. However, he lacked direct expertise in marine science and specific knowledge of the institutional management structure in the Bering Sea region. Given these challenges and shortcomings, he appeared to become discouraged early on and was never fully on board with the project. In addition, he didn't appear to fully understand or agree with the approach of the social component. He wanted it to be more closely tied to conservation interventions and resource use than the general "status" indicators were that were proposed by the core measures team. The resulting personnel challenges required a degree of technical assistance and support during the start-up period that was comparable to that provided to Tanzania and Mozambique (countries with very limited technical capacity).

Midway through the first year the original hire resigned after 4 months, resulting in a capacity gap for several weeks until a consultant could be hired and a contract finalized. The impact of this gap was reduced somewhat by the consultant's familiarity with the existing Bering Sea CAP analysis, including involvement with developing the original indicators for marine mammals and some fisheries. The consultant had also been brought in to provide guidance to Bering Sea program measures staff with collecting and updating data for the current project. Nevertheless, these unanticipated complications and delays

put the project behind schedule. The primary impact of this was that the Russia component of this project has been postponed. This was due in part to the fact that the new consultant came on during the summer when many of the necessary Russian scientific contacts were in the field conducting research. It was decided to wait until the US portion of the project was completed to determine whether the existing budget would allow for the Russian component to proceed.

Since the consultant was hired the project has proceeded smoothly. The consultant is comfortable in all the project components and has GIS technical skills. He is organized, and due to his experience and contacts he has been able to locate data that closely matches the originally identified indicators or recommend suitable adjustments as needed. Close collaboration with core WWF measures staff as well as Bering Sea program staff has also resulted in refinements to the indicator structure that provide greater connectedness between indicator categories.

2. Methods

The Bering Sea region is characterized by a wealth of ecological and historical information that spans several centuries. This is particularly true for marine mammals and fisheries. However in retrospect, this presented a unique problem – especially for the original hire – in determining how best to utilize the sheer abundance of data for the current program. This likely contributed to the difficulties experienced by the original hire in that it may have been somewhat overwhelming and certainly presented challenges to sort through, organize and analyze the data gathered.

Biological and Threat Indicators
The initial biological and threat indicators were taken from the Bering Sea CAP workbook completed by TNC and WWF in 2005. During a December 2008 workshop held at the TNC office in Anchorage, the list of indicators was revisited, resulting in a few changes within the threats category. Additional refinements were also made after the new consultant took over. Most of these changes were made because initial indicators were not clearly specified or were only done so to the Target and Key Attribute level (e.g. Pelagic fish; population size and dynamics) and not to the level of the indicator itself (e.g. Eastern Bering Sea pollock stock biomass). As necessary, indicators were adjusted to reflect available data sets that best captured the intent of the indicator. For example, for the key attribute Oil Spills the indicators (location, distribution of impact and remediation state) were split into onshore and offshore categories based on the structure of the Alaska Department of Environmental Conservation, Division of Spill Prevention and Response (SPAR) database. In some cases, indicators were dropped from the measures database because it was determined that there was no feasible source of long-term monitoring data based on consultation with agency staff (e.g. sea otter adult/pup ratios).

The final indicator data sets were structured and compiled considering the following issues:

- Standardization of data and the ability to easily obtain updates from ongoing data collection programs conducted by federal and state agencies or established organizations. Where possible we used long-term data sets to better evaluate changes over time.
- Compatibility with ecosystem indicators being developed by the National Oceanic and Atmospheric Agency (NOAA) and the North Pacific Fisheries Management Council (NPFMC) as part of the stock assessment and "ecosystem consideration" process.
- Connectivity and interaction of indicators between Target, Threat, Conservation Management and Social categories.

To the greatest extent possible, ranking criteria for biological indicators and threats were developed using a quantitative framework. This was accomplished in part by tying ranking categories to existing management frameworks such as the stock assessment process established under the U.S. Marine Mammal Protection Act (MMPA) or the fishery stock assessment process established by the NPFMC under the Magnuson-Stevens Fishery Conservation and Management Act (aka. Sustainable Fisheries Act). Where regulatory acts did not come into play (e.g. non-managed species or currently unregulated threats like shipping volume), or were not applicable (e.g. climate change indices) we attempted to use long-term time series data to evaluate changes in indicators over time. For some indicators we have not yet developed ranking criteria.

In summary, the experience during this process of selecting and collecting data for biological and threat indicators in the Bering Sea was largely successful. Some indicators needed revision or changes; however all of the Key Attributes were represented by indicators derived from updatable data sources. This process highlights why it is important to revisit indicators on a regular basis to ensure that we are tracking the most pertinent and high priority ones, especially as both the status of key species and the nature of threats may change or evolve over time. It will also be important to track and where possible interact with efforts by federal agencies such as NOAA and NGOs (e.g. TNC) as they select ecosystem indicators. The broad scope of the WWF Conservation Measures project may provide a valuable contribution to this process by incorporating a wide range of indicators into one analytical process.

Conservation Management Indicators

Key attributes were developed for the Bering Sea Conservation Management category, however similar to other geographies, there has yet to be a large scale evaluation of the protected area systems for the Bering Sea. GIS data were collected for a range of existing MPAs (Marine Protected Area) in US waters, which will allow an evaluation of the representation of habitats in management and protected areas to be done and updated on a regular basis. Additional indicators for key attributes such as protected area representation of priority areas, protected area management effectiveness, marine management effectiveness, require further specification. Indicators for conservation funding and enforcement could likely be developed with data from management agencies. If this is pursued, it may be advisable to categorize or group indicators by management agency or organization (e.g. federal vs. state funding levels and enforcement

efforts). At present, the Conservation Management Indicator category was primarily put on hold for the Bering Sea, however follow-up work on this category seems justified.

Social Indicators

The social indicators for the Bering Sea were initially developed during a long afternoon brainstorming session with two prominent local social scientists, Matt Berman and Henry Huntington, whose input was invaluable. As project implementation progressed, it became apparent that the original measures hire did not agree with the rationale behind the social well-being status indicators. His reinterpretation of them with WWF-US program staff led to a time-consuming process of re-development, prioritization and re-prioritization. This reflected lack of a shared vision between the core conservation measures staff and Bering Sea staff, which may have resulted from a failure to engage program staff early in the process of grant development and implementation. This resulted in the perception among the field office that the conservation measures program was thrust upon the Bering Sea program without suitable preparation and involvement. Margaret Williams, Managing Director for the Bering Sea program commented:

> There could have been better planning on the intent and function of the Sall program from the very beginning. Might be able to hire consultant to do work rather than staff person. In any case, one person in field may not be enough. We may need a team or working together with other NGOs (e.g. TNC). We may have spread ourselves too thin on this issue – i.e. we may have over-extended ourselves.

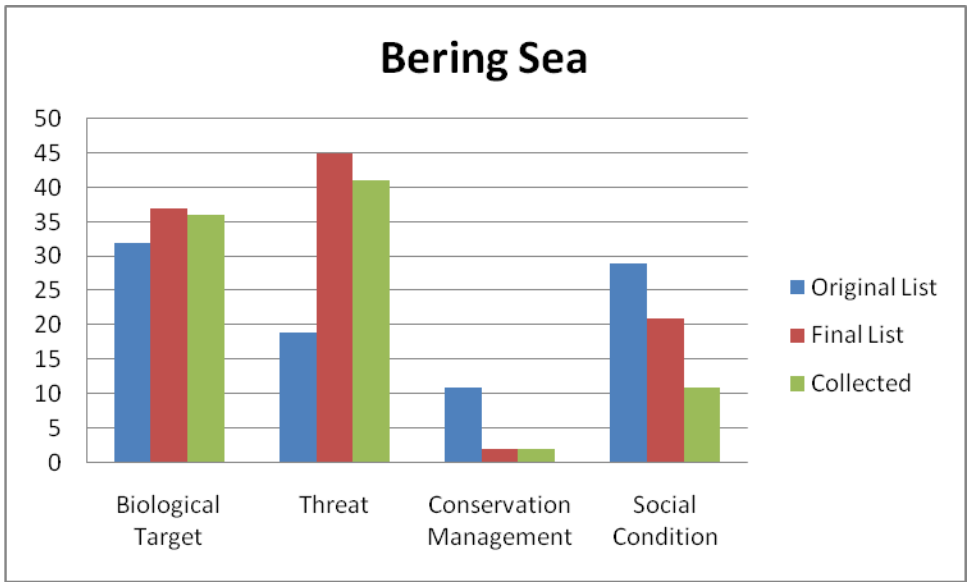
In retrospect, these comments address some of the core issues that affected the progress and eventual accomplishments of the Bering Sea measures implementation process (i.e. the need to postpone Russian data collection), and especially the social indicators. This underscores the need for early and consistent involvement of field offices in measures programs. The resignation of the Bering Sea measures officer before collecting any social data further complicated the process with social indicators, requiring a second round of redevelopment based on the consultant's ideas and knowledge of data sources. This will be discussed more below.

Similar to the biological and threat indicators, the wealth of information made matching ecological and political boundaries more of an issue for selecting social indicators than in other places. For a marine environment, we had to determine the appropriate administrative unit at which to measure the state of the people living *on the margins* of the targeted geography – in other words, coastal communities. Previous efforts to delineate social boundaries in Bering had been undertaken by the Community Conservation team, in collaboration with Margaret Williams. They defined a "coastal fringe" as those people living within 5km of the coast. However, most data in the region are collected in units that don't correspond to this boundary. Specifically, on the US-side, the census block was deemed most appropriate and on the Russian side, the *oblast* would be the most appropriate unit. However, these units cover vastly different amounts of land. Decisions about exactly which Russian *oblasts* to include have been postponed.

As discussed above, the new consultant focused on the US side only. He found a data source through NOAA that has collected quantitative data and produced detailed profiles of 136 Alaskan communities that are involved in commercial fishing. The study looks at commercial, recreational and subsistence activities within the selected communities; it also provides a profile of their basic demographic and socio-economic characteristics. This study provides a comprehensive set of indicators that paint a clear picture of the socio-economic conditions of some communities in the Bering Sea ecoregion. It is also data that NOAA will update in the future; meeting the measures criteria that data should be easy to collect and update periodically. There was initial concern that only using data focusing on fishing communities may introduce a bias in the social data, however, these data cover over 95% of the communities on the US side of the Bering Sea and should accurately reflect regional trends in social well-being. We will tackle the Russian-side issue at a future time when the Bering team can devote time to collaborating with WWF-Russia to develop measures on that side of the Bering Sea.

Defining social boundaries was further complicated because relationships to the ecological region are not limited to people living within the defined ecoregion boundary. For example, commercial fisherman in Washington and Oregon actively participate in and rely on the Bering Sea fishery for their livelihood. In NOAA's analysis of the socio-economic conditions of communities reliant on commercial fishing, they acknowledge that omitting Washington and Oregon represents a gap in their analysis. They addressed this gap by producing a separate set of profiles of Washington, Oregon and California communities involved in commercial fishing in the North Pacific Fisheries (i.e. Alaska).

The Measures program chose to draw a hard boundary around Alaskan and Russian communities, hence omitting this other potential stakeholder group. This highlights a limitation of the approach to measuring place-specific social conditions: it does not allow for a comprehensive analysis of the people and institutions that directly or indirectly interact with the biodiversity in the place. Similar issues can be seen in ecological interactions, in that many important species (e.g. northern fur seals) spend only a portion of their annual cycle within the Bering Sea. The majority of the biomass of marine species harvested by fisheries are also exported from the system and consumed in distant locations. Another step to fill out the understanding of this overall context would be to conduct network analyses and/or institutional mapping exercises to better understand the dynamic spatial relationships between people and biodiversity. Measuring place-based social conditions provides a solid foundation, but it should only be understood as a starting point, and not sufficient to fully understand the interaction between the ecological and social context of a place.



3. Resources

Resources appear to have been almost sufficient for the task. Although the original measures hire collected a sizable amount of information, it was difficult for the subsequent consultant to utilize and incorporate much of it into the final stages of the project. Thus, the majority of the data used for indicator evaluation process was collected by the consultant. Given this, the late start compressed the schedule, which – together with capacity gaps in the USA – probably prevented productive action on Russian component of the project. Even so, it was apparent that a bit more funding to support a hire in WWF- Russia was going to be needed. This should be considered going forward, as now a robust list of indicators for which there is repeatable data exists on the US side. A primary consideration for information synthesis that spans international boundaries is the need to synthesize data collected by parallel agencies in each country into comparable formats.

4. Time

The late start and then resignation of the initial measures staff hindered progress towards overall objective. Had everything gone smoothly, the time allocated for the project was probably adequate, but was ultimately insufficient given the eventual difficulties in program planning and implementation. Earlier engagement and buy-in from field staff might have facilitated later steps, resulting in more efficient (less time-consuming) implementation efforts. In the future, the majority of the indicators selected will be easily updated through agency data requests and online access. The data sources and contacts are all documented in the accompanying information for each indicator.

5. Programmatic

a) Alignment

The Bering Sea program has identified a set of strategies in their Conservation Action Plan and is currently implementing these through a range of projects. The Conservation Measures project was not a current priority in the Bering Sea program. However, the work is very well aligned with the original TNC/WWF Conservation Action Plan. The current updated indicators reflect this integration. The final matrix of indicators was also designed such that continual updates to the indicators should provide a valuable tool for program staff, both in their individual fields of expertise and for the program as a whole. For example, continued implementation of the measures process will entail compiling and regularly examining trend and spatial data for threat indicators such as oil spills from marine vessels or shipping traffic as well as status indicators for important components of the marine ecosystem and dependent communities. Having these current data readily accessible at all times can provide a tool for Bering Sea staff to have effective and productive interaction with resource managers, members of industry and potential funders.

Ultimately, the Bering Sea is an important part of the Arctic NI, and the Bering Sea Managing Director recognizes that the data generated by the current effort can inform that planning process. She also recognizes the potential to integrate the information gathered by the conservation measures program into ongoing activities, both within WWF and with partners. A "State of the Bering" report and "Call to Action" would be aligned with desires among WWF and its partners to raise awareness about Bering Sea issues.

b) Leadership

The Bering Sea Managing Director cooperated with the efforts of the conservation measures program. Probably because the measures work in the Bering Sea was mandated by WWF-US leadership, the Bering Sea staff looked to the measures team for leadership, as well as technical advice. The DC based measures staff was heavily involved in hiring the Measures Officer and – at times – almost served as this individual's supervisor. This may be attributable to the lack of ownership on the part of field office staff, which may have been the result of a lack of engagement by the measures team during the proposal stages.

Problems also existed with expectations regarding organizational roles/responsibilities; where there was an expectation (stated or unstated) that the measures team would play a prominent role in program management for Bering Sea, which was difficult for the team given the number of places in the pilot portfolio. Because the measures team did not fully recognize nor embrace this management responsibility, project management for this region was perhaps less efficient than it could have been.
Similarly, the original Bering Sea Measures Officer lead displayed lack of initiative and self-direction – partly based on personality and partly the result of needing to hit the

ground running on a fast moving and pre-planned program. Thus, the Bering Sea measures work was initially not self-directed, requiring more support than any other region than Coastal East Africa.

However, the replacement (consultant) is self-directed and capable of acting independently. This person might have been able to provide appropriate leadership from the start. It is possible that now the consultant has gathered an impressive array of data, a "State of the Bering Sea" type report is possible.

The Bering Managing Director, like other place leads, is also concerned with having strategy effectiveness measures. This is illustrated by her comments on prior measurement efforts undertaken by her project:

> We were monitoring certain species populations and identifying threats to these species, i.e. fur seals and polar bears. In the context of Pribilof Island project – we looked more closely at seabirds, crab and halibut, and addressed threats that were of concern to diversity. We did this by bringing in outside scientists to share information and the experts presented this in a neutral way. We did not call it 'measures' but that is essentially what it was. We got a formal evaluation of working with communities, and how we were engaging with locals (as part of our NSF project) – a fairly rigorous analysis about HOW we were working with people, and whether we were addressing the "right" issues in the communities.

c) Structure

The preceding comments illustrate the concern shared by field managers and network leaders that a measures program be structured to effectively assess and validate or where needed re-align program efforts through status and effectiveness measurement. A well designed and implemented measures program not only provides this function, but maintains it over time. However, a one-time evaluation of effectiveness is not sufficient, the process must be ongoing. Many conservation strategies will need to be implemented on a long-term basis (e.g. 10-20 years), with course adjustments and re-evaluations along the way. For the Bering Sea, there is a wealth of long-term data series for biological indicators (e.g. northern fur seals) and threats (e.g. fisheries exploitation rates) that can provide necessary insight to determine the direction and focus of conservation strategies. For other indicators, such as shipping traffic, the ability to track appropriate indicators (e.g. vessel transits) is just coming on-line. In these cases the measures data can help identify and target efforts for WWF to support (e.g. remote vessel tracking stations) to insure effective long-term monitoring.

Multi-nation geographies present challenges for long-term conservation efforts, and in this case the Russian cross-boundary issues were no exception. Timing and planning errors exacerbated the complications presented by the boundary. Had the initial start not been delayed and/or had measures program field staffing remained consistent throughout

the program implementation period, we may have had greater success in acquiring Russian data. Similarly, had we anticipated the delays in obtaining data for the USA, we probably could have initiated a subcontract to Russia early and at least initiated the process. For now, obtaining data from the Russian side is postponed. Based on the consultant's knowledge of Russian biological data and previous acquisition efforts by federal agencies, this will likely be a multi-year effort that will necessitate capitalizing on existing scientific collaborations and relationships, and establishing new ones where necessary.

C. Summary of Lessons Learned - Bering Sea

- In the case of the Bering Sea, a skilled consultant with long-term local knowledge turned out to be a better investment than a full time measures officer (though this didn't necessarily have to be the case).
- For data rich geographies, local experience and contacts are critical. Lacking these attributes, a large volume of regional data can present an obstacle rather than a resource.
- To the extent possible, biological and threat indicators should be integrated in ways that reflect important ecosystem components and the stresses that act upon them.
- Defining the terrestrial boundary for social indicators was not easy because the smallest possible unit for the collection of social data was difficult to identify, particularly on the Russia side. This resulted in largely different sized terrestrial blocks on the Russian and US sides.
- The appropriate social indicators took several iterations to finalize, reflecting a lack of shared vision between the field and the core team during the early stages of the project.
- With marine ecoregions particularly, there are often many people who live outside of the region who may have an impact on it either directly (e.g. international fishing fleets) or indirectly (e.g. seafood consumers living away from the coast). This is certainly the case for the Bering Sea. However, for the sake of the social data collection, a hard line was drawn around the ecoregion, excluding those people living elsewhere, instead focusing on the communities within the Bering Sea that WWF programs may have a direct impact on.
- A Russian consultant or collaborator will likely be needed to assist with data collection in Russia. Due to staffing problems, there was insufficient time to hire a Russian consultant, so data collection this year focused on the US side.
- Resources were close to sufficient, but time was a limiting factor, particularly with the resignation of the Measures Officer requiring a restart of data collection late in the year.
- The Washington DC based measures team was expected to take a larger leadership role than it was prepared to do. As a result, the Bering Sea program required a greater percentage of the team's time than expected.
- The DC Measures Team assumed that because the Bering Sea program was based in the US with easy access to data, and we were able to hire a qualified individual,

the program would be self-directed. This assumption was validated in the later stages of the project by the accomplishments of the replacement consultant, underscoring the need to hire measures field staff with long-term knowledge of a geography, or the appropriate skills to network with relevant organizations and individuals with such knowledge.

D. Indicators

Color indicates viability rating of indicator:

- red = poor;
- yellow= fair;
- light green=good;
- dark green=very good.

Biological Indicators – Bering Sea

Target	Key Attribute	Indicators
Seabirds	Long Term Trends in Population and Productivity	Cormorants: % breeding pairs producing chicks, population count
	Long Term Trends in Population and Productivity	Kittiwake: % breeding pairs producing chicks, population count
	Long Term Trends in Population and Productivity	Murres: % breeding pairs producing chicks, population count
Pinnipeds	Population size & dynamics	Northern fur seal bull counts
	Population size & dynamics	Northern fur seal pup counts
	Population size & dynamics	Steller sea lion non-pup counts
	Population size & dynamics	Walrus Island Steller sea lion pup counts
	Population size & dynamics	Harbor seal population counts
	Prey availability	Female fur seal trip distance and duration
	Prey availability	NFS pup weight
	Prey availability	Number (%) NFS pup starvations/year
Whales	Population size & dynamics	Eastern Bering Sea Stock Beluga population size
	Population size & dynamics	Bristol Bay Stock Beluga population size
	Population size & dynamics	Fin whale population size
	Population size & dynamics	Gray whale population size
	Population size & dynamics	Orca population size
	Population size & dynamics	Right whale population size
	Population size & dynamics	Sperm whale population size
Sea Otter	Population structure & recruitment	Sea Otter population counts
Pelagic Fish	Population size & dynamics	Eastern Bering Sea Pollock Biomass
	Population size & dynamics	Aleutian Islands Pollock Biomass
	Population size & dynamics	Bogoslof Pollock Biomass
	Population size & dynamics	Percentage of streams meeting salmon escapement goals

Target	Key Attribute	Indicators
	Population size & dynamics	Forage Fish Trawl Survey CPUE
Bottom Dwelling Fish & Crab	Population size & dynamics	Blue King Crab (Nearshore species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Pacific Cod Biomass (Shelf species population)
	Population size & dynamics	Pacific Ocean Perch Biomass (Shelf break species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Yellowfin Biomass(Mid-Shelf species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Flathead Sole Biomass (Outer-Shelf species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Atka Mackerel Biomass
Coral/sponge Gardens	Size, extent, and architecture of coral/sponge communities	HAPC Biota Trawl Survey CPUE - Eastern Bering Sea
Sea Ice Habitat	Sea ice habitat integrity	Aerial extent and timing of pack ice (km2) over shelf; winter maximum and summer minimum
	Sea ice habitat integrity	Amount (km2) of multi-year ice vs. annual ice
	Population size & dynamics	Polar bear population size
climate change	Sea Surface Temperature	SST in May in the southeastern Bering Sea
	Sea Surface Temperature	Average SST from Mooring 2 for January 15 through April 15
	Sea Surface Temperature	Winter Sea Surface Temperature, Pribilof Is.
	Bottom Temperature	Summer Bottom Temperature on the EBS Shelf
	Sea Ice	Ice Cover Index
	Sea Ice	Ice Retreat Index

Threat Indicators – Bering Sea

Threat	Key Attribute	Indicators
Oil & Gas development	offshore facilities	area of lease tracts
	offshore facilities	location, footprint, number of sites
	onshore facilities	area of footprint
	onshore facilities	landscape fragmentation
	oil spills (onshore facilities)	location
	oil spills (onshore facilities)	distribution of impact
	oil spills (onshore facilities)	remediation state
Shipping	groundings/wrecks/disablement/spills from ship transport	location
	groundings/wrecks/disablement/spills from ship transport	distribution of impact
	groundings/wrecks/disablement/spills from ship transport	remediation state
	groundings/wrecks/disablement/spills from ship transport	shipwreck response time
	shipping volume and traffic	pass routes
	shipping volume and traffic	Bering strait traffic
	shipping volume and traffic	routes in BS/CS
	shipping volume and traffic	changing patterns?/future route
Fishing	destructive	Bottom Trawl Area
	destructive	Bottom Trawl Amount
	destructive	Pelagic Trawl Area
	destructive	Pelagic Trawl Amount
	destructive	Bycatch of Prohibited Species
	destructive	Bycatch of Non-Target Species
	marine trophic index/trend	FIB
	Overfishing	EBS Pollock Exploitation Rate
	Overfishing	AI Pollock Exploitation Rate
	Overfishing	Bogoslof Pollock Exploitation Rate
	Overfishing	EBS/AI Pacific Cod Exploitation Rate

Threat	Key Attribute	Indicators
	Overfishing	EBS/AI Pacific Ocean Perch Exploitation Rate
	Overfishing	EBS/AI Islands Yellowfin Sole Exploitation Rate
	Overfishing	EBS/AI Flathead Sole Exploitation Rate
	Overfishing	EBS/AI Atka Mackerel Exploitation Rate
	Overfishing	Eastern Bering Sea Pollock Stock Status
	Overfishing	Aleutian Islands Pollock Stock Status
	Overfishing	Bogoslof Pollock Stock Status
	Overfishing	EBS/AI Pacific Cod Stock Status
	Overfishing	EBS/AI Pacific Ocean Perch Stock Status
	Overfishing	EBS/AI Yellowfin Sole Stock Status
	Overfishing	EBS/AI Flathead Sole Stock Status
	Overfishing	EBS/AI Islands Atka Mackerel Stock Status
	Overfishing	Halibut Exploitation Rate
	Overfishing	Crab Exploitation Rate
	Overfishing	(& #spp. w/declining TACs)
	Overfishing	(ecologically distributed spp.)
	Bycatch	Percent of female northern fur seals entangled/year
	Bycatch	Incidental catch of NFS in commercial fisheries/year
	Bycatch	Incidental catch of SSL in commercial fisheries/year
	Bycatch	Incidental catch of Fin whales in commercial fisheries/year
Introduced/Invasive Species	rats	presence confirmed
	rats	new introductions

Conservation Management Indicators – Bering Sea

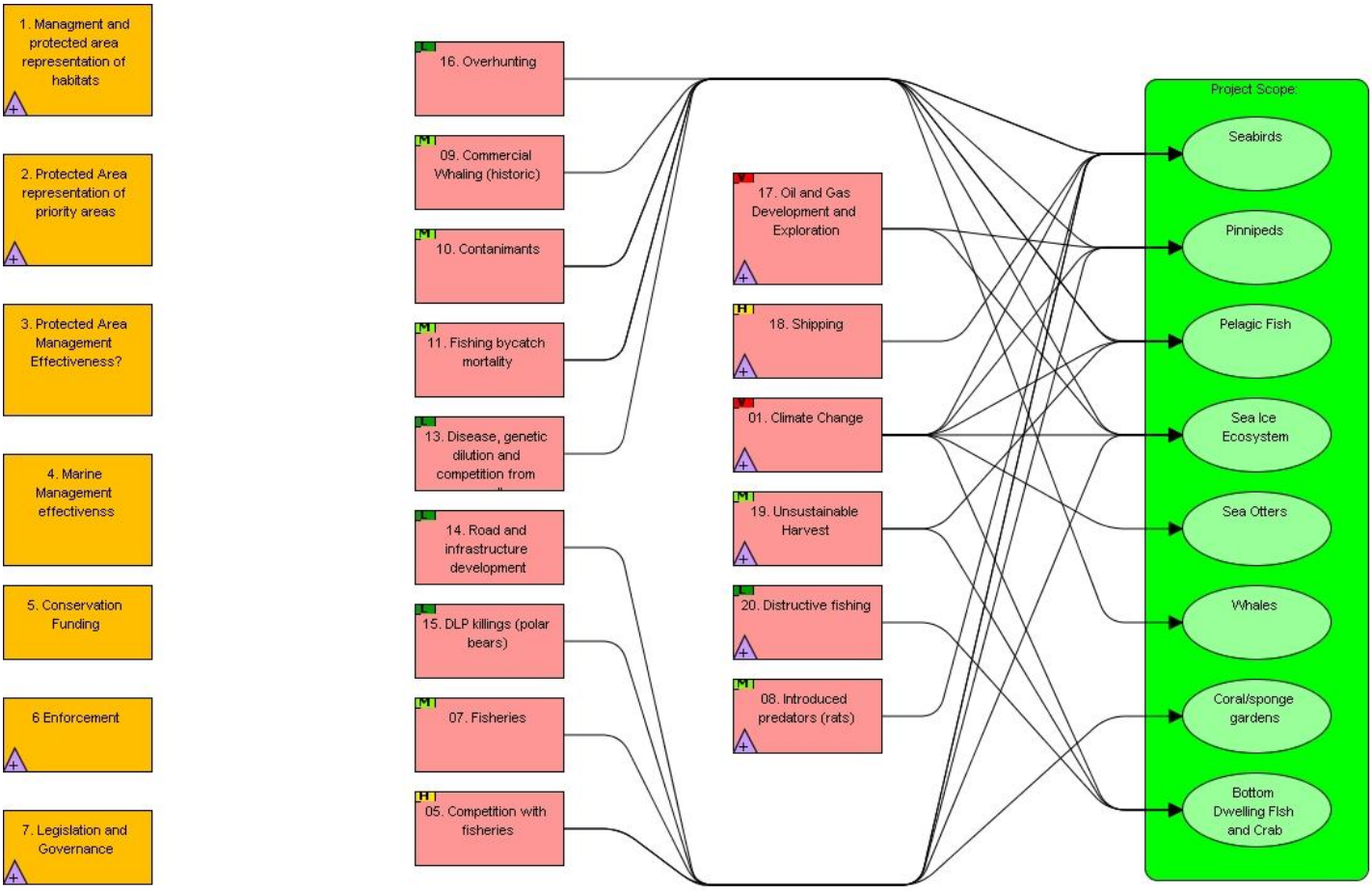
Conservation Management	Key Attribute	Indicators
Protected Area Representation	Representation of habitats in management and protected areas	
	Protected Area representation of priority areas	
	Protected Area Management Effectiveness?	
	Marine Management effectiveness	
conservation policy	Conservation Funding	
	Enforcement	
capacity		
sustainable finance		
ecoregion conservation		

Social Indicators – Bering Sea

Target	Key Attribute	Indicators
wealth/economic well-being	Per Capita Income	$/руб. per person/year
	Income	" from Marine Resources
	Income	Total income per sector
	Employment	% Adults in wage labor
	Employment	" by Sector
	Cost of Living	Cost of Food
	Cost of Living	Cost of Fuel
	Access to Information/ Communication	% communities w/ high speed internet
health	Nutrition	% children with low birth weight (World Health Org - WHO)
	Mortality	% children die before 1 year
	Health Care Access	% community w/ access to: Health Facility, MD, Nurse, Community Health Worker (& Russian equivalents)
political empowerment	Marine Resource Rights	-% communities involved in CDQ
	Marine Resource Rights	% harvest allocated to CDQ
	Marine Resource Rights	marine mammal co-management and/or local participation in fisheries management board and councils
	Marine Resource Rights	[local ownership of quota/salmon permits]
	Marine Resource Rights	-access/use
	Marine Resource Rights	-mgmt/decision-making
	Local governance capacity	% communities w/ civil society organizations [avg per community?]
	Women's empowerment	% Community org officials are women
	Rights - self-determination (?)	# of times Traditional Ecological Knowledge represented in formal hearings
education	Enrolment	% school age kids enrolled in: primary, secondary, tertiary (split by gender)
	Literacy	Literacy rate of population, (split by gender)
	Ecological Knowledge	% communities w/ culture camps
	Ecological Knowledge	*% school districts w/ traditional knowledge programs*
	Ecological Knowledge	other methods of capturing elder knowledge

Target	Key Attribute	Indicators
culture	Contact with Nature (Divorce from Nature?)	Needs to be developed.
	Native language Education Access (cross w/ culture)	% communities w/ formal instruction in native language
Cross-Cutting	Population Change/Dynamics	% change in overall population
	Population Change/Dynamics	% change native population
	Subsistence economy/culture	% Adults in subsistence (Key Analysis to pull from data: % participation in subsistence harvesting - total adults in subsistence/total population)
	Subsistence Harvest	harvest per capita meat & fish – x spp. Marine & terrestrial (Key analysis to develop from this data: Changes in proportion of species or category used in subsistence; e.g., from mari
	Subsistence Harvest	% harvest shared with other households

E. Conceptual model – Bering Sea



III. Coastal East Africa

A. Introduction

Coastal East Africa in the measures context consists of three separate projects: Primeiras e Segundas National Park in Mozambique, and the Ruvuma Wilderness split between Tanzania and Mozambique. The Ruvuma wilderness was initially envisioned as a single project, but WWF political reality has broken it into two parts with somewhat different focuses: in Tanzania the landscape is completely terrestrial, while the Mozambique office has incorporated Quirimbus National Park and the associated marine ecosystems, greatly expanding the number of indicators being collected. Neither Tanzania nor Mozambique had a previously developed measures program or methodology, particularly for these landscapes, which are closely associated with the Coastal East Africa WWF Network Initiative.

Planning for both Primeiras e Segundas and the Ruvuma Wilderness occurred during a single intensive week-long workshop in Pemba, Mozambique in November, 2007. However, data analysis languished until early spring 2008 in both countries due to a lack of capacity. Annie Claus from WWF-US Conservation Science traveled to the region in February and revisited the indicators with the field staff and community members. Data

collection for year 1 ended in late August, 2008. Coastal East Africa has three years worth of funding for Measures from the Sall grant (i.e. two additional years of funding).

B. Project Analysis

1. Capacity

Capacity has been a major issue in Coastal East Africa. While it was initially envisioned that there would be a single measures officer in charge of the project in both countries, it became clear that there would need to be one officer for each country office. The primary issue was not data sharing across country boundaries, but issues of responsibility and authority. Country offices were unwilling/unable to take responsibility for work on another WWF office's "turf". There was no organizational structure within the WWF network that had overall responsibility for the two landscapes in this project – and therefore nowhere that someone could be housed to take responsibility for the whole project.

At the time of the conservation measures workshop in November 2007, neither country office had managed to hire a suitable Measures Officer, though both had come close. In both countries the first hurdle was finding someone who met the recommendations of the conservation measures core team: a master's degree in a conservation field, experience with data management and skills in statistical analysis and mapping. Of the people identified with some or all of these recommendations, very few were willing to take a post away from the capital or major cities. The offices near the relevant landscapes, in Pemba, Mozambique, and Kilwa, Tanzania, are considered to be out "in the sticks". In Mozambique, the search was hamstrung the week before the meeting when the chosen applicant turned out to have major visa and passport issues as a foreigner seeking employment.

Capacity was not filled in either country until the early spring of 2008, though fortunately the people eventually selected as Measures Officers were both present at the November workshop. In Mozambique, the chosen Measure Officer was given the task of organizing data collection in addition to his ongoing responsibilities in Quirimbus National Park, which likely led to the further setbacks, mentioned below.

Tanzania was fortunate to hire one of the experts who was doing government-based research in the Selous Game Reserve and accompanied the Tanzanian delegation to the Measures Workshop in Pemba. It is also fortunate that the lead person for southern Tanzania was an early proponent of the measures project, and continues to be a strong supporter and leader for the project.

Some confusion about the program budget remains to this day. In recent communication from the field, Tanzania stated that:

> [T]he implementation of the measures field activities needs a full time employee who will not be assigned other duties. The current funding under the measures has no provision for paying for this employee. (In view of this the measures officer is also carrying out CBNRM and Forest and Wildlife Sustainable exploitation

activities funded by the Salls (WWF US) implemented within the Selous Niassa Eastern Corridor).

This apparent incongruity between what the core measures team believed to be happening and what the field was funding will be examined.

In Mozambique the bulk of the data collection has been done by three interns, while in Tanzania they have hired short-term consultants to collect socio-economic data and the biological indicators were collected by WWF Project Leader and Measures Officer. In both cases the Measures Officer acts more as a coordinator for the project than as the primary data manager, as is the case in other places.

Capacity for GIS and remote sensing in both offices is limited, and remains essentially the responsibility of WWF-US. Some training in GIS and RS was performed in Mozambique and Tanzania, but for the former, computer literacy, software, data and the commitment of WWF local staff was an issue. The Tanzanian team has indicated that further capacity-building training (in data gathering/analysis as well as GIS and mapping) is very important to them, and they would like to be able to pass along much of it to the community groups and district appointed staff they are working with in the field.

2. Methods

The Measures workshop in November 2007 combined both the Ruvuma Wilderness as a whole (including both the Mozambique and Tanzanian sides) and the Primeiras e Segundas landscapes, devoting only two and a half days per place. Time limitations during the workshops precluded complete indicator selection, prioritization, and context ranking for the two landscapes. Otherwise, both workshops went smoothly, with a number of participants from different organizations attending and added their own insight. Unfortunately, some key participants, including the eventual Mozambique Measures Officer, were in and out of the meeting over the course of the week, resulting in a spotty understanding of the reasoning behind the selection of particular indicators. The rushed workshop process for identifying indicators, etc., resulted in under-developed content and the need for extensive follow-up in country.

Annie Claus made one follow-up visit to the region in the spring of 2008. During this time she helped both the Tanzanian and Mozambican teams prioritize and revisit the indicator lists. The Mozambican team expressed concerns over the geographic breadth of the work, preferring to focus their efforts on their current program areas. They also are much more interested in collecting primary data than working on finding existing data. Annie did an excellent job allaying their concerns, both at that time and in the following months.

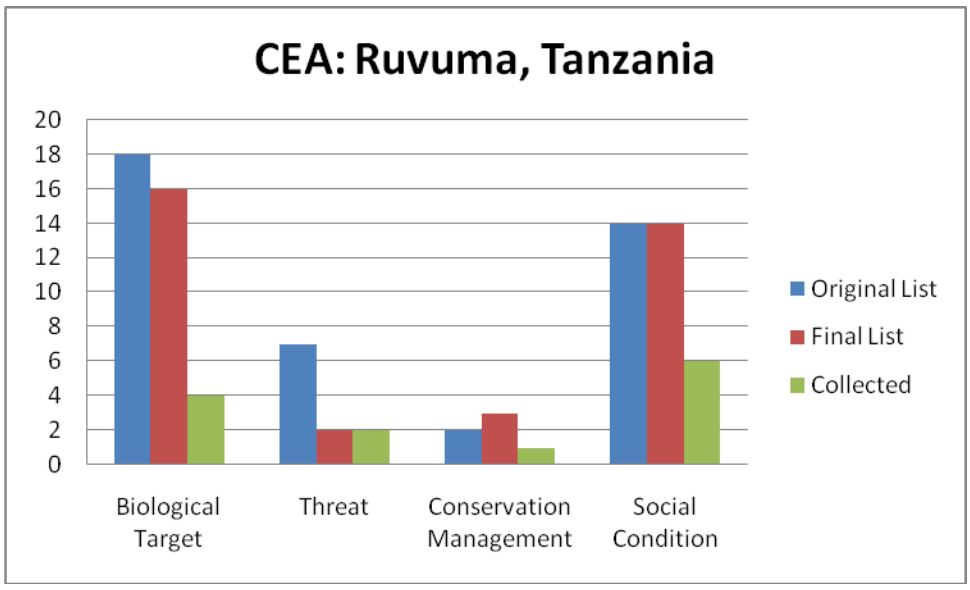
Our remote sensing specialist expressed the following concerns: The workshops were performed with no input from the remote sensing specialist, yet many of the indicators were expected to be mapped using satellite imagery. These were often determined with little knowledge as to whether remote sensing was feasible, cost effective, or even

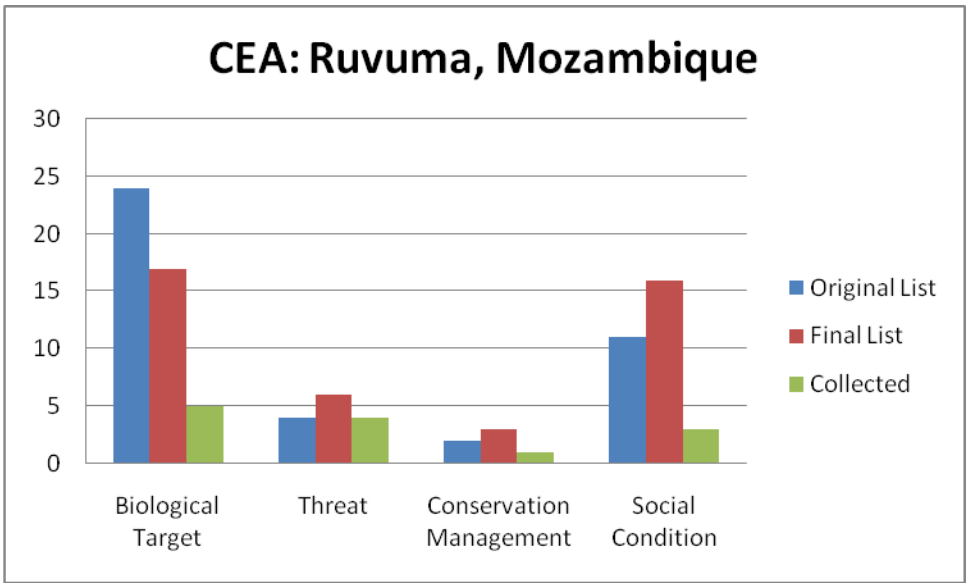
possible, and no funds were committed in the first year to purchasing any satellite data, hindering progress or success. The remote sensing technical lead at WWF-US was only consulted after the fact – once the indicators were already defined. Ultimately, data availability became a major issue. Because of the size of the study area, and the desired resolution, obtaining data within the time frame, without any financial investment is practically impossible.

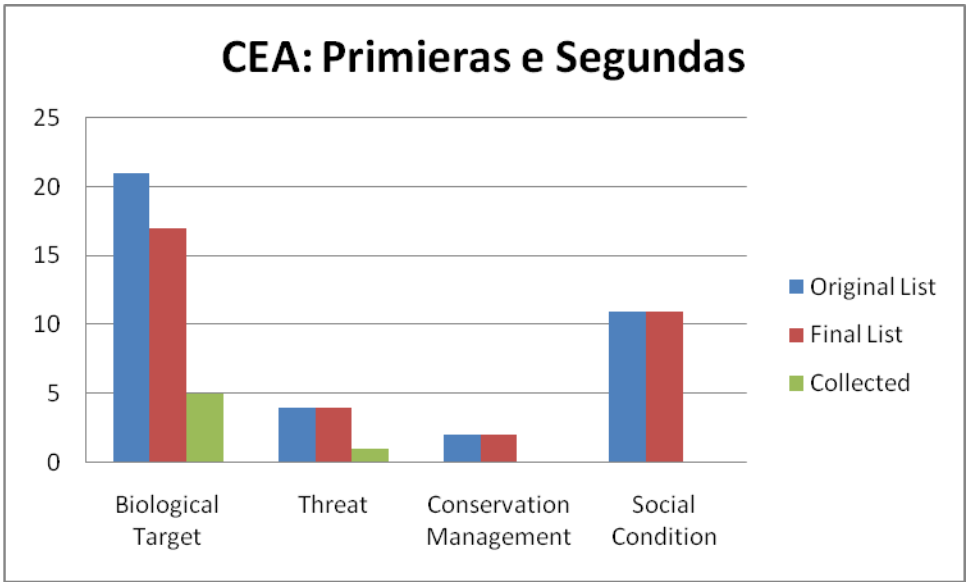
Yet, for most of the indicators cited, which involve the extent of large-scale habitats, remote sensing is the only answer. Concerns about remote sensing indicators will be addressed like all under-developed indicators (i.e., through iterative dialogue with field, technical experts, and program managers). Further expertise and funding will eventually need to be found to address these issues.

Data availability is a recurring concern. Mozambique is experimenting with participatory data collection systems derived from the Namibia model, but this effort is still in the early stages. Mismatch between the scale of activities/data (often w/in protected areas) and study areas (landscapes) has been source of frustration and confusion for field staff who are accustomed to working at a smaller project level. Reliance on secondary data has also frustrated and confused field staff, who are accustomed to collecting primary data and generally do not trust data collected by others (including government agencies, other NGOs, etc.). For example, considerable social data exist for all of Mozambique in spatially explicit form, through the US Demographic and Health Surveys (DHS). Unfortunately, local staff seem either unaware of this information (due to internet limitations?) or do not trust it for their purposes. Accessing, analyzing, and mapping data appears to presents a challenge to local staff.

In Tanzania data is available but collected by individuals to suit specific objective(s). It is not harmonized between programs. There is no central hub where one could go and access data. There is a problem of confidentiality of data that in some areas requires a long bureaucratic process to allow access.







3. Resources

Three years of funding provides CEA with critical long-term support necessary to build capacity and robust datasets and analyses. However, even with provided resources, the original intention to have one social measures lead and one biological measures lead for CEA has not been realized (all measures staff are biologists). As mentioned before, Tanzania did not feel that it had sufficient funds to hire a full time measures person as the conservation measures team assumed would be possible. They also were only able to collect social and some biological data, leaving threat and conservation management data collection to the core team in DC, as the following text from the field office outlines:

Threats: Most of these threats (especially infrastructure development, fire, logging and agricultural conversion) were to be undertaken through remote sensing at higher level or by consultancy. Unfortunately there were no funds allocated for this activity**.** On the other hand scanty information has been made available for poaching incidences because this activity is done secretly and in remote areas.

Conservation management: Like threats, protected area presentation was to be undertaken through remote sensing exercises. Luckily a workshop was held in Masasi to identify and classify status of forests located within Selous –Niassa Eastern corridor in Masasi, Nanyumbu, Nachingwea and Liwale districts.

Lack of high speed internet and other reliable means of communication hindered collaboration, data access, etc. Dated computer hardware may hinder some data analysis. The Tanzanian team has expressed strong interest in greater collaboration in terms of "regular and sustained opportunities for communication, collaboration, and relationship building" between their office and Mozambique, which has been lacking to date.

4. Time

Initial desire to quickly "show results" to donor created immediate tension between WWF-US staff and WWF-MZ. Initial timeline expectations/aspirations were unrealistic and created poor foundation for long-term collaboration.

The fact that the WWF MZ project team lead is responsible for carrying out the work of two people is problematic; as it assures that he doesn't have the time to focus exclusively on managing the measures program in Mozambique. As of this writing, data collection in Coastal East Africa has lagged significantly behind the other places. However, this should not be seen as a failure, merely a fact of working in the region. Generally high transaction costs (communication, hiring, travel, etc.) mean that things take longer than might be anticipated or desired. Again, fortunately, the CEA measures grant provides three years of support.

5. Programmatic

a) Alignment

WWF-US focused on status measures at the landscape/NI scale, whereas country programs (especially WWF-MZ) initially emphasized traditional project monitoring and adaptive management. This tension was encountered among other measures sites, not

simply Mozambique, though it seems to have been exacerbated there. The original proposal to the Sall Foundation lacked shared understanding (WWF-MZ field, WWF-MZ leadership, WWF-US leadership) of what 'measures' would entail. WWF-US spent two months in Mozambique in June-July 2007, working with local staff to understand current practices and explore how planned measures activities could complement and build upon their existing efforts. Work did not move forward without agreement among WWF-MZ leadership, WWF-US program lead, and WWF-US science lead. Yet the different aims of WWF-MZ leadership and the conservation measures pilot persisted and led to high transaction costs, fluctuating levels of local support, and continuing conflict.

These conflicts were compounded by the fact that initial framework and protocols were still in flux during initial contact in June-July 2007. The conservation measures team was in the awkward position of selling a product that it hadn't finalized yet, serving as both champion and technical advisor. This dual role did not serve WWF well; the lack of an established framework made it difficult to effectively communicate areas of alignment and engage field offices.

> On a more positive note, on the Tanzanian side, the project executants discovered that "both parties and/or stakeholders (local communities, district councils and government) based in the Ruvuma Wilderness have shown positive willingness and participation in the implementation of project activities." This bodes well for future expansion and further implementation of measures programs in the region. They also felt that the data they gathered as part of the socio-economic survey "…can be used as baseline information to track changes not only by WWF but also with other stakeholders interested in the development of the Corridor."

b) Leadership

Leadership at WWF MZ was never fully bought in to the idea of measuring the conservation status of large landscapes that are more NI priorities than WWF MZ priorities. Field staff must follow their leadership, and if leadership doesn't truly believe in concept, then they will try to allocate resources to activities more aligned with local priorities/needs. Yet the Coastal East Africa program at WWF-US played a critical role in advocating for conservation measures at the landscape level, in support of the NI. Once given the go-ahead from conservation program leadership, the WWF-US conservation measures team then assisted the field programs with implementation of this landscape level initiative.

c) Structure

The Coastal East Africa NI covers a vast area, and includes large parts of Kenya, Tanzania and Mozambique. The conservation measures program focused on two landscapes, Primeiras e Segundas (fully within Mozambique) and the Ruvuma Wilderness, a cross-boundary landscape of Miombo woodland between Tanzania and Mozambique. While the ecology of the Ruvuma remains constant across the border, the practicalities of collaborating between the two program offices precipitated the decision to effectively split the Ruvuma into the two countries. While the indicators for the

Ruvuma as a whole were identified during the workshop in Pemba, subsequent iterations resulted in slightly different lists between Tanzania and Mozambique.

C. Summary of Lessons Learned – Coastal E.Africa

- The Coastal East Africa (CEA) measures geography consisted of two distinct and geographically separate landscapes, one of which was cross border between Tanzania and Mozambique, effectively splitting the place into 3 distinct projects. This makes rolling up more challenging.
- As in all of the cross- boundary places, one person could not effectively collect data on both sides of the border.
- Capacity was a serious problem for both countries, as it took over half a year for each to get a capable measures officer in place.
- There continue to be problems with capacity. The measures officer for Mozambique is torn between two full time jobs despite having adequate funding in the program to hire a new person. The Tanzania side did not distribute their funding in such a way that it pays for a full person, so the measures officer there is also splitting work between different projects.
- The bulk of the data collection in the end was done by interns in Mozambique, and short-term consultants in Tanzania.
- Despite a huge effort on the part of the DC measures team, miscommunication remained a problem throughout the year. This resulted in, among other things, a disparity in data collection in Tanzania (too much money spent on Social data collection left no money for Threat or Conservation Management), and very little data collection in Mozambique after a mid-year reevaluation of the whole program.
- Both field teams suffered from a lack of high-speed internet and other reliable means of communication.
- Capacity for GIS and remote sensing is very limited in both countries, and the DC team was required to do all the mapping.
- Field staff, particularly in Mozambique, value primary data collection over data mining from other organizations and individuals.
- CEA has three years of funding, which will provide critical support to build capacity and allow for robust data analysis. However, the intent of the project and distribution of funds needs to be readdressed.
- Due to the demands of multiple projects on the measures officers, they don't have the time to focus exclusively on managing the measures program. Getting work done also simply takes longer in East Africa than in many other places. This is not a failure of program, but a reality that must be taken into account.
- On the Mozambique side, the country representative apparently made landscape-scale status measures a lesser priority than project-level monitoring data, which has hampered the buy-in of the field staff.
- The divergent indicator lists does not bode well for easy roll up of indicators across the whole NI. However, the Tanzanian team has expressed a strong interest in coordinating collaboration across the border which is a positive sign. This willingness to

work together by field staff coupled with stronger buy-in to the NI concept by country leadership will hopefully result in a coordinated NI-wide measures effort with useful results.

D. Indicators

Biological Indicators - Ruvuma

Place	Target / Domain	*Key Attribute*	Indicators
Ruvuma	**Coastal Forest***	*Extent*	% Historical Coastal Forest
Mozambique	**Coral reefs***	*Extent*	extent km sq
Tanzania	**Elephant**	Movement/ migration	# elephants moving through natural corridor at specific times of year (Selous-Niassa Eastern Corridor and Western Corridor)
Tanzania	**Elephant**	Population Structure	Calf/Adult Ratio
Tanzania	**Elephant**	Spatial Distribution and Population Size	Estimated # elephants by management zone - Selous-Niassa East Corridor, West Corridor and Selous GR
Mozambique	**Elephants**	*Spatial Distribution and Population Size*	Estimated # elephants by management zone - Niassa, NQ Corridor, Quirimbus
Mozambique	**Elephants**	*Population Structure*	Male/Female Ratio
Mozambique	**Elephants**	*movement/migration*	Niassa Quirimbus Corridor
Mozambique	**Estuary habitat**	*Extent*	seagrass bed extent
Mozambique	**Inselbergs**		Fauna spp composition at the selected inselbergs
Mozambique	**Inselbergs**		Flora spp composition at selected inselbergs
Mozambique	**Mangroves***	*Extent*	% of historical mangrove cover
Ruvuma	**Miombo***	*Extent*	% of Historic Forest
Tanzania	**Miombo**	*Wildlife Spp Diversity*	(#) Presence of Wildlife Species
Mozambique	**Miombo**	*Wildlife Spp Diversity*	Density of Key Species
Mozambique	**Offshore islands**	*Extent*	% forest cover
Mozambique	**Reef and non reef fish**		% change in presence/absence
Mozambique	**Reef and non reef fish**		Catch per unit effort
Ruvuma-Tnz	**Rhinos**	*Habitat Extent*	% of Historic Thicket Habitat (ha/km^2) TNZ (remote sensing) (?)
Ruvuma-Tnz	**Rhinos**	*Spatial Distribution and Population Size*	Estimated # of Black Rhinos in Selous GR - Tanzania
Mozambique	**Sea turtles**	*Population Size*	# nests
Ruvuma	**Wetland***	*Extent*	% Historical Wetland area (km^2)
Ruvuma	**Wetland**	*Persistence/ Permanence*	% of Historical wetlands that dry up seasonally (compared to Past)
Tanzania	**Wild Dogs**	*Habitat Extent*	# of Blocks of a minimum size (?) for relatively open habitat (?) that are interconnected
Tanzania	**Wild Dogs**	*Spatial Distribution and Population Size*	# of Packs
Tanzania	**Wild Dogs**	*Population Structure*	% Age Classes
Tanzania	**Wild Dogs**	*Spatial Distribution and Population Size*	Estimated # of Wild Dogs by Mgt Zone
Tanzania	**Wild Dogs**	*Population Structure*	Male/Female Ratio
Tanzania	**Wild Dogs**	*Population Structure*	Pack sizes

Threat Indicators - Ruvuma

Place	Threat	*Key Attribute*	Indicator
Mozambique	**Poaching**		number of incidences recorded on illegal logging
Mozambique	**Poaching***		Number of processes resolved on illegal logging
Mozambique	**Poaching***		number of incidences recorded on fauna
Mozambique	**Poaching**		Number of processes resolved on fauna
Ruvuma	**Fire***	*Fire Intensity*	Intensity during dry season (remote sensing) (?)
Ruvuma	**Agricultural Conversion***		Area of conversion by area and habitat type

Conservation Management Indicators - Ruvuma

Place	Conservation Management	*Attribute*	Indicator
Mozambique	**Conservation Financing**		By source of funding
Tanzania	**Conservation Financing**		% of funding from each source for each protected area
Ruvuma	**Protected Area Representation***		by Habitat

Social Indicators - Ruvuma

Place	Target / Domain	*Key Attribute*	Indicators
Tanzania	**Economic Well-Being**	*Employment/Occupational status*	% of community employed by govt, private companies, agriculture, NGOs, etc.
Tanzania	**Economic Well-Being***	*income*	Amount of funds generated from hunting concessions that are returned to communities (for each concession)
Mozambique	**Economic Well-Being**	*income*	monthly income of families
Tanzania	**Economic Well-Being***	*Material assets*	status/change in households with particular housing materials
Mozambique	**Economic Well-Being**	*Material assets*	status/change in housing materials
Mozambique	**Economic Well-Being**	Income	income from fishing per month
Mozambique	**Economic Well-Being**	Income	monthly family income
Mozambique	**Economic Well-Being**	income	status change in housing materials
Tanzania	**Health**	*Access*	% of population with access to a staffed health clinic
Tanzania	**Health***	*Child mortality*	Infant Mortality Rate per 1,000 live births (MDI)
Mozambique	**Health**	*Child mortality*	status/change in overall community health (e.g. infant mortality rate per 1,000 live births (MDI); under 5 mortality rate per 1,000 live births (MDI))
Mozambique	**Health**	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
Tanzania	**Health**	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
Tanzania	**Health**	*Water security*	% of population with access to improved water source
Mozambique	**Health**	*Water security*	% of population with access to improved water source
Mozambique	**Health***		child mortality rate 0-5yrs
Mozambique	**Health***		nutrition 0-5 yrs %
Tanzania	**Political Empowerment**	*Community organization*	measure of status/change in capacity to address conservation issues (e.g., % change in # of community associations; % change in number of people belonging to community associations)
Mozambique	**Political Empowerment**	*Political Involvement*	political capacity/opportunities for women (% district/provincial leadership=women) (MDI variation)
Tanzania	**political empowerment**	*Resource rights:*	# of villages within WMA lands who benefit from WMA resources
Mozambique	**Political Empowerment**		# of woman/men involved in district/provincial leadership
Tanzania	**Education**	*# of Schools*	# of primary and secondary schools which are adequately staffed
Mozambique	**Education**	*Literacy*	Adult literacy rate (male/female)

Tanzania	**Education***	*Literacy*	Adult literacy rate (male/female)
Tanzania	**Education***	*School enrolment*	status/change in net enrolment ratio in primary and secondary education (MDI)
Mozambique	**Education**	*School enrolment*	status/change in net enrolment ratio in primary education (MDI)
Tanzania	**Education**	*School enrolment*	status/change in ratio of girls to boys in primary and secondary education (MDI)
Mozambique	**Education**	*School enrolment*	status/change in ratio of girls to boys in primary education (MDI)
Mozambique	**culture***	*Sacred Places*	# of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))
Tanzania	**culture***	*Sacred Places*	# of Sacred/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))

Biological Indicators – Primeiras & Segundas

Target / Domain	*Key Attribute*	Indicators
Coastal Forest	*Extent*	% Historical Coastal Forest
Coastal Forest	*Wildlife Spp Diversity*	Density of Key Species
Coral reefs*	*Extent*	extent km sq
Elephants	*Spatial Distribution and Population Size*	Estimated # elephants by management zone -Gile Reserve
Elephants	*movement/migration*	Gile/P&S Corridor
Elephants	*Population Structure*	Male/Female Ratio
Estuary habitat	*Extent*	seagrass bed extent
Mangroves*	*Extent*	% of historical mangrove cover
Mangroves	*Crown Cover*	%/Ha
Mangroves	*Species Diversity*	species composition (% change in presence/absence of Avicenia marina, Rhizophora mucronata, Bruguierna gimnorhiza)
Miombo*	*Extent*	% of Historic Forest
Miombo	*Wildlife Spp Diversity*	Density of Key Species
Offshore islands *	*Extent*	% forest cover
Reef/non-reef fish		Catch Per Unit Effort
Sea turtles	*Population Size*	# nests
Wetland*	*Extent*	% Historical Wetland area (km^2)
Wetland	*Persistence/ Permanence*	% of Historical wetlands that dry up seasonally (compared to Past)

Threat Indicators – Primeiras & Segundas

Threat	*Attribute*	Indicator
Agricultural Conversion		Area of conversion by area and habitat type
Fire*	*Fire Intensity and Frequency*	Intensity and frequency
Infrastructure Development		Area of New infrastructure (km^2, Ha, Km) by type
Poaching		Poaching activity

Conservation Management Indicators – Primeiras & Segundas

Conservation Management	*Attribute*	Indicator
Conservation financing		By source of funding
Protected Area Representation		by Habitat

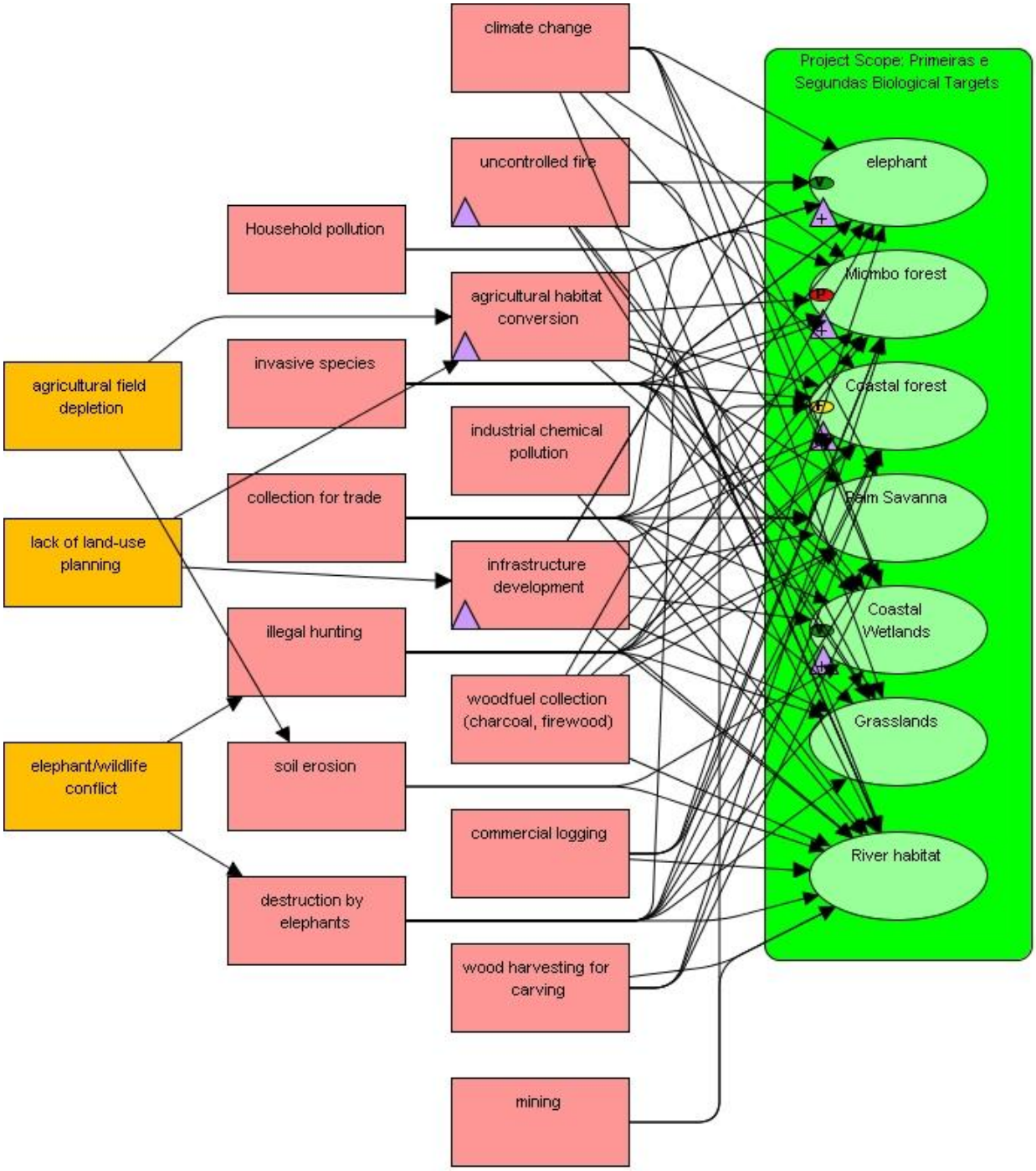
Social Indicators – Primeiras & Segundas

Domain	*Attribute*	Indicator
culture	*Sacred Places*	# of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments)) (comparison to Historic?)
education	*School enrolment*	status/change in ratio of girls to boys in primary education (MDI)
education	*Literacy*	Adult literacy rate (male/female)
education	*School enrolment*	status/change in net enrolment ratio in primary education (MDI)
health	*Water security*	% of population with access to improved water source
health	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
health	*Child mortality*	status/change in overall community health (e.g. infant mortality rate per 1,000 live births (MDI); under 5 mortality rate per 1,000 live births (MDI))
political empowerment	*Political Involvement*	political capacity/opportunities for women (% district/provincial leadership=women) (MDI variation)
wealth/economic well-being	*income*	Income from fishing (rendimento do ultimo dia da pesca)
wealth/economic well-being	*income*	monthly income of families
wealth/economic well-being	*Material assets*	status/change in housing materials

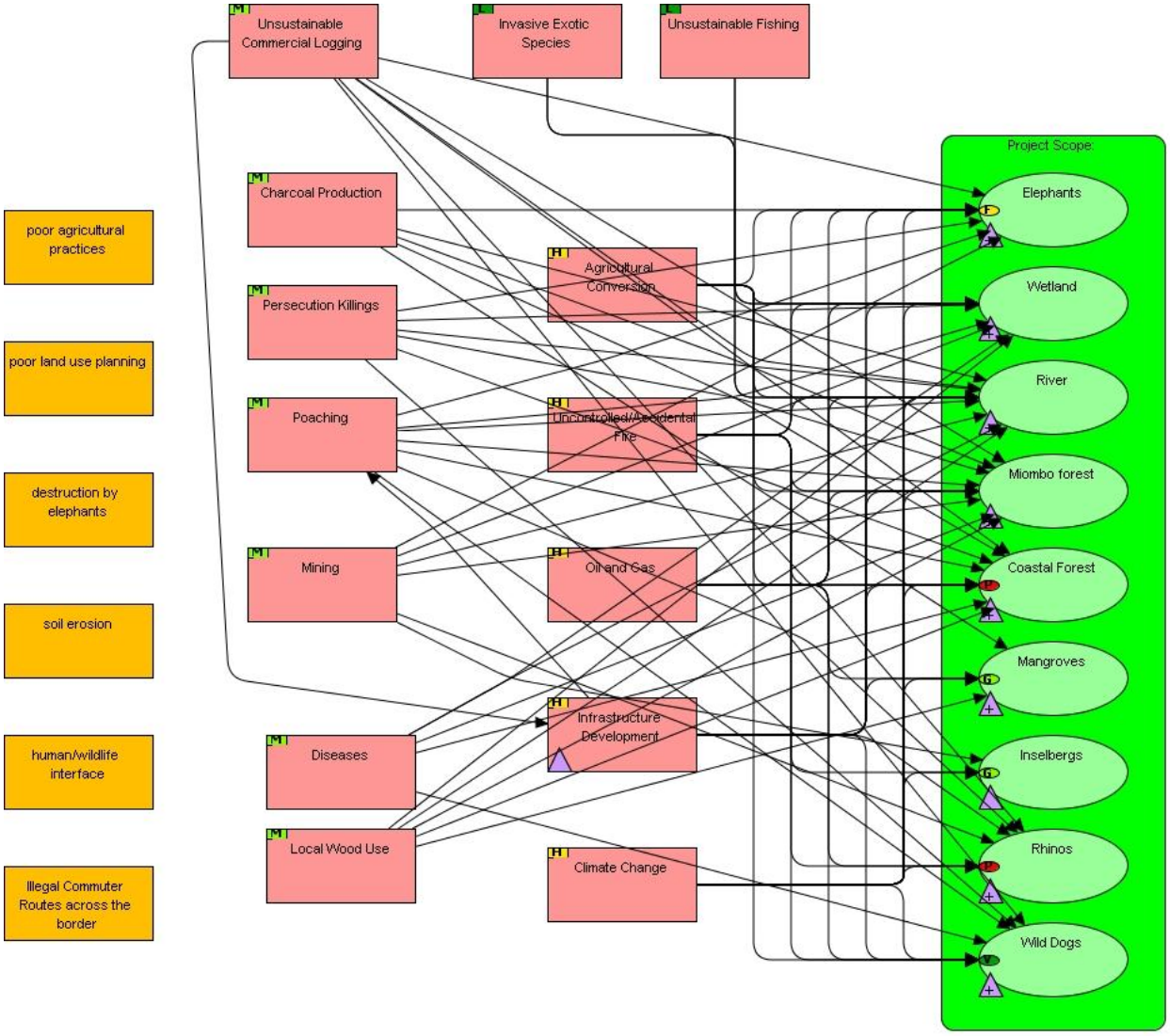
E. Conceptual models – Coastal East Africa

These are the original conceptual models made at the end of the workshop in November, 2007.

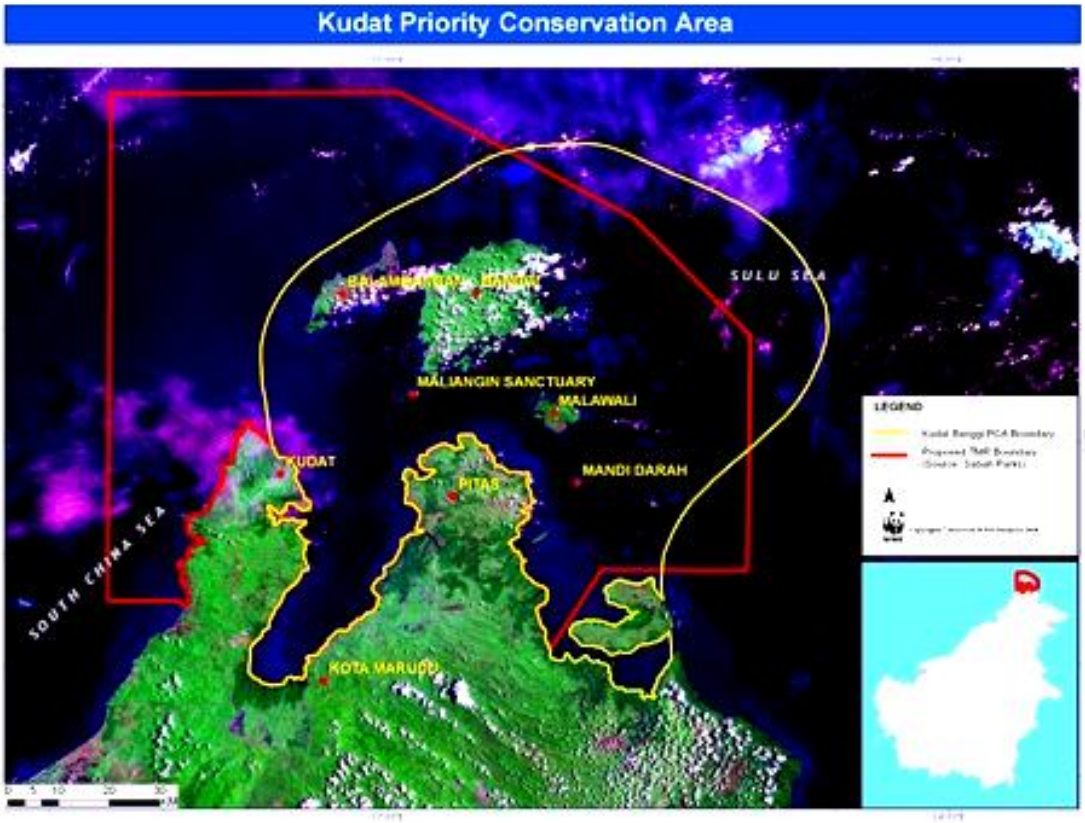
Primieras e Segundas



Ruvuma Wilderness



IV. Coral Triangle



Red Line – Proposed Tun Mustapha Park
Yellow Line – Kudat-Banggi Priority Conservation Area

A. Introduction

The Coral Triangle project is the smallest of the six Measures pilots, both in terms of area and financing. Due to the small size, this site also involved primary, rather than secondary data collection. It is a holdover from the original measures proposal, but was kept as part of the measures pilot because the larger Coral Triangle is a WWF priority. The core measures team suggested dropping it midway through the project because it was getting so little funding that it would be difficult to hold them to the same standards as the other places – in the end it was kept. For the field team, Tun Mustapha was an important site because it represents an opportunity to collect baseline data before the gazetting of the Marine Protected Area. Al Lombana, the WWF-US Conservation Science Marine Scientist, notes that having before and after data for comparison is a "feat not too common in the realm of MPAs." He added that "WWF Malaysia would be wise to continue the collection of pre-MPA data to bolster the baseline picture of its current

status. Then I hope time and money are adequate after protection is in place to continue to monitor and have a powerful dataset and evidence for the benefits of marine reserves."

Due, in part, to the smaller amount of money allotted to the program, the field team focused much of their primary ecological data collection on a demonstration site within the proposed park area: the Maliangin Sanctuary. A socio-economic survey was conducted covering the whole of Tun Mustapha Park, but conducted with funding from various sources including the Measure Project.

The proposed Tun Mustapha Park (TMP) is located in the northern region of Sabah, Malaysia, covering an area approximately 1.02 million hectares. It covers the coastal and marine area of three districts, i.e. Kudat, Pitas and Kota Marudu, and includes an estimated 50 islands within the Banggi sub-district of Kudat. The intention to gazette the proposed Tun Mustapha Park was approved by the Sabah Government in March 2003, with the objectives of protecting biodiversity, sustainable development and poverty alleviation.

The proposed Tun Mustapha Park is part of the Kudat-Banggi Priority Conservation Area (PCA) which is one of the globally outstanding PCAs identified within the Sulu-Sulawesi Marine Ecoregion, the Apex of Coral Triangle. TMP serves as a corridor for migratory species including sea turtles, whales and whale sharks, moving between the South China Sea and the Sulu Sea and vice versa. Endangered species such as dugong and humphead wrasse are found in the area. TMP also harbors large and diverse coastal and marine ecosystems, ranging from the mangrove forests, seagrass beds and coral reefs; to dramatic limestone cliffs that can only be found within this area. These ecosystems create productive fishing grounds that support a large number of coastal communities in the region. These ecosystems are currently under threat from habitat degradation and over-exploitation.

WWF-Malaysia's objectives to work in TMP are (i) to ensure maintenance of marine ecological integrity, and (ii) to achieve sustainable fisheries resources. These objectives will be achieved through the establishment of TMP that supports the protection of marine biodiversity and sustainable fisheries resource management through the adoption of Ecosystem Based Management (EBM) approach. This is carried out through strategies to enhance community participation in the establishment of TMP, demonstration of benefits, development of alternative livelihoods and continuous community education and awareness activities.

A community survey was conducted in mid 2006 to mid 2007 to gather local knowledge on various aspects including ethnobiological knowledge, baseline socio-economic status and level of awareness on marine conservation.

Maliangin Sanctuary, south of Banggi Island, is proposed as a pilot demonstration site, to demonstrate the benefits of protected areas in terms of increased fisheries resources, biodiversity protection and improved socio-economics of the local community within the site. Ecological surveys to gather primary ecological data is concentrated in this area.

Data from these two main activities were used to provide the information for the measure project. There were no planning sessions conducted to select sets of indicators for the measure project. The Field Team draw on an on-line training on WWF Programme Standards to provide the conceptual model for TMP/Kudat-Banggi PCA, and on existing Coral Triangle sets of indicators for the 4 dimension selected for the measure project, i.e. ecological, socio-economic, threats and governance indicators.

Conservation Status (based on the information collected during the measures pilot):

Biological

Maliangin Sanctuary has 376.5 hectares of coral reefs, small patch of mangrove forests, and an estimated seagrass bed of less than 1ha. No quantitative data are available on the species indicators; except for humphead wrasse (only 1 fish was found in 376.5ha area). Qualitative information is known for marine turtle nestings and sightings and status of coral reefs (assessed using Reef Check) range from fair to poor in various sites.

For the entire proposed Tun Mustapha Park, TMP has 48,396.7 hectares of coral reefs, and about 70,000 hectares of mangroves. Small beds of sea grass beds can be found through out the TMP and a confirmed area of 200 hectares of seagrass can be found in Wak Wak Bay, near Banggi Island. No quantitative data available on the species indicators, except for humphead wrasse (8 fishes were found in 1,306.5 hectare area). An estimated density of 0.024 individuals/km^2 is reported for the Humphead wrasse in TMP and Sabah in general. Qualitative information is known for marine turtle nestings and sightings (more than 20 nesting beaches were reported by local communities of TMP). Status of coral reefs (assessed using Reef Check) varies from fair to poor.

Threats

Cyanide fishing and blast fishing occur and has been verbally reported in Maliangin Sanctuary. However, no quantitative data is available for the rate of cyanide fishing and blast fishing for the area. Reports have indicated reduced rate of blast fishing in Banggi in general (e.g. Daw et. al. 2004[1]).

For TMP as a whole, local knowledge indicates that destructive fishing methods (e.g. blast fishing and cyanide fishing), conflict of resource use (e.g. encroachment of trawlers and purse seiners into traditional fishing area) are among the main issues in the area.

Conservation Management

There is no legal and institutional structure for the management of Maliangin Sanctuary. As part of the proposed Tun Mustapha Park (TMP), management framework compatible with MPA management is being established. Currently, legal and institutional structure exists through sectoral agencies that look into different aspects of natural

[1] Daw, T. et al. 2004. ***Reef fish aggregations in Sabah, East Malaysia***. A report on stakeholder interviews conducted for the Society for the Conservation of Reef Spawning Aggregations. Western Pacific Fisher Survey Series: Society for the Conservation of Reef Fish Aggregations. Vol 5.

resources/wildlife management such as Department of Fisheries, Forestry Department the Wildlife Department. Capacity building for collaborative management is on-going through WWF-Malaysia's initiative to establish Maliangin Sanctuary as a demonstration site to showcase benefits of MPAs.

The establishment of TMP as a multi-use protected area is on-going. A management plan is being prepared and governance structure is being identified.

Social well-being

Maliangin Sanctuary has a small population of approximately 108 people from 14 households. The community of Maliangin Sanctuary is mostly poor and is highly dependent on natural resources for their subsistence and livelihood. A large number of the population in Maliangin Sanctuary has historically move out of the island (Maliangin Besar) to take advantage of education and other economic facilities in neighboring island, Banggi. There is a high level of awareness on the importance of conserving fisheries resources on the island, through the establishment of MPA.

For TMP as a whole, the communities of TMP are mostly poor and are highly dependent on natural resources for their subsistence and livelihood. They value education and see this as an opportunity to move them out of the circle of poverty. They are holders of rich local knowledge, awareness of their surrounding environment, and understanding of the impacts of their actions on the environment. They are willing to be involved in natural resource management through collaborative management and monitoring.

B. Project Analysis

1. Capacity

No dedicated measure officer was hired, as the measure project form a smaller component of the overall WWF-Malaysia's work in the proposed TMP. The fund from the measure project was used to co-fund existing work in TMP. Responsibilities to achieve the objectives of the measure project were shared between five staff. The technical expertise include i) Fish taxonomy and ecology; ii) marine biology, iii) social science, and iv) geography and GIS. The field team was aided by two assistants who are highly knowledgeable of local culture and practices, and of the geographical features of the area.

Surveys to establish baseline data (used for indicators) were also conducted in collaboration with partners, i.e. Sabah Parks (Park Management), Department of Fisheries (Fisheries Resource Management) and Universiti Malaysia Sabah (Research and Development).

WWF-Malaysia has strong technical capacity, especially on the biological side. Field staff have advanced degrees, and were able to identify, prioritize, and map indicators with minimal assistance from DC. However, in the opinion of the WWF-US Marine Scientist, the project did not reach its full potential during the first year, mostly due to a lack of

available manpower. This was supported by the field staff, who felt that there was sufficient capacity for the collection of baseline socio-economic data, but was insufficient for the collection of ecological data. There were also technical gaps in database establishment and management.

The WWF staff time was stretched thin already and, this being the first (and only) year using this measures framework, much time was spent learning the reporting requirements and dealing with the funding and administration issues. The conservation measures team is confident that if the Coral Triangle program had received greater funding support and initial engagement with the field-based staff for appropriate capacity building, training and alignment of expectations, the team could have fully implemented the program as envisioned very successfully.

These conclusions point most clearly to the need for a long-term fully funded measures program that allows for a steep learning curve plus sufficient time in the monitoring phase.

2. Methods

WWF-Malaysia started working in the proposed Tun Mustapha Park in 2006. The early focus of the work is on community consultations and awareness work, and baseline data gathering. WWF-Malaysia is building baseline information specific to the TMP to help with the establishment of a management plan for TMP.

In general, there is a scarcity of data available for this area. Ecological data is mainly limited to habitat extents (e.g. coral reefs and mangroves), and reef check surveys conducted mainly in Banggi Island and surrounding area. There are data gaps for coral reefs health and cover for other areas, population structure for endangered species such as the sea turtles and humphead wrasse etc. However, there are time series of fisheries data available from the Sabah Fisheries Department. A TMP-wide socio-economic survey was conducted to fill gaps in socio-economic data.

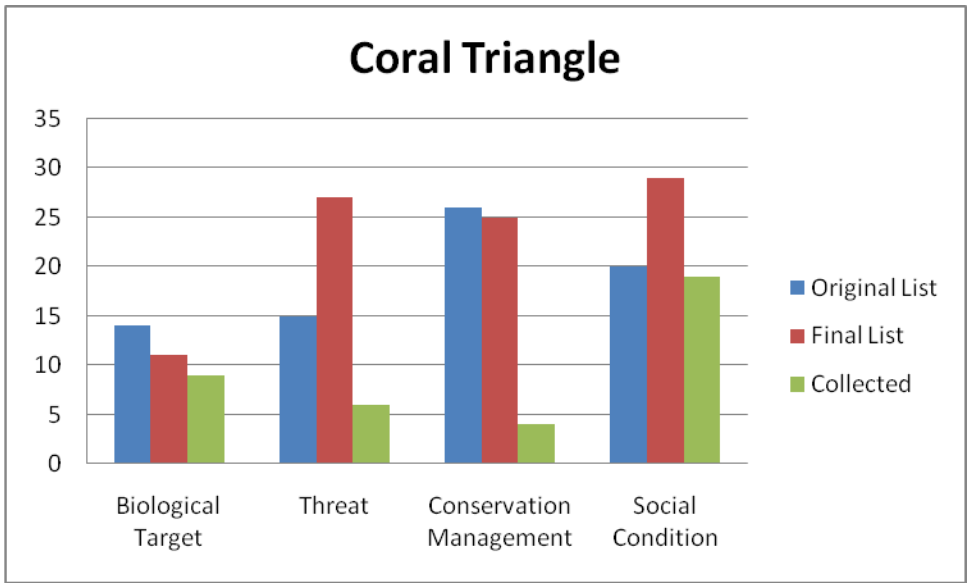
These data were made available to the Measure Project. However, as the Measure Project came on-board half-way through the project, there were gaps in data for the list of indicators used in the Measure Project. The team felt that it would be useful to have the list during the designing stage of a survey, so the survey can aim to collect information that can contribute as much to the Project objectives as possible.

The Field Team also worked with Al Lombana through the on-line WWF Program Standards course for two semesters developing conceptual models, biodiversity targets and indicators for the area. These were helpful in providing further input into the Measure Project.

Analysis of data for the social indicators was possible using data from the socio-economic data, with small gaps where data were not collected during the survey. Secondary information is available for some of the listed indicators, especially on governance indicator. There is scarcity in data for threats making analysis for threat indicators difficult. The analysis of threats (e.g. threat ranking, WWF Programme Standard course) relied on expert opinion of field staff working in the area. In most cases, scarcity of data is hampering the completion of the analysis of current status of Maliangin Sanctuary/Tun Mustapha Park. However, the conservation measures methodology used during the pilot will be useful in designing future ecological surveys within the TMP.

The field team felt that rapid collection of primary data is possible for a smaller area, as compared to a larger area. The indicators can also be easily measured for a more specific and smaller area, compared to a general and larger area. For example, while it is difficult to calculate one representative measure for a large area, using one measure of an indicator from one location for the whole TMP can also be misleading. It is much easier to establish baseline for indicators for selected specific locations within a larger area such as TMP.

The conservation measures core team felt that the scale of investigation was small, relative to other sites (smaller than landscape), but unfortunately they were often aggregated in large bundles (relatively speaking) that obfuscated spatial heterogeneity that might have informed conservation planning and elucidation of patterns and trends. More could certainly be done with the available data, but - given the limited support provided by Sall funds to support this work in Coral Triangle – this was not realistic.



3. Resources

WWF Malaysia felt resources were adequate but that time was a limiting factor. The WWF-US Marine Scientist felt that this program would have benefitted greatly, as others did, from three years of funding. This year felt rushed and there wasn't time to do a thorough job of monitoring the biological side of things.

The conservation measures core team felt that overall, the minimal investment leveraged tremendous ongoing activities/resources to generate considerable data and insights. To carry out work from scratch, however, investment was off by at least an order of magnitude and probably more. To get accurate assessment of resource needs and appropriateness, would need to review total budget invested in M&E in the study area.

4. Time

The time of field team was divided between 4 grants (including this project); therefore only 25% of staff time was dedicated for the implementation of this project. This was sufficient to achieve the deliverables outlined in the scope of work for the grant, but was not sufficient to achieve the conservation measures pilot objective, i.e. gathering baseline data for the listed indicators. The WWF-US Marine Scientist felt that though they got a head start on the socioeconomic monitoring, the biological part was piecemeal and all four indicator categories would have been stronger with more time. In addition, there's probably a wealth of subtle lessons hidden in the data that were collected that deserves more time for analysis.

The main lesson from this is that had the program been in place earlier it might have helped frame and focus the data collection efforts. However, at this point, it may be able to serve as useful model for measures efforts for Coral Triangle as a whole where primary data collection will be used.

5. Programmatic

a) Alignment

The field team felt that the project was well aligned with the Coral Triangle Network Initiative, and that it gave insights into the choice of indicators for the CTNI. However, they felt that there were insufficient funds to collect the full list necessary for the CTNI within Tun Mustapha Park. Instead:

> The TMP Project took a step-wise approach based on the available resources (following the Ecosystem-based Management of Fisheries). It focused on the gathering of socio-economic and governance baseline levels (of socio-economic indicators) and local knowledge on species, use of marine ecosystems and resources; readiness of for collaborative management. The intention is to gather next ecological indicators throughout the TMP.

The establishment and gazettement of the proposed Tun Mustapha Park is currently on-going. Primary data is still being collected in most parts of TMP, and management mechanism and conservation measures are still being established. This may not be able to fit very well in the conservation measures work that seems to be more advanced in terms of primary data collection and analysis of current status of success of conservation work.

TMP should prove a key piece of evidence of the value of MPAs in the Coral Triangle. Though it's just one site, strong results from large MPAs tend to carry a lot of weight in convincing governments and communities that protection is a good thing for biodiversity, resources, and people. There's a real opportunity here to be a model of MPA management and scientific research into what makes a reserve successful.

b) Leadership

The WWF-US managing director never really engaged with the core measures team, and that made communication with the field more awkward than it needed to be.

WWF Malaysia, especially the Kudat team, is very committed to the project and serve TMP well. They make do without excess resources and should be commended for getting so much accomplished in so little time. The whole program was hampered by the fumbling early on by WWF US with respect to the administration of the grant, selection of sites, distribution of funds, etc. There was a great delay in establishing a clear structure for the program and communicating it to the field. Early engagement and more collaborative development of initial proposal (field, DC program staff, and core measures team) might have ameliorated these challenges by developing shared vision and lean, effective management structures.

c) Structure

The field team felt that the structure of this program was not obvious/clear from the beginning of the project. The linkages between the Washington core team and place-based team were not emphasized; therefore the team (place-based team) acted as an independent team. It was unclear at the beginning on how the work of the core team and the place-based team were to interact.

This particular project doesn't suffer from cross-boundary complications, but the WWF-US Marine Scientist feels the other Coral Triangle countries would learn a lot from the methods and experiences from TMP. He encourages WWF Malaysia to share this information and help other countries with establishment of MPAs and with monitoring them once they're in place.

Finally, it is interesting to think through relationship between WWF-MY country office and Coral Triangle-NI. We need to figure out effective way to roll up from individual sites (like TMP) or countries (MY) into broader Coral Triangle. Leadership in TMP initiative may be able to offer constructive input and leadership on this point.

C. Summary of Lessons Learned - Coral Triangle

- The Coral Triangle measures project focused entirely on the (relatively) small proposed Tun Mustapha Park (TMP), with most ecological data coming from a single demonstration site within the park: the Maliangin Sanctuary.

- WWF-Malaysia and the WWF-US Marine Scientist felt this was a unique opportunity to gather baseline data for a Marine Protected Area (MPA) before its gazettement.
- The CT measures program received by far the least funding for the project of the six places, therefore did not hire a full-time staff to coordinate data collection and instead spread the task amongst existing team members.
- Scientific capacity amongst the field team members was very high, and the team was aided by assistance with extensive knowledge of local culture and practices and the geography of the area. So, despite not having a person hired to do the work, the quality of the data collection and analysis was very high.
- The time given was not sufficient for the team to become fully versed in the methodology of the pilot project and collect the data.
- Given the high capabilities and interest of the team members, a long term, fully-funded measures program would most likely be very successful. A question is whether such an effort is sustainable across the entire Coral Triangle.
- The Measures program started after community surveys were already in progress. The field team felt that it would have been useful to have done the WWF Program Standards course (which they did in lieu of a workshop) before designing the surveys.
- Despite the relatively small size of TMP, the team felt that distilling a single data point per indicator for the whole park would be misleading.
- The field team felt the resources were adequate for data collection, but the WWF-US Marine Scientist and DC core team felt that if the field had been given the full amount that other places received, the field team could have done a more thorough job. This is especially true if they wish to expand the target list to include all the targets necessary for the Coral Triangle Network Initiative.
- Time was the biggest limiting factor, as the field team was divided between 4 grants, thus effectively reducing the already limited time to a quarter of the year. Despite this, the Coral Triangle team was the first of the 6 pilot places to finish the initial round of data collection, analyze it and send a report to the DC team.
- The field team felt that the efforts in TMP were a very good basis for expanding out to the whole CTNI.
- There was very little interaction between the field team and the DC team, which resulted in some confusion early on, as well as formatting that doesn't quite line up with the other places, but will still serve the TMP and CTNI well.

D. Indicators

Biological Indicators – Coral Triangle

Target	Key Attribute	Indicator
Coral reef	Abundance	% Live hard coral cover - Maliangan Sanctuary (Lowest/Highest for Deep and Shallow transects
	Abundance	% Live hard coral cover - Northeast Banggi
	Abundance	% Live hard coral cover - Southeast Banggi
	Abundance	% Live hard coral cover - Southwest Balambangan
	Abundance	% Live hard coral cover - Southwest Banggi
	Extent	Extent of coral cover
Coral Reef Indicator Species	Abundance	# of species In Maliangin
	Abundance	# of species In Northeast Banggi
	Abundance	# of species In Southeast Balambangan
	Abundance	# of species In Southeast Banggi
	Abundance	# of species In Southwest Banggi
Mangroves	Extent	Extent of Mangrove habitat
Seagrass communities	Extent	Extent of Seagrass communities

Threat Indicators – Coral Triangle

Threat	Indicator
Bycatch - fish by catch on trawler	Endangerment (# of threatened or vulnerable species)
	Size (mean length/species)
	Type (# of species)
	Weight (kg, tons)
Bycatch - turtle by catch (gill net fishing and trawling)	No of fishermen reporting turtle by-catch
	Size (mean length/species)
	Type (# of species)
Climate change	Bleaching (# of bleached sites; % coral bleached)
	Ocean acidification (pH)
	Sea surface temperature
Destructive fishing practices	Blast fishing (# blasts/month)
	Bottom trawling (total area trawled: trawl area x trawl time) (m2)*
	Cyanide fishing (incidents reported/month)
Invasive species	Abundance (#; biomass)
	Density (#/area)
Pollution	Waste (volume/effort of trash collected on coastline) (ton/hour)*
Shipping	Distance to cruise or cargo shipping traffic routes (km)
	Frequency of oil spills (#/yr)
Water quality	Heavy metals
	Nutrients (N, P) and fertilizers
	Oxygen content
	Pathogens (E. coli, etc.)
	Pesticides and toxins
	Petroleum products
	Sedimentation rate
	Turbidity (Secchi disk)

Conservation Management Indicators – Coral Triangle

Conservation Management	Key Attribute	Indicator
Monitoring and enforcement	Coverage	# of surveillance patrols/month
		# of patrols/area
		# of trained enforcement personnel; patrol man-hours/month)
Monitoring and enforcement	Openness	# of stakeholders involved in enforcement
		% of enforcement team comprised of community members)
Monitoring and enforcement	Procedure	# of reported violations
		# of successful prosecutions
		# of failed prosecutions as a result of unclear procedures or guidelines)
Capacity building	Effectiveness	Compliance (% whose understanding of regulations and enforcement has increased, or whose compliance behavior has changed, as a result of training [self-report]; No. passing the competency test (for HWW)
Capacity building		Participation (% whose support for the MPA has changed, or whose economic activities have improved, as a result of training [self-report])
Capacity building		Sustainable use (% whose understanding of sustainable use has increased, or whose resource use practices have changed, as a result of training [self-report])
Capacity building	Funding	Budget (amount of funding allocated to capacity-building; % of MPA budget devoted to capacity-building activities)
Capacity building	Funding	Sufficiency (% of MPA staff who feel budget is sufficient to meet capacity needs; survey instrument)
Capacity building	Information dissemination	Compliance (# trained in rules, regulations, and enforcement arrangements; # of workshops held) - No. appointed as HWW - No. trained in Wildlife regulations through the Honorary Wildlife Warden (HWW) training - No. seminar held (Seminar on Legislation relevant to resource management)
Capacity building	Information dissemination	Participation (# trained in co-management, guiding, or rangering; # of workshops held)
Capacity building		Sustainable use (# trained in sustainable resource use; # of workshops held)
Capacity building	Stakeholder satisfaction	Staff (% of community satisfied with training skills of staff; survey instrument)
Capacity building		Training (% of community satisfied with workshops and training courses; survey instrument)

Conservation Management	Key Attribute	Indicator
Legal & Institutional Structure	Framework	Collaborative management (ha under active co-management)
		Decision-making and/or management body (frequency of meetings; ordinal ranking of authority; ha under active management body)
		Formal legislation (ordinal ranking of compatibility with MPA goals)
		Management plan (ordinal ranking of completeness and enforceability; ha under active management plan)
	Funding	Governmental (funds committed by CT-6 nations)
		Non-governmental (funds committed by NGO partners)
		Private (funds committed by private sector)
		Sustainability (funds present in permanent trust funds; funds generated yearly for MPA operations)

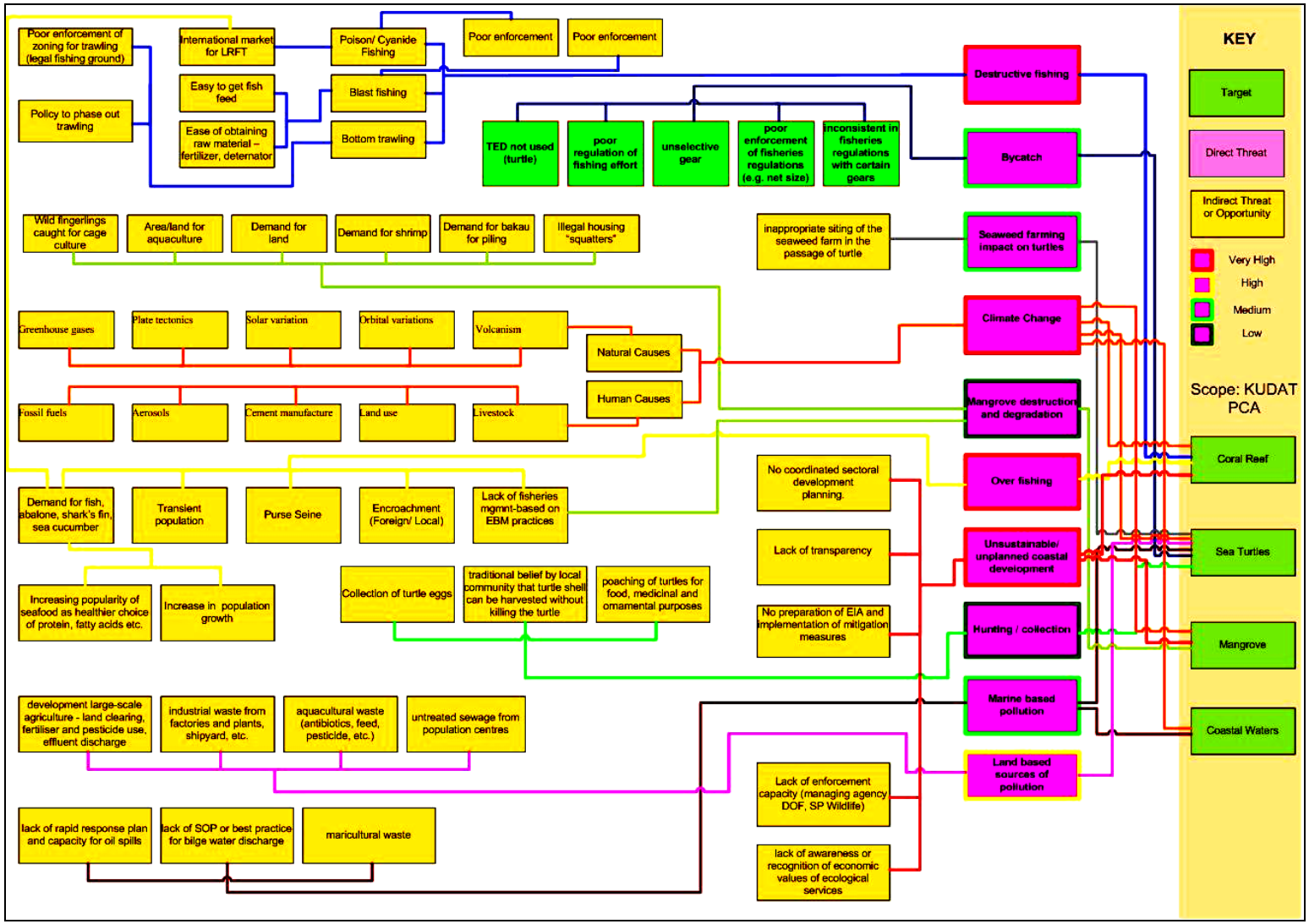
Social Indicators – Coral Triangle

Domain	Key Attribute	Indicator
Education	Scholastic	Achievement (% with high school diploma; % attending university - Highest education level in the house)
Education		Equity (ratio of girls:boys enrolled in primary education vs. ratio in population)
Education		Participation (% of youth enrolled in primary education)
Education	Environmental : "Formal" scientific knowledge	% with knowledge that coral reefs are important to prevent coastal erosion; % with knowledge that protection of coral reefs will benefit fisheries in the long run; % with knowledge that fisheries will decline without the mangrove ecosystems; % with knowledge that coral reefs has other importance other than fishing or SCUBA diving; % with hopes that mangroves and coral reefs will remain for their future generation to appreciate; % with knowledge that no-take-zone should be established or fishing effort limited in some areas to allow growth and recovery of fish and coral reefs; % with knowledge that sea grass has direct and indirect value to people.
Education	Environmental : "Local" knowledge of natural history	% with knowledge that turtle can live up to 100 years % with knowledge that out of 1,000 turtle hatchlings, only 1 will grow to adulthood % with knowledge that sea turtles are fully protected under the Sabah Wildlife Enactment % with knowledge that sea turtle population is declining globally %with knowledge that sea turtles are migratory species
Education	Environmental: MPA regime	% with knowledge or understand the meaning of collaborative management % with prior knowledge of the proposed Tun Mustapha Park, a proposed multiple-use MPA % with knowledge or understanding of the role of Sabah Parks in the management of MP % that agrees that coastal development need to be regulated/control to ensure conservation of nature for the enjoyment of future generation
Empowerment	Capacity	(# of community organizations organized to participate in management) - Membership in association/groups

Domain	Key Attribute	Indicator
Empowerment	Institutional framework	(# of scheduled stakeholder meetings with MPA managers and staff)
Empowerment	Interest	% interested to know more about collaborative management of fisheries resources with the government agency
Empowerment	Leadership	% having met the political representative of the area to discuss environmental issues, or to suggest solutions to problems in the area
Empowerment		% think that their opinion and suggestions in a meeting is taken seriously and into account
Empowerment	Participation	% have attended discussions or meeting on ways to take care of the fisheries resources, sea or the environment
Empowerment		% willing to care/manage the fisheries resources and surrounding marine area through collaborative management with Government Agency.
Empowerment	Satisfaction	% satisfied with degree of participation in collaboration
Health	Availability of health services	Choice of health care services (%)
Health	Child mortality	Infant [< 1 yr] (mortality rate/1,000 live births)
Health		< 5 yr (mortality rate/1,000 live births)
Health	Disease	Incidence of preventable disease (# present in community)
Health		Prevalence of preventable disease (rate/disease)
Health	Nutrition	Caloric intake (calories/day)
Health		Households w/consistent access to sufficient food (%)
Health	Water security	Distance to potable water source (m)
Health		Households w/consistent access to sufficient potable water (%) - Source of water supply by villages (%)
Wealth	Income	Quantity (% below national poverty line; mean % of national median) - (House) Income range (%,)
Wealth		Source (mean % of income reliant on fishing or extraction) - Livelihood/income source of household family members
Wealth	Material assets	Housing - Type of House (%) - No. of Bedrooms (%) - Roof Material (%)

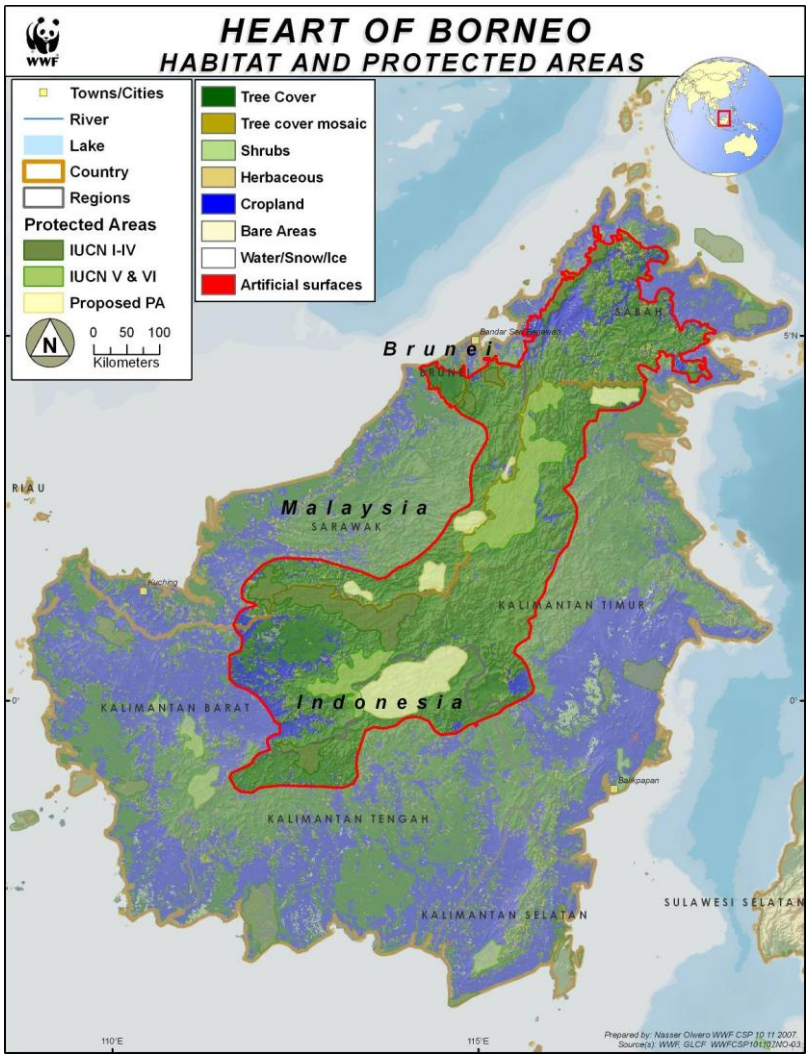
Domain	Key Attribute	Indicator
		- Flooring Material (%) - Type of Toilet (%)
Wealth	Material assets	Technology - Power source (%) - TV (%) - Telephone (%) - Refrigerator (%) - Video camera(%) - CD/DVD Player (%)
Wealth	Material assets	Boat (%)
Wealth	Material assets	Car (%)

E. Conceptual Model – Tun Mustapha Park/Kudat PCA



Conceptual model developed through the WWF Programme Standard on-line course

V. Heart of Borneo



A. Introduction

The island of Borneo is one of the richest places in the world in terms of biodiversity. Most of the island was until recently covered by tropical rainforests. While much of the lowland areas have been converted to other land use types, most of the interior is still intact despite that fact that people have lived in the area for hundreds of years. This interior area, known as the Heart of Borneo, comprises the upstream sections of all the major river drainage areas of Borneo. The tropical rainforest of the Heart of Borneo covers almost 30% of the third largest island in the world and represents one of the largest contiguous forests remaining in all of Southeast Asia.

The Heart of Borneo area is known for the cultural and linguistic diversity of the several ethnic groups of indigenous peoples collectively known as Dayak. Local people depend on the forest for a variety of resources including: food, medicinal plants, non-timber forest products for trade, wild game, fish, construction materials and water. The traditional management practices of the

Dayak communities have contributed to managing sustainably the natural resources of the area over the last centuries.

The area also represents one of the most biologically diverse habitats on earth. The highly diverse topography of Borneo resulted in the development of a high variety of forest ecosystems, ranging from swamp and dipterocarp forests in the lowlands to upper montane cloud forests in the mountains. An extremely high number of plant and animal species have evolved in these forest ecosystems, and many of these are endemic to the island of Borneo. Most of the original forest ecosystems and wildlife of Borneo is still present and the preservation of the Heart of Borneo is being given the highest conservation priority.

In February 2007, through the signing of the HoB initiative, the governments of Indonesia, Malaysia and Brunei have agreed and committed to protecting the Heart of Borneo and promote sustainable use of resources in the area. A major conservation work of WWF focusing on the center of Borneo is known as the HoB Program, which is one of WWF Network Initiative being hosted by WWF-Indonesia.

HoB was included in the measures pilot based primarily on the interest of the donor and its status as WWF priority place and Network Initiative. Little monitoring had been conducted except for different specific purposes, e.g., forest fire, land use, but there were remote sensing resources to draw upon. For socio-economic dimensions of conservation work, the Community Empowerment Unit of WWF-Indonesia had started to develop success indicators in early 2007. This was also a factor in linking the work being done in Indonesia to indicators of success for socio-economic aspects and their conservation impacts and the Measures project.

The WWF-US Measures team held two workshops to select indicators for the Heart of Borneo. The first was held in Washington, DC in October 2007. In this workshop, a small group of experts identified the biological, threat and conservation management indicators; and began to establish rating criteria for those indicators. Participants included Adam Tomasek, Managing Director of the WWF-US Borneo program, Stephan Wulffraat, the HoB biological measures official, and two Borneo experts, Lisa Curran of Yale University and John Payne of WWF-Malaysia
The second workshop was held in Jakarta, Indonesia in December 2007 with the goal of selecting a set of social well-being indicators. This workshop was organized and led by the WWF-Indonesia Community Empowerment Unit. It included program staff from throughout Indonesia. The focus of the workshop was to discuss conditions and aspects of community work that should be taken into consideration when developing a monitoring system. The scope was the WWF-Indonesia national program of work. Managers and field staff from throughout Indonesia participated. The Conservation Measures Program and WWF Program Standards helped provide the right framework for discussion. The selection of social well being indicators for the HoB became a special topic, and was discussed on the third day of the workshop.

Conservation Status (based on the information collected during the measures pilot):

<u>Biological</u>

The Heart of Borneo (HoB) encompasses a wide variety of forest ecosystems, inhabited by a high number of unique animal and plant species. Economic development is progressively making a larger impact on the ecosystems.

Undisturbed lowland rainforest has become rare in the HoB, due to conversion and forest fires. Most of the remaining lowland areas are under logging concessions. The status of heath forests is approaching critical levels. This fragile ecosystem has suffered irreversibly from forest fires in many areas. Peat swamp forests are rather under-represented within the HoB boundaries and are found mainly around the Sentarum and upper Mahakam lakes. These are generally in better conditions than the peat swamp forests of the coastal areas. Most of the upland forests are still in good conditions, although logging companies are now gradually starting operations in these areas. The status of the montane forest ecosystems is generally very good, with few disturbances so far.

Orangutan populations throughout Borneo are declining due to destruction of their habitats. Clouded leopard habitats are still widespread, but the total area that can support viable populations is smaller than originally assumed. Elephants and rhinos are restricted to some areas in the north-east of Borneo. The status of most of the endemic pitcher plants is good, as these occur mainly in remote areas with little disturbance.

Threats

The highest threat in the HoB is the industrial conversion of natural forests, which is done mainly to establish oil palm plantations. This threat is affecting most of the lowland areas. Forest fires have already destroyed many natural areas, and have so far affected particularly the coastal lowlands. It would, however, increasingly become a major threat approaching towards the interior of the HoB. Mining is a bigger threat than originally expected. Maps confirm that wide areas, including uplands, are being under exploitation and exploration for concessions. Most of the remaining lowland forests and many upland forest areas are under logging concessions, and evidence seems to suggest that logging is often carried out at unsustainable levels. Although some forests concessions will be logged but not converted, logging remains a major threat to the functioning of the forest ecosystem, particularly with regard to the survival of sensitive wildlife. Illegal logging is a major threat in some of the protected areas of HoB, as can be concluded from the still limited quantitative documentation.

Conservation Management

Several large areas within the HoB are protected as National Parks or Nature Reserves. Upland and montane forest ecosystems are well represented in these protected areas. Additional protected status is needed to preserve viable areas of lowland forests, heath forests, limestone forests and peat swamp forests. A large part of the habitats of remaining populations of Orangutans is not included in protected areas. A protected status with limited commercial land use possibilities is currently being proposed for two large corridor areas that will link most of the largest forests in the HoB. Protected area effectiveness and forest areas protected within concessions are two aspects that are getting more attention.

Social Well-being

The "Measures Program" data collection was conducted in eight districts in two trans-border provinces, representing about 85% of the total area of the Heart of Borneo landscape. These are classified among "**poor areas"** in the government national poverty map. Official statistics indicate that 70% of people make their living from farming, and live between US$ 1–2 per day. Basic health care and education facilities exist in every village at sub-district level, however personnel is limited, both quantity and quality wise. Poverty, for rural locations in the interior of HoB area, is in direct correlation with the geographical isolation from, and the poor access to, market and urban centers. The geographical terrain and distance make transportation from villages to the district capital costly and time-consuming.

From village to provincial level, the Credit Union network proved to be a strong indicator of economic status and potential of the local poor, and is not part of published statistics. Additional qualitative information from research, community mapping, and surveys indicate close dependence and reliance of the local indigenous peoples, majority Dayak sub-ethnic groups, on forest products for sustenance, trade, medicinal and ceremonial functions. Land for farming and freshwater sources in the interior are still plentiful.

Local traditions and practices provide effective mechanisms for natural resource management. Harvest of non-timber forest products is still done in sustainable ways by local inhabitants. Promotion of legal recognition for the local/traditional rights, to complement conservation efforts, would be essential in the HoB locations. In buffer zone and "corridor" areas, community groups have started pilot projects to link local-based economic and conservation activities through micro-credit system.

B. Project Analysis

1. Capacity

Technical expertise in HoB was among the highest of any place in the pilot. Three staff members from within WWF-Indonesia (i.e., Senior Biologist, Community Empowerment Coordinator, Monitoring & Evaluation Manager) shared significant time allocation to manage the data collection, analyses, and reporting on the HoB Measures program. Other required skill sets were generally appropriate, but time share from existing GIS expertise for data analysis was limited, which was then appropriately substituted by member of WWF-US core team

The geographical scope of the HoB Measures program and the coordination between Indonesia and Malaysia were unclear in the beginning. Initially WWF-Indonesia only concentrated on the Indonesian side. Because Malaysia and Indonesia are two different WWF National Offices, it was more appropriate for the NI leader to mediate the initial coordination between the two programs. Subsequently, the coordination was handled directly by the Community Empowerment Unit, and the WWF-Malaysia staff was invited to Jakarta on two occasions to discuss the indicators and data collection.

It took some time to get these human resources in place. Even though workshops to define indicators were held in October & December of 2007, it took until March 2008, to get the external capacity fully in place for secondary data collection in Indonesia and until June 2008, to

get capacity in place for Malaysia. Based on comments in the WWF-Indonesia Technical Progress Report, it appears that there was an initial misunderstanding about the scope of the project, which led to a delay in getting capacity in place in Malaysia: "Later, discussions for expansion to cover data collection from the Malaysian side of HoB arose. The process evolved gradually, but timely caught the assignment of a newly-hired HoB Malaysia staff in Kuching, in June 2008. Data collection from Malaysian Sarawak state initiated by then, which up to this point is partially completed." This points to a broader issue of lack of alignment on project objectives that presented challenges at the outset of the project. This will be discussed below in section B.5.

In terms of GIS, although there is capacity in Indonesia, it seems that it was not tapped for the Measures effort. Therefore, most of the responsibility for mapping fell on the WWF-US remote sensing specialist. However, this staff member had not been involved in the initial selection of indicators, therefore she was unaware of the extent to which her expertise would be relied on to map and analyze HoB indicators. In the end she had to complete mapping and spatial analysis via email communication, which worked out well, and finalizing the maps needed only a few hours of direct communication at the WWF-US office.

For the social component, a strength of the HoB model is that the Community Empowerment Unit, which can draw on expertise in monitoring, social analysis, and extensive knowledge of Borneo conditions, was involved to ensure appropriate analysis of the secondary data collected and critical evaluation of the indicators and criteria. Respectively 20% to 30% time of two managers was devoted to the Measures project but not financially supported by the Measures program per se. On the biological side, another well-trained, experienced staff member helped to select the indicators and devoted 60% of his time to collecting data.

For secondary data collection, it was decided to hire one consultant each for East and West Kalimantan. The decision to hire short-term external consultants was based on the following considerations: the limited time for data collection and the uncertainty of funds (1 year on paper but 7 months effectively) excluded the option of hiring one staff who could be dedicated to the Measures program and monitoring in general, at least for the time being. In the future, if the program is to be continued, this option will be considered. Another consideration was that the collection of secondary data did not require the direct involvement of managers' time. However, time was spent by the M&E Manager and the Senior Biologist to coach and supervise the work by the consultants.

2. Methods

Because the Biological, threat, and conservation management indicators were assembled separately from the social well-being indicators, we treat these separately in the following methods section.

Biological, Threat and Conservation Management Indicators

The biological indicator workshop was held in Washington, DC in October, 2007. WWF program staff from Indonesia and Malaysia were in attendance, along with Lisa Curran from

Yale University. The participant from Indonesia was the recently hired HoB Biological Measures Officer.

The workshop went very smoothly, with a positive feeling of consensus amongst the participants. It was very valuable having the HoB Measures Officer there, as he gained a clear understanding of what he needed to do going forward.

I t was hoped that remote sensing data might be available from Lisa Curran's group, but sensitivity related to graduate studies and publication prevented its being available to the team. The team was extremely fortunate that satellite-derived data was available for this region from another project as it proved essential in mapping many of the indicators. This would have been impossible without the MODIS composites from SarVision, which were an expensive product to generate, and should be considered in future costs for measures (this separate and previously contracted effort was funded by WWF-Netherlands). This method of data collection and sharing needs to be explored for the other measures places, as this kind of data was sorely lacking everywhere else.

A passage from the HoB field team's technical progress report describes the indicators that were developed in the October 2007 meeting:

> A number of thirteen biodiversity targets were selected and for each target indicators were developed that would provide significant measurable information. The indicators include biological, threat and conservation management indicators. Many of these indicators are in the form of spatial information, while additional field information was also compiled and integrated with the spatial data.
>
> Two types of targets were recognized. The first group are the ecosystem targets, comprising all major ecosystems of Borneo (peat swamp, heath, limestone, lowland, upland, montane and river ecosystems) while the second groups concerns major keystone species (orangutans, endangered plant species, forest edge herbivores, rhinos and large number of bearded pigs).
>
> The compilation and analyses of the status data for the ecosystems indicators went very well, and nearly all of the required information could be made ready. This was strongly facilitated by the recent availability of an up-to-date cloud-free satellite image mosaic for the whole of Borneo.
>
> The identification and mapping of un-degraded forest (canopy cover >60 %) was the only issue that could not be done with these images, and this indicator data still needs to be investigated further. A second problem was with the illegal logging data, of which only a few point records are available. The same problem was encountered with tree species diversity in lowland forest ecosystems, since only few coordinate records exist for the selected endemic Dipterocarpaceae, Fagaceae and Moraceae.
>
> The compilation and analyses of the status data for the keystone species indicators turned out to be a more complicated exercise. Extensive research has been done on orangutans,

rhinos and elephants and spatial as well as field data was sufficiently available. The extent of suitable habitats for clouded leopards could be mapped by combining landscape ecological characteristics and ecological knowledge. Information on banteng distribution is very limited and the occurrence of these wild cattle cannot be directly correlated to landscape ecological characteristics. Good representatives for endangered plant species were found by selecting the rare endemic pitcher plants (Nepenthaceae), of which useful distribution records exist for most species. These pitcher plants serve as good indicator species since they grow mainly in fragile habitats.

Reliable and quantitative data on large numbers of bearded pigs exist only for a few study areas. It is still being investigated whether it is possible to extrapolate this information to other areas of Borneo.

Social Indicators

Communication and agreement on objectives for the Social Measures workshop in December was challenging. There was not clarity among the field staff that the effort was directed at HoB-wide status measures. This can be traced to different expectations. WWF-Indonesia had already engaged in a program of work to develop indicators of success for socio-economic activities and their conservation impact based on actual WWF field activities, and intended to focus on measuring effectiveness of WWF interventions. Instead, the objectives outlined under the Sall grant highlighted status measures based on common MDG-based[2] indicators across the six places. The different expectations caused initial confusion and some misunderstanding.

Rather than focusing on measuring the status of socio-economic conditions, the indicators developed intend to measure effectiveness of activities, both in terms of their contributing to the fulfillment of the selected principles of community empowerment and intended results, and their contributing to positive and sustainable conservation outcomes.

> Given the vastity (sic) and complexity of the HoB landscape, and in consideration of the fact that conservation interventions have been going on in the area for several years, it is proposed that effectiveness become the priority target for socio-economic measures. General information on socio-economic status is available from government data, previous surveys conducted in the area and other information.

This highlights a common perception that the Measures program was executed in a top-down, donor driven manner. This was not intentional on the part of WWF-US staff. However, actions were driven by a sense of urgency to deliver results to the donor in Washington. As a result, there was not sufficient time devoted to develop a mutually-agreed set of objectives and implementation plan with regard to the social component of Measures.

When the WWF-US team arrived in Jakarta for the December 2007 workshop, there was still disagreement over scale and questions about measuring status vs. measuring strategy effectiveness. Despite this, the two teams worked hard to reach agreement on a set of

[2] MDG = Millennium Development Goals.

social indicators. Subsequently, WWF-Indonesia staff decided to gather data from selected and representative areas within the HoB. In fact, over 85% of the area inside the HoB boundary was covered in the survey - omitting only one district in Central Kalimantan. Both of these decisions are explained in the following excerpts from the HoB team's TPR.

Review of the Social Indicators

The process of data collection and preliminary analysis of the results prompted the need to recommend re-definition of some of the indicators (i.e., what do the indicators actually measure?) as initially agreed, and the identification of additional ones that would be important to consider in the future.

It was found that Credit Union, originally defined as an indicator of community organization, should indeed, and more appropriately, used as an indicator of economic strength of local communities. With regard to the listing of "Village organizations", and given the extensive, capillary penetration into the administrative and political life by the Indonesian state at all levels as part of the drive to build a unitary state and to shape consensus, including villages, these might be best captured as an indicator of political participation.

Food security might be best categorized under the economic well-being. This would also sit well with one of the most striking aspects of life of local people in the Heart of Borneo, i.e. the high reliance on a wide range of food sources and wild foods that help reduce their vulnerability to natural disasters and climatic changes.

In this regard, it was recognized that important aspects of livelihoods and well being have not been included in the initial indicators and consequently, not measured, including data on number of plants and natural resources used for food. This kind of data might not be available for all the areas or districts, but could be drawn from specific research projects (with sample communities) conducted on this topic. The number of hectares of lands under cultivation (swidden cultivation, permanent rice fields, gardens, agro-forestry plots) in each community might also be useful indicator of economic sustainability and security. The latter data could be compiled from the results of participatory community mapping.

The inclusion of these additional indicators would enable to see more clearly the multi-dimensional picture of "economic well-being" and "good livelihood." Areas that in government statistics are defined as "poorest of the poor" (including the Malinau district, for example) might actually be possibly "poor in cash" but enjoy additional levels of food security, land use security, and water availability, that might not existing in other areas.

As mentioned above, the HoB team also decided to collect social data from selected locations within the landscape, rather than across its entire extent. This decision is summarized as follows.

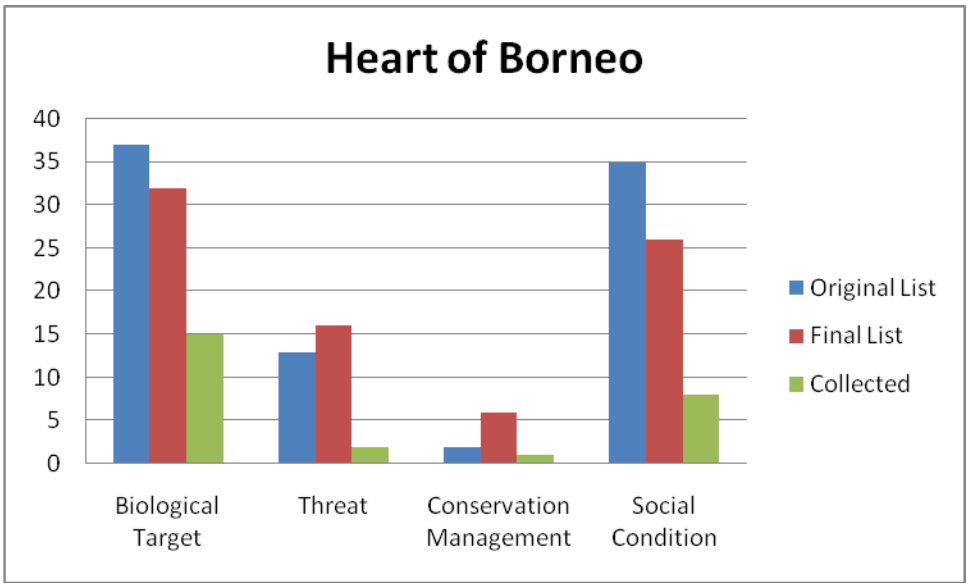
The huge area coverage of HoB locations and high diversity with different level of accessibility to data sources came facing the HoB measures team in the first place. This was partially true with the biological data, but more for the socio-economic and culture component. The fact that data are not always comparable across all data collection units and limited time to compile data from research reports were next challenges in the process.

Since the onset of data collection, WWF-Indonesia Measures team decided to prioritize sampling areas. The focus on eight districts in two provinces for the socio-economic indicator is the result of this decision (see Table 1). The selected districts are areas where WWF has been most active, are key areas of future growth and directly in the larger HoB program, and also appear as especially isolated and poor according to government statistics.

Table 1. Locations of data collection for HoB Measures

A. Indonesia		
West Kalimantan		
Districts		
Kapuas Hulu	- trans-bordering Indonesia – Malaysia	- WWF work site
Sintang	- trans-bordering Indonesia – Malaysia	- Some WWF work
Melawi	- trans-bordering Indonesia – Malaysia	- Non-WWF site
Landak	- poorest district in West Kalimantan	- Non-WWF site
East Kalimantan		
Districts		
Malinau	- transbordering Indonesia – Malaysia	- WWF work site
Nunukan	- transbordering Indonesia – Malaysia	- Some WWF work
Kutai Barat	- transbordering Indonesia – Malaysia	- Non-WWF site
Kutai Kertanegara	- poorest district in East Kalimantan	- Non-WWF site
B. Malaysia		
Sarawak		
Long Lawas	- trans-bordering Malaysia - Indonesia	Non-WWF site
Long Lama	- trans-bordering Malaysia - Indonesia	Non-WWF site

The HoB experience with social data also highlights the need to be aware of shortcomings in data quality. For example, government data may be biased to meet political end. In Indonesia, it is suspected that government manipulates statistical data to show higher levels of poverty in order to get more aid from the central government. In addition, poor survey design and/or implementation can also reduce the quality of social data generated by the government.



3. Resources

According to WWF-Indonesia staff, the resources allocated were sufficient for the HoB measures activities. However, they note the challenges created by a late project start-up and the time needed to locate capacity (consultants) to carry out the data collection part of the work. The end result is that the compressed timeframe led to an inefficient use of resources. They feel that a 2-year span would allow more efficient use of the resources. It would also make it possible to hire a monitoring staff to help for data collection in the field.

The HoB team agreed to divide tasks and time on the project, with only one person financially supported by the Measures budget. The two other senior staff were working out of their responsibilities as Community Empowerment Unit Coordinator and M&E Manager. This might have put some constraints on the process, but had the advantage of furthering integration with existing programs and encourage continuity. Coordination with Malaysia was limited by the very recent hiring of a staff in charge of HoB activities in Sarawak, time needed to socialize and explain the Measures program, and the difficulty of obtaining data from the government in Sarawak.

Resources might have been spent more efficiently on an integrated kickoff workshop, with both biological and social indicators, rather than separate biological and social workshops. Timing and availability were the issues.

4. Time

Note that the HoB field team felt that a 2 year time span would have allowed a more efficient use of project resources. The core measures team felt that the time was probably sufficient, but that the timing was very problematic. Early engagement with field program was lacking, so shared understanding and support for initiative was lacking, too. Incremental and piecemeal engagement with field (sequential biological and social workshops, absence of a HoB program

lead for a time) resulted in rush to implement without full agreement/support of key principals – resulting in 'donor driven' activities/efforts. Leadership from the NI managing director (Adam Tomasek) was eventually key to moving process forward productively and garnering greater engagement and support, but the initial extent of the gulf between field and DC perspective was considerably underestimated – resulting in much greater transaction costs and conflict than necessary/desirable.

In the end, nearly one FTE was required to investigate the availability of and gather social data in 10 districts in Indonesia and Malaysia. As mentioned in the introduction, some data were compiled for 85% of the social indicators. The data from the social indicators were subsequently analyzed and short synopsis for data prepared. However, it was deemed partially premature to compute single values for most of the social indicators at this stage. This delay led to a subsequent delay in mapping the social indicators.

5. Programmatic

a) Alignment

The HoB-wide workplan aligned with WWF Network Initiative and WWF-US' vision for HoB. WWF-Indonesia team also tried to align the Measures project to WWF-Indonesia program. There was some initial misalignment and confusion as to geographic scope which might have been averted with more lead time and early intervention of the NI leader.

At the December 2007 social indicators workshop in Jakarta, the program office staff seemed skeptical about how well measuring "status" aligned with their work and the priorities of the current program. Having WWF-Indonesia been active and working at two main field projects in Borneo for over 10 years, staff felt the priority should be the measurement of effectiveness of WWF strategies and the socio-economic and conservation impact of activities. Moreover, some of the social indicators selected were outside the scope of WWF program in the area, or unrelated to the focus of field activities. In the end, the data collected provided a solid baseline based on secondary (mostly government statistics and some WWF project data); however it is still unclear how the social data can be related to WWF work in the future.

The identification of social and biological indicators and the analysis of data was conducted separately. This prevented a more integrated review of the conditions in HoB (from the TPR report): "More integration between socio-economic and biological data might help interpretation of the data and highlight the dynamic interactions of biological and socio-economic factors.**"**

b) Leadership

There was considerable uncertainty about roles and relationships both in field and in DC. The WWF-Indonesia team organized and coordinated the effort internally in effective ways, however communication internally and with the Measures Team in Washington was somewhat unclear.

Technically, the M&E Manager serving as project coordinator should have been the point person for all communication between the field and Washington. In reality, different communication channels were activated thus creating some confusion. Moreover, it was not always clear who was the US counterpart for this project, and communication for social and biological data often ran on different tracks. The WWF-Indonesia team possessed enough expertise and seniority to lead the effort and obtained technical support and overall coordination from the team in Washington.

The eventual move of the HoB NI managing director from DC to Jakarta appears to have fostered support and greater coordination of field planned activities. The WWF-Indonesia country program is interested in integrating some of the measures protocol piloted in HoB in the ongoing development of its own monitoring plan building on current work and the previous socio-economic matrix.

c) Structure

As described in the capacity section above, the internal organizational structure (within WWF-Indonesia) allowed efforts to be distributed among appropriate experts. From a disciplinary perspective, this division of labor is preferable to having one person responsible for collecting information for all four categories of the measures framework. The social and natural sciences employ different methodologies for research and analysis, and it is reasonable to expect that an individual with have deeper training in one over the other. Aware of the possible transaction costs of the management arrangement with split responsibilities, the WWF-Indonesia team united coordination and communication efforts of the project under the M&E manager. This move however was either not convincingly communicated and/or understood and therefore gave rise to several instances of poor communication.

According to WWF-Indonesia staff, this structure emerged more out of necessity than by design:

> "Originally, WWF-Indonesia intended to assign one full-time monitoring officer for each provincial location. However, recruitment did not turn-out as planned, due to limitations in time and administrative capacity. "

Working across the international boundaries in the Heart of Borneo initially presented a challenge. The WWF organizational structure in the region (country offices, rather than regional cross-border responsibility) complicated efforts to obtain data and work with programs outside Indonesia (the country where lead staff were posted). The lead staff lacked authority/capacity to work outside home country. However, the WWF-Indonesia team effectively collaborated with WWF-Malaysia to complete the work. This challenge probably could have been avoided (or reduced) if the terms and scope of the Measures project had been clearly agreed to at the outset of the project. As it stood, the issue did not emerge until measures workshop in Jakarta in December 2007 when WWF-Indonesia team raised the concern that it would be difficult for them, as Indonesians, to gather social data on the Malaysian side of the Heart of Borneo.

Initial challenges aside, staff from the two offices worked together to identify the capacity need and locate a person to fill it. Once the person was in place, the WWF-Indonesia team helped define the scope of work and provide supervision throughout the process. However, it took time to get it started. Data collection did not begin in Sabah and Sarawak until June, 2008, six months after the Jakarta kick-off workshop in December. In contrast, a consultant was hired to collect data in Indonesia in March, 3 months after the initial workshop. This points to the need to consider such start-up costs when implementing a Measures program in cross-boundary situations. There needs to be sufficient time to reach agreements among distinct offices, define the scope of work, management structure and capacity needs, and find appropriate staff.

C. Summary of Lessons Learned - HoB

- The development of indicators and consequently systematic analysis of large amounts of field data provided many important, and in several cases new insights in the current status of conservation-related issues in the Heart of Borneo.

- Lack of agreement/shared understanding of program objectives resulted in challenges down the road: field perception that Malaysia was "added", US assumption that this was understood; time delay to get capacity in place; what to measure for social (status v. effectiveness).

- Lack of shared understanding of roles and responsibilities at project inception resulted in discontinuous and inconsistent communication between WWF-US and WWF-Indonesia staff throughout the life of the project.

- Dividing work among disciplinary experts resulted in a more rigorous process for collecting and analyzing data for Social indicators.

- It seems that the social and biological staff did not collaborate very closely and, as such the components remained largely separate.

- A one-year timeframe precluded the most efficient use of the project's financial and human resources. WWF-Indonesia staff believe that a two-year timeframe would have enabled more efficient resource use.

D. Indicators

Biological Indicators – Heart of Borneo

Target	Key Attribute	Indicator
Bornean Clouded Leopard*	Size	Km^2 of suitable habitat
Heath Forest*	Extent	% of intact historic (by country)
Limestone Forest*	Extent	% of intact historic (by country)
Lowland Forest*	Extent	% of intact historic (by country)
Lowland Forest	Condition	Tree diversity at network of sites
Lowland Forest	Extent & Condition	# of large blocks
Lowland Forest	Landscape Context	Connectivity between blocks
Upland Forest*	Extent	% of intact historic (by country)
Upland Forest	Condition	Tree diversity at network of sites (Dipterocarpaceae & Fagaceae)
Montane Forest*	extent	% of intact historic (by country)
Montane Forest	Condition	Presence of bearded pigs at network of sites
Peat Forest*	Extent	% of intact historic (by country)
Peat Forest	Condition	% canopy cover at network of sites
Peat Forest	Condition	Presence of orangutans at network of sites
River Ecosystems	Condition	% intact watersheds by basin
River Ecosystems	Landscape Context	% of major rivers unobstructed
River Ecosystems	Landscape Context	% riparian cover in 100m buffer along major rivers
Orangutan	Size	% of historic distribution
Orangutan*	Size	Density at network of sites: Lowland Forest, Peat Swamp,
Sumatran Rhinoceros	Size	Total population size
Large numbers of bearded pigs	Size	Presence and/or density at network of sites
Large numbers of bearded pigs	Size	Group size at network of sites
Forest Edge Herbivores	Size	Total population size Bornean elephant
Forest Edge Herbivores	Landscape Context	Connectivity among elephant population
Forest Edge Herbivores	Size	Extent of suitable elephant habitat (km^2)
Forest Edge Herbivores	Size	Presence of banteng at network of sites
Sensitive Plant Species (orchids and Nepenthes)	Size	% of historic locations that are still viable

Threat Indicators – Heart of Borneo

Target	Key Attribute	Indicator
Industrial Forest Conversion		Annual conversion
Industrial Forest Conversion		Annual plans for conversion
Industrial Forest Conversion*		Forests within plantations and logging concessions
Legal unsustainable timber extraction		% crown cover in working forests
Illegal logging		Loss of forest (km^2)in protected areas (broken down by forest/ecosystem type)
Forest fire*	Incidence	Fires in logging concessions
	Incidence	Fires in Upland forest ecosystems
	Incidence	Fires by Forest Habitat
	Incidence	Fires by year
	Incidence	Fires in Heath Forest Ecosystems
	Incidence	Fires in Lowland Forest Ecosystems
	Incidence	Fires in Montane Forest Ecosystems
	Incidence	Fires in Peat Swamp Ecosystems
Mining		Existing extent
Mining		Projected extent
Hunting		Km^2 of forest affected by overhunting
Conversion of forest through small-scale agriculture		Annual Conversion
Hydropower expansion		% of major rivers obstructed
Recent extreme droughts		Areas affected by extreme droughts
Recent extreme floods		Areas affected by extreme floods
Swamp Drainage		Areas of natural swamp being drained
Unsustainable firewood extraction		Areas of forest destruction caused by over-harvest

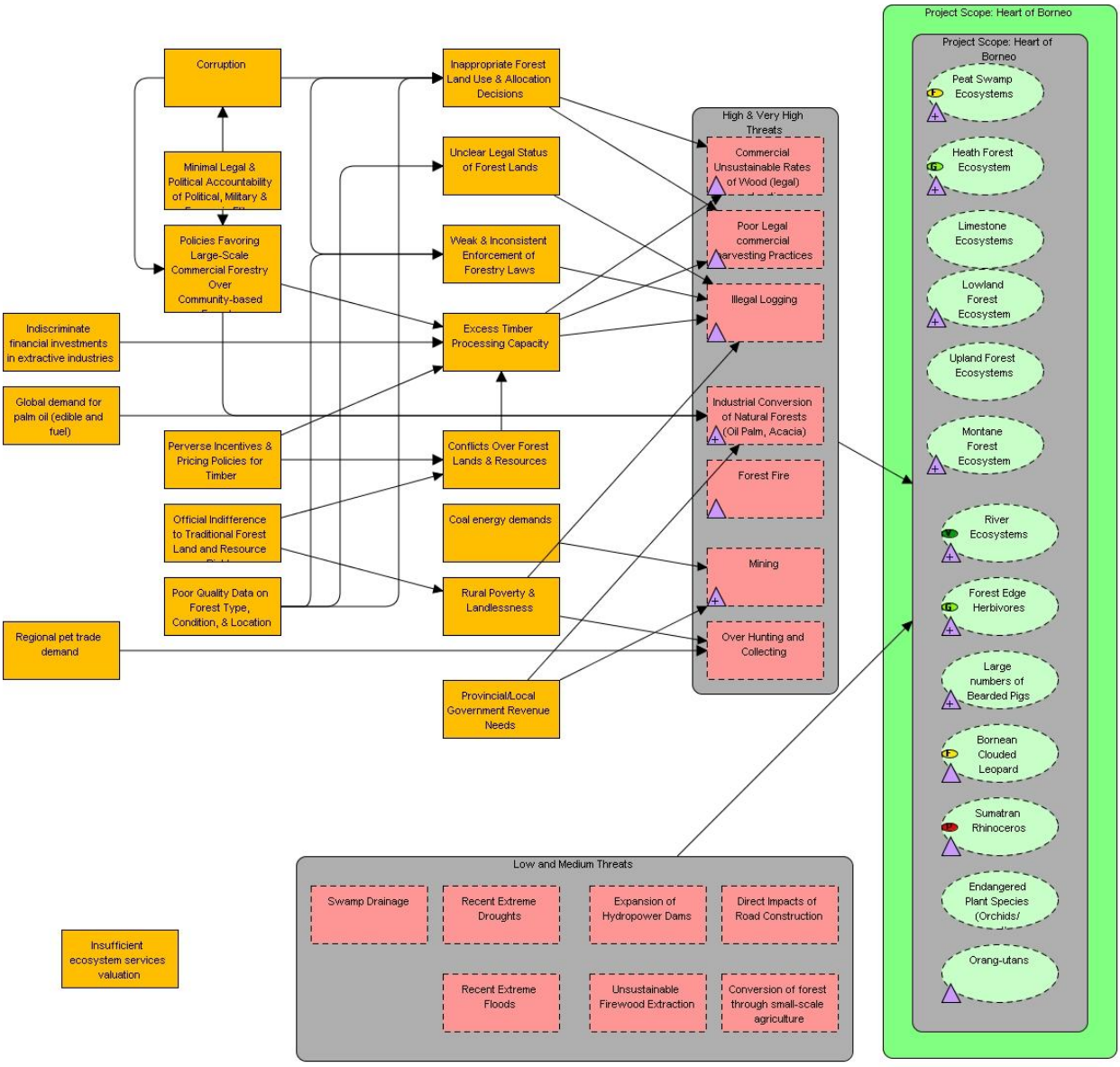
Conservation Management Indicators – Heart of Borneo

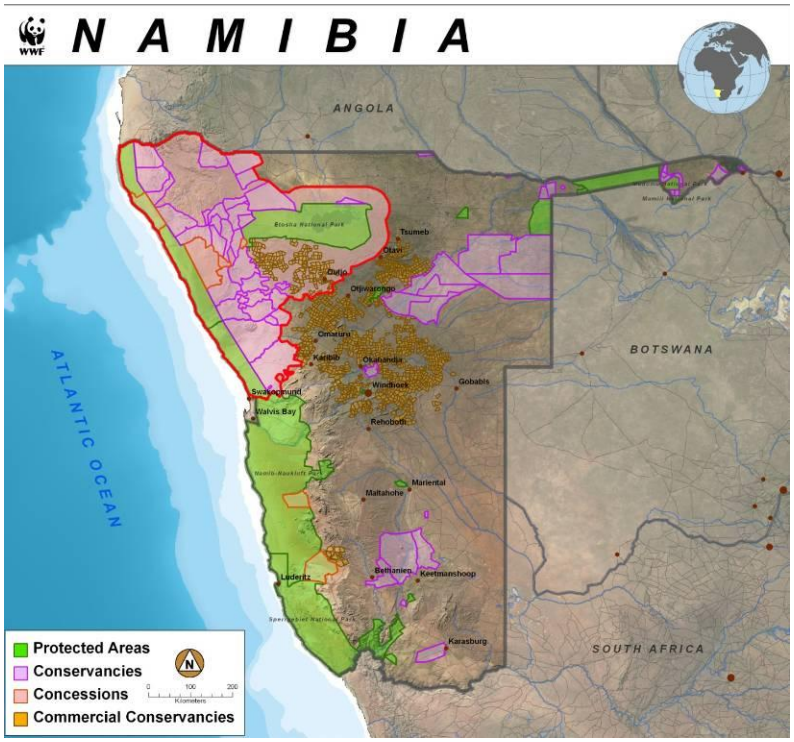
Target	Key Attribute	Indicator
Protected area representation*		% of Lowland Forest in a protected area
Protected area representation*		% of Montane Forest in a protected area
Protected area representation*		% of Upland Forest in a protected area

Social Indicators – Heart of Borneo

Domain	Key Attribute	Indicators
Economic well being	Transportation access	% population who can reach markets / 'urban' centers w/in ½ day
Economic well being	Transportation means + household goods	% population who own (bycycle, motorcycle, longboat), TV, radio, generator/solar panel
Economic well being	Housing ownership	% HH who own house where living
Economic well being	Income	% population below national poverty line % population with savings or access to credits
Economic well being	Occupation (formal and informal)	% people with salaried jobs (private and gov't) % people who extract natural resources (trading, migrant workers)
Health*	Infant mortality	Infant mortality rate, children under 1 yr
Health*	Clean water	MDI - % population with access to clean water
Health	Diseases rate	% population #/1000 → TBC, Cholera, diare, malaria
Health	Access to quality health care	% population w/in subdistrict with facility + village dispensary + staff
Health	Food security	% population usually eating 3x/day
Health	Traditional medicine	% population using traditional/modern medicine
Political Empowerment	Community organization (traditional, new organization)	% villages with different types of community organization (custom, farmer, others) % population who belong to community organizations
Political Empowerment	Natural resources right (land, forest, traditional knowledge)	% population whose (land, forest) rights are recognized by government
Political Empowerment	Collaboration partnership	% of community group belong to larger organizations or federations
Political Empowerment	Women empowerment	% of women who belong to community organizations % (village, subdistrict, district, parliament) female leaders

E. Conceptual model – Heart of Borneo





VI. Namibia

A. Introduction

This Project is predominantly focused in a landscape in the north western parts of Namibia, including both communal and protected areas. This landscape comprises a portion of the Namibia/Karoo Ecoregion that contains a large number of communal conservancies that interface closely with the Etosha and Skeleton Coast National Parks. The landscape also comprises freehold land, as well as government land leased under concessions to private sector tourism operators.

Following a decade of devastating conservation impacts in the 1980's as a result of the turmoil leading up to and immediately following Namibia's independence from South Africa, wildlife has subsequently recovered greatly as a result of a community based conservation management programme. This approach uses wildlife as a legitimate form of land-use. Specifically, wildlife adds value to peoples' livelihoods through various forms of consumptive and non-consumptive use. In some cases, the benefits thus derived can even outcompete agriculture and pastoralism.

Much of the data used to populate the Measures Project was acquired as a result of more than 12 years of systematic collection and storage of conservancy monitoring information that was amalgamated through WWF-LIFE Project support to the Ministry of Environment and Tourism. Through a partnership with communal conservancies and the government, the WWF-LIFE project developed a community-based monitoring system called the "Event Book System". It is

a management-oriented system that generates information that communal conservancies need for adaptive management. The system helps local communities capture and analyze data on events (fire, poaching, and wildlife mortalities) as well as to conduct more systematic monitoring (vegetation patterns, wildlife movement, etc.). A key feature of the system is that the conservancies choose what to monitor, which promotes ownership of the monitoring process and helps ensure that the conservancies use the information for adaptive management (Stuart-Hill, et al. 2005). Due to its focus on communal conservancies exclusively, using only this data for Measures led to some spatial gaps across the landscape.

Using Miradi software a conceptual model of the landscape was built (see below) and monitoring indicators developed for each of the targets and threats. When populating each of these indicators with measures data, a very positive conservation picture of the landscape emerged to the extent that it was agreed that population numbers (of most species) is a non-linear conservation measure – a notion not commonly appreciated by the wider conservation community. The conservation model for the north-west however, fell short in the area of socio-economic benefits. This was probably because the methodology is primarily threat-based whereas WWF's conservation programme in Namibia is opportunity focused – specifically using wildlife to promote improved land use and generate socio-economic benefits. Thus whilst the model does not cater for socio-economic targets, indicators were developed for these and populated with data.

Conservation Status (based on the information collected during the measures pilot):

Biological

Following decades of wildlife decline caused by a combination of poaching, competition with livestock and drought, all wildlife species in the landscape have been increasing over the past decade. Further population increases of many species is no longer expected, nor desired, as this may lead to increased rangeland degradation, exposure to droughts as well as possibly dampening the recovery of endangered species such as black rhino, that inherently take longer to recover.

Threats

Wildlife in general is not currently highly threatened in the landscape despite a number of adverse drivers such as competition with livestock and settlement at water points. The massive community support for conservation that has been achieved through the conservancy programme and legislation that allows land managers to own and benefit from wildlife has almost eliminated community-based poaching. The commercial external poaching threat to black rhino and elephant remains present and great vigilance and preparedness is required despite the absence of poaching in recent years.

Conservation Management

The vast majority of the landscape is under communal land tenure although there are a number of protected areas and freehold farms. Whilst management in the protected areas is not of an exceptionally high standard it is sufficient to support the current conservation status in these areas. Management on freehold farms is generally of a high standard although in some cases this has a negative impact on conservation if the management objectives of the land-owner are

focused on livestock rather than wildlife. The greatest recent change in management in the landscape is on the communal lands where Conservancies have become established and conservation management has improved dramatically. This has come about through allowing rural people to receive tangible benefits through sustainable use of wildlife and wildlife-based tourism. This most recent change in management regime has contributed hugely to the current healthy conservation status of the area.

Social Well-being

The majority of people in the landscape are poor and eek out a living from extensive livestock farming. With the advent of the Conservancy programme, people are now receiving benefits from wildlife based tourism as well as from trophy hunting and other forms of consumptive use. This has had the effect of making people more conservation friendly to the extent that some land-managers are actively promoting wildlife as the primary form of land use. It has not yet being quantitatively shown by how much conservation contributes to livelihoods at the household level but the contribution of Conservation to socio-economic benefits in the landscape through income and employment is significant. Judging by the population's recent tolerance and interest in wildlife, this must be having an impact at household level.

B. Project Analysis

1. Capacity

The WWF LIFE project has a long-standing partnership in place to collect data for monitoring wildlife conditions and programmatically oriented indicators, such as the benefits that local people derive through conservation efforts. The system is based on the active participation of conservancy members and has generated abundant time series monitoring data over the years. These data formed the foundation of all of the status data compiled for the Conservation Measures effort.

The existing source of data, and established system for collecting it, provided a ready platform on which to build the Measures effort. However, the Namibia program still faced significant challenges in terms of capacity for carrying out the work. It was not possible to find a person with the right mix of expertise – who was also available to work on the project - to fill the Measures Officer role. Therefore, the effort stalled for several months (approximately July 2007 – February 2008). There were a few primary drivers of the delay: 1) Lack of technical capacity available to absorb the additional workload and 2) The LIFE project faced significant financial uncertainty and the small number of staff in the office had to prioritize time and effort toward securing future funding

WWF-Namibia staff describe the challenge in this way:

> The measures project in Namibia was added to the core CBNRM support programme activities, which are the prime mandate of the WWF in Namibia office. As such, it was difficult to dedicate the necessary amount of staff time. Consequently, an external GIS specialist was commissioned to aggregate data and generate the various map and graph outputs. This consultant worked with

> both the Director of the Namibian WWF office, as well as the Natural Resource Advisor, both of whom are extremely experienced in both the landscape and in performance monitoring systems – indicating that a high degree of skills is required in such an initiative.

They credit the WWF-US core team for providing a critical source of support during a period when the program faced significant uncertainties about future funding sources. This challenge was external to the Measures effort, but it impacted the capacity available for the project greatly:

> The Namibian measures programme received invaluable support from staff from Washington. This was particularly needed as WWF staff in Namibia were overcommitted and struggling to maintain core business during a difficult transition period from USAID funding support to WWF family core support.

The level of technical skills required for doing indicator selection, data collection, and analysis (spatial and statistical) is significant; and is not readily found in Namibia. Those people with the appropriate skills have permanent jobs and were not willing to leave them to take a short-term position. The Measures effort was limited by the short-term nature of the program and insecure future funding prospects. It could not provide adequate incentive to attract qualified people to the position. In addition, obtaining required capacity at WWF would likely have meant hiring someone away from a local partner organization, which could have created other challenges for future programmatic efforts. As a result, Namibia hired a consultant from South Africa to move the WWF- Namibia data into GIS in order to map it for Measures. Two CSP staff from WWF-US, Aurelie Shapiro and Robin Naidoo, traveled to Namibia for a week to help pull together and map the data. Finally, Greg Stuart-Hill had to add to an already full workload in order to oversee and support these efforts to compile and map data.

2. Methods

The methodology being tested by the Conservation Measures Program presented some fundamental challenges for implementation in Namibia. A guiding principle of the Measures methodology is to rely on existing sources of data. Namibia was selected because it had a wealth of data to draw from, due to its long-standing monitoring program. As such, from the perspective of WWF-US, it provided the perfect opportunity to quickly generate proof of concept for the measures methodology. However, this opportunistic approach led to unintended consequences. First, tensions arose over data ownership and second, Namibia staff perceived the effort as a top-down mandate that resulted in duplicate data management systems. However, the methodology also helped Namibia shift from a project focus (CBNRM) to a landscape focus by laying the foundation for monitoring at this scale.

The highly participatory nature of the data collection/ownership in Namibia, as well as the highly collaborative nature of the program (with numerous partners), meant that data acquisition, use, and attribution were extremely contentious issues. Namibia certainly highlights that the *existence* of data does not necessarily imply the ability to *access* or *use* data. Data sharing within WWF cannot be assumed – and time must be built into the measures process to explore and address issues of data ownership, access, and use. In this case, even though the WWF-US

program team in Namibia was routinely using the data that was needed for the conservation measures pilot activities, gaining access to these data required considerable time, energy, and organizational sensitivity.

As mentioned above, the Event Book system had been operating in Namibia for a decade when the Measures Program began. These data, together with a host of data from other monitoring and inventory systems, are aggregated into a national information system known as CONINFO. Rather than adapting to this system, the Conservation Measures effort introduced a new system that drew from CONINFO and other national databases where Event Book data are stored. In practice, it was a laborious process to manually extract data from CONINFO because this system does not have a query facility to automatically extract subsets of data for any particular area (landscape, district, etc.) that might be made up from a number of different land tenure systems (e.g. conservancies, freehold land, protected areas). The result is explained by Namibia staff, as follows:

> Consequently, a considerable amount of time and project resources were spent on manually extracting data for the landscape from the national data sets, with the additional and rather unproductive complication of having to create a separate duplicate data set and directory structure that was specified for the international measures programme.

From the perspective of Namibia staff, Measures resources would have been better spent on building a landscape query function into the national information system (CONINFO) , so that data could be efficiently extracted for various units of analysis. However, from the perspective of the core DC-based team, Namibia was selected to participate in the Measures program precisely because it had access to this rich source of data. There were high expectations from senior leadership in the US that Namibia could quickly generate data to serve as a proof of concept for Measures. This highlights a key lesson to come out of the Namibia pilot: Implementing staff at all relevant levels (PO, NO, NI, etc.) should reach an agreement on the approach to Measures – i.e. methods, systems and implementation plans - *before* implementing a measures program. The condensed timeframe for the Measures pilot, among other things, hampered efforts to reach such a clear agreement between DC-based and Namibia-based staff.

On the other hand, as the WWF network coalesces around Network Initiatives and standardizes its measurement and reporting systems, such tensions where mandated systems usurp locally developed systems may continue to emerge. For example, the developing WWF Network-wide "INSIGHT" database may impose similarly painful adaptations to data management systems on project offices such as Namibia, particularly considering that the locally developed information system has been developed by WWF in Namibia as a joint venture with its Namibian partners, who fall outside the control of WWF.

On a positive note, the spatial component of the Measures methodology allowed the Event Book and other data to be seen in a landscape context. This had the immediate effect of highlighting the spatial gaps that need to be filled when scaling up from conservancy-based work to landscape-level work. As a result, the Director of the Namibian office expressed interest in conducting spatial planning exercises for some landscapes in Namibia. In addition, the program is considering a new landscape-scale approach:

> WWF in Namibia sees that the establishment of 'Conservation Complexes', consisting of an aggregation of freehold farms, communal conservancy lands and state protected areas, all working together on issues of common concern to be an important strategic objective towards achieving the conservation targets in Namibia.

Other positive impacts of the Measures initiative is that it gave an opportunity to clean up some important socio-economic data sets that required serious housekeeping, as well as providing a number of outputs that may ultimately be used to develop an 'atlas' for the landscape. Moreover, as Stuart-Hill et al. (2005) point out, the Event Book System is not necessarily suited for monitoring other values that society at-large may deem worthy. In such a case, they claim, an external system may be appropriate. This presents an opportunity for the Conservation Measures approach to complement the Event Book system by adding in other landscape-level indicators, including some broader indicators of social well-being.

Regarding the overall Measures Framework and Results Chain methodology, the Namibia team appreciated the opportunity to take a step back and view their programmatic work through a different lens.

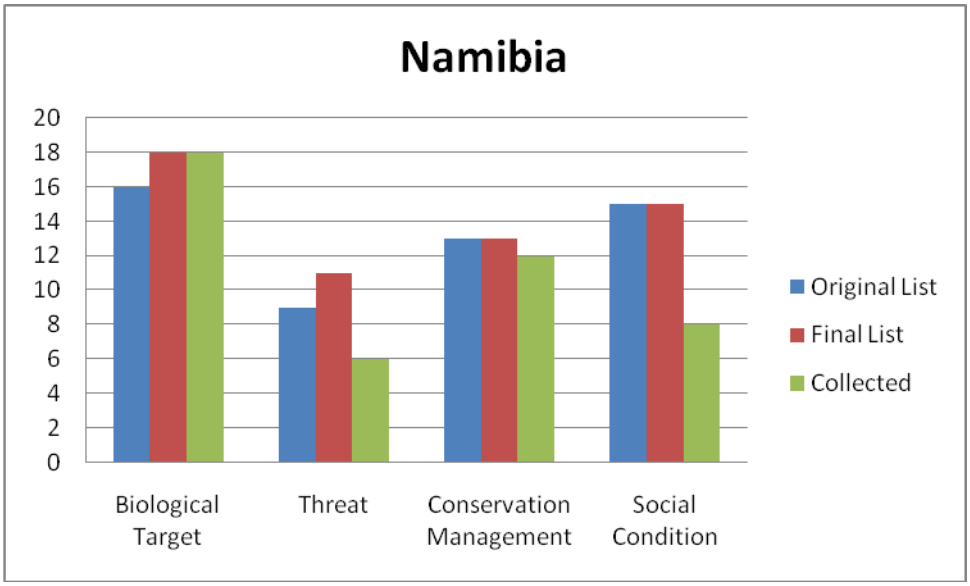
> From the Namibian perspective, one of the strengths was that the Conservation Measures methodology allowed us to test and evaluate our existing conservation paradigm.

However, they also expressed concerns about the threats-based conceptual modeling methodology:

> One of the biggest weaknesses of the methodology (Miradi) is that it is completely threat focused and does not encourage creative thinking in terms of identifying and capitalizing on opportunities – both conservation and socio-economic. When the Namibian programme was subjected to the methodology major components of the most successful aspects of the programme did not emerge. This apparent shortcoming was raised with the USA based team through an exchange of emails but was not ultimately resolved.

From the perspective of DC-based staff, creative thinking can be captured in the conceptual models and results chains. If Namibia's strategies were analyzed using the Results Chain methodology (the next step after developing a Conceptual Model), it is likely that the most successful components would emerge.

Finally, there was a mismatch between the intention of the "social measures" pilot effort and the way it was implemented in Namibia. The orientation of the social indicators that Namibia selected was different from the orientation of social well-being "status" indicators that the Measures program intended to test. The social indicators included in the Measures framework were programmatic in focus and relied on the data already collected for monitoring the programmatic interventions in Namibia. While these data are valid for monitoring and measuring the impact of WWF-Namibia's interventions, they do not provide information about the overall status of social well-being across the NW Namibia landscape. It is unclear whether this is solely an issue of indicator selection or whether there would have been challenges accessing data to measure such general status indicators.



3. Resources

Due to the challenge of finding adequate capacity, the WWF-LIFE office did not spend the full resources allocated for this effort within the project timeframe. Broader lack of resources for WWF-LIFE office created challenges for measures, as general resource constraints made it difficult for the local office to focus on measures activities (which were less time sensitive than finding basic operating costs).

According to Namibia staff, the resources that the project office brought to the table contributed significantly to the success of the program. Had the time and expense to generate data in the CONINFO database been accounted for in the Measures pilot, the overall cost would have increased significantly:

> Most importantly, this project benefited hugely by capitalizing on a decade's worth of monitoring support and comprehensive inventory surveys from a number of independent projects. This project drew heavily on data and information generated by an extremely widespread and comprehensive local-level monitoring programme referred to as the 'Event Book System', as well as

the Namibian atlas, and a number of specialist researchers' databases. Without this prior investment this project would probably only have been able to generate approximately 10-15% of the achieved results. The difference in the amount of data available for the communal lands versus that for the freehold and parks is a tangible illustration of the key role that previous monitoring efforts in the landscape have played. In short, it is critical to understand that the outputs generated by this project would not have been achieved with the same of investment made by the current measures project.

4. Time

Once the local office was able to find capacity (from WWF-US, S. Africa, and locally), it was able to move quickly to collect, analyze, and map necessary data. Time to focus on measures activities seemed like a key constraint, as a result of human capacity limits noted above.

According to the WWF-Namibia office, the following time was committed to the project:

- GIS consultant: 47 days
- Natural Resource Advisor: 45 days
- Director of WWF in Namibia: 7 days, and
- Direct support from two WWF-US (CSP) staff: (note: the core measures team believes the number is closer to 15-20 person days).
- Student working on data collection: approx. 6 days
- WWF Natural Resource Technician: approximately 65 days in the field collating and capturing data from different conservancies and supporting conservancies in the monitoring programmes.

Most importantly this number of days should not be used as any indication of what it would take to replicate this in another landscape. In Namibia the measures project was fortunate in being able to capitalize on almost a decade of investment into local level, as well as national-level monitoring systems.

5. Programmatic

a) Alignment

In the short-term, the results of the Measures program seemingly have little bearing on the conservancy program activities. The Event Book system meets ongoing monitoring and informational needs; all while garnering active community participation in conservancy management. The traditional program orientation of WWF in Namibia posed some challenges in the development of appropriate status indicators. As noted in a previous section, the indicators tended toward program effectiveness, particularly in the case of social indicators.

The Measures process stimulated thought about moving from a program focus to a landscape focus, as may happen in certain parts of Namibia, including the northwest. This reframed thinking from program metrics and activities to the landscape scale would be essential if Namibia is to evolve from a program to a country office. The data may also contribute to a tool

for policy advocacy and/or programmatic support by forming the foundation of an "Atlas of the Northwest" that the Namibia project staff have talked about producing.

However, the new northwest landscape forms only a portion of the area that the existing database was developed for:

> Conceptually, the Measures project fits extremely closely with the activities of WWF in Namibia, and in particular, the north-west landscape in relation to monitoring the impact of the CBNRM programme. However, the spatial scope of the measures project did not align well with previous data collection methodologies, as the Measures activities were confined to the landscape – a subset of the national CBNRM monitoring information system and the national CBNRM programme was confined to a certain land tenure system being the communal lands.

Even with these challenges, the field appreciates the importance of having landscape-scale data, in order to carry out conservation planning at the landscape scale:

> A positive aspect of the measures work was that it highlighted spatial gaps in the landscape where there is no data available. As mentioned previously this was as a result of WWF's activities over the past decade having being focused on CBNRM. Filling these gaps will be no easy feat. Firstly, WWF in Namibia has neither programmes nor any funding for work in National parks and freehold farms - although we try to work closely with these land managers on issues of common concern with conservancies. Secondly, even if these areas were fully included into WWF programmes, it would take years of effort to initiate and develop the necessary local level monitoring programmes that are the critical building blocks for a measures programme. Nonetheless, it will be important for planning at a landscape level to rectify these shortcomings.

b) Leadership

Leadership challenges link back to human capacity issues. Office leadership provided key support and assistance, operating in a very collegial and collaborative manner. Unfortunately, given the other pressures on local leadership, it was very difficult to get measures onto the agenda. And, there was no one to whom this could be delegated because of broader capacity limits and the small size of the office.

c) Structure

The highly participatory nature of the data collection/ownership in Namibia, as well as the highly collaborative nature of the program (with numerous partners), meant that data acquisition, use, and attribution were extremely contentious issues. Namibia certainly highlights that the *existence* of data does not necessarily imply the ability to *access* or *use* data. Data sharing within WWF cannot be assumed – and time must be built into the measures process to explore and address issues of data ownership, access, and use. In this case, even though the WWF-US program team in Namibia had significantly contributed to and were routinely using these data,

getting agreement from Namibian partners to use data for Measures activities required considerable time, energy, and organizational sensitivity.

There were also impressions that the Measures program came across at times as a directive from the WWF in the USA, as highlighted in the following quote from the Namibia program report:

> …in an attempt to standardize outputs and data structures, the project had a tendency to be top down. [As a result] local Namibian partners were antagonistic because they felt that the data were for 'WWF- US' ("they want our data") and the WWF team in Namibia were hard pressed to allay these fears.

This was particularly problematic given the issues of ownership, as noted above. However, it also sheds light on the need for any externally driven effort (Measures or otherwise) to be sensitive to meeting the field where it is. Otherwise it risks stumbling (or failing) from lack of local buy-in, based on the perception of being a top-down mandate. Even though the Measures Program did not intend to dictate top-down mandates, a good lesson learned is the importance of effectively communicating the program intent. Equally important is the need to develop a flexible program – in partnership with the implementing field offices – that capitalizes on the strengths of the field office (in this case, the Event Book system), while meeting the needs of the Donor Organization or the WWF Network.

Namibia staff echo this sentiment, while also conceding that the support provided by WWF-US staff was invaluable:

> The Namibian measures programme received invaluable support from staff from Washington. This was particularly needed as WWF staff were overcommitted and struggling to maintain core business during a difficult transition period from USAID funding support to WWF family core support. As a result, assistance from the contracted GIS expert was invaluable.

Many of these structural problems stem from the hurried way in which the Measures Program moved from planning to implementation. It precluded the DC-based team from spending the time necessary to develop a coherent vision or find viable, willing field partners to test the methodology. Taking on six places at once was also probably overly ambitious and stretched the team too thin.

C. Summary of Lessons Learned - Namibia

- The *existence* of data does not necessarily imply the ability to *access* or *use* data. Data sharing within WWF cannot be assumed – even when WWF filed offices have generated data as a joint effort with local partners – and time must be built into the measures process to explore and address issues of data ownership, access, and use.
- When entering into partnerships for data collection or sharing, WWF needs to clearly address the associated intellectual property rights; and reach clear agreements with all relevant stakeholders in the partnership

- Generating robust data across large scales takes time. In Namibia, the Measures project pulled data from a 12-year monitoring program, plus a number of inventory initiatives (e.g. the Namibian Atlas).
- From the perspective of WWF staff in Namibia, the threat focus of the WWF Standards conceptual modeling method did not highlight the opportunity-based orientation of the Namibia office
- The inability to capture "social targets" in the conceptual models (and Miradi) presented a challenge for Namibia staff. From a technical perspective, it is possible to work around this limitation. However, the challenge stems from different philosophical perspectives on the appropriate way for WWF to address social factors. The perspective promoted in the WWF Standards is that social objectives can exist as a means to a conservation end. However, some in the WWF network – including Namibia staff - highlight social goals as an end because they feel that conservation won't gain traction without them.
- The Measures methodology facilitated a "scaled-up" view of the NW Namibia landscape, helping staff to conceptualize strategic action beyond its traditional focus on individual conservancies in communal lands. This lays the foundation for Namibia to achieve conservation results at the landscape scale.
- A limited pool of highly-skilled human resources was a severe limitation for Measures in Namibia. The Measures Program – with its one-year time horizon – could not provide enough incentive to bring skilled, employed Namibians in to fill the role of the field-based Measures Officer.
- Any Measures effort should build in time to assess existing monitoring and data management systems and explore options for integrating systems to meet local needs and WWF network needs. The one-year time horizon of the Measures Program was not sufficient create a streamlined data management system that worked for both WWF broadly and the Namibia office and its partners.
- The indicators selected for the Social category of the Measures Framework, as well as in some of the Threat and Conservation Management indicators would better measure programmatic outcomes than the current state of the social, institutional and enabling conditions of the place. Status measures are inherently *not* tied to WWF programs. However, introducing this novel concept to staff in well-established programs requires time and adequate training to move beyond outcome-oriented metrics to status metrics.

D. Indicators

Biological Indicators – Namibia

Target	Key Attribute	Indicators
1. Black-faced impala	population size	number of individuals
1. Black-faced impala	population size	% historic range occupied
2.Black rhino	population size	relative abundance
2.Black rhino	structuring of vegetation	% of historic rhino range now occupied
3. Large herbivores	presence/absence	% of historic complement of large herbivore spp. now present
3. Large herbivores	structuring of vegetation	% of historic elephant range now occupied
3. Large herbivores	ecological connectivity	map of contiguous habitat patch, and contiguity index
4.Large predators	predator-prey dynamics	% of historic complement of predator spp. now present
4.Large predators	lion abundance	# lions
4.Large predators	lion abundance	% original range occupied
4.Large predators	cheetah abundance	cheetah observations/100 km transect
5. Namib desert	extent and condition	% in good condition
6. Nama Karoo	extent and condition	% in good condition
7. Salt pans	extent and condition	% in good condition
8. Tree-shrub savannah	extent and condition	% in good condition
9. Riparian/watercourses	extent and condition	% water points/springs intact (no human settlement, etc.)

Threat Indicators - Namibia

Target	Key Attribute	Indicators
1. Poaching		% or # of protected & specially protected spp. killed/yr
2. Killing of "pest" animals		relative abundance of pest animals (jackals, vultures, raptors)
3. Barriers to connectivity	Fencing	km of fences

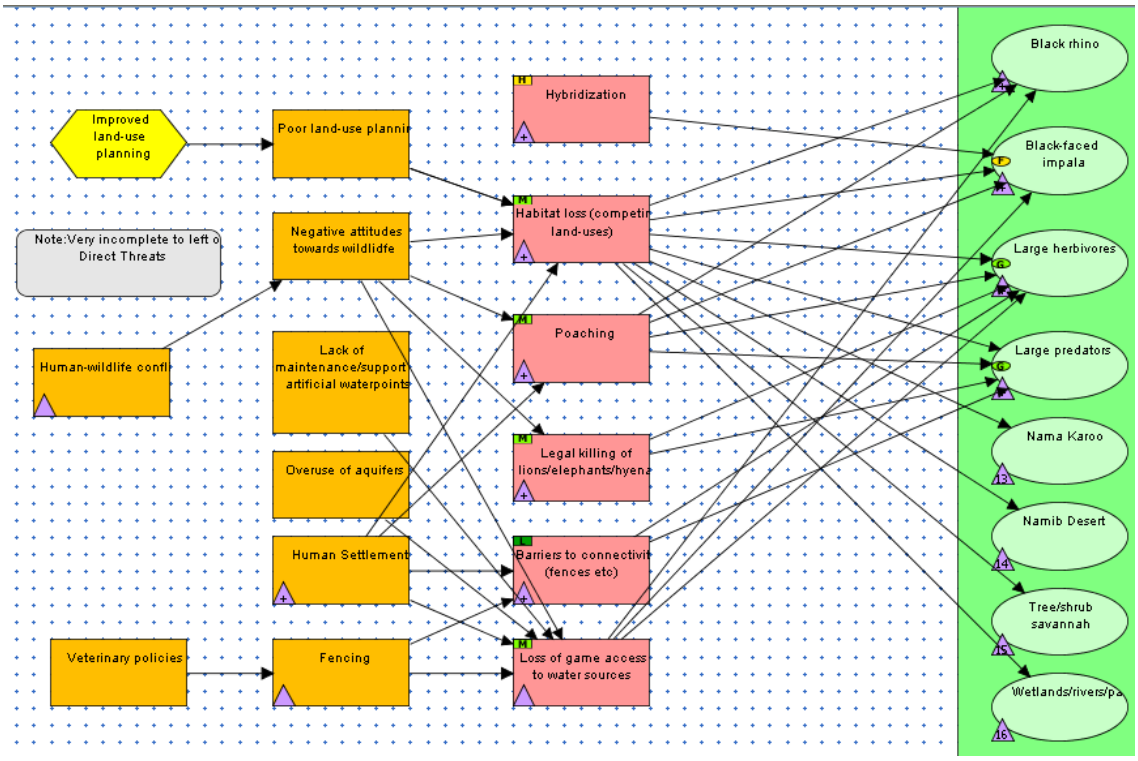
Conservation Management Indicators - Namibia

Target	Key Attribute	Indicators
Riparian habitat		% linear watercourse under protection (cons, PA, freehold,etc)
Terrestrial habitat		% total area under conserv. Mgmt. (conservancy, park, concessions)
Namib desert		% biome under cons. Mgmt
Nama Karoo		% biome under cons. Mgmt
Salt pans		% biome under cons. Mgmt
Tree-shrub savannah		% biome under cons. Mgmt
Management capacity	Management plans	% conservation mgmt units w/comprehensive mgmt plans
Management capacity	Management plans	#/% of management units implementing management plans effectively
Management capacity	Patrols	# game guards/ 5000 ha
Protected area representation		% priority areas for terrestrial diversity under protection
Protected area representation		% priority areas for terrestrial endemism under protection
Ecoregion conservation		% area covered by co-management institutions
"green" enterprises		% Namibian conservation enterprises eco-certified
Self-financing	sustainable finance	% of conservation management units fully covering own costs/yr

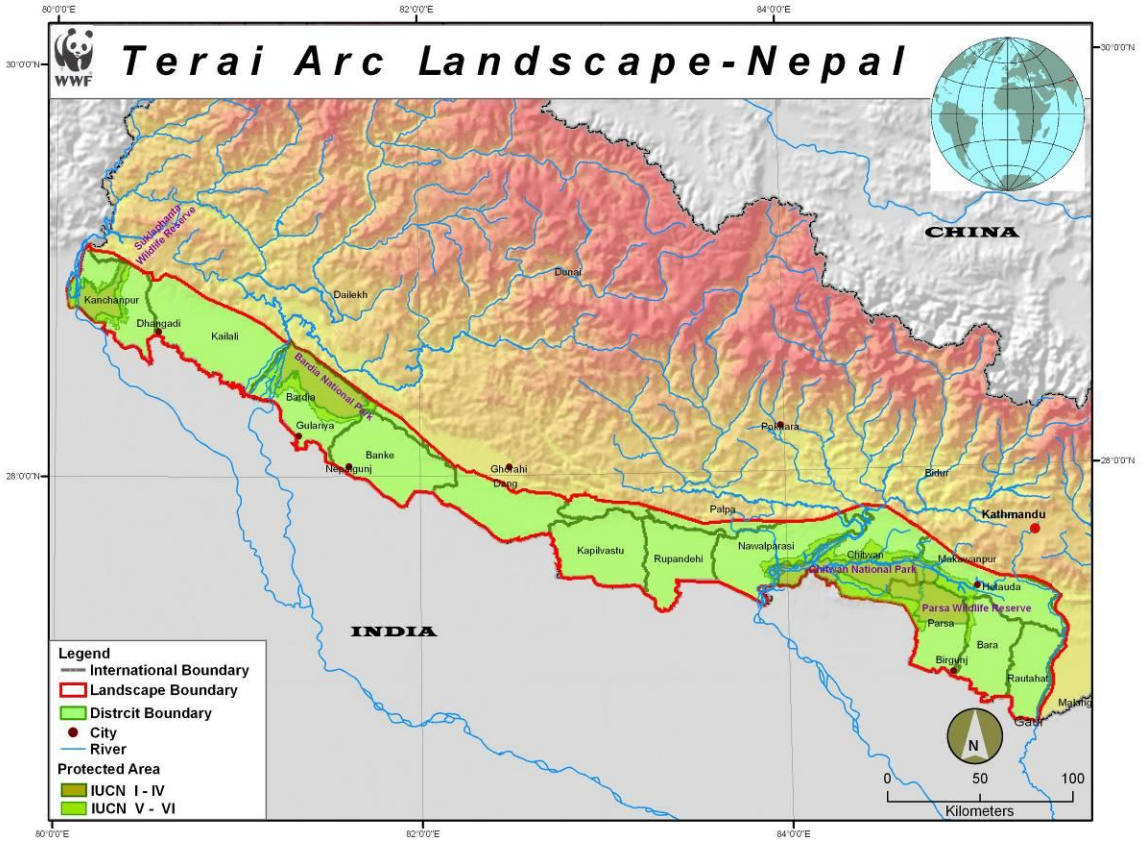
Social Indicators - Namibia

Domain	Key Attribute	Indicators
health	risk of injury or death	% pop or # individuals attacked by wildlife/yr
health	food security	% livestock killed by wildlife/yr
health	food security	# or % fields raided by wildlife/yr
health	Disease prevalence	% population HIV+
health	Disease prevalence	% population w/malaria/yr
health	nutrition	kg / game meat distributed /capita / yr
health	access to health care	% population w/"ready access" to health clinic
economic well-being	Natural assets	monetary value of wildlife populations in landscape
	Conservation revenues	total revenue from conservation-based economic activity
	Employment	total jobs generated by conservation-based economic activity
	Employment	% jobs generated by conservation-based economic activity held by women
political empowerment	resource rights	% of conservancy population who are registered members
	resource rights	% population who reside in conservancies
	female empowerment	% conservancy mgmt members who are female
	security of land tenure	(unsure how to measure)
education	access to education	% population (children) w/"ready access" to a primary school
	environmental awareness	level of conservancy commitment to conservation demonstrated through NRM staff levels
	environmental awareness	level of conservancy commitment to conservation demonstrated through investment of own funds into NRM
culture	traditional ceremonies	% conservancies w/game meat available for traditional ceremonies
	local ecological knowledge	% landscape mapped through participatory mapping of local knowledge
	local ecological knowledge	# or % local trackers demonstrating wildlife expertise/tracking skill

E. Conceptual model – Namibia



VII. Terai Arc Landscape – Nepal



A. Introduction

When established in 2004, the Terai Arc Landscape (TAL) represented a paradigm shift in biodiversity conservation. While past conservation initiatives have focused on protected areas, species preservation, and integrated conservation and development programs (ICDPs), the Terai Arc Landscape program takes conservation beyond boundaries of protected area management and national borders, and focuses on connectivity, communities, ecoregions, and landscape-level planning.

The TAL-Nepal spreads over an area of 23,199 km^2 and is bound by the Mahakali River to the west, Bagmati River to the east, Churia ridge to the north, and India to the south. It encompasses parts or all of 14 Terai Districts: Kanchanpur, Kailali, Bardia, Banke, Dang, Kapilvastu, Rupandehi, Palpa, Nawalparasi, Chitwan, Makwanpur, Parsa, Bara, and Rautahat. Fed by the waters from the Churia (Siwalik) Hills and mountains, the Terai Arc Landscape-Nepal is highly fertile and is appropriately called the "rice bowl" of the country.

According to the 2001 census, 6.7 million people of mixed ethnic groups and migrant histories live in the Terai Arc Landscape–Nepal. While hill migrants generally settled in the Terai's northern regions, indigenous Tharus populate the southern regions. Migration,

particularly from adjoining hill districts, continues to be a leading cause of population growth in the Terai.

The majority of TAL-Nepal's inhabitants are poor and rely on subsistence agriculture as their main source of livelihood. The average household income is NRs 7,200 per annum, but there are considerable inequalities within and between districts in the Terai. Sixty percent of TAL-Nepal households own less than one hectare (1.5 *bigha*) of land, and 71% of the population are unable to grow food sufficient to last through the year. Poverty is generally higher amongst indigenous Tharus, Dalits (socially disadvantaged groups), and ex-Kamaiyas (bonded laborers who were emancipated in 2001). Moreover, poverty is geographically skewed towards the Mid- (44.8%) and Far- (41%) Western Development Regions (NPC-CBS 2005).

WWF-Nepal has developed robust monitoring systems for key species and landscape indicators. For example, it has conducted the Rhino Count every 5 years since 2000. The TAL was included in the Conservation Measures pilot program because it was perceived that there was a fair amount of existing data that could fit into the Measures program model.

Conservation Status (based on the information collected during the measures pilot):

Biological
It is evident that the population size of rhino and tiger is decreasing. There is the dispersal of those species with the restoration of critical areas. Endangered vultures are on brink of extinction. Gangetic River Dolphin is decreasing in number.

Threats
Poaching of focal species has decreased but this is still a challenge. Human wildlife conflict is also a major issue in the landscape. Oil and gas extraction, invasive species and encroachment are the main threats in the landscape.

Conservation management
The area under specific management has increased throughout the years. It includes protected areas, buffer zones, corridors and bottlenecks. Human resource from government for the landscape remains almost the same as cabinet approval is required for the deputation of gazetted officers. Similarly, there is no substantial rise in the annual budget throughout the years. Most of the government budget is spent on management or overhead.

Social conditions
There is a general trend of population increase in Terai. The estimated rate of population increase is 3.93% for TAL as compared to 2.13% for Nepal. This increasing number of populace could be the reason why the % of population with sustainable access to an improved water source has decreased than in 2001 despite the interventions. The % of population with ready access to health clinic has crossed 100% which could be attributed to the increasing number of Indians receiving the health services along the border areas. The number of households with legal access to forest resources is increasing with the formation of community forest user groups. The country was plunged into civil strife for

a decade which finally ended in 2006. This had hampered the development activities in the country and the service delivery by government was extremely poor during that period.

B. Project Analysis

1. Capacity

WWF-Nepal was well positioned to test the conservation measures approach in the Terai Arc Landscape. It already had a Monitoring & Database Unit with two full-time staff, as well as long-term monitoring plans for certain species (rhinos and tigers) and project activities. With the hire of a Monitoring Officer through the Conservation Measures grant , the M & DB Unit expanded to three full-time staff. The unit is supported by full-time research biologists, GIS staff, and a livelihoods specialist; all of whom contributed to the Measures project.

The WWF-Nepal Measures staff had the appropriate blend of expertise, including a solid methodological grounding and ability to manage complex projects. WWF-US staff did provide some technical assistance and support to supplement on ground capacity. The Measures Officer also required supplemental assistance from other WWF-Nepal staff regarding social components and GIS analyses. The TAL team demonstrated strong commitment and managed transition in staff effectively – from the US-based program lead to the place-based Measures Officer once hired.

However, even though Nepal has excellent human capacity in place, progress on the Measures program was delayed by capacity issues. The delay occurred because the Measures Officer was asked to fill gaps on the M&E team when one member resigned, and was pulled into other efforts within the WWF-Nepal office. This highlights a challenge in the "dedicated staff" model. Even though staff are dedicated to a particular set of tasks, management may still reprioritize its staff's activities if there are competing priorities within the organization.

2. Methods

All four categories of indicators were developed in a workshop attended by a representative group of WWF-Nepal staff. The workshop had strong support of senior management, for example both the Nepal Country Representative participated in part of the 3-day workshop and the Conservation Director participated in nearly all of it. In addition, the US-based place lead participated, as did the place-based Measures Officer. This mix of participants demonstrated – and perhaps contributed to – a level of commitment and buy-in to the process that would help the Measures project on track, with fewer transaction costs than in other places where buy-in was weaker. However, as

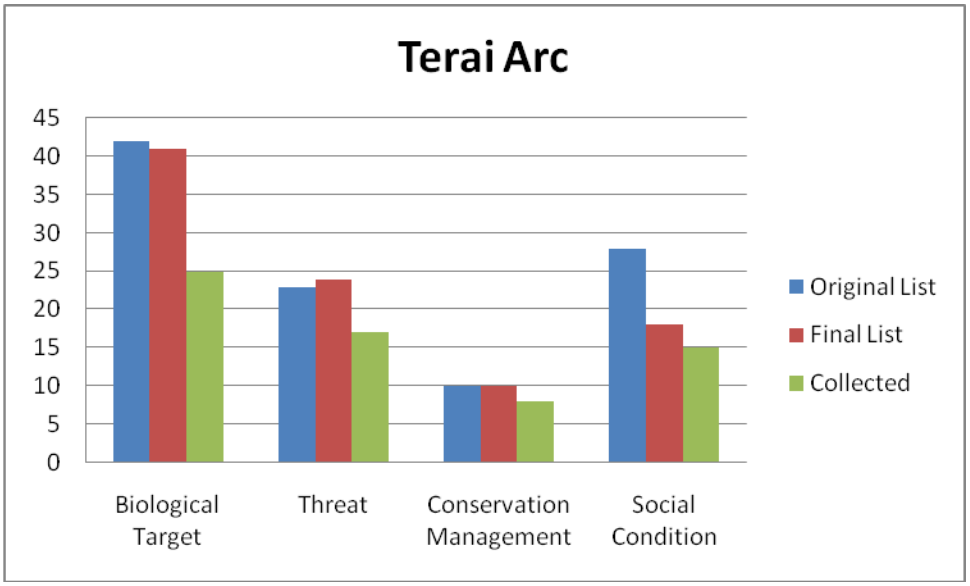
in most of the other Measures geographies, there was a tension between WWF-US' focus on status measures and WWF-Nepal's preference to focus on strategy effectiveness.

During the Measures workshop, this tension manifested more strongly with regard to the social indicators than with the other measures categories. This is also a recurrent theme across geographies. As noted above, in early 2008 the TAL program was in the middle of implementing a 5-year strategic plan. Therefore, staff did not immediately buy into the value of collecting broad social context data that was, in some cases, not related to expected outcomes of program activities. It may have helped if some external social scientists, with deep understanding of socio-ecological relationships in Nepal, would have participated in the workshop. This would have enriched the discussion about the relationships among the categories of indicators, and added support and legitimacy to the claims of the internal Livelihoods Officer. Due to the condensed timeline of the overall Measures effort (as explained in Program Lessons section below), there was not enough time to put this together. Moreover, prior to the workshop, there was a general consensus among the team that it would not be productive to include partners at that point in the process.

There was widespread existing data from WWF's monitoring efforts, government, and research institutions. The field team was comfortable using existing data, unlike some of the other place teams. According to the field report:

> The entire work was based on secondary data. They were mostly published data and only few were unpublished (raw) data. WWF Nepal has a great strength on data for biological targets. It is supported by the GIS facility. Department of National Parks and Wildlife Conservation (DNPWC), Department of Forest (DoF), IUCN-Nepal, Bird Conservation Nepal (BCN) and similar organizations were visited for the data for biological, threats and conservation management. UNDP, UN-WFP, National Bureau of Statistics, Department of Health Services, Ministry of Education, Sports and Culture, Department of Water Supply and Sewerage, Social Welfare Council, National Women Commission and other development-related organizations were visited for the data for social indicators.
>
> Most of the government institutions have poor data management system, let alone the bureaucratic sluggishness, so a lot of effort was put to drain data from the departments. Raw (unpublished) data were taken and analyzed at instances. Data could not be found for each year as shown in the template e.g. national census data is taken in every ten year and forest cover and wildlife census etc. are carried out in certain pocket areas of interest of the scholar. So, it was harder to interpret the dataset for the entire landscape based on the data in hand for the pocket areas. Forest cover analysis is usually carried out every 10-years; rhino count (status and distribution) is done every 5-years and the tiger and gaur estimations were a one-time research study.

Given the relatively small scale of the conservation geography, relatively fine scale units for social data were necessary to have value/meaning for staff operating at landscape level. Most of the data correspond to the district level, however some data were available at the Village District Committee (VDC), which comprises nine wards; four-seven villages/ward. This level provides better resolution for decision makers. There was also a mismatch between boundaries of data collection (administrative) and conservation planning (biogeographic). WWF-US provided some technical assistance to test methods to manipulate the social data to correspond to the biogeographic boundaries. This process has moved slowly due to time and capacity limitations in DC. In addition, questions emerged regarding the relationship among variables, and one's ability to understand local dynamics based on data aggregated at the district or VDC level.



3. Time

Nepal joined the measures program late, as they did not initially receive funding from the Sall grant. Strong organizational links and some personal relationships ensured strong field commitment to overall effort, which is similar to the case in Namibia. This accelerated the project startup and limited the transaction costs that have been associated with other places. Similarly, the availability of considerable existing data enabled the Nepal program to get up to speed quickly. There was a delay in hosting a workshop until 6 months into effort. The delay was the result of limited WWF-US staff capacity to start-up the program in 6 places simultaneously. To some extent, this hindered local buy in and understanding, as well as the deepening of personal relationships required to be effective. However, due to various factors mentioned above, this delay did not significantly affect progress.

4. Resources

According to WWF-Nepal, the financial resources provided were sufficient to accomplish the project objectives.

5. Programmatic

a) Alignment

A strategic plan for the TAL is in effect until 2014. Therefore, the Measures work was not fully aligned with the Program Office's needs. The information on Conservation Status would have been most useful either when the strategic plan was being developed or when WWF-Nepal goes into a new strategic planning phase. During the workshop to develop status indicators, however, WWF-Nepal staff recognized the value of revisiting biological targets and threats to provide a feedback loop for adaptive management purposes. They also expressed a clear desire for support in measuring the effectiveness of the strategies being implemented in TAL. Strategy effectiveness measures would have been more aligned with the TAL program in 2007-2008. However, the Nepal office values and has a long history with monitoring, so it was a willing partner in the Measures pilot. Additionally, the office is eager to adopt the Network Standard approach for Measures, so it was hopeful that by participating in the pilot project it would be an early adopter of the future network-wide standard for measurement.

As regards the alignment, the WWF-Nepal Measures Officer expressed the following

> TAL envisions 'A globally unique landscape where biodiversity is conserved, ecological integrity is safeguarded and sustainable livelihoods of its people are secured'. It identified five broad program areas, which are governance, sustainable forest management, species and ecosystem conservation, Churia watershed conservation and sustainable livelihoods based on its strategies. Targets were set for each program e.g., number of policy formulation, area under restoration of degraded forests, action plans for key species, area under watershed management, coverage of sustainable livelihoods etc. It is supported by logframe, where goals, objectives, outputs and activities are elucidated in a matrix. Some of the activities are enhancing capacity of various institutions, effective management of forests, reduction of human wildlife conflict (HWC), increased understanding of ecological services of Churia, enhancing opportunities of income generation based on forest or agriculture resources etc.
>
> The measures work is a 'monitoring process' at a higher level (impact monitoring) of the projects in the landscape. The projects are being implemented by WWF Nepal and its partner organizations. The measures template subsumes four domains namely, biological, threats and opportunities/assets, conservation management and social condition. It keeps track of time-series data of each identified indicator. The output and outcome of conservation activities are reflected in the template, whereas the social

conditions reflect the outcome and the impact of the corresponding projects. WWF Nepal has been working on endangered species and habitat. The template reflects the output (annual) of the conservation activities. It complements the activities on habitat and species, e.g. work in critical areas are reflected by the data for functional corridors, activities to reduce poaching and retaliatory killings, support for biogas plant etc.

However, the measures work has very less correlation with the works carried out by WWF Nepal on livelihood issues (social indicators). The datasets are [too coarse to assign attribution to] the activities of WWF Nepal.

b) Leadership

Nepal staff have provided strong leadership. The move of the former measures lead to DC as Eastern Himalaya's Senior Program Officer for the Nepal program provided depth of technical knowledge and programmatic support for Measures. After arriving in DC, he worked closely with the core conservation measures team in DC to initiate the project, and played a strong role in liaising with colleagues in WWF-Nepal to ensure that the project stayed on track.

In WWF-Nepal, a new staff member was hired to fill the Measures Officer took role. As a new staff, he may have had less standing in the organization than the previous measures lead. This may explain why he was drawn into other projects and had challenges moving the work forward quickly amidst competing priorities. On the other hand, it is a testament to this new staff member's valued skills that he was drawn into other projects, and asked to take over as the M&E lead in the spring of 2008 when the woman who held this position resigned. Taking on these additional responsibilities also meant that the Measures Officer was unable to devote 100% of his time to the project. Ultimately, the decision of more senior WWF Nepal staff to redirect the Measures Officer to other efforts may reflect a sentiment that Measures moved down the list relative to the other priorities that emerged.

c) Structure

In TAL, the program intentionally focused on the portion of landscape occupied by Nepal, and excluded the India side of the TAL. This simplified management and avoided structural complexities associated with cross-border collaboration. At the same time, it fails to provide a comprehensive picture of conservation status of TAL in its entirety – which is the point of this initiative (and ecoregion conservation, for that matter). This challenge will become more acute if this effort is scaled up to the NI level for the Living Himalayas initiative.

C. Summary of Lessons Learned - TAL-Nepal

- Strong organizational links and some personal relationships ensured strong field commitment to overall effort. This accelerated the project startup and limited the transaction costs that have been associated with other places.

- Strong technical capacity in the WWF-Nepal office facilitated the compilation of a robust, largely complete set of data for most of the indicators in each Measures category.

- Relative to other places, it was a straightforward process to find a Measures Officer with the appropriate mix of technical skills.

- Even with dedicated Measures staff, management may still reprioritize its staff's activities if there are competing priorities within the organization.

- Active participation of leadership within WWF-Nepal at the early stages of the program resulted in a higher level of commitment and buy-in than in other Measures places. The Nepal Country Representative and the Conservation Director participated in the workshop to develop the Measures indicators. In addition, the US-based place lead, the CSP Liaison and the place-based Measures Officer all participated in the workshop.

- There was widespread existing data from WWF's monitoring efforts, government, and research institutions. However, available data were patchy both temporally and spatially, creating challenges to interpret data for the entire landscape at one point in time.

- Government institutions in Nepal have poor data management systems and sluggish bureaucratic processes. This resulted in a time and labor-intensive process to collect data.

- WWF-Nepal had a demonstrated commitment to monitoring prior to the project's inception, which facilitated an easy uptake of the Measures effort

D. Indicators

Biological Indicators – Terai Arc Landscape - Nepal

Target	Key Attribute	Indicators
Target: By 2020, demographically and ecologically viable populations of focal species conserved		
Species 1a. Tiger	Population size (size)	Number of individuals
Species 1b. Tiger	Population distribution (area)	% historic range occupied
Species 1c. Tiger	Demographic structure (condition)	Number of breeding adults in core populations
Species 2a. Greater One-horned rhino	Population size (size)	Number of individuals
Species 2b. Greater One-horned rhino	Population distribution (area)	% of historic rhino range occupied (Terai area only)
Species 2c. Greater One-horned rhino	Demographic structure (condition)	Number of calves in core populations
Species 2c. Greater One-horned rhino	Demographic structure (condition)	Calf to Female Adult (per 100)Ratio
Species 3a. Asian elephant	Population size (size)	Number of individuals
Species 3b. Asian elephant	Population distribution (area)	% of historic range now occupied
Species 3c. Asian elephant	Demographic structure (condition)	Number of calves in core populations
Species 4a. Swamp deer	Population size (size)	Number of individuals
Species 4b. Swamp deer	Population distribution (area)	% of historic range now occupied
Species 4c. Swamp deer	Demographic structure (condition)	??? (verify with Ritesh & then Eric W)
Species 5a. Slender billed Vulture	Population size (size)	Number of individuals
Species 5b. Slender billed Vulture	Population distribution (area)	??? (verify with Eric W & BCN)
Species 5c. Slender billed Vulture	Nesting success (condition)	Number of nests/sites
Species 6a. White-rumped Vulture	Population size (size)	Number of individuals
Species 6b. White-rumped Vulture	Population distribution (area)	??? (verify with Eric W & BCN)
Species 6c. White-rumped Vulture	Nesting success (condition)	Number of nests/sites
Species 8a. Gangetic Dolphin	Population size (size)	Number of individuals
Species 8b. Gangetic Dolphin	Population distribution (area)	% of length of river
Species 9a. Gharial	Population size (size)	Number of individuals
Species 9b. Gharial	Population distribution (area)	% of historic range now occupied
Species 9b. Gharial	Number of captive population released	Number of individuals

Target: By 2020, 56 Terai wetlands under effective management for biodiversity conservation		
8a. River system (lotic)	Continuity	Length of undisturbed river stretch
8b. Wetlands (lentic)	Number of active wetlands	Number of Wetlands under effective management
Target: By 2020, XX ha of grassland and YY ha of forests under effective management for biodiversity conservation		
Habitat 1a. Churia Forest	Area in hectares	Area under conservation management and restored in PAs
Habitat 1b. Churia Forest	Area in hectares	Area under conservation management and restored outside PAs
	Quality (condition)	% of non-degraded forest
Habitat 4a. Terai Forest	Area in hectares	Area under conservation management and restored in PAs
Habitat 4b. Terai Forest	Area in hectares	Area under conservation management and restored outside PAs
	Quality (condition)	% of non-degraded forest
Habitat 2. Riverine Forest	Area in hectares	Extent
	Quality (condition)	% of non-degraded forest
Habitat 5a. Saccharum spontaneum dominated grassland	Area in hectares	Area under conservation management and restored in PAs
Habitat 5b. Saccharum spontaneum dominated grassland	Area in hectares	Area under conservation management and restored outside PAs
	Quality (condition)	% of non-degraded grassland
Habitat 6a. Other grasslands	Area in hectares	Area under conservation management and restored in PAs
Habitat 6b. Other grasslands	Area in hectares	Area under conservation management and restored outside PAs
	Quality (condition)	% of non-degraded grassland
Habitat 7. Corridors	Number of corridors	Number of corridors being used by focal species

Threat (& Opportunity/Asset) Indicators – Terai Arc Landscape - Nepal

Target / Theme	Key Attribute	Indicators
Habitat conversion		
1. Agriculture expansion	Area	Area (ha.) agriculture in PAs, BZs, corridors & bottlenecks
2. Encroachment	Area	Area (ha.) encroached in PAs, BZs, corridors & bottlenecks
3a. Infrastructure development	No. of sites	Footprint of impact
3b. Infrastructure development	No. of sites	Footprint of impact
3c. Infrastructure development	Length of Extension Grid	Footprint of impact
4. Natural succession	Extent (change in habitat)	Area of Grassland (Ha) in PAs
5. Oil & gas extraction	Number	Number of sites/ Blocks
Habitat degradation		
6. Watershed degradation	Number	Number of landslides
	Condition	Turbidity in major rivers
7. Unsustainable logging		No. of cases
8. Unsustainable fuel wood and fodder collection	Tons of oil equivalent	Quantity of unsustainable collection of fuel wood
	Number	Number of stall-feeding
9. Overexploitation of NTFPs		
10. Forest conversion (monoculture)	Extent	Conversion of forests into agriculture
11. Overgrazing	Extent	LU per unit Ha
12. Chemical pollution	Extent	
13. Uncontrolled forest fires	Number	Number of fires
14a. Invasive species	Area	Riparian Vegetation Infested
14b. Invasive species	Area	Degraded Land Infested
15. Unregulated tourism in PAs	Percent Increase/decrease from baseline	No. of Tourists flow in PAs
Population decline		
16. Poaching of focal species	Poaching incidents	Number of poaching incidents in TAL per year
17. Accidental killing	Extent	Number of animals killed
18. Retaliatory killing		Number of animals killed
19. Poor fishing process		
20a. Human wildlife conflict (with focal species)	Incidents of conflicts	Number of conflicts (fatalities, depredations) per year in TAL
20b. Human wildlife conflict (with focal species)	Impacts to local Communities	Human Injuries and Fatalities

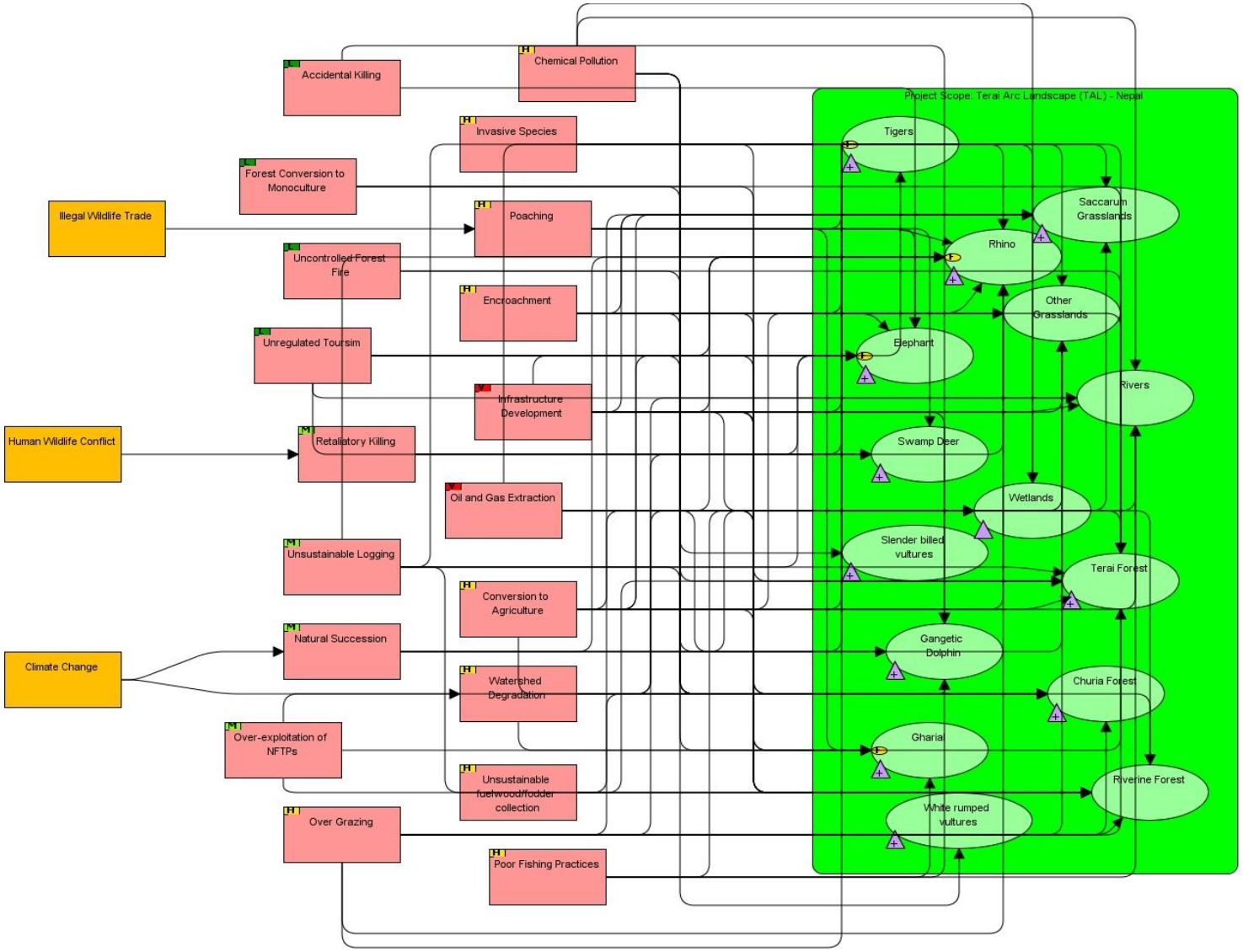
Conservation Management Indicators – Terai Arc Landscape – Nepal

Target / Theme	Key Attribute	Indicators
Target: By 2020, four Protected Areas in TAL (Nepal) effectively managed		
1. Habitat representation		Representation of habitat types by PAs
2. Management plans		Management plans for PAs & CFs
3. Specific management of some habitats		% of landscape managed under specific management plans
4. Resource allocation to PAs		Government allocation of resources to PAs
5. Management effectiveness of four PAs	Management plans	Percent execution/implementation of management plans
6. Institutions	Number	Number of existing registered (formal) management institutions
7. Human resource	Number	Number of government staff deputed to manage biodiversity in Terai
8. Budget		Annual budget allocation by government for management of biodiversity in Terai (TAL)
9. Management capacity of four PAs	Staff/Infrastructure/equipment	RAPPEM Score
10. Management budget of 4 PAs	Budget	% budget available against required

Social Indicators – Terai Arc Landscape - Nepal

Target / Theme	Key Attribute	Indicators
Economic well-being	Assets	% of area under forest cover
		% of permanent households*
		Number of biogas plants*
		% of HH using Solids Fuel *
	Land	% of HHs with landholding <0.5 ha
	Access to credit	% of HHs with access to institutional credit
	Income	Total revenue from conservation-based economic activity
		% of population below $1 (PPP) per day
	Employment	Total jobs generated by conservation-based economic activity
		% of unemployment rate of people 15 - 24 age*
Health	Nutrition	% of population below minimum level of dietary energy consumption*
		Prevalence of underweight children under five years of age
	Food security	% of HHs with food sufficiency greater than 6 months
	Water security	% of population with sustainable access to an improved water source*
	Access	% population w/ "ready access" to health clinic
		% of population within half an hour walk to health facilities/outreach clinics
	Mortality	Infant mortality rate*
		No of Incidence of ARI per 1000 Children under <5 years*
		No of incidence of diarrhea cases per 1000 Children under , years
	Population	Total population
		Net migration
	Family planning	Contraceptive prevalence rate (CPR)
Political empowerment	Resource right	% of HH with legal access to forest resources
		Number of CBOs managing natural resources
		% indigenous people (IP) in CBO executive committee
	Women's Empowerment	% Community Forest Executive Committee members who are female*
		Ratio of Literate female to literate male (15-24) Years
		% of women in non agriculture sector
		% women in key positions of CBO related to NRM- executive committee
Education	Access	Ratio of girls to boys in primary, secondary & tertiary education
	Environmental awareness	% of students who are member of eco-clubs
		Total number of schools with ecoclubs in landscape
Culture	Culture	Number of ethnic groups

E. Conceptual model – Terai Arc Landscape - Nepal



VIII. WWF-US Core Conservation Measures Team

A. Introduction

The initial conservation measures grant was received in early 2007. After several months of organizing the project, laying the groundwork for the field work, developing the initial framework for measures categories and key metrics, and hiring key staff, the field work essentially commenced in November 2007.

In the meantime, the core conservation measures team was busy defining the exact scope of each geography with the relevant managing directors, and organizing short, multi-stakeholder workshops all over the world.

An annotated timeline follows:

July 2007 Namibia indicators, Windhoek, Namibia
August 2007 Terai Arc social indicator work
October 2007 Heart of Borneo (excluding social) indicators, Washington, DC, USA
November 2007 Coastal East Africa (both Ruvuma Wilderness and Primeiras & Segundas landscapes), Pemba, Mozambique
December 2007 Heart of Borneo (social only), Jakarta, Indonesia
December 2007 Bering Sea (with TNC), Anchorage, AK, USA
February 2008 Terai Arc, Kathmandu, Nepal

After the very intensive series of workshops was completed by the beginning of 2008, the process became one of ongoing guidance and support. In the meantime, the core measures team continued to meet on a biweekly basis, and continued to develop support materials that would provide assistance to the field staff, summarize the lessons of the project, and provide guidance that could be codified as part of the WWF Program Standards.

It is important to note that the conservation measures core team simultaneously had to design the program and to implement it. Considerable effort was required to develop a thoughtful program and to get it off the ground in six widely scatter locations. The biological and threat methods were based essentially on the WWF Program Standards, but the team responsible for the social component had to design a *methodology* simultaneous to the design and implementation of the *program*. It was very challenging to manage expectations and relationships with the field staff that are testing a methodology while it is actually still in the R&D phase.

The core measures team tried not to require burdensome reports from the field – relying instead on the TPRs that are required as part of any grant. Follow-up was accomplished with email, phone calls, and follow-up in-country visits (Coastal East Africa, Heart of Borneo, Coral Triangle, and Namibia). The liaisons gradually pulled back their

involvement and the core measures team took over the ongoing support and coordination roles.

It was apparent from DC that a number of the measures officers had multiple responsibilities, and that their focus on conservation measures was episodic. This is probably to be expected, and may in fact be beneficial in some ways, since having a measures officer integrated into the work of programs is a desirable situation. But it is also very challenging for timely assembly, analysis, and application of data.

February 2008 The Board of Directors of WWF-US approved a set of recommendations related to a number of program areas, including conservation measures. In the white paper submitted to the Board for consideration, the strategic review committee noted:

> "WWF-US Places and Drivers do not use a consistent methodology for developing goals, strategies, and measures. Although the Sall measures project has provided a jumpstart in six places, no WWF-US Priority Place or Driver has a comprehensive, funded, and implemented measures program for the entire the place or program."

One of the five recommendations endorsed by the Board was "Promote the use of common conservation planning and measurement methodologies across the Network." The core conservation measures team saw this as a sign that the work was valued and as an important step for the organization, and one that would lead to serious and deliberate review of the work of the entire group working on conservation measures.

July 2008 Field staff were requested to wrap up data collection by the end of this month, so that organization, mapping, and analysis could begin – leading to a group gathering in the Fall.

November 2008 A week-long conservation measures workshop and summit brought together the field staff that led the effort, relevant executive leadership from WWF-US and WWF-International, managing directors of priority places, measures staff from other donor WWF National Organizations, and the core conservation measures team.

Throughout, measures team attempted to coordinate with WWF-I, especially with the hire of a dedicated measures staffer Ashwin Bhouraskar, who came on board early in 2008. Before that, the team kept PJ Stephenson, the head of the WWF-I's Conservation Strategy and Performance Unit, apprised of activities and directions.

B. Project Analysis

1. Capacity

The Director of Conservation Measures was officially hired in August 2007, though retroactive to May 2007. The informal Deputy Director was brought on in parallel,

though he had been working on the initiative since late Summer 2006 without compensation or as part of any official portfolio.

Though the funding was available, there was focused internal resistance from one corner of WWF-US to the hiring additional support staff to implement the program from DC. This resistance was eventually overcome, and an overall conservation measures program officer was finally hired August 2007. A social measures staffer was hired in November 2007. However, determined efforts were made all along by particular WWF staff to limit the term of this support capacity – a constant source of distraction to the team.

The capacity of the core conservation measures team is believed to be sufficient to service 6-10 geographies total, as long as all of those geographies are not starting up at once, since there is a significant amount of transaction effort required to get a measures program up and running in a given place. The current (Fall 2008) allocation of capacity is:

- Part-time conservation measures director (60%);
- full-time conservation measures officer (100%);
- part-time social measures director and deputy measure director (30%);
- full-time social measures officer (100%)
- part-time remote sensing specialist (50%).

Initially, when the funds were available, there was also a CSP liaison for each place, with a 20% time allocation. The liaisons helped significantly while they were involved (through June 2008); especially when significant coordination was required in some cases (Bering, CEA). This amounted to a total of 1.2 FTEs. When the initial donor funding ran out, the services of the liaisons were removed from the program, and the core measures team took on the responsibility of ongoing support. The time commitment required to support each place was significant, ranging from 20% (Coral Triangle) to 60% (Coastal East Africa) of an FTE.

The presence of a remote sensing specialist on the team was absolutely critical. Many of the key biological (and some threat) indicators were ecosystem or community-scale metrics of extent that were only practically attainable using remote sensing. There is very little other remote sensing capability throughout the rest of the WWF Network.

No social measures guidance was available to WWF staff when we began the program, and approximately 1.3 FTEs spent a significant portion of their time developing this guidance. Significant progress has been made towards developing a social measures framework and guidance, but after the November 2008 measures workshop, effort will still be needed to complete guidance for the WWF Program Standards and detailed facilitators guidance. In addition to processes and structures, it can safely be assumed that continued technical assistance will be required to implement social measures elsewhere – to accurately define indicators, find sources of data and interpret data. The case is similar to Remote Sensing capacity across the network, as the training of the majority of the existing measures officers is a testament to this: most are trained in biological, not social, sciences.

2. Methods

As mentioned in the timeline above, the consistent process by which the conservation measures team attempted to support the assessment of conservation status in the six places was:

- Work with managing directors in DC and appropriate field staff to define the exact scope of the geography – this was easier in some cases than others.
- Work with the managing directors in DC and the field to get at least one full-time conservation measures officer in place in the field. This was not always possible for a variety of reasons (see the place by place accounts for Coastal East Africa, Namibia, Coral Triangle). This ranged from periodic updates to actually interviewing the candidates.
- Work with the managing directors and/or place-based conservation measures officers to organize a 2-3 day workshop for the development of indicators.
- Facilitate a measures workshop for each geography, wherein the WWF Program Standards were introduced, conservation targets were identified, a basic conceptual conservation model was assembled, direct threats were ranked, and biological, threat, conservation management, and social well-being indicators were developed.
- Provide ongoing support and guidance to the field-based measures staff:
    - Prioritize indicators
    - Help to establish goals and objectives
    - Develop and advise on biological viability criteria
    - Collect existing data and assess viability
    - Provide centralized repository for mapped data
    - Locate web-based data
    - Perform some mapping
    - Perform remote sensing and analysis
    - Assist with statistical and other data analysis as needed
    - Day-to-day/week-to-week calls with field
    - Overall coordination
- Help to organize the field-based staff for the conservation measures group meeting in November 2008.

Some discussion of the structure and reasoning behind that structure is warranted. As mentioned in the introduction. The assessment of conservation status was made across four themes:

- Biological
- Threats
- Conservation Management
- Social Well-Being

Besides simply identifying and acquiring real data for key indicators, an additional objective of the conservation measures program was to put the numbers in context by providing a ranking system.

Biological Indicators

What are they?:

A minimum set of indicators intended to characterize the overall biological health of the place.

Rationale:

The biological status of the place is the conservation bottom line – how is the ecology doing – and is the ultimate test of strategy effectiveness.

Components:

Ecosystems, communities, species groups, species

Example Indicators:

Ecosystems and communities: extent, condition, connectivity, ecological processes
Species and species groups: numbers, growth rates, prey, habitat

Ranking:

Biological indicators are ranked using objective criteria related to the viability of the target.

Threat Indicators

What are they?:

Indicators of the level of human activities that directly degrade biodiversity.

Rationale:

A place team should have a handle on all threats, and an objectively based expert ranking should be sufficient (severity, scope, irreversibility for each threat-target combination). However, if the place team believes it would be helpful, they are encouraged to track quantifiable indicators for the top 3-5 ranked threats.

Example Components:

Logging, Pollution, carbon emissions, poaching

Example Indicators:

Km^2 of illegal logging, km^2 of anthropogenic fires, estimated volume of illegal bushmeat trade, etc.

Ranking:

Overall impact of the each threat, and each threat to each target, using criteria based on the probability of each threat decreasing the viability of a target. Can also be broken down into severity, scope, and irreversibility.

Conservation Management Indicators

What are they?:
Indicators of the state of systems required for long-term biodiversity management.

Rationale:
Tracking conservation management is not currently hard-wired into the WWF Program Standards, though any team that prioritizes a protected area, protected area management effectiveness, or conservation funding strategy would need to track it. Protected area representation is the only indicator that was mandated in the program – because it is such a fundamental metric for effective conservation.

Example Components:
protected area representation, protected area management effectiveness, sustainable financing for conservation, necessary legislation.

Example Indicators:
% of habitats in protected areas, protected area management effectiveness scores from Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) or similar standard scorecard, overall level of conservation funding.

Ranking:
Uses generic criteria based on the ability of management systems to maintain target viability.

Social Well-Being Indicators
What are they?:
Indicators of the overall level of well-being of local inhabitants.

Rationale:
This component of the conservation measures framework is also not currently hard-wired into the WWF Program Standards. This information serves as a baseline of data for decision-makers, and a starting point for social scientists conducting more complex analytical research about the relationships between biodiversity conservation and social well-being. It also feeds a comprehensive Situation Analysis with critical information about one conservation constituency – local people. With this snapshot of the social context, the conservation planner rapidly discerns opportunities and challenges to begin designing informed strategic interventions.

Components:
economic well-being, health, political empowerment, education, culture

Example Indicators:
per capita income, child mortality, resource rights, food security

Ranking:
To put the social well-being data into context, we developed a benchmarking system that draws from objective measures produced by the United Nations. This system attempts to

mirror the WWF Standards' method for conducting a viability assessment on biological targets. It will allow conservation planners to place an indicator into one of four categories that represent a continuum from low levels of human development to high levels of human development: Low Human Development (LHD), Lower-Middle Human Development (L-MHD), Upper-Middle HD (U-MHD) and High Human Development (HHD).

An explicit decision was made to focus the measures program initially on conservation status rather than strategy effectiveness. This decision was made for a couple of reasons:

- Several of the programs involved did not have a good handle on the state of biodiversity or the relative or absolute magnitude of direct threats. Additionally, few of the programs had set measurable goals for the desired state of biodiversity. Although strategies were already being implemented in some of these places, it makes logical sense to understand the viability of conservation targets, the magnitude of threats, and the long-term goals before planning gets underway. Focusing on conservation status provided underpinnings to the existing planning and the opportunity to revisit.
- Conservation status is, by definition, the ultimate measure of conservation strategy effectiveness. Without baseline measures of conservation status, there would be no way to judge the overall effectiveness of implemented strategies.

The field teams have expressed a desire to focus more on strategy effectiveness. The conservation measures team is quite willing to assist the place teams in developing indicators and objectives for their strategies, despite stretched capacity. This will be considerably easier now that a foundation of conservation status has been laid down. The process of developing strategy effectiveness measures (already begun in, Heart of Borneo, Terai and Coastal East Africa) would consist of:

- Refining and extending the basic conceptual models (situational diagrams) that were begun during the identification of targets and direct threats;
- Brainstorming and prioritizing new and/or existing strategies;
- Developing results chains for the priority strategies, with indicators and objectives.

3. Resources

The resources available to the conservation measures team were roughly sufficient to travel to each place and assist with indicator development and to make a follow up visit later in the year. It would have been helpful to maintain the place-specific liaisons, but the funding ran out at the end of June 2008. The program ran a bit longer than anticipated, but key staff were not hired until late, so this probably cancels out. Importantly, sufficient funds were available to hold the November 2008 workshop and summit to synthesize lessons learned (~$25,000).

One item that was not sufficiently budgeted initially was funds for remote sensing imagery. The conservation measures team estimates that a budget of $10,000 for each

place, on a 2-3 year cycle, would be sufficient to purchase remote sensing imagery frequently enough to track changes in the status of major ecosystems.

4. Time

The initial time allocated for the work was approximately one year. WWF-US executives seemed to hope for results within a couple of months. None of the places, even the ones that had been gathering data for many years, were in a position to assemble and present a balanced (biological, threats, conservation management, social) portfolio of conservation measures before approximately one year.

The time required to hire the conservation measures officer often took two to three months (or more), and in some cases could not actually be done.

The short time allotted for the kickoff workshops was probably not enough, though it was difficult to block out the 2-3 days for the expert and partner participants. At least four days, and perhaps a full week is necessary to:

- Introduce the WWF Program Standards;
- Explain the logic of the conservation measures work;
- Discuss the geographic scope of the work;
- Develop indicators across the four themes (biological, threats, management, social);
- Hand off the real work to the respective teams.

For a few of the key indicators identified as critical initially for each place (especially species data – data on extensive ecosystems is much easier to develop using remote sensing), it may be several years before that data comes available.

Clearly, patience is required to move large programs with:

- little to no familiarity with the WWF Program Standards;
- little to no understanding or interest in NI's at the field level;
- little to no quantifiable information as to the conservation status of their places;
- little to no quantified goals for desired biological status;

to a condition where they are comfortable using the WWF Program Standards and using quantifiable conservation status information adaptively to manage their places. These same issues exist, in one form or another, in virtually every NO in the WWF Network.

This is not an easy task and frankly not one that can be fully accomplished even in 1 ½ years. However, it is also clear that a sufficient picture of the conservation status of a place is possible in approximately one year if the institutional support is there. Some status measures can be improved in following years, and some indicators should not be collected every year.

Early programmatic consultation, support, and buy-in are extremely helpful for a conservation measures program to be effective. Though eventually all programs need to be involved, initially it may be beneficial to seek opportunities for success. Focusing on programs where stars are aligned with willing partners at all levels can facilitate proof of concept and further piloting. A simultaneous blanket effort with little consideration to where the opportunities lie in terms of data, people, organizational need/interest/alignment, etc., presents additional challenges that impede effective pilot efforts.

Yet conservation measures is an effort that must be undertaken if the organization is to truly engage in robust adaptive management at scale. As more places and staff are exposed to the full cycle of the WWF Program Standards, the hope would be that conservation measures is more and more institutionalized and the need for conservation measures core staff would disappear and become part of the general support of the WWF Program Standards.

5. Programmatic

a) Alignment

In its current form, the conservation measures program is consistent with the WWF Program Standards, with a couple of additions that we believe should be part of those standards. We hope to get modification and consensus from key Network staff that will allow the guidance developed by the conservation measures team to become codified as part of the WWF Standards. Because Network Initiatives are required to design their programs in line with the Program Standards, there should be no disconnect between the work of the conservation measures program and Network Initiatives. Of course, all programs in the organization would benefit from application of the Program Standards.

As mentioned in the Methods section above, the two new elements that are part of the conservation measures work are:

- conservation management; and
- social well-being.

We believe that there are good reasons to add these elements to the indicators that a program should measure as part of adaptive management – but we seek feedback and consensus on this point.

- The mismatch between NI-level staff and field-level staff is great, and in some cases had a large effect on the conservation measures work – it is the responsibility of donor WWF-I, donor NOs, and NI teams to bridge this gap – not technical support staff.
- Executive management is not managing based on biodiversity goals, and thus does not mandate that the field use them. But how to change this situation?

b) Leadership

The core conservation measures team has been in a difficult position from the beginning. Executive leadership is not terribly familiar with the WWF Program Standards and quite unsure of the relative amount of effort to devote to helping places become self-sufficient in a conservation measures effort (and, thus, allow them to fully engage in adaptive management). WWF-US included the term "measurably conserve' in its vision statement, and the WWF-US Board made a clear commitment to measures. However, there is a strong sense of ambivalence about conservation measures among a significant portion of the WWF-US executive team. In particular, there seems to be a lack of clarity about:

- what level of measurement is appropriate;
- what method to follow; and
- how many resources to devote to it.

Perhaps this is the reason that the WWF-US executive team has not promoted the work of the measures program or provided any kind of mandate to any WWF-US programs outside of the geographies in the Sall grant or to the WWF Conservation Committee or Network Executive Team. Ideally, executive leadership would create the demand for the conservation measures team to fill. Is it the conservation measures team's responsibility to convince the executive team of the merits of adequate status measures, or should the executive team be demanding that programs be able to report on the ecological status of the places relative to conservation goals?

The conservation measures program was relatively isolated within WWF-US. Presentations were made to the marine group of place leads, but we could never quite schedule a presentation to the terrestrial group. To the best of our knowledge, programs were not encouraged (nor discouraged) to work with the measures program by leadership. Several managing directors outside of the conservation measures pilot were contacted about their conservation measures needs, and there was assistance provided to the willing and able.

As already mentioned, previous to the conservation measures pilot, the field programs themselves have had little exposure to the WWF Program Standards, little reason to monitor (since no one has really asked them to before), or in some cases limited incentive to participate in NI- scale thinking or activities.

In some cases conservation directors are not familiar with the Program Standards. In some cases, conservation directors themselves were not on the same page as NI leaders that the conservation measures team was working with, and went so far as discouraging staff from working at the scale originally agreed to.

Thus, the conservation measures team has been in the unenviable position of simultaneously attempting to convince its own executive management and the field programs of the merit of its work, while also providing technical support to the field programs and overall leadership on measures. This role was in some cases partially filled by managing directors of places, but they are busy people and were not able to provide a

full explanation to field staff. More often than not, the managing directors were not able to be present at the workshops where indicators were actually developed.

c) Structure

The overall structure of the conservation measures pilots consisted of:

- An oversight team – consisting of executive staff from WWF-US;
- core measures team – consisting of five full or part-time staff, equating to 2.8 FTE's;
- conservation science liaisons – for approximately the first year of the program, one CSP staff person liaised with each of the six places (20% each for a total of 1.2 FTE's) – this was suspended when donor money ran out;
- managing directors – the managing directors of the six places were nominally part of the team;
- field measures team – the field measures staff were the foundation of the effort – it was their work to actually find and assemble the relevant data.

The structure of effort had all of the essential elements, at least in theory. In practice, it could have worked better.

The oversight team met infrequently, and several meetings were postponed or cancelled. The process for decision making was never clarified to the conservation measures team, and decisions seem delayed and made without much consultation. A conservation measures "deep dive" held in July 2008 produced predominantly positive feedback from the field and managing directors, but the decisions that followed seemed quite disconnected from this feedback. An oversight committee that met regularly, was supportive of the work of the team, and asked difficult questions would be a very positive force for conservation measures.

The core conservation measures team seemed to function well, despite more than half of the staff being new to WWF. These staff were quick understand the program, be involved in implementing it, and adapting to ever changing mandates. The director of the program was only programmed to be 60% on the measures work – in some cases protracted overseas travel made decision-making more difficult than it might have been for the staff, but they handled this well. Two of the core team were primarily focused on social measures, and as this was quite experimental and had never been implemented before, a substantial effort was required to develop methodologies and produce guidance.

The liaisons were part of the core measures team while there was donor money available. These staff were members of CSP. The liaisons were vital to getting the program moving after indicators had been identified and the core team was busy drafting basic guidance materials. The liaisons maintained regular contact with the field teams and tried to keep them moving on data collection. As time went on, not all of the liaisons felt that this role was the best use of their time, and as restricted funding ran out, this role was largely abandoned, with exceptions (e.g. Coral Triangle, Bering Sea). Again, the liaison role was

essential when 6 teams were beginning at once, with a donor-driven agenda, but given the fact that teams would presumably be added in smaller tranches the limited availability of funding, the core team could function adequately without them.

The role of managing directors is critical. Because the core measures team has no supervisory role of the field, they are dependent on the leadership and advocacy of managing directors. In general, this was present during the measures pilot. And it was easy to see that without this support the effort could easily flounder (and might despite the best efforts of a managing director!).

The field teams forged bravely ahead into uncharted waters, doing their best to collect data for the indicators as they understood them. From the measures team's perspective, once the indicators had been identified, the task of the measures officers was to work with the team to prioritize indicators, be ready and willing to modify indicators based on peer review and the availability of data, and to see how much existing data was available for a relatively idealized set of indicators. There were a number of complications which affected how the field was able to perform their jobs:

- Lack of understanding of the WWF Program Standards – the short introduction provided by the conservation measures team was surely not enough, and in some cases it's unclear that the use of the Standards is promoted by supervisors;
- Difficulties, delays, and missteps in actually hiring field staff – in some places, field staff with the necessary skills were simply unavailable;
- Competing responsibilities – while it was the expectation of the core team that measures officers would be focusing on conservation measures full-time, this was often not the case;
- Mismatch between the programmatic responsibilities of the field and HQ (i.e. smaller projects vs. NI-scale interventions and thinking);
- Difficulties of communications between the field and Washington, DC – field visits could only partially remedy this;
- Lack of computer capacity, software, and GIS skills – access to better computers, software, and either more training or available local GIS-skilled staff time would have accelerated data collection and analysis.

Despite these obstacles, the field teams did their best to assemble the requisite data.

C. Summary of Lessons Learned – Core Conservation Measures Team

Measures Team Capacity Lessons Learned

- At least during the first year of implementation, significant assistance is required to support a conservation measures rollout – approximately 30% of an FTE per geography. It is expected to be somewhat less in subsequent years. A core staff of ~3 FTEs in total is sufficient to get a conservation measures program up and running. Longer term capacity needed is approximately 1.5 FTEs to maintain a program assisting 3-4 places, with additional assistance requiring ~0.3 FTEs per place. Someone needs to take overall responsibility for overall coordination and guidance in order to have a consistent program that could eventually roll up. Theory, methods, and guidance will evolve, and this needs to be captured.
- Among the Network's core conservation measures staff, there needs to be capacity in Ecology, Remote Sensing, and Social Science.

Measures Team Methods Lessons Learned

- The field expressed eagerness to work on strategy effectiveness measures – it is worth considering whether status and effectiveness measures can be pursued simultaneously (this is possible but may distract from status effort).
- Methods need to be flexible enough to adapt according to the particular conditions of the place.

Measures Team Methods Development Needed

- In general:
  - What is the right amount of effort/indicators for each category?
- For Threats:
  - At what scale is a threats analysis most useful – multi-ecoregional? Ecoregional? Landscape? Site? All of the above?
- On the Conservation Management category in general:
  - Is this a valued component?
  - Should indicators be standardized?
  - Should rankings be tied to IUCN management effectiveness categories?
  - Should Conservation Management be a standard component of any conceptual model?
- On the Social Well-being category in general:
  - Is this a valued component?
  - Should indicators be standardized?
  - Do the categories capture all critical elements of social context? Where should important aspects of social context BEYOND social well-being be captured, if anywhere?[3]

[3] Note that "threats" (human behaviors) and "conservation management" (human administrative systems) are actually social context variables. Other aspects of social context – including broader issues of land tenure and resource governance, conservation beliefs and values, and demographic change – are highly relevant to conservation planning but are not captured within the current framework for measuring

    - Document how information generated is applied to conservation planning
    - What indicators also serve as baseline for measuring strategy effectiveness? Are there "typical" strategies where they apply?
- Are Enabling Conditions adequately addressed?

Measures Team Resources Lessons Learned

- The basic resources required to set up a conservation measures program includes salary for core staff, a reasonable travel budget, any place-based budgets, and ~$10,000 (every 2-3 years per place) for remote sensing imagery to supplement place based budgets.

Measures Team Time Lessons Learned

- Previous WWF Program Standards training in the places would have accelerated the conservation measures work significantly.
- The bulk (75%) of a functioning conservation status measures program can be established in a year (provided the leadership is supportive, field staff are familiar with the WWF Program Standards, etc.), and the work can be improved over time. In the meantime a place can work on strategy effectiveness measures.
- Sufficient time (several months) must be devoted to consultation with counterparts in the field, in order to develop support and buy-in. Though eventually all programs need to be involved, initially it may be beneficial to seek opportunities for success, where stars are aligned with willing partners at all levels

Measures Team Programmatic Lessons Learned

- Executive commitment should be a prerequisite for implanting a conservation measures program in a donor NO. To do otherwise creates needless stress for the team and wasted effort.
- A conservation measures oversight or management team needs to be engaged throughout to support measures as part of advocating for better conservation planning, implementation, and adaptive management at the Conservation Committee level and above. The committee should have a clearly defined role and decision-making process; and should provide constructive input to improve measures at WWF. This advocacy should not be the role of the conservation measures project team.
- One or more well-functioning core measures teams is critical to success – to organize places, provide guidance and facilitation and for ongoing support.
- Additional liaisons (not part of core team) are very helpful getting a place up and running, partly because the team was trying to get so many places up and running simultaneously. If fewer new teams were involved, a core team might be able to handle the coordination themselves.
- The support and advocacy of managing directors (for ecoregions and NIs) is critical – core measures staff have no supervisory power.
- At the program office or field-based level, it is important to secure the active involvement or at least mandate of the respective conservation director or similar responsible party.

"conservation status." It may be possible to address these elements within effectiveness measures; as part of 'enabling conditions,' if subsequently included; or as part of a broader look at 'social measures.'

- Field teams need more WWF Program Standards exposure and training.
- The hiring of field measures staff is not a trivial exercise, and may not even be possible.
- GIS skills among the field measures staff are not obligatory but are very helpful.
- Social science training among field measures staff is not obligatory but is very helpful.
- Smoothing over the mismatch of priorities between local projects and NI-scale interventions should be the responsibility of conservation directors and executive leadership.
- The TOR for field measures staff needs to be made clear to core measures team at donor NOs – what percentage will the field staff actually be working on measures?

Measures Team Programmatic Development Needed

- Consensus is needed across the Network on the measures approach, since some element are not currently part of the WWF Program Standards.

IX. Overall Conservation Measures Program Lessons Learned – process, products, & looking forward

A. Summary of lessons learned

1. Introduction

As a reminder, the objectives in the six pilot geographies were to:

- Implement a conservation status measures system;
- Develop strategy effectiveness measures to the extent possible;
- Capture the lessons learned during the first year of implementation;
- Solicit feedback and consensus on methods from the WWF Network;
- Develop guidance to implement similar programs in other places.

The conclusion of the core conservation measures team is that it is indeed possible to assemble a meaningful set of metrics that accurately reflects the overall status of a large ecoregion, in a relatively short time (1 year +), while relying on a combination of local field staff and centralized remote sensing (and, potentially centralized data collection for many social indicators). There are a number of preconditions and actions that will make such an effort go more smoothly, and these are summarized below. A similar effort to establish measures in the government sector can cost millions of dollars and take years to get going (e.g. Everglades, Columbia River, and Chesapeake Bay). The current pilot effort forms the foundation for improvement and refinement in the conservation measures program overall and in each of the places. More and better data sets will become available, and the all-important thresholds for conservation target viability will be better understood with more thought and research. These thresholds will provide more precise guidance for the desired biological state. Strategy effectiveness measures could have been implemented before the status measures, but that would have meant that status baselines would not be established until well into strategy implementation. Of course, strategies are often being implemented anyway in most priority places, and strategy effectiveness measures could be developed at the same time as the status measures, if the commitment and capacity is in place to do both.

The obstacles to developing a solid conservation measures program across all of WWF's geographies are many, but this should also not stop us from doing it. As an organization it is our professional and fiduciary responsibility to understand where we are relative to desired biological state.

With a reasonable foundation of conservation status in place and improving with time, efforts can now be focused on assisting programs with systems for documenting their strategy effectiveness, which is the clear desire of the field teams.

Overall Summary: Given adequate time to internalize a measures effort (~ 6 months), it is possible to establish a measures programs and baseline conservation status measures in priority places over the course of a year, with the support of a core team, provided that:

- leadership at all levels of the organization are supportive;
- there is (are) core teams to provide support;
- field teams are in place and understand the WWF Program Standards;
- there is alignment between the field and larger (NI) goals.

The baseline status measures will improve over time, and strategy effectiveness measures can follow. Strategy effectiveness measures could be implemented first, but that would mean that baselines would not be established before strategies are implemented. Both sets of measures could be done simultaneously if the commitment and capacity is in place.

2. Project Analysis

a) Capacity

Core Team Capacity

A small central core team is sufficient to organize and implement a conservation measures effort in a set of priority places. How small? We began the current pilot in Spring 2007 with 4.6 FTEs (including 6 liaisons at 20% each). The liaisons dropped out after the first year. Of the remaining 3.8 FTEs, approximately 1.2 FTEs were devoted substantially towards developing a framework and guidance for social well-being measures – an innovative component of the program. Now that the framework is there, some of that capacity is no longer necessary. On average, the experience of the conservation measures core team is that each place required approximately 0.3 FTEs from the core team for ongoing guidance, follow-up, etc.

As has been demonstrated by the past year's experience - support to the field is needed – not just technical support such as remote sensing, but more ongoing support to help identify indicators, recommend datasets and leverage data acquisition. Without that kind of support, the likelihood of a measures program in any given place delivering a robust yet focused set of status and strategy effectiveness metrics, which aligns with the WWF Program Standards is relatively low.

The depth and breadth of tasks undertaken by the core measures team is considerable, as the following table illustrates:

Lead Standards workshops to identify status and effectiveness measures	Plan
	travel
	Facilitate
	Follow-up
Standards Support	Training on Program Standards
	Develop consensus on Scope
	Develop indicators w/ small group
	Revisit indicators
	Attempt to establish goals (targets) and objectives (threats)
	Develop and advise on viability criteria
	Collect existing data and assess viability
	Put into template
Technical support	Provide centralized repository for mapped data
	Locate web-based data
	Doing mapping
	Doing remote sensing and Analysis
	Research and review new methodologies and disperse to field
	Assist with statistical and other data analysis as needed
Administrative support	Hire FTEs
	Day to Day/ Week to week Calls with field
	Helping coordinate with partners
	Overall coordination
Documents	Provide updated background and overview documents
	Create Measures Guidance Document
Measures innovation	Creating and developing Measures Framework
	Work with WWF-I and other NOs to keep up to speed
	TPR/ Presentation for executives
	Create and maintain partnerships with other organizations to collect and share data.
	Support efforts by other (non-priority) places

Adam Tomasek (HoB NI lead) noted (July 2008):

> "Support from DC has been very important. They were able to organize the initial (and in some ways most important) measures workshop for HoB. They brought in Lisa Curran from Yale which added to the work immensely. They continue to guide the staff in the field through the process and this is important. Without the guidance and support I could easily see the program faltering – there are too many competing priorities and without consistent support something new like measures could become a lesser priority. Also, the technical support from the DC is invaluable. From analyzing or processing remotely sensed data, to accessing new and relevant data to providing moral support throughout the process as the field staff struggle with trying to answer the difficult questions. Continued support will be necessary. There are opportunities to expand the work and to bring in other technical partners, but that will require DC leadership and guidance. Now is not the time to reduce these efforts."

What seems clear is that, despite the existence of some managing capacity in the Network, if a WWF-US (or any other NO for that matter) desires to get robust monitoring from the places it supports (i.e. "how are we doing relative to our conservation goals?"), it will need to provide some minimal level of ongoing core support, or somehow organize that support in concert with other capable NOs.

WWF Network involvement in conservation measures is critical if such an effort is to be sustainable. WWF-International has one FTE (Ashwin Bhouraskar) whose job it is to support conservation measures – though his remit also includes the GPF. There are a few other NOs that have a programmatic measures officer, though the extent to which each NO follows the WWF Program Standards varies. As yet there is no organizing body to organize these staff across the Network.

The presence of a remote sensing specialist on the core team was invaluable – and little data would have been available on the extent of key ecosystems without this capacity – since there was little of this capacity amongst the field teams. One remote sensing training was organized for a field team, but this did not allow the field team to actually develop any data using the training.

Field Capacity

At least one conservation measures FTE per place is required, though a team may in fact be required (see table below), and in few of the pilot geographies was the measures officer fully dedicated to the task of conservation measures. The need for some minimal threshold of capacity in each place, however, reconfirms the lesson from the Ecoregion Task Force experience. In fact, at least one person per national office seems to be the general requirement – some WWF national or program offices are still resistant to

collaborating with other national or program offices, even when the biodiversity benefits of doing so are manifest. In the case of the pilot, a team was generally required to get the work done. Not only are in-country staff much better placed to identify the appropriate indicators, gain access to data through networking, but they are also the right people to ask the right questions of the data- however, additional training may significantly enhance this ability.

The process of hiring a field measures staff-person can be time consuming. In-country capacity is often an issue, it is difficult to keep national and program offices focused on the need to keep the effort moving, and interviews and hiring simply takes two or more months if all goes well.

Consultants can work, but this requires more guidance from the core team. Consultants were used in a few cases, and in one case the most of the data was assembled by a consultant. This was a data rich geography (Bering Sea), and involved an exceptionally proficient consultant with a long history working with the program (and already familiar with a version of the WWF Program Standards) but this may be a useful model in such situations.

GIS skills are not an absolute necessity, but would increase the likelihood of completion, the efficiency of the process, understanding and use of the data in-country. Social science training would also be helpful.

The following table summarizes the conservation measures capacity of each place. Note that these are conservative estimates that do not include time invested by measures core team directors, conservation program leaders, and in-kind contributions by WWF field staff and partners.

Place by Place Conservation Measures Staff			
Name	**Role**	**% Measures**	**Term**
Namibia			
Greg Stuart-Hill	Lead	10%	Oct 2007 – Jun 2008?
Barry	Consultant	?	Mar 2008 – Jun 2008?
Aurelie Shapiro	CSP Remote Sensing	10%	July 2007 - present
Robin Naidoo	CSP liaison	20%	July 2007 – June 2008
Sheri Stephanson	CSP liaison	1%	July 2008 - present
Coastal East Africa			
Cyprian Malima	Tanzania lead	10%?	Dec 2007
Nalimi Mdata	Tanzania lead	50%?	March 2008 - present
Armindo Araman	Mozambique lead	50%	March 2008 - present
Interns (Yolanda, Tomas)	Mozambique	100%?	Dec 2007 - present
Annie Claus/Mike Mascia	CSP liaison	35%?	July 2007 - Aug2008

Bronwyn Llewellyn	CSP liaison	5%	May 2008 - present
Heart of Borneo			
Stephan Wullfrat	HoB Biological Component	30%?	Oct 2007 - present
Cristina Eghenter	HoB Social Component	20%	Oct 2007 - present
Hanna Tobing	HoB Social Component	30%	Oct 2007 - present
Dora Jok	Malaysia Social Component	5%	May 2008 - present
M. Nasir	Data collection E. Kalimantan	N/A (external hire)	April – June 2008
Yuli	Data collection W. Kalimantan	N/A (external hire)	May – July 2008
John Morrison	CSP liaison	20%	July 2007 - present
Sheri Stephanson	Social liaison	5%	March 2008-present
Terai Arc Landscape			
Bijan Gurung	Measures Officer	50%?	Jan 2008 - present
Gokarna Thapa	GIS Specialist	?	?
Kanchan	Research Biologist	?	?
Tara Gnyawali	Livelihoods Specialist	?	?
Ritesh ?	Database Manager	?	?
Huaqun Li	CSP Intern	2%	?
Eric Wikramanayake	CSP liaison	20%	July 2007 – June 2008
Sheri Stephanson	Social liaison/CSP liaison	5%	Jan 2008 - present
Bering Sea			
Rob Liebermann	Bering Sea lead	100%	Dec 2007 – Mar 2008
Bruce Robson	Consultant	N/A	May 2008- Nov 2008
Helen Fox/Al Lombana	CSP liaison	20%	July 2007 - present
Sheri Stephanson	Social liaison	2%	Dec 2007 - present
Coral Triangle			
Yoke Lee	Marine Biologist	N/A	N/A
?	Social Scientist?	N/A	N/A
Al Lombana	CSP liaison	20%?	July 2007 - present

Capacity Summary

- A small central core team is sufficient to organize and implement a conservation measures effort in a set of priority places. A total of 2-3 FTEs (including remote sensing capability) should be enough to assist half a dozen or more measures efforts in priority places. On average, the experience of the conservation measures core team is that each place required approximately 0.3 FTEs from the core team for ongoing guidance, follow-up, etc.
- One implication of this finding is that if all of the Network's priority places are to get supported, a larger, perhaps distributed support team is needed.

- An overall WWF Network coordinating and advisory body for measures would be very helpful to sort out consensus on methods, to help organize core capacity among the donor NOs, and to make sure that place teams get the support that they need.
- The experience of the pilot was that for any given place, a team was generally required to get the work done. The conclusion at the November 2008 measures workshop was that the team, while being integrated into projects and programs (see "Alignment" below), should specifically include:
    - a central coordinator with in-depth knowledge of the place. Geographical and geopolitical divisions may require more than one coordinator. This person may be generalist, with a broad outlook and ability to ask the right questions. In some cases, especially data-rich situations, the right consultant is a viable solution to assemble status measures.
    - an intermediate tier of people to assist in data analysis (WWF and partners);
    - access to specialized technical skills (e.g., GIS/remote sensing);
    - a network of collaborating organizations from which we obtain monitoring data.
- Social expertise both in the field and on core teams is important in order to adequately handle social well being measures.
- The presence of a remote sensing specialist on the overall core team was invaluable, since this is the best way to develop data on the extent of key ecosystems, and little of this capacity is present among the field teams.
- Participants at the November 2008 measures workshop felt that careful design and planning should allow capacity needs to decrease over time.

b) Methods

(1) Enabling Conditions

Two important pre-conditions influenced the success of the work in each place:

1. Buy-in and management from relevant NI managing directors and conservation directors;
2. Familiarity with the WWF Program Standards.

Attention and support from relevant managing directors varied from place to place. There were a number of ways this attention could manifest itself:

- Advocacy for conservation measures;
- Active involvement in hiring field measures staff;
- Attendance at kickoff workshops;
- Participation in biweekly update meetings;
- Active involvement with keeping measures staff on track.

The results of the effort are obviously heavily dependent on the field staff, and this is in turn heavily dependent on the interest and intervention of NI leaders, managing directors, and conservation directors. Their participation can easily make or break the effort. And major successes and setbacks were often a direct result of the involvement or lack thereof by these managers.

It appeared that few of the field measures staff were previously familiar with the WWF Program Standards and the related emphasis on adaptive management. Previous exposure would have assisted the measures team greatly.

(2) Process

The initial kickoff workshops, though only 2-3 days in length, were critical. In fact, 4 or more days would have been better. This time was necessary to:

- Introduce the WWF Program Standards;
- Explain the logic of the conservation measures work;
- Discuss the geographic scope of the work;
- Develop indicators across the four themes (biological, threats, management, social);
- Hand off the real work to the respective teams.

The short time allotted for the kickoff workshops was probably not enough, though it was difficult to block out the 2-3 days for the expert and partner participants. A couple of hours to introduce the WWF Program Standards is a very short time. It has been noted by the core measures team that there was not enough time allowed to develop social indicators. We were introducing a new concept to participants, which required time to allow the concepts to sink in, allow participants to ask questions to deepen their understanding and start to buy into it.

An open question is how broad a set of stakeholders should be invited to the kickoff workshops. The core measures team left it to the field teams as to whom they wanted to invite to the kickoff, and several of the team invited a number of key stakeholders who added significant value to the workshops. Participation of partner organizations & those with potential links to data sources create a launching point for collaborative relationships and identifying data sources upfront. This can save the field measures officer time and energy looking for data. To do this effectively, entails a larger workshop, structured slightly differently and will probably require more time. However, the potential pay-off is high. Suggested groups include:

- scientists/experts on in-country issues and data collection;
- local reps of bi-lateral, multi-lateral agencies (UNDP, USAID, DFID, GTZ etc.);
- local statistical agencies/census bureau;
- NGOs/potential partners.

Follow up with the field teams by the liaisons and core team occurred via email, telephone, Skype, and with follow-up visits. Some places required multiple visits. There was a training component to some visits, but others were simply detailed updates.

An explicit decision was made by the core measures team to tackle status measures before strategy effectiveness. This decision was made because:

- Basic conservation parameters, including the state of biodiversity and threat levels were unknown in several of the programs, and few of the programs had set any conservation goals. Although strategies were already being implemented in some of these places, it makes logical sense to understand the viability of conservation targets, the magnitude of threats, and the long-term goals before planning gets underway.
- Conservation status is by definition the ultimate measure of conservation strategy effectiveness. Without baseline measures of conservation status, there would be no way to judge the overall effectiveness of implemented strategies.

Field teams and a couple of the managing directors expressed the interest of the field to engage in strategy effectiveness measures. Shubash Lohani notes (July 2008): "The popular demand in the field has been the effectiveness measure so I personally see more value for the effectiveness measure over the status measure." Whether this means that field teams are simply ready to move on to strategy effectiveness measures or are generally more interested in strategy effectiveness measures is unclear.

(3) Data Framework

Biological Indicators

There is broad consensus on the need to monitor a minimum set of indicators intended to characterize the overall biological health of the place. The biological status of the place is the conservation bottom line – how is the ecology of the place doing? – and is the ultimate test of strategy effectiveness. The participants of the November 2008 measure workshop reaffirmed this.

How many indicators are sufficient is an open question. The WWF Program Standards process, which is a direct outgrowth of the Conservation Action Planning process that The Nature Conservancy has been applying for many years, provides some guidance. This has become a standard method for identifying biological status measures across the conservation community. That process breaks down the biodiversity of a place into a small (8-12) number of biological targets, each with 2-3 key ecological attributes and associated indicators. For the purposes of conservation measures, the key ecological attributes and associated indicators of these targets is what gets tracked. A key next step will be to review the collected information, and get peer review of the final indicators and the data collected for those indicators. Extra efforts may be recommended to develop datasets for some indicators for which there is currently no data.

The viability ranking is seen by the conservation measures team as an essential element of the measures program – there is no sense in simply collecting data if there is no

framework for evaluating what it means. Developing viability criteria is a long-term process however, and field teams need not be concerned if they have not been able to develop quantitative thresholds for Poor, Fair, Good, and Very Good, though they should be able to make an educated estimate of current and desired status. The participants at the November 2008 measures workshop affirmed that the viability assessment is valuable – they also noted that it is challenging.

During the November 2008 workshop, the teams considered the implications of what they had learned from measuring biological status. The following table is a sample of that learning:

Lesson	Implications for WWF's Work
HoB New finding: Very little primary lowland rainforest remains island-wide	Prioritize key remaining areas of lowland forest to protect and identify partners who can put more effort into protecting it
TAL: Tiger & rhino distribution is increasing and moving beyond PA's	Human-wildlife conflict is expected to increase. WWF should develop a proactive strategy for addressing human-wildlife conflict. There is gov't, scientific and community interest in this.
CEA: Elephant migratory routes are critical focus for conservation planning and data is emerging for the region	Start mapping data, use as basis for developing a regional vision, add data as it emerges
Bering: For viability assessment, threshold levels of other organizations may not agree with our desired thresholds	We need to know their thresholds to have a frame of reference for conversation and discussion

Threat Indicators

There was clear consensus among the November 2008 conservation measures workshop participants that it is very important to measure threats (it was also noted that assets, opportunities, and enabling conditions are important). Participants cautioned, however, that current ecological conditions are not necessarily reflective of current human behaviors. Past threats can have a long-term legacy effects.

As part of the WWF Program Standards, teams are already encouraged to perform an expert threat ranking, wherein every combination of threat and conservation target is scored for severity, scope, and irreversibility (see conservation measures guidance document or WWF Program Standards for more information). This expert threat ranking identifies what threats to measure directly, and should be revisited periodically.

The measures pilot suggested that field teams track indicators related to the top 3-5 threats that emerged from the expert threat ranking exercise. The pilot participants affirmed that this is worth doing.

It's worth noting that climate change was given little attention in terms of direct measurement. All field teams identified climate change as an important threat, in fact it was often the highest ranked threat in the expert ranking due to global scope and high irreversibility of the impacts. Yet few if any teams identified indicators of climate change that they would like to track. This is not the fault of the teams, but identifies an opportunity for climate change support staff to assist field teams.

Examples of learning from the measures pilot participants, summarized during the November 2008 workshop are:

Lesson	Implications for WWF's Work
HoB New finding: a significant amount of heath forest has been burned	Prioritize key remaining heath forest and identify partners who can put more effort into protecting heath forest in Borneo
CEA: Poaching is increasing across the region (TZ)	Conduct joint patrols (TZ), quantitative data collection (TZ + MZ), build capacity with partners (TZ + MZ)
Bering: There is only baseline data (not long-term data) for shipping and oil spills	Need to flag for continued data collection to determine thresholds and trends
Terai: Oil & gas are high potential threats	Folded into strategic negotiations with gov't
CT: Biological and socioeconomic measures documented destructive fishing (bombing) in Kuambang and conflict between trawling and small-scale commercial fishing.	Use results to engage communities in the process of gazettement of the park, zoning of the park, and sustainable livelihoods.

Conservation Management Indicators

Conservation management is *per se* currently not part of the WWF Program Standards. This is partly to do with the fact that spatial planning was almost completely left out of the Standards (this is currently being remedied though). From a spatial planning perspective, the representation of key habitats in protected areas is a cornerstone of conservation biology (though note that guidance on this point is in need of consideration of climate change effects). But few programs are aware of its importance for spatial planning - for this reason, indicators of the representation of each major habitat in protected areas was the ONLY standard indicator mandated among all of the places.

Other commonly considered options were protected area management effectiveness, and current conservation funding relative to perceived necessary funding.

Most places have not benefitted from a large-scale evaluation of their protected area systems to date, and in fact few places were able to collect much information on what one might think are key conservation parameters. Interest seemed lacking at the field level.

There was mixed agreement among the participants of the November 2008 measures workshop that conservation management is important. The core measures team and the participants agreed that key indicators are:

- Protected area representation of all habitats;
- Protected area management effectiveness;
- Total current conservation funding vs. the perceived total need.

Ranking of conservation management data is possible against representation targets (which all places should but often don't have), management effectiveness ideal scores, and perceived total funding needs.

The measures workshop participants did allow that there is a need for greater clarity on indicators should be included in the conservation management category and how the category links to other components of measures. Examples of specific conservation management learning from the November 2008 workshop are collected in the following table:

Lesson	Implications for WWF's Work
CEA: Information management is a key aspect of conservation management.	Build capacity at district level across region, establish measures officer as central node in regional hub WWF should monitor capacity related to information management.
HoB New finding: lowland forest is poorly represented in protected areas Borneo-wide	Continue establishing protected corridors connecting upland and lowland forest in HoB initiative, work with logging concessions to make sure that set asides are actually happening
HoB New finding: lack of protected area effectiveness information in Borneo	1. Obtain RAPPAM data for HoB parks and insert into conservation measures 2. Determine the appropriate type/level of management/governance across HoB 3. Implement METT in HoB to track effectiveness of those protected areas

SocialIndicators

Social Well-Being is another novel component that was tested in the Conservation Measures pilot project. This component was added in recognition that large-scale biodiversity conservation areas often exist within dynamic human landscapes. Social factors necessarily affect, and will be affected by, our conservation interventions. Yet, they tend to be underrepresented in spatial conservation planning. Across the WWF Network, there is an understanding that we must address social concerns as a fundamental part of our conservation work. Yet, we lack sufficient methods, guidance and capacity, to help integrate social aspects into large-scale planning.

To start planning at the NI scale, the conservation planner must first create a 30,000 foot view of the place to decipher the broad patterns and trends of the place. This view will identify the best opportunities for strategic investments before drilling down into detailed planning. The WWF Standards of Conservation Project and Programme Management provide broad guidance for analyzing the social context of conservation. However, they do not suggest scientifically rigorous approaches adequate for making evidence-based decisions at this scale. For example, the Situation Analysis suggests that the conservation planner assess the social and economic context. However, it doesn't specify what data to look for, where to find it, nor how to present and analyze it spatially. With the highly spatial nature of large-scale conservation planning, this represents a critical gap. However, just as the Standards present an iterative process, their development and refinement is also an iterative process. In the first phase of the Conservation Measures Program, we chose to focus on social well-being of local people as a starting point for generating spatially explicit data about the social context of conservation geographies. There are ample opportunities to expand upon this approach and this may be the focus of subsequent work, either within the Conservation Science Program (CSP) or in collaboration with others in the Network.

The concept of social well-being encompasses many aspects of society that are considered important for quality of life. It recognizes that poverty – or its inverse of well-being – has as much to do with such dimensions as education, health and empowerment as with the amount of money an individual earns. The Millennium Development Goals (MDGs) institutionalize this view of development and "have been commonly accepted as a framework for measuring development progress" (The World Bank, 2008). The MDGs provide a foundation for our Social Well-Being framework. It captures the elements of human development that also tend to overlap with conservation outcomes: Economic well-being, Health, Political Empowerment, Education and Culture. To test the framework, we provided guidance on what indicators measure social well-being, how to identify the best indicators and find data to measure them, and how to represent the data spatially and quantitatively. The result is baseline information that the conservation planner can analyze to discern the social patterns and trends most relevant for conservation in a specific geography.

Participants in the November 2008 conservation measures workshop agreed with the importance of collecting social data, but held varying perspectives regarding which specific types of social indicators were most informative for conservation planning.

General interest in social data illustrating links with resource use or associated with a strategy suggests a continuing tension between measuring status v. strategy effectiveness.

There was not consensus about the linkages between specific components of social context and WWF's work – and thus what social wellbeing data should be collected. There was also not consensus about how to apply data about social context to WWF's work at the landscape scale or above. This highlights the need to continue refining this novel component of the program. Where social well-being measures are incorporated, is should be ensured that individuals with social science expertise actively participate in indicator development, data collection, analysis, and interpretation.

Participants in the November 2008 measures workshop provided the following selection of examples of social well-being learning as a result of the conservation measures pilot:

Lesson	Implications for WWF's Work
Bering: Status measures don't show the effects of our programs but do show very interesting information about the communities we work in and the context of working in the place (eg poverty levels, cost of gas, etc)	Use data to target communities to • understand and communicate the context of the work • increase cooperation with government agencies
HoB: were not able to get the type of information needed to determine the extent to which local people depend on forest resources	• Additional indicators need to be identified about forest dependence • Would need to invest in primary data collection to determine the extent to which local people rely on forest resources (this would be worthwhile)
CT: Socioeconomic surveys documented strong community support for co-management of fisheries resources.	Provide technical information as input into participatory planning for the proposed marine park. The planning process will be led by the government.

(4) Standard Indicators

A general and open question is whether and to what extent indicators should be standardized between places. As mentioned, in the conservation measures pilot only a single indicator, protected area representation of major habitats, was mandated. The field had complete freedom to devise their own indicators across the four themes of biological, threat, management, and social-well being.

Biological indicators would be virtually impossible to standardize, since the ecology of each place is relatively unique (though there could be a high degree of similarity between different places that are in the same biome). Threat indicators also tend to be unique though IUCN and the Conservation Measures Partnership do use common lists of threats. There does seem to be more room for standardized indicators in conservation management and some components of social well-being (economics, education, health). It is an open question.

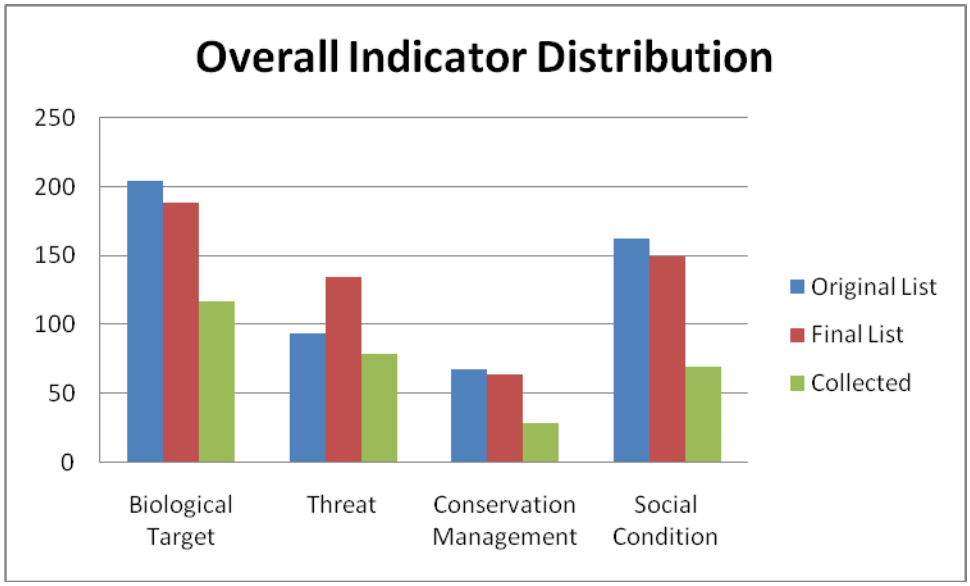
(5) Scale

It seems to take as much effort and manpower to adequately monitor a small geography as it does to monitor a very large one. This is partly because small areas will often require primary data collection. Obviously there is higher resolution for the smaller area under such a scenario of equal effort, but for purposes of management the outputs may have almost equal value (i.e. coarse, large-scale data is generally adequate for most large-scale decision making). Under the current framework, it would require basically the same budget for the Bering Sea as for one small part of Tun Mustapha Park in Malaysia. Obviously, the resolution is lower for the Bering Sea. Common sense would dictate that there is obviously a threshold of overall investment before the effort of spending $50-100,000 is warranted. This threshold is probably approximately:

- A collection of landscapes in an ecoregion or NI
- An ecoregion, either alone or as part of an NI.

NI-level measures, when an NI is composed of ecoregions that are themselves different biomes, whether freshwater, marine, or terrestrial, or different habitat types (temperate conifers vs. temperate grasslands) should be measured at the ecoregion or landscape level. Network guidance on this topic is sorely needed.

(6) Data Availability



Approximately 55% of the indicators identified during the initial workshop were collected as of November 2008. Data collection will continue within the programs, particularly Coastal East Africa, so this percentage should increase. The final list of indicators represented a change in focus for data collection, and actually resulted in a slight increase in the total number of indicators determined to be important to pursue. In any category there are likely to be important indicators for which there is currently no data. These indicators should stay on the overall list, so that opportunities to develop the appropriate information can be looked out for.

There are a number of ways to consider data availability:

- across regions (between countries);
- effort and cost;
- DC (remote) vs. in-country data collection;
- proprietary concerns.

As far as effort and cost are concerned, an explicit decision was made to cap the amount of effort directed at the measures work in each place at no more than one FTE equivalent per country office (where relevant). Strong suggestion was also made to rely on tracking down and assembling existing datasets rather than engaging in primary data collection. If efforts were directed toward primary data collection, it's likely that data would be collected for a select few indicators that would not provide the overall picture that was the intent of the program.

While the Measures Program did not systematically review the possibility of accessing data from Washington DC (or other Donor Organization location), WWF-US

management has asked whether this is a feasible option. A cursory review of Social data sources has revealed some easily accessible on-line sources:

- Demographic and Health Survey (DHS) data are available on-line and can be downloaded for free. This source is maintained by USAID and covers some key social indicators for many countries around the world. The data are collected at regular intervals by each country using a standardized survey instrument developed by USAID. However, the resolution of the data tends to be coarse. For example, in Mozambique, the DHS data correspond to Provinces;
- Census data is often available on line. From DC (via internet), we found better resolution census data for Nepal (VDC vs. District level) than the Nepal program found from Nepal;
- The Center for International Earth Science Information Network (CIESIN) also posts spatially-referenced social data sets on-line for free download. The resolution also tends to be coarse, regional or provincial, however the site also contains guidance on small area estimation techniques to further disaggregate the data;
- WRI has collected social, threat and biological data for Kenya, which are readily accessible, although this is not a source that will continually update data on the same indicators.

Another aspect of data collection that was not adequately anticipated by the core measures team was proprietary considerations. In some cases, data collected even by WWF staff are considered proprietary, and are not easily "given away." Data for the program are intended to be used by both the field programs and WWF as a whole in an effort to assess conservation status. In the future, sensitivity and understanding should be the rule when investigating the use of existing data sets.

(7) Data Quality

Data quality is a large concern of the core measures team, but until all of the data is in, it is difficult to make any judgments on its quality. In fact, assessing the quality and validity of the data may be a longer term task that may take a couple of months and require outside review.

Concerns will include:

- adequate spatial coverage;
- adequate documentation;
- reliability of collection agency.

The Mozambique office apparently does not feel comfortable using data from other agencies, based on reliability concerns. We did not encounter this problem in other geographies.

Each of the field based measures programs will be encouraged to assess the validity of their data, and to assign (a yet to be developed) data quality rating to datasets. Peer review is rare in WWF programs, but this is one area where peer review of data (and even indicators) seems warranted.

Methods Summary

- Field familiarity with the WWF Program Standards and buy-in and management from relevant NI managing directors and conservation directors were two key preconditions that greatly affected process and outcomes. Cross-national boundary arrangements must be considered in advance of implementing a similar program.
- The initial workshops are critical. A balance must be struck between the length and level of participation, and availability and other priorities among field staff and experts. A 3-day workshop is probably what is workable in most situations, but more time would be welcome.
- Logic dictates that it makes sense to tackle status measures first, in order to establish a baseline, but there is eagerness on the part of field staff to develop effectiveness measures.
- There seems to be no argument that biological and threat indicators are important.
- There is less common understanding about how to best incorporate the novel conservation management and social well-being measures.
- There was but varying understandings of how to link specific types of social data to conservation decision-making. This highlights the need to continue refining this novel component of the program while simultaneously ensuring that individuals with social science expertise actively participate in indicator development, data collection, analysis, and interpretation.
- What is the minimum number of indicators needed to adequately evaluate biological status and social well-being?
- Standard indicators should be considered for conservation management and social well-being categories.
- The threshold for engaging in such a comprehensive measures effort is probably approximately:
    - a collection of landscapes in an ecoregion or NI;
    - an ecoregion, either alone or as part of an NI.
- Some data is available centrally. This includes both remote sensing information as well as some online data – of course, the preference would be for all data to be collected in-country using in-country capacity.
- There are proprietary concerns about data, even when it is collected by WWF staff.
- Data quality is a major concern of the core measures team but it is too early to judge the overall quality of the assembled data. It will be important to assign data quality ratings and to subject the data to adequate peer review.

c) Resources

A group of core measures staff, with measures experience and ability to train in the WWF Program Standards needs to be in place across the Network. Overall leadership should probably be in WWF-International, but other donor NOs will want to have1 or 2 core

staff to be sure that their priorities are covered. Core salary, some travel funds, and a small amount of extra funds to supplement place-based budgets would be adequate.

One oversight in developing the original donor proposal for the measures pilot was to not earmark funds (~$10,000) for remote sensing imagery in each place. While such data is not required every year or every other year, such imagery would have facilitated the collection of data on the extent of major habitat types. As it was, imagery was generally located, but availability of funds would have allowed greater flexibility.

Of course the most important place for measures budgets is in the field-based conservation programs themselves. It would make sense for measures budgets to be built into core budgets as part of WWF Program Standards and funded by donor NOs. Either in place budgets or through access to resources in donor NOs and partners, a measures effort requires dedicated resources to cover:

- Capacity (see above)
- Computers, software
- Internet access
- Remote sensing imagery and other data
- Travel expenses
- Workshops and meetings
- Planning
- Building partnerships
- Building consensus on viability work
- Ongoing technical support (see below)

In this measures pilot, field teams were directed to make the most of existing information. Leveraging the previous and ongoing work of governments, universities, and other organizations makes the most sense for a non-profit organization struggling to establish measures programs. This worked for most of the places. Yet, there was some discomfort with two aspects of this strategy:

- Some information is considered proprietary and there was concern about exporting data out of the country for use by others;
- Some places were concerned with the reliability of data gathered by others.

Resources Summary

- Besides salary for core staff, and place-based budgets, a reasonable travel budget, and ~$10,000 for remote sensing imagery (every 2-3 years per place) to supplement place based budgets is sufficient to get a conservation measures program up and running in a donor NO.
- Measures budgets should be should be built into NI core budgets as part of WWF Program Standards and funded by donor NOs.
- Leveraging the data already collected by governments, universities, and other organizations is a viable strategy, but attention should be paid to proprietary concerns with partners and concerns about the quality of data collected by others.

d) Time

A conservation measures program can be established in one year, especially when core measures staff are already up and running, protocols are in place, and there is sufficient pre-planning to ensure that all parties are agreeable. However, participants at the November 2008 measures workshop stressed that aligning measures work to WWF's program in the place requires at least 6 months. Once this alignment has occurred, one needs at least a year to establish a baseline for status measures (with exceptions in data rich areas). This phase includes hiring or indentifying a measures officer, indicator selection, engaging partners, data collection and analysis.

The long term context of monitoring for measures should be integrated into project planning. Further, the process of monitoring and evaluating programs at large scales should be seen as an iterative one. Where programs begin with status measures, the baseline can be improved significantly and strategy effectiveness measures begun in years 2 and 3. Indicators, datasets, analysis will improve with time – this is perfectly reasonable and to be expected.

Many (most) status indicators do not need to be collected on an annual basis, or even every other year – the monitoring plan should lay out the schedule for each indicator. Miradi is quite suitable to detailing the monitoring plan.

In fact, measures staff should be thinking about what data that they are currently missing are critical and be developing a plan (with help from Network measures staff) to work with partners and funders to get that data.

For those places that are ready, the next step should be a concentrated effort on strategy effectiveness measures. Some background work can continue to improve status measures.

Time summary

- Aligning measures work to WWF's program in the place requires at least 6 months.
- Once alignment has occurred, one year is enough time to establish a measures program in a place leadership is bought in, core and field staff are in place, and there is alignment between field staff and larger organizational (NI) goals. Improvement should be seen as an ongoing process.
- The schedule for each indicator needs to be made clear in the monitoring plan (Miradi is very suitable for this).
- The next emphasis should be on effectiveness measures, with improvements in status measures happening concurrently.

e) Programmatic

(1) Alignment

Adherence and alignment with WWF Program Standards is a critical aspect of the program. The program was conceived as an extension of the Program Standards, and the intention is that conservation measures-specific guidance will be developed and added to the existing WWF Program Standards guidance. The novel components of the conservation measures pilot (conservation management, social well-being), in particular, may need to be vetted further.

Alignment with the Program Standards should avoid needless confusion amongst field programs. That said, the conservation measures team basically introduced the Program Standards to the field teams, which had little to no previous experience with them. Previous introduction and training for the Standards would have been very helpful for the conservation measures team.

Alignment with the Global Programme Framework should not be a problem, as the intent of the GPF is to draw on information that is already being collected by the field programs for their own purposes (which is guided by the WWF Program Standards).

Alignment of country and program offices with Network programs was an issue during this phase of the measures work. Field programs' loyalties are often more aligned with their own projects and country offices rather than Network Initiatives. Landscapes that crossed international boundaries were problematic. A primary lesson about sharing data across countries is that success depends largely on the strength of working relationships across program/country offices. If, historically, there is not a good working relationship among offices, then any effort to promote cross-border collaboration may take time and effort to build relationships where none exists. How long and how much effort will depend on the particular situation. Smoothing over the mismatch of priorities between local projects and NI-scale interventions should be the responsibility of conservation directors and executive leadership.

With the exception of remotely sensed data, it was anticipated that there would be some data issues related to national (and even sub-national) boundaries. It was not anticipated (by the core team) how large the national boundary issues would loom. National boundaries were a confounding issue for three of the 6 pilots (Bering, HOB, CEA), and would have been more significant for a fourth (Nepalese Terai) which was selected in such a way as to avoid anticipated cross-boundary problems. In the case of Bering, problems associated with the original field hire made the timing to difficult to access Russian data. In Coastal East Africa, the WWF-Mozambique and WWF-Tanzania offices have not collaborated to collect data, nor share data with one another. At the start of the pilot program, TPO and MCO did not share a perception of "one" Ruvuma Wilderness and the concept of a singular trans-boundary area remains an externally-driven idea. In practice, the two offices largely operate on their own sides of the national border and do not share information or collaborate with one another. This is a larger issue for WWF than simply a measures problem.

On the other hand, in the Heart of Borneo, collaboration across the Malaysian and Indonesian borders seems to have been as easy as developing a TOR to subcontract a Malaysian to collect data in that country. For the social indicators, colleagues from the WWF-Indonesia office and the WWF-Malaysia office gathered in a joint workshop to share data and lessons learned from the process.

This is a huge issue that is not only relevant to conservation measures but goes to the heart of ecoregion conservation. The theory was (and is) that in order to conserve ecosystems and processes that operate at large scales one has to plan and operate at the same scales. Yet, ten years after the advent of ecoregion conservation at WWF, we are still struggling mightily to coordinate between national offices.

Alignment at the finest (project staff) level is also important. Participants at the November 2008 workshop had a consistent message for the core team – while the measures pilot was (perhaps necessarily) a top-down, one-off exercise, future measures work must be more integrated into projects and programs. This includes both staff and the measures themselves. Measures staff should be integrated into program staff and have clear roles and responsibilities. Indicator selection should be part of a program's long term conservation planning and adaptive management strategy. If this is done, measures may be seen as a useful tool for monitoring progress.

(2) Leadership

Leadership is important at several levels. At the highest level, the involvement of the Conservation Committee (CC) would be helpful. The existence and aims of the conservation measures pilot has not been presented to the CC to the best of our knowledge, and even WWF-US management seem to be unclear about the role of conservation measures in the organization. The CC has the mandate to issue clear guidance with respect to measures – the current guidance to use the WWF Program Standards is insufficient. Ideally, the CC would generate this new guidance through a sub- or specially formulated committee or group. It might even be advisable to convene an outside scientific advisory committee to feed into a Network measures group.

In the case of this pilot, the core conservation measures team found itself in the unenviable position of convincing the field teams as well as its own senior management of the value of its work. This is an untenable position.

As mentioned in the method's section, a managing director's active involvement is also crucial. In several of the Sall Conservation Measures Programs places, management issues have arisen. When managing directors are well-engaged and have a clear supervisory role with field teams, as they are in two of the pilot places, things have gone quite smoothly. In another, constant effort is required to help smooth out the wrinkles that continually seem to crop up between national offices and to encourage the offices to follow through on important milestones like hiring. At the program office or field-based level, it is important to secure the active involvement or at least mandate of the respective

conservation director or similar responsible party. This in turn should be facilitated by leadership in the donor NOs or WWF-I.

There are different phases to the measures work, and intervention by managers may be more important in some phases than others. For example, project inception is critical, and the presence of managers at an annual review (adaptive management) would also be important. Beyond that, the level of participation is dependent on the capacity of the field measures staff and a manager's style. Certainly, however, the more engaged the manager is the better.

(3) Structure

Conservation measures are simply an emphasis within the WWF Program Standards. As such, responsibility for implementing rests across every level of WWF programs. The ideal overall structure of conservation measures has been described as:

- An oversight team – either a subcommittee of Conservation Committee or made up of measures staff from across the Network (an outside advisory group with peer review capacity may also be desirable);
- core measures team – consisting of five full or part-time staff, equating to 2.8 FTE's;
- managing directors/conservation directors – the managing directors of the six places were nominally part of the team;
- field measures team – the field measures staff were the foundation of the effort – it was their work to actually find and assemble the relevant data.

The Conservation Committee should consider creating a measures subcommittee. Regardless of whether this happens, a conservation measures oversight or management team needs to be created and engaged constantly to support measures as part of advocating for better conservation planning at the Conservation Committee level and above. This advocacy should not be the role of the conservation measures team. It may be worth developing an outside advisory committee as well, which would undertake peer review of measures frameworks and indicators.

One or more well-functioning core measures teams in the Network is critical to success – the effort to organize place-based teams, assist with initial development of indicators, provide ongoing guidance and facilitation is considerable. It would be useful to now review the measures capacity across the Network.
WWF-I has a measures officer, who is also responsible for Global Programme Framework indicators. WWF-US has maintained a core support team for the life of this measures pilot (3.4 FTEs total) – all of this capacity has been needed and then some. For the first year of the pilot, there were 6 liaisons (20% of each) assigned to assist the core measures team. This capacity was lost after the first year and the liaison task was absorbed by the core team.

The next rung in the overall conservation measures structure is NI managing directors and in-country conservation directors. They have indirect or direct oversight of the work of the field measures staff and are crucial to the success of any measures effort.

Finally, and most importantly, are the field measures staff themselves. As discussed under capacity, at least one field measures officer (and preferably one per country involved) needs sufficient (60%?) time to devote to the conservation measures work. Every NI (and viable ecoregion program) ought to have a conservation measures person on staff if WWF is serious about applying science-based adaptive management to programs that absorb several millions of dollars.

Programmatic Summary

- Alignment of the conservation measures work with the WWF Program Standards is critical to promote consistency and avoid confusion. Conservation measures is simply one field of (that merits) emphasis within the WWF Program Standards.
- Alignment of country offices with larger NI goals is not part of conservation measures per se but certainly affects how smoothly a measures effort will run. A primary lesson about sharing data across countries is that success depends largely on the strength of working relationships across program/country offices. Lack of cross-border collaboration presents an impediment to large scale conservation planning and measurement.
- Leadership for conservation measures is critical, from CC, through donor NOs, through managing and conservation directors – since convincing the field and management of the importance of measures at the same time is too much to ask of core measures support staff. Leadership of NI managing directors and in-country conservation directors is especially critical, since field measures staff are generally reporting to these people, either directly or indirectly.

B. How this helps WWF

How does the conservation measures pilot help WWF? This question can be answered at two levels. At the highest level, how does any conservation measures plan assist an organization? The following passage lays out the goals of the system-wide United States National Park Service Vital Signs Monitoring Program:

> "• Determine the status and trends in selected indicators of the condition of park ecosystems to allow managers to make better-informed decisions and to work more effectively with other agencies and individuals for the benefit of park resources.
> • Provide early warning of abnormal conditions of selected resources to help develop effective mitigation measures and reduce costs of management…
> • Provide data to better understand the dynamic nature and condition of park ecosystems and to provide reference points for comparisons with other, altered environments…

• Provide a means of measuring progress towards performance goals."[4]

Who is conservation measures for? The field staff? NI managers? Executive leadership at WWF? All of these groups will benefit from a conservation measures program, along with marketing staff, development staff, auditors, and operations. Conservation measures, at its core, tells us how we are doing relative to our conservation goals. Depending on the responsibilities of field staff, such information may be most useful to those planning and implementing at the landscape, ecoregion, and NI scales.

More specifically, the conservation measures pilot assists WWF at two levels:
1. the six pilot geographies have benefitted. Before the pilot the geographies had a wide range of experience monitoring conservation status. Those that had little to no data about their geographies now have a balanced assessment of the state of biodiversity in their places (with one exception). Those that had gathered some information now have organized that information into a consistent, recognized framework that is aligned with the WWF Program Standards. None of the places had assessed monitoring information relative to long-term viability and conservation goals.
2. the pilot has helped conservation measures in general at WWF by providing a proof of concept, warts and all, of a comprehensive conservation measures effort. There is more work to be done to complete the task, but there is now a solid experience to build upon.
For the reasons above and more, WWF needs a robust program that allows it to evaluate how places are doing relative to conservation goals, and whether strategies are progressing according to the theories that spawned them. Now there is an example to learn from.

C. Path forward/vision

Hopefully it is clear to all that WWF programs should be measuring where they stand relative to conservation goals, and to see if strategies are being effective, at scales relevant to management decisions. Looking forward, questions should be confined to:

- the details of recommended methods;
- the programmatic structure of the effort;
- the amount of effort;
- who will support the effort.

This year's conservation measures pilot was an initiative intended to provide a model for all of the dimensions above. How best to benefit from the experience of the last year? What is worth continuing? What should be changed? Can the methods used be modified/adapted to best advantage of the organization?

[4] Emmott, Robert G., Nora Murdock, Jack Ranney and Patrick Flaherty. 2005. *Appalachian Highlands Inventory and Monitoring Network Vital Signs Monitoring Plan*. National Park Service, Asheville, North Carolina. 207 pp. plus Appendices.

To repeat the overall summary, it is possible to establish a measures programs and baseline conservation status measures in priority places over the course of a year, with the support of a core team, provided that:

- leadership at all levels of the organization are supportive;
- there is a consistent and reliable source of technical support and leadership;
- field teams are in place and understand the WWF Program Standards;
- there is alignment between the field and larger (NI) goals.

The baseline status measures will improve over time, and strategy effectiveness measures can follow. Strategy effectiveness measures could be implemented first, but that would mean that baselines would not be established before strategies are implemented. Both sets of measures could be done simultaneously if the commitment and capacity is in place. The threshold for engaging in a comprehensive measures effort is probably a collection of landscapes in an ecoregion or NI or an ecoregion, either alone or as part of an NI.

The following short section provides recommendations from the measures core team based on the summary of the lessons learned, including the November 2008 measures workshop.

One general note is in order. It has surely been raised before, but conservation measures is another area where the WWF Network would benefit from a more systemic learning culture – the essence of the WWF Program Standards. Many staff are still not familiar with the Program Standards. The systems for accountability for individuals and teams should be based on documenting adaptive management, which in turn is based on monitoring and evaluation. Leaders throughout the organization should model and promote this type of behavior.

Aligned with the need for more learning is a need for greater peer review. The WWF-US conservation measures core team calls for systematic peer review of this conservation measures pilot and subsequent conservation measures efforts across WWF's priority places – this will ensure that WWF place programs use the most robust and efficient means to evaluate their conservation progress.

1. Capacity

Individual place teams desire support for measures. A small team of 1-3 FTEs in any given NO can support several priority places. Network coordinating and advisory body for measures would be very helpful to sort out uncertainties on methods, to help organize core capacity among the donor NOs, and to make sure that place teams get the support that they need.

- **Recommendation:** The Network should organize a distributed support team of measures staff from donor NOs, with WWF-I taking the overall coordination lead, so that all WWF priority places have support.

The experience of the pilot was that for any given place, a team of staff who are integrated into the program is generally required to get the work done. The team should include a central coordinator(s) with in-depth knowledge of the place, other staff (or

partners) to assist in data collection and analysis, and access to specialized technical skills, especially GIS and remote sensing. Some data is available centrally, including both remote sensing information as well as some online data, but the majority of indicators identified by any given team is often only available in-country. Of course, the preference would be for all data to be collected in-country using in-country capacity.

- **Recommendation:** If they have not already done so, WWF priority place teams need to identify the staff capacity within their program to undertake adaptive management measures.

2. Methods

Field familiarity with the WWF Program Standards and buy-in and management from relevant NI managing directors and conservation directors are important preconditions for undertaking measures work – both of which are generally lacking in WWF.

- **Recommendation:** Priority WWF programs need more familiarity with the WWF Program Standards, and NI managing directors and NO conservation directors should strive to use the adaptive management indicators of the Program Standards to manage programs and staff.

Logic dictates that it makes sense to tackle status measures first, in order to establish a baseline, but there is eagerness on the part of field staff to develop effectiveness measures.

- **Recommendation:** Ideally, programs would initiate a conservation status measures effort before engaging with strategy effectiveness measures, but many programs are already going, and will need to make the decision for themselves.

There is strong consensus that biological and threat indicators are important, but less so for conservation management and social well-being measures.

- **Recommendation:** Programs undertaking a conservation status measures effort will certainly want to establish biological viability and the quantitative status of key threats. They must decide for themselves if conservation management and social well-being status is a priority for them.

There has not been a thorough peer review of the assembled datasets for data quality, but this is obviously always a concern.

- **Recommendation:** Participants of the pilot as well as all program measures teams should seek outside peer review of both the indicators selected and the datasets collected.

3. Resources

WWF-I cannot be solely responsible for supporting conservation measures across the Network, but can help to organize Network staff. Donor NOs should have the staff to support WWF's priority places. Salary for 1-3 core staff, a reasonable travel budget, and small amounts of money (e.g. $10,000 for remote sensing per place every 2-3 years) to supplement place based budgets is sufficient to get a conservation measures program up and running in a donor NO – this team can support several WWF programs as part of a distributed network of Network measures support.

- **Recommendation:** Donor NOs that are concerned that their own priority programs are being managed adaptively should either make sure that other donor NOs are supporting measures in their priorities, or assist with the necessary resources.

Conservation measures is a core function of any program, and WWF is responsible to its donors to assure the programs track progress toward stated conservation goals. NI's and other priority programs need the resources to do measure progress and manage adaptively. Leveraging the data already collected by governments, universities, and other organizations is a viable strategy, but some information (i.e. remote sensing) may need to be collected by WWF programs themselves, and attention should be paid to proprietary concerns with partners and concerns about the quality of data collected by others.

- **Recommendation:** Measures budgets should be should be built into NI core budgets as part of WWF Program Standards and funded by donor NOs.

4. Time

Aligning measures work to WWF's program in a place requires at least 6 months, and was seen as a critical phase by field participants in the November 2008 measures workshop. This includes identifying or hiring staff, building partnerships, ironing out data sharing arrangements, etc.

- **Recommendation:** Measures programs in a place should be built up slowly in a place, so that the measures work is well-integrated into programs, staff are on board, and data-sharing partnerships are not strained.

Once alignment has occurred, one year is enough time to establish a measures program in a place leadership is bought in, core and field staff are in place, and there is alignment between field staff and larger organizational (NI) goals. Improvement should be seen as an ongoing process. The next emphasis should be on effectiveness measures, with improvements in status measures happening concurrently.

- **Recommendation:** Allow a year to develop baseline conservation status measures. Strategy effectiveness measures can either wait until baselines are established or, with adequate staffing proceed simultaneously.

5. Programmatic

Alignment of the conservation measures work with the WWF Program Standards is critical to promote consistency and avoid confusion. Conservation measures is simply one field of (that merits) emphasis within the WWF Program Standards.

- **Recommendation:** Any measures program in the Network should fit into the WWF Program Standards – this is not conceptually difficult.

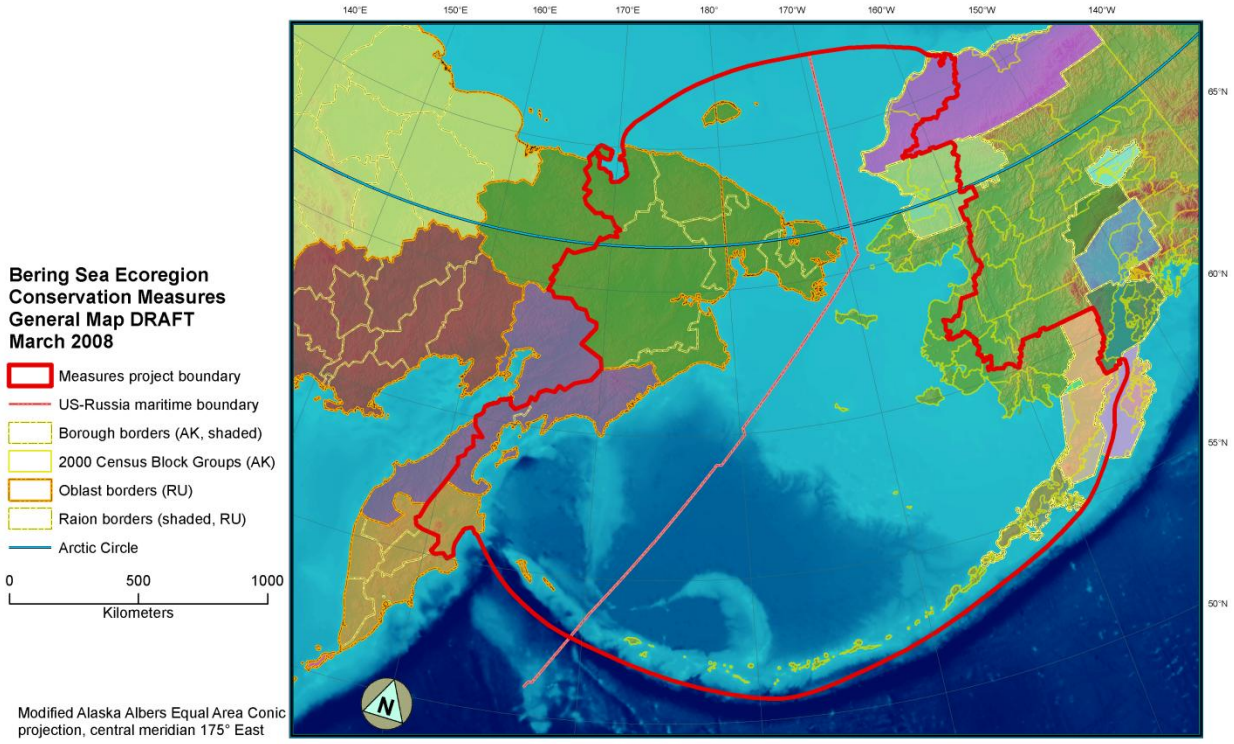
Alignment of country offices with larger NI goals is not part of conservation measures per se but certainly affects how smoothly a measures effort will run. A primary lesson about sharing data across countries is that success depends largely on the strength of working relationships across program/country offices. Lack of cross-border collaboration presents an impediment to large scale conservation planning and measurement.

- **Recommendation:** As part of the 6-month lead up (see "Time" above) to the initiation of any cross border measures program, any lingering cross-border NI management issues need to be worked out so that measures work is as seamless as it should be.

Leadership for conservation measures is critical, from CC, through donor NOs, through managing and conservation directors – since convincing the field and management of the importance of measures at the same time is too much to ask of core measures support staff. Leadership of NI managing directors and in-country conservation directors is especially critical, since field measures staff are generally reporting to these people, either directly or indirectly.

- **Recommendation:** Responsibility and broad direction for measures should be with NI managing directors and conservation directors, who should require that their staffs report back on objectives and goals developed during WWF Program Standards planning.

Appendix 1: Bering Sea



Conservation Measures Program

The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

Credits:

Bruce Robson coordinated the data collection

Technical Progress Report

for a living planet®

X.

XI.

XII.

XIII. WWF Technical Progress Report (TPR) Format

(TPR to be submitted every 6 months)

This template is to be used when reviewing and reporting on the progress of projects/ programmes[5] funded by WWF. In this context, a *project* is defined as a set of actions undertaken by any group – including managers, researcher, community members, and any other stakeholders – to achieve defined goals and objectives. A *programme* is a set of projects that together address a given theme or strive towards a broad, over-arching goal. The template is designed to comply with the concepts and terminology present in the WWF Standards of Project and Programme Management. In line with these standards, project/ programme leaders are expected to analyse their progress regularly, write their analysis down, and use the analysis for the benefit of the project and of WWF's learning objectives. This supports adaptive management, impact assessment, and generating and sharing knowledge.

The report should be compiled from regular monitoring information and after an analysis of project progress that should be undertaken with the involvement of project team members (which could include project stakeholders or external WWF members). Because of the importance of associating closely the operational side of a project with the programme side (e.g. budgets to enable activities), it is strongly recommended to include operational team members at all stages of your project including in developing reports. The analysis carried out for the end of year report is expected to be more comprehensive and thorough than for the mid year report.

There are two parts:

- Part 1, the General Narrative Report (required every 6 months: mid year (Jan. 31) and end of year (July 31); and
- Part 2, the Monitoring Report (required at year end (July 31).

[5] The terms projects and programmes are used interchangeably through this document.

Part 1 requires the project team to review and share key information relating to the project/ programme. It meets multiple needs, including the communication of successes, progress, issues and changes to plan.

Part 2 requires the project team to systematically review and share progress against the planned Goals, Objectives, Activities (Outputs), and their associated indicators. This should help the team to assess the impact of their work, and to take the right adaptive action based on what proves to be most effective.

Note that the end of year report is for the whole financial year (the previous 12 months rather than the previous 6 months). The end of year report may include an update of the information provided in the mid year report.
If you are reporting on behalf of a programme that consists of a number of closely related (sub) projects, it is recommended to consolidate your reporting into one TPR.

You are reminded to upload each technical report onto the project database within 4 weeks of the reporting period; and also to update other project information every 6 months e.g. financial summary, key contacts. In addition, we recommend that you make use of available financial information (e.g. from Quarter 3 (Q3 financial reports) to help complete your year end technical report.

A. *WWF TECHNICAL PROGRESS REPORT*

B. *PART 1: GENERAL NARRATIVE REPORT*

C. *(every 6 months (jan. 31 and july 31), suggested LENGTH 3-6 pages)*

1. Project/ Programme Title:	**2.** Bering Sea/Kamchatka Ecoregion Program
3. International Project Number(s):	**4.**
5. Reporting Period:	**6.** Final
7. Name (writer(s) of this report):	**8.** Bruce W. Robson
9. Position/ Title:	**10.** Consultant, WWF Bering Sea Ecoregion Program
11. Organization:	**12.** Community and Ecology Resources, LLC
13. Date:	**14.** 10/27/08

15.

1) **Global Programme Framework.** [I don't have the necessary information to write this section]

2) **Project Successes:**
   a. In the final stage of the project we were able to identify a significant number of on-going data collection programs conducted by federal and state agencies and local organizations. We linked many of our indicators to data provided by these programs in order to provide cost effective time-series data for use in assessing the status of indicators over decadal time scales. To the greatest extent possible we selected legally mandated processes (e.g. the fisheries and marine mammal stock assessment programs) to insure long-term availability of agency funding.

   b. In several cases (e.g. marine mammals and fisheries) we were able to establish connectivity of indicators between multiple Target, Threat, Conservation

Management and Social categories. For example we used overall assessed biomass of a suite of pelagic and benthic fish species as Target indicators. These were linked to exploitation rate and stock status of the fisheries for these species as Threat indicators. These in turn will impact the harvest of fish species allocated to communities involved in the fisheries Community Development Quota system which is a Social indicator.

c. To the extent possible, indicator species and processes were selected to coincide with indicators being selected by NOAA and the North Pacific Fisheries Management Council (NPFMC) as they develop ecosystem models and strategies for use in implementing ecosystem management. While the evolving nature of these processes may result in the need to adapt these indicators over time, this linkage will keep the WWF process integrated with the development of ecosystem management in the Bering Sea region.

3) **Progress on Activities and related financial issues.**

a. Following a considerable setback due to staff changes, significant progress has been made on the development and specification of Targets, Threats and Social Indicators for US side of the Bering Sea ecoregion. However, given the short time frame left for the project, we were unable to make progress on defining data sources and researching indicators for the Russian side of the ecoregion. Following the completion of contract obligations for the US indicators, if there are any remaining funds we will apply these to data collection for Russian indicators. The initial priority will be to collect Russian data for Biological Targets, followed by Threat indicators.

b. [Insufficient information to answer this question]

4) **Problems and Constraints.**

a. The departure of the lead place-based staff person was the most significant impact on the overall progress of the project. This situation was resolved by hiring Community and Ecology Resources (Co-Eco) a team of consultants with experience working in working in the Bering Sea over the last three decades. One of the consults played a role in the development of some the initial indicators in 2004 which provided a level of familiarity with the Measures project. the early stages of the project and widespread institutional knowledge of the program

5) **Unexpected effects.**

a. The approach taken in the final stages of the project has provided positive connections with agency scientists and community members that have resulted in potential benefits to the measures program through the use of ecosystem modelling and community-based monitoring. The decision to select a suite of 94 communities also monitored by NOAA and the NPFMC

will provide potential benefits for NOAA, WWF and the communities in the future.

6) **Learning and Sharing.** Describe key lessons learned, that are important to your project or that may be of use to others outside this project. They may relate to any of the following: successes, strategies adopted, challenges you are facing, surprise results, management processes, or technical understanding.

a. From a research and data gathering standpoint, outreach to agency scientists and experts in the field was critical. This approach also extended to detailed discussions with database managers (e.g. the ADEC Oil Spill database). A detailed understanding of the structure and constraints of the data that was requested or downloaded is critical to insuring reliable and accurate long-term data sets. Documentation of these processes will also facilitate future updates of the indicator data.
b. Regular phone calls and teleconferences (primarily toward the end of the second phase of the project) were very useful. Given the volume of data collected and synthesized, it was often necessary to refocus the goals of a particular indicator or suite of indicators. The programmatic knowledge provided by WWF Conservation Science staff was critical to this process.

Due to its nature as a learning effort, the Conservation Measures program has developed the following questions to capture insights on specific components of our program. Your feedback will be incorporated into a final program report and recommendations for implementing Conservation Measures in the future.

c. Provide a brief summary of the results of the analysis of the Biological, Threat, Conservation Management and Social Condition status of the Bering Sea.
    i. Target indicators
        1. The indicator analysis showed that upper trophic level species in the ecosystem are showing signs of stress, especially the large baleen whales, however to a large extent the low population levels for these species may be related to historical exploitation patterns and recent population increases are a positive sign of recovery. Pinnipeds and sea otters are also experiencing declining population trends that may be related to a number of interdependent factors including fisheries, predation and environmental variability and changes.
        2. The middle trophic level fish species are relatively healthy, however downward trends in several major stocks (EBS Pollock and cod) are cause for concern.
        3. Climate indicators show that climate change in the EBS is manifesting as underlying long-term temperature increases with increased variability around the long-term mean In the last 8 years we have seen a series of both record warm and record cold years.

ii. Threat indicators
    1. Fisheries data indicating declining trends in pollock and cod stocks are cause for concern. Exploitation rates should be carefully monitored in coming years for these species.
    2. Good baseline data was obtained for threat indicators related to shipping, oil spill monitoring and oil development. These should be monitored carefully in coming years as vessel traffic in the Bering Sea increases and lease sales for offshore oil and gas development move forward.
    3. Data collection for Conservation Management and Social Condition status is ongoing so results are not available at this time.

d. Please comment on the following elements of the program:

i. **Human Capacity**: What capacity was employed to accomplish the objectives (staff, technical expertise, etc.)? Was this sufficient? If not, please comment on the gaps.
    1. The first place-based staff member for the Bering Sea project was able go gather a significant amount of information on indicators. However, he may have been hindered by a lack historical experience in the EBS and which presented difficulties in connecting with relevant researchers who could help locate and fine tune the indicator data. These difficulties may have been compounded by the decentralized structure of the measures program and field office. In conversation he expressed a sense of isolation and a lack of clear direction for his role in the project. This may have led to discouragement and his eventual departure from the program.

    2. The replacement researchers had the benefit of a long history of involvement at multiple levels of research and management in the Bering Sea. This provided the necessary contacts and ability to think synthetically about how indicators can interact. This experience allowed us to work more independently and to benefit from Measures Program guidance without needing more support than Measures staff were reasonably able provide without local expertise in the ecoregion.

ii. **Methods:** Please evaluate the Conservation Measures methodology. What were its strengths and weaknesses? Please comment specifically on issues of data availability, analysis, & issues associated with scale.
    1.

iii. **Resources:** Were there sufficient financial resources to accomplish the project objectives? If not, what would have been required?

1. The financial resources requested in the proposal submitted by Co-Eco should be sufficient to complete indicator research for the US side. Without knowledge of the project budget it is not possible to add any insight as to whether the total project budget was appropriate.

iv. **Time:** How much staff time was dedicated to this project? Was this sufficient to accomplish the objectives?

1. Without detailed knowledge of the first phase of the project, it is difficult to determine whether the original amount of staff time dedicated to the project was sufficient. The Co-Eco contract budgeted 2.5 months of staff time to complete the indicator research for the eastern Bering Sea (USA portion of the project), with any remaining funds to be allocated to research on indicators for the Russian side of the Bering Sea/Kamchatka Ecoregion. Based on progress to date, we will be able to complete the research for the US side of the ecoregion, however it is not likely that sufficient time will remain to complete the necessary research for the Russian indicators. However it is clear at this point that additional time to develop the process would have been very beneficial. The contacts and thought process necessary to fully develop a network of indicators of this nature would benefit from ongoing discussion and refinement that can happen more naturally over a longer period of time. We are also running into problems getting data from several sources for Social indicators. Agency data managers are usually busy people and it is important to patiently cultivate relationships to insure data access in future years.

2. It is worth noting that with the initial research completed, the approach used to link many of the US indicators to existing monitoring programs conducted by federal and state agencies and other collaborating organizations will result in significantly less time needed to update the indicators on a regular basis.

v. **Alignment:** How did the Measures work fit with the portfolio of activities in the Bering Sea Ecoregion?

1. [This should probably be answered by WWF place-based staff]

vi. **Organizational Structure:** To the extent applicable, please comment on any opportunities or challenges that emerged from the overall structure of the Conservation Measures Program (i.e. Washington core

team and place-based team) and the structure of the program in your place (i.e. working across trans-national boundaries, etc.)

1. Given the de-centralized nature of the project, tele-conferences were very helpful to give a sense of programmatic goals.

e. **Conservation Findings:** Did the analysis of the indicators result in any new insights about the Bering Sea Ecoregion?
   i. Analysis of catch-per-unit-effort of forage fish caught as bycatch in the groundfish trawl surveys revealed that an important nearshore forage species Pacific sandlance, is currently at low levels of abundance. This was subsequently verified in discussions with NOAA fisheries biologists and merits further attention and monitoring.

7) **Adaptive Management.** Based on your analysis of the situation and the project's progress, which project objectives and activities have been changed, or will need to be changed? Please attach latest versions of your action plan (e.g. logframe) and monitoring plan, if changes have been made.
   a. Indicator changes listed by
      i. Target Indicators
         1. Approximately 30 Target indicators were initially selected representing marine mammals, seabirds, marine fish and invertebrates. Climate change indicators were originally included in the Threats section, but were shifted to Targets based on discussion with Conservation Measures program staff. Some of the initial indicators (18) were based on research conducted in 2004 however these needed to be updated data to current values, formatted for Miradi software and checked to insure that data sources and methods were properly documented.
         2. Four indicators were dropped from the analysis due to insufficient data or a clear indication that the indicator would provide limited value in the future (i.e. no new data collection planned).
         3. Three of the original Target indicators will require additional research to determine if they are viable.
         4. An additional 14 Target indicators were defined in situations where the original indicators were poorly specified or available data needed to be split into sub-regions. Ranking criteria needs to be developed for some of these indicators.
      ii. Threats
         1. The initial project plan specified 40 threat indicators representing climate change, oil and gas development, fishing and invasive species. Six of these were not viable due to lack of time-series data (e.g. ocean acidification). An additional 12 Threat indicators were defined during the research process.

iii. Conservation Management
    1. There were initially 5 categories defined for Conservation Management: Protected Area Representation, Conservation Policy, Capacity, Sustainable Finance and Ecoregion Conservation. However, Key Attributes were only defined for the first two categories, and of these, only Protected Area Representation had viable indicators developed at the time of this report. These are:
        a. Distribution of fisheries management zones and trawl closures in habitat areas
        b. Distribution of fisheries management zones and trawl closures in priority areas

iv. Social Measures
    1. 34 21 13

8) **Communications/ Stories.** Highlight any actions or successes meriting communications attention e.g. positive media coverage, success stories, contacts made (such as with government), major events.
    a. None yet. Unfortunately it was primarily an unglamorous process of grinding through a lot of data.

9) **Future Issues/ Challenges.** Highlight the 3 most significant issues/ challenges ahead for the project, focusing on the next 12 months, and explain how they will be addressed. (Concentrate on barriers to delivery that could lead to major changes to objectives or plans).
    a. **[I'm not sure this is relevant at this point?**]

10) **Overall Assessment of progress.** Assess whether the project has made the expected progress against the action plan, and whether planned the objectives will be achieved (In the early stages of a project, this will be a somewhat subjective judgement. As the project progresses, this should be based on an assessment of progress against goals and objectives and the associated indicators)
    a. **[I need access to the action plan to address this question]**

D. WWF Technical progress report

E. PART 2: monitoring REPORT (Only required at year-end, july 31). suggested format- an excel or word table.

F.

1. Project/ Programme Title:	**2.**
3. International Project Number(s):	**4.**
5. Reporting Period:	**6.**

The monitoring report requires the project team to systematically review their monitoring data and share progress against the planned Goals, Objectives, Activities (and Outputs)[6], and their associated indicators. This should help the team assess the impact of their work and to take the right adaptive action based on what proves to be the most effective. A significant amount of data will likely be collected during the course of the year as part of the project management and this will help fill out the monitoring report section. This information will also be easily uploaded into any WWF Network data management system (INSIGHT)[7].

G. GUIDANCE

1) It is recommended to use **one or more** Excel spreadsheets as the preferred format for Part 2. The number of spreadsheets will depend on structure of the project/ programme plan. Word tables are also acceptable, but will be more difficult to manage, especially for larger projects/ programmes.
2) It is suggested that you use your monitoring plan and Annual Workplan as a basis for creating the monitoring report. If appropriate, add additional columns to show results in subsequent years. Provide more detailed information in narrative form or as additional documents if you wish.
3) Focus on providing quality information on progress against Goal and Objectives. Report also on Activities (and Outputs where used) – keep this simple and light, whilst making it clear to the reader which tasks identified in the Annual Workplan have been completed and which have not. Important Activities that were not originally planned should be mentioned, as well as planned Activities.

[6] Many projects or programmes use the terms targets and milestones in place of goals, objectives…..

[7] Working Group 8 under INSIGHT is defining WWF's Conservation Project Management systems requirements

4) Tracking of changes in assumptions and risks can also be kept simple e.g. in a qualitative way by checking with relevant information sources and networks whether changes have occurred.
5) It is recognised that it will often take some time to establish the baseline. Indicators at Goal and Objective level may be measured at frequencies of less (or more) than one year. For biological indicators, and some socio-economic indicators, measurement it is likely to be at longer intervals. Where no new information is available, state when the next measurement/ assessment is due.
6) Success rating. This should be your assessment of whether the anticipated progress has been made towards each Goal, Objective or Activities (and Outputs where used) over the past year. In the early stages of a project this may be a somewhat subjective judgement, but increasingly this should be based on data (>67% on plan = green, 33-67% = amber, <33% = red)
7) The final column should identify whether and which higher level Goals and Objectives the project is contributing to (if any) i.e. Network Initiatives or other Priority Programme Goals and Objectives, Biodiversity and/ or Footprint Goals. For example, Coral Triangle Goal 1, Forests and Climate Objective 2.2. Add an extra column if necessary, and write it down descriptively if that is easier.

Targets	Indicators (**what** you are measuring)	Baseline (Value and date of measurement)	Current status (Value and Date) with discussion of any variance	Success rating (green, amber or red)	Indicate what GPF Goals and Objectives this relates to
Goal level					
Objective 1					
Objective 2 etc.					
Activity 1 (and Output 1 if used)					
Activity 2 (and Output 2) etc.					

Risks	Discussion and validation (or readjustment)
Assumptions	Discussion and validation (or readjustment)

Thank you!

For submitting this progress report to the Conservation Measures Team at WWF-US by September 19, 2008.

Biological Targets

Target	Key Attribute	Indicators
Seabirds	Long Term Trends in Population and Productivity	Cormorants: % breeding pairs producing chicks, population count
	Long Term Trends in Population and Productivity	Kittiwake: % breeding pairs producing chicks, population count
	Long Term Trends in Population and Productivity	Murres: % breeding pairs producing chicks, population count
Pinnipeds	Population size & dynamics	Northern fur seal bull counts
	Population size & dynamics	Northern fur seal pup counts
	Population size & dynamics	Steller sea lion non-pup counts
	Population size & dynamics	Walrus Island Steller sea lion pup counts
	Population size & dynamics	Harbor seal population counts
	Prey availability	Female fur seal trip distance and duration
	Prey availability	NFS pup weight
	Prey availability	Number (%) NFS pup starvations/year
Whales	Population size & dynamics	Eastern Bering Sea Stock Beluga population size
	Population size & dynamics	Bristol Bay Stock Beluga population size
	Population size & dynamics	Fin whale population size
	Population size & dynamics	Gray whale population size
	Population size & dynamics	Orca population size
	Population size & dynamics	Right whale population size
	Population size & dynamics	Sperm whale population size
Sea Otter	Population structure & recruitment	Sea Otter population counts
Pelagic Fish	Population size & dynamics	Eastern Bering Sea Pollock Biomass
	Population size & dynamics	Aleutian Islands Pollock Biomass
	Population size & dynamics	Bogoslof Pollock Biomass
	Population size & dynamics	Percentage of streams meeting salmon escapement goals
	Population size & dynamics	Forage Fish Trawl Survey CPUE
Bottom Dwelling Fish & Crab	Population size & dynamics	Blue King Crab (Nearshore species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Pacific Cod Biomass (Shelf species population)
	Population size & dynamics	Pacific Ocean Perch Biomass (Shelf break species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Yellowfin Biomass(Mid-Shelf species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Flathead Sole Biomass (Outer-Shelf species population)
	Population size & dynamics	Eastern Bering Sea/Aleutian Islands Atka Mackerel Biomass
Coral/sponge Gardens	Size, extent, and architecture of coral/sponge communities	HAPC Biota Trawl Survey CPUE - Eastern Bering Sea
Sea Ice Habitat	Sea ice habitat integrity	Aerial extent and timing of pack ice (km2) over shelf; winter maximum and summer minimum
	Sea ice habitat integrity	Amount (km2) of multi-year ice vs. annual ice
	Population size & dynamics	Polar bear population size
climate change	Sea Surface Temperature	SST in May in the southeastern Bering Sea

Target	Key Attribute	Indicators
	Sea Surface Temperature	Average SST from Mooring 2 for January 15 through April 15
	Sea Surface Temperature	Winter Sea Surface Temperature, Pribilof Is.
	Bottom Temperature	Summer Bottom Temperature on the EBS Shelf
	Sea Ice	Ice Cover Index
	Sea Ice	Ice Retreat Index

Seabirds - Cormorants: % breeding pairs producing chicks, population count

Target: Seabirds

KEA/Indicator: Long Term Trends in Population and Productivity / Cormorants: % breeding pairs producing chicks, population count

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Variable - annual report with 2-3 year publication delay
Where: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge
How: Request report via email
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:
Source(s):
2001 Data: Dragoo, D. E., G. V. Byrd, and D. B. Irons. 2003. Breeding status, population trends and diets of seabirds in Alaska, 2001. U.S. Fish and Wildl. Serv. Report AMNWR 03/05. 2002 Data: Dragoo, D. E., G. V. Byrd, and D. B. Irons. 2004. Breeding status, population trends and diets of seabirds in Alaska, 2002. U.S. Fish and Wildl. Serv. Report AMNWR 04/15. 2003 Data: Dragoo, D. E., G. V. Byrd, and D. B. Irons. 2006. Breeding status, population trends and diets of seabirds in Alaska, 2003. U.S. Fish and Wildl. Serv. Report AMNWR 06/13. Homer, Alaska. 2004 Data: Dragoo, D. E., G. V. Byrd, and D. B. Irons. 2007. Breeding status, population trends and diets of seabirds in Alaska, 2004. U.S. Fish and Wildl. Serv. Report AMNWR 07/17. Homer, Alaska. 2005 Data: Dragoo, D. E., G. V. Byrd, and D. B. Irons. 2008. Breeding status, population trends and diets of seabirds in Alaska, 2005. U.S. Fish and Wildl. Serv. Report AMNWR 08/03. Homer, Alaska.
Contact(s): Dragoo (don_dragoo@fws.gov) and Byrd (vernon_byrd@fws.gov) at Alaska Maritime NWR, Homer; Irons (david_irons@fws.gov) at U. S. Fish and Wildlife Service, Migratory Bird Management, 1011 East Tudor Road, Anchorage, Alaska USA 99503

Seabirds - Kittiwake: % breeding pairs producing chicks, population count

Target: Seabirds

KEA/Indicator: Long Term Trends in Population and Productivity / Kittiwake: % breeding pairs producing chicks, population count

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Variable - annual report with 2-3 year publication delay
Where: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge
How: Request report via email
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Seabirds - Murres: % breeding pairs producing chicks, population count

Target: Seabirds

KEA/Indicator: Long Term Trends in Population and Productivity / Murres: % breeding pairs producing chicks, population count

Justification for Indicator:

Long-term Viability Goal:

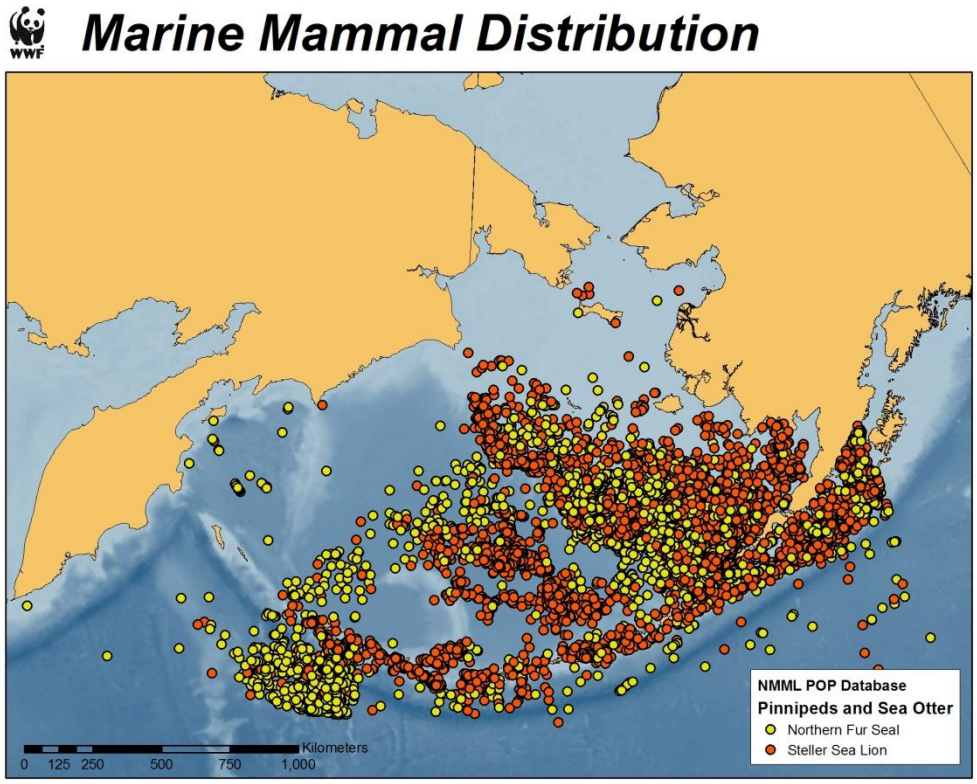
Monitoring Approach:
When: Variable - annual report with 2-3 year publication delay
Where: U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge
How: Request report via email
Future Indicator Development Required:

Notes:

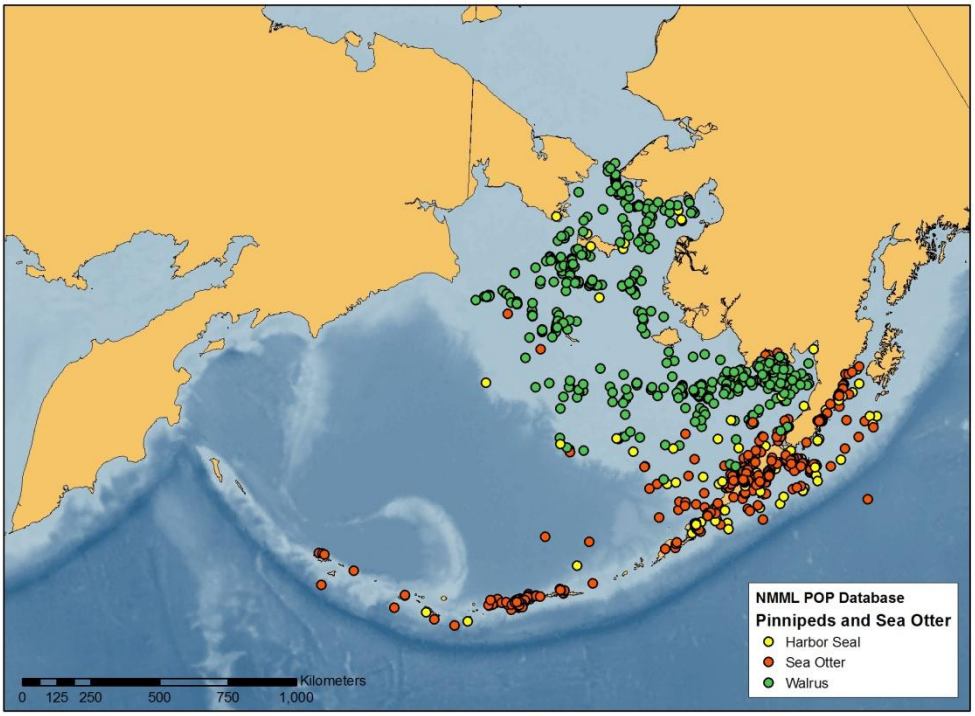
Working Group Members:
Bruce Robson

References:

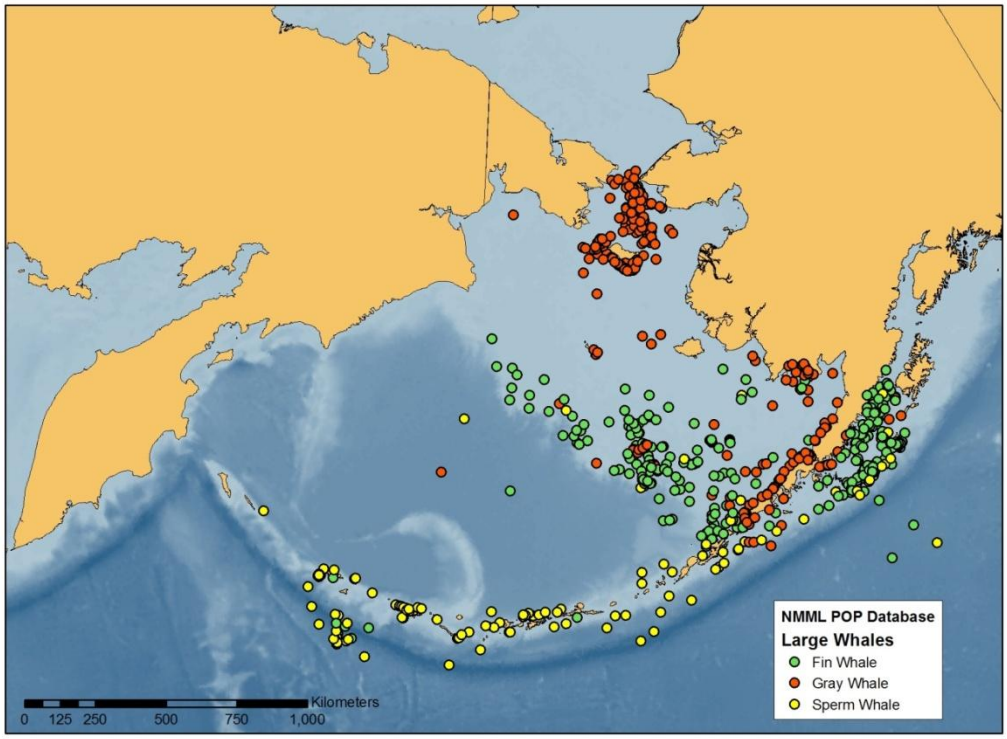
Marine Mammal - Population distribution

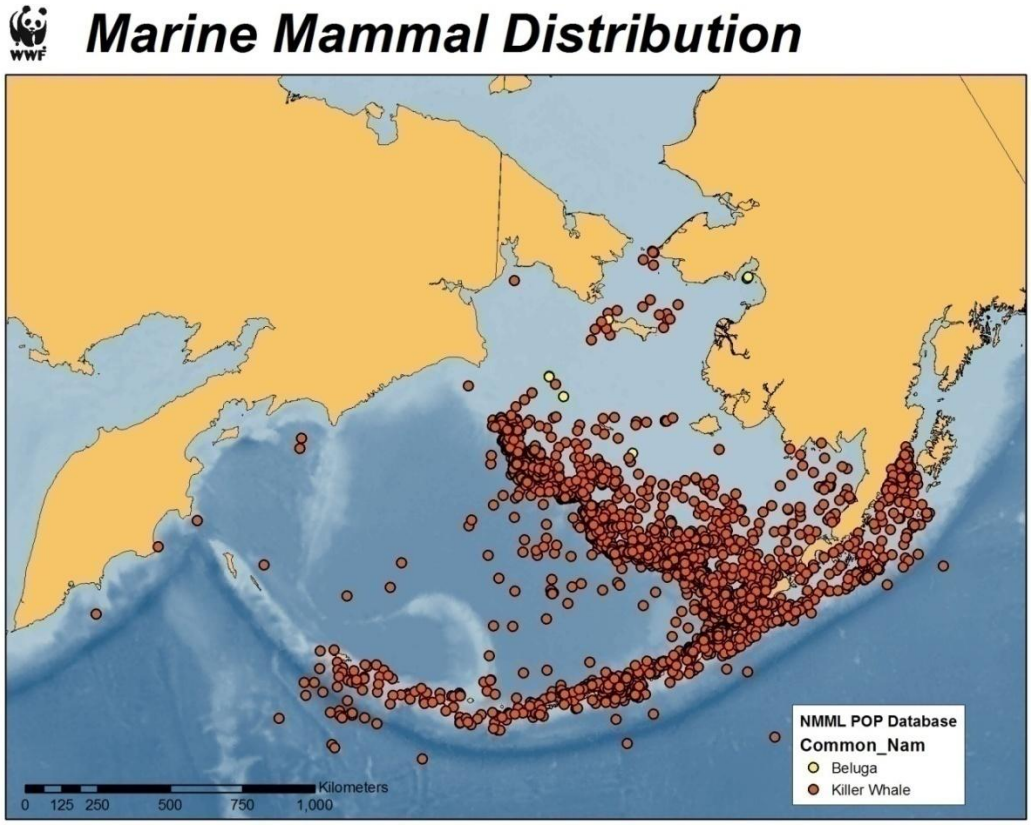


Marine Mammal Distribution



Marine Mammal Distribution





Target: Marine mammals

KEA/Indicator: Population distribution/ Sea Otters, Pennipeds, Whales

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

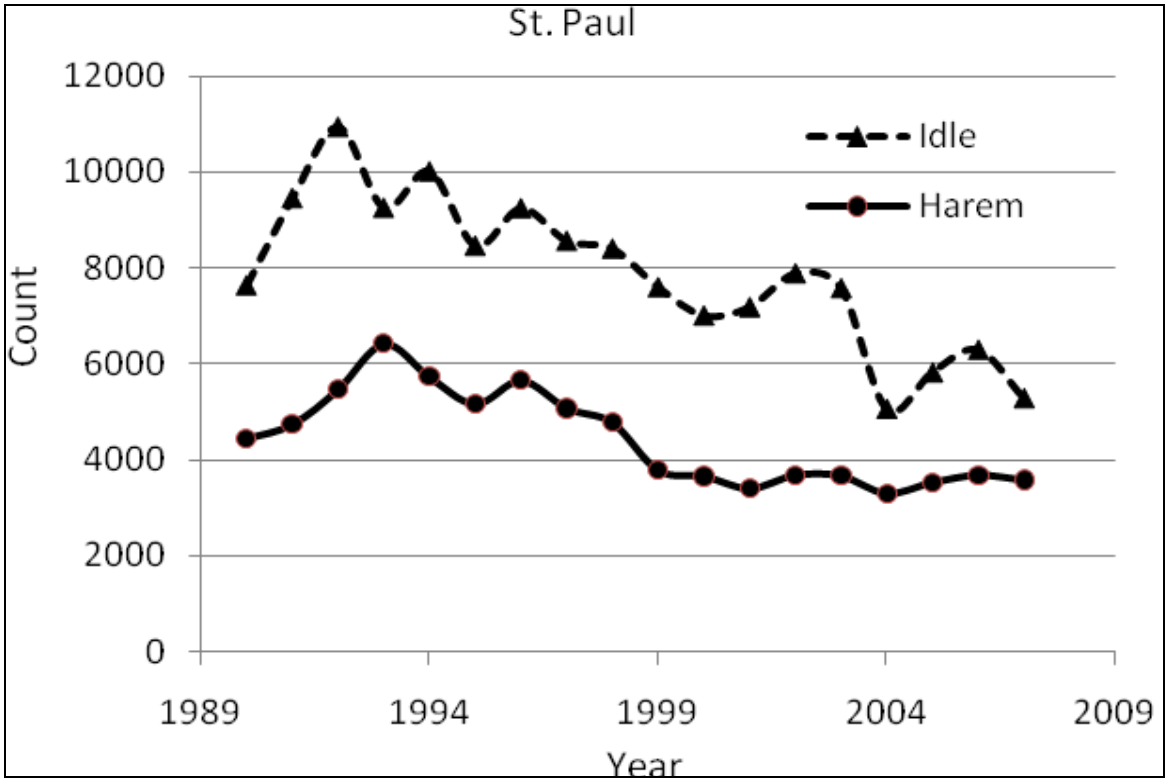
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - Northern fur seal bull counts



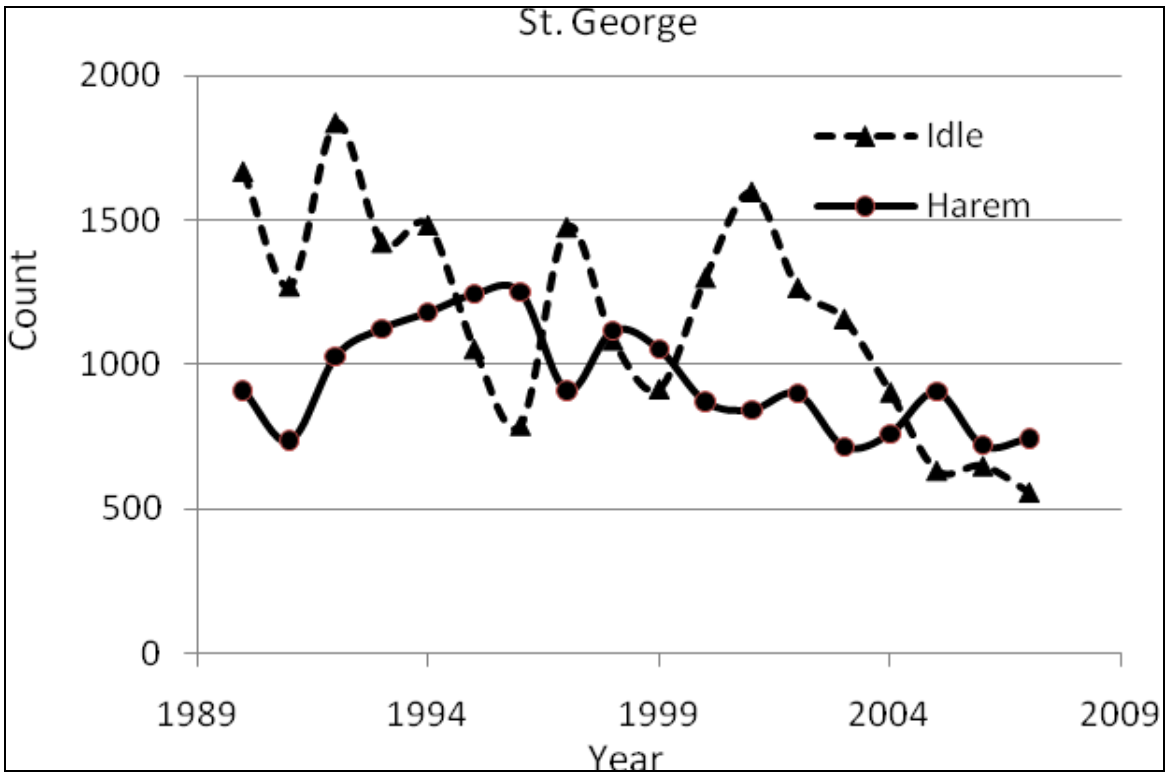


Figure1. (Previous page) Temporal dynamics of the counts of adult male northern fur seals on St. Paul and St. George Islands, 1990-2007, showing territorial males with females (filled circles) and idle males (territorial without females and non-territorial combined, filled triangles).

Target: Pinnipeds

KEA/Indicator: Population size & dynamics / Northern fur seal bull counts

Justification for Indicator:

Long-term Viability Goal:

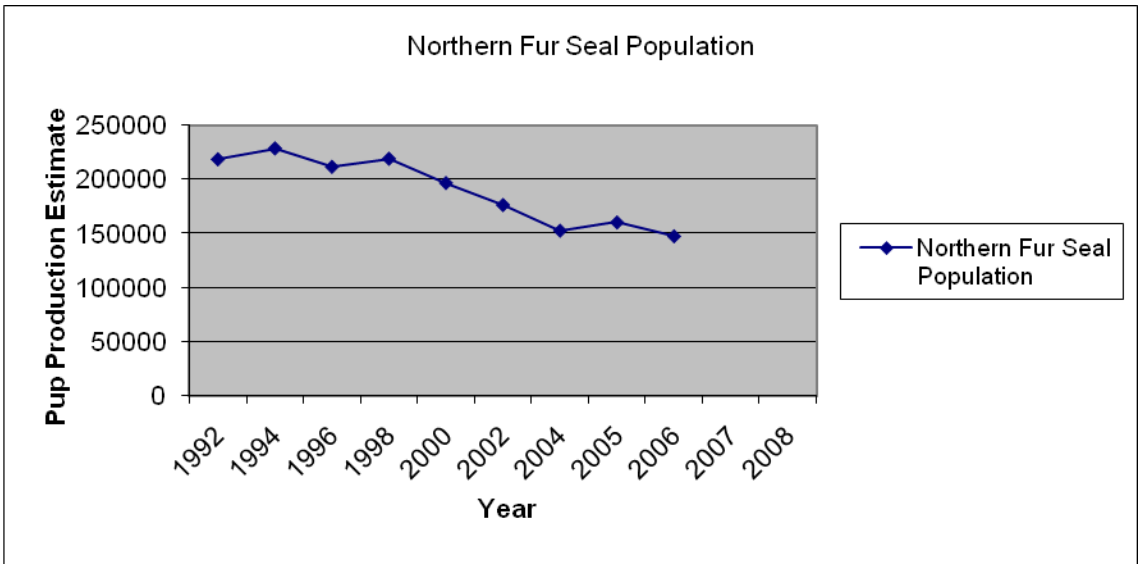
Monitoring Approach:
When: Annual Memo with research results published on website; Biennial Fur Seal Investigations Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.afsc.noaa.gov/nmml/species/species_nfs.php)
How: Download from internet:
(http://www.afsc.noaa.gov/nmml/species/species_nfs.php)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:
1977-2005 Pribilof Island Data: Testa, J. W. (editor). 2007. Fur seal investigations, 2004-2005. U.S.
Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-174, 76 p. (Appendix Table B-3).
National Marine Fisheries Service. 2007. Conservation plan for the Eastern Pacific stock of northern fur seal (Callorhinus ursinus). National Marine Fisheries Service, Juneau, Alaska.
2006-07 Data: Unpublished northern fur seal field reports available from:
http://www.afsc.noaa.gov/nmml/species/species_nfs.php
Contact(s): Tom Gelatt, NMML Alaska Ecosystems Program Leader (tom.gelatt@noaa.gov)

Pinnipeds - Northern fur seal pup counts



Target: Pinnipeds

KEA/Indicator: Population size & dynamics / Northern fur seal pup counts

Justification for Indicator:

Long-term Viability Goal:

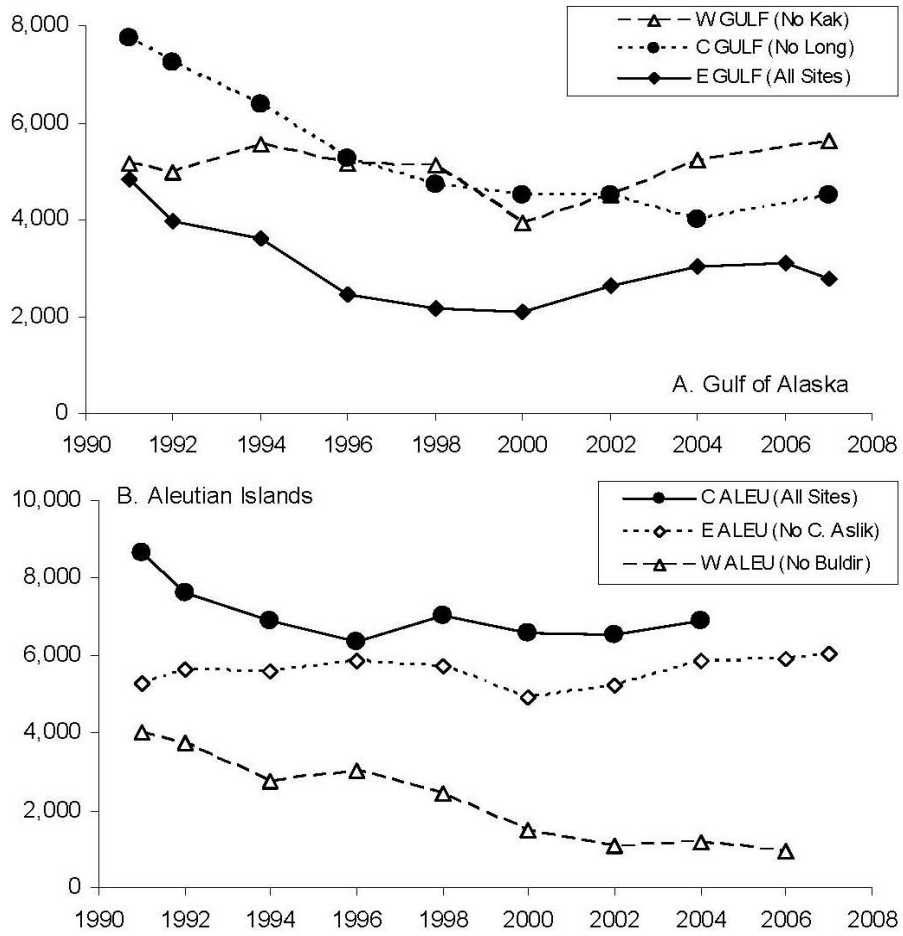
Monitoring Approach:
When: Biennial Memo with research results published on website; Biennial Fur Seal Investigations Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.afsc.noaa.gov/nmml/species/species_nfs.php)
How: Download from internet:
(http://www.afsc.noaa.gov/nmml/species/species_nfs.php)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - Steller sea lion non-pup counts



Target: Pinnipeds
KEA/Indicator: Population size & dynamics / Steller sea lion non-pup counts
Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:
Notes:
Working Group Members:
Bruce Robson
References:

Pinnipeds - Walrus Island Steller sea lion pup counts

Target: Pinnipeds

KEA/Indicator: Population size & dynamics / Walrus Island Steller sea lion pup counts

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - Harbor seal population counts

Target: Pinnipeds

KEA/Indicator: Population size & dynamics / Harbor seal population counts

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - Female fur seal trip distance and duration

Target: Pinnipeds

KEA/Indicator: Prey availability / Female fur seal trip distance and duration

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - NFS pup weight

Target: Pinnipeds

KEA/Indicator: Prey availability / NFS pup weight

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pinnipeds - Number (%) NFS pup starvations/year

Target: Pinnipeds

KEA/Indicator: Prey availability / Number (%) NFS pup starvations/year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Eastern Bering Sea Stock Beluga population size

Target: Whales

KEA/Indicator: Population size & dynamics / Eastern Bering Sea Stock Beluga population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Bristol Bay Stock Beluga population size

Target: Whales

KEA/Indicator: Population size & dynamics / Bristol Bay Stock Beluga population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Fin whale population size

Target: Whales

KEA/Indicator: Population size & dynamics / Fin whale population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Gray whale population size

Target: Whales

KEA/Indicator: Population size & dynamics / Gray whale population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Orca population size

Target: Whales

KEA/Indicator: Population size & dynamics / Orca population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Right whale population size

Target: Whales

KEA/Indicator: Population size & dynamics / Right whale population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Whales - Sperm whale population size

Target: Whales

KEA/Indicator: Population size & dynamics / Sperm whale population size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Sea Otter - Sea Otter population counts

Target: Sea Otter

KEA/Indicator: Population structure & recruitment / Sea Otter population counts

Justification for Indicator:

Long-term Viability Goal:

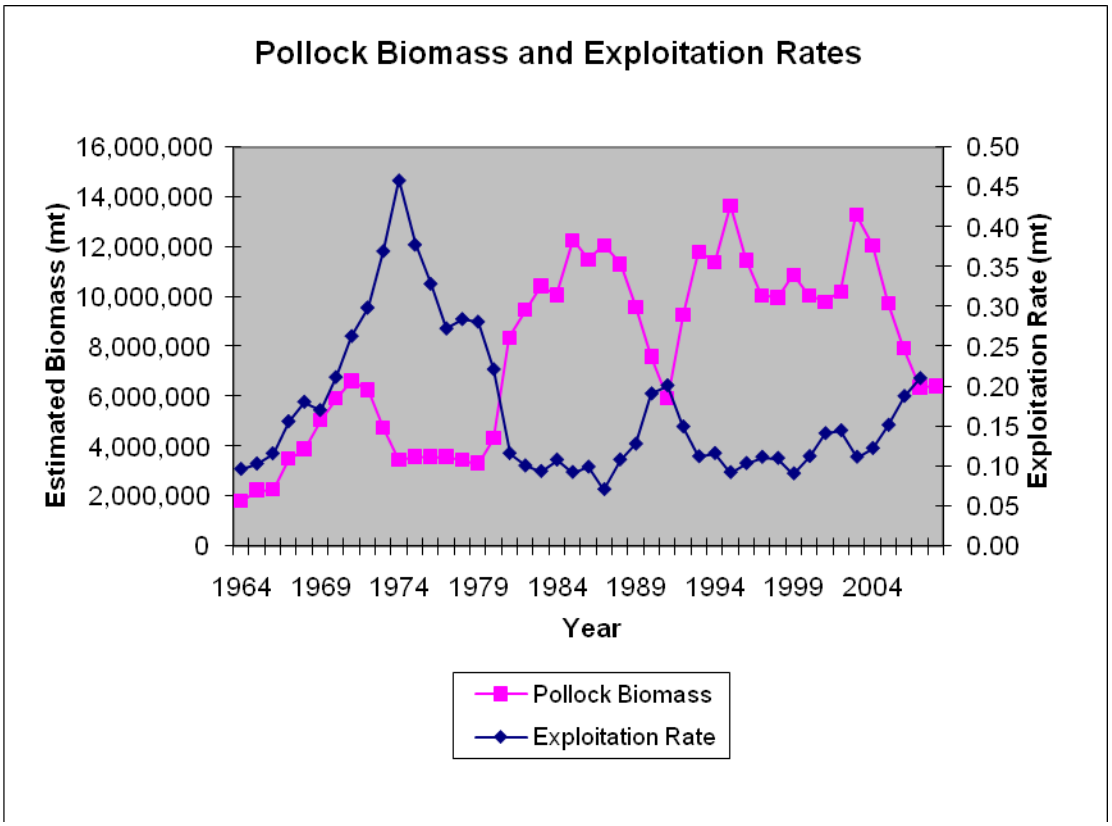
Monitoring Approach:
When: USFWS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References: USFWS

Pelagic Fish - Eastern Bering Sea Pollock Biomass



Target: Pelagic Fish

KEA/Indicator: Population size & dynamics / Eastern Bering Sea Pollock Biomass

Justification for Indicator:

Long-term Viability Goal:

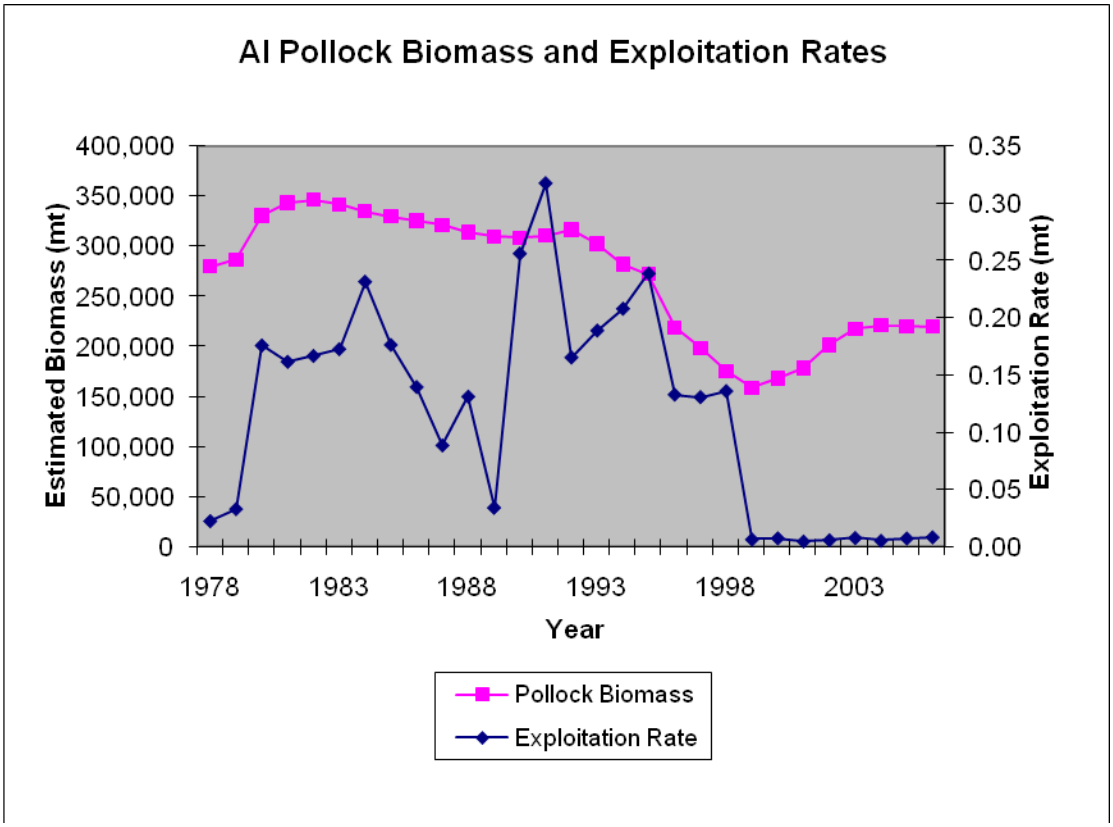
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pelagic Fish - Aleutian Islands Pollock Biomass



Target: Pelagic Fish

KEA/Indicator: Population size & dynamics / Aleutian Islands Pollock Biomass

Justification for Indicator:

Long-term Viability Goal:

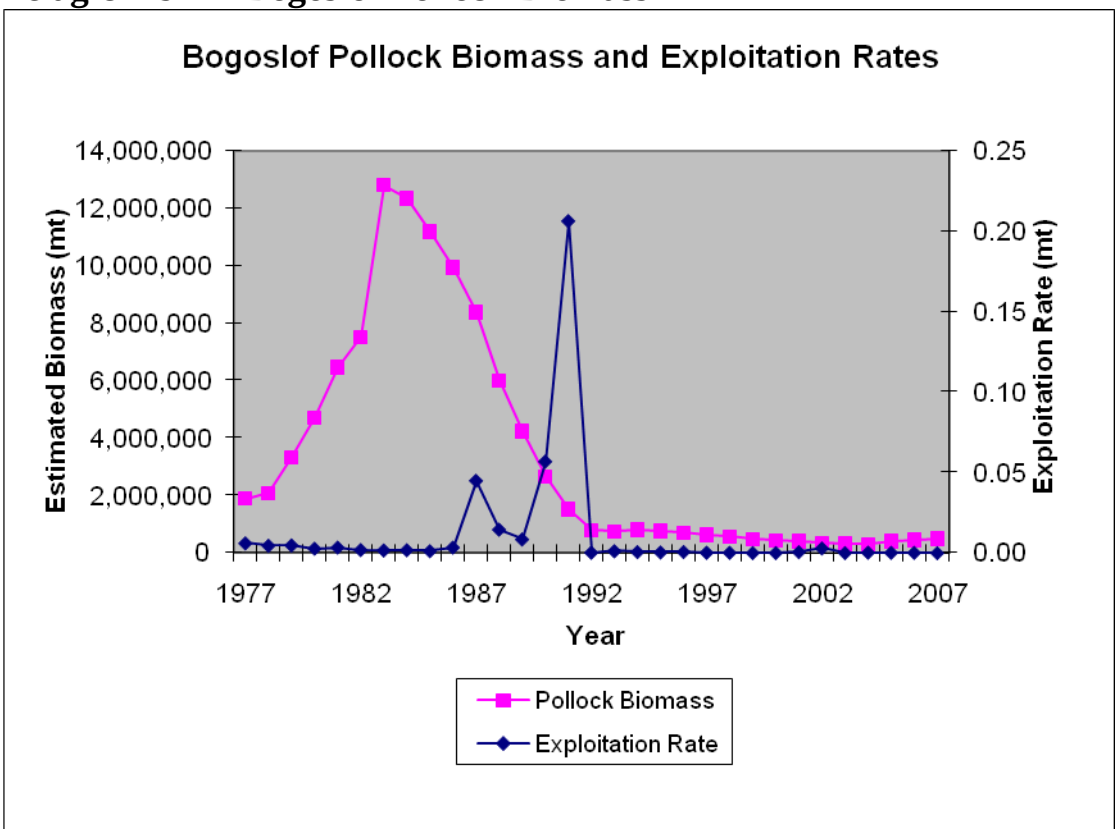
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pelagic Fish - Bogoslof Pollock Biomass



Target: Pelagic Fish

KEA/Indicator: Population size & dynamics / Bogoslof Pollock Biomass

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pelagic Fish - Percentage of streams meeting salmon escapement goals

Target: Pelagic Fish

KEA/Indicator: Population size & dynamics / Percentage of streams meeting salmon escapement goals

Justification for Indicator:

Long-term Viability Goal:

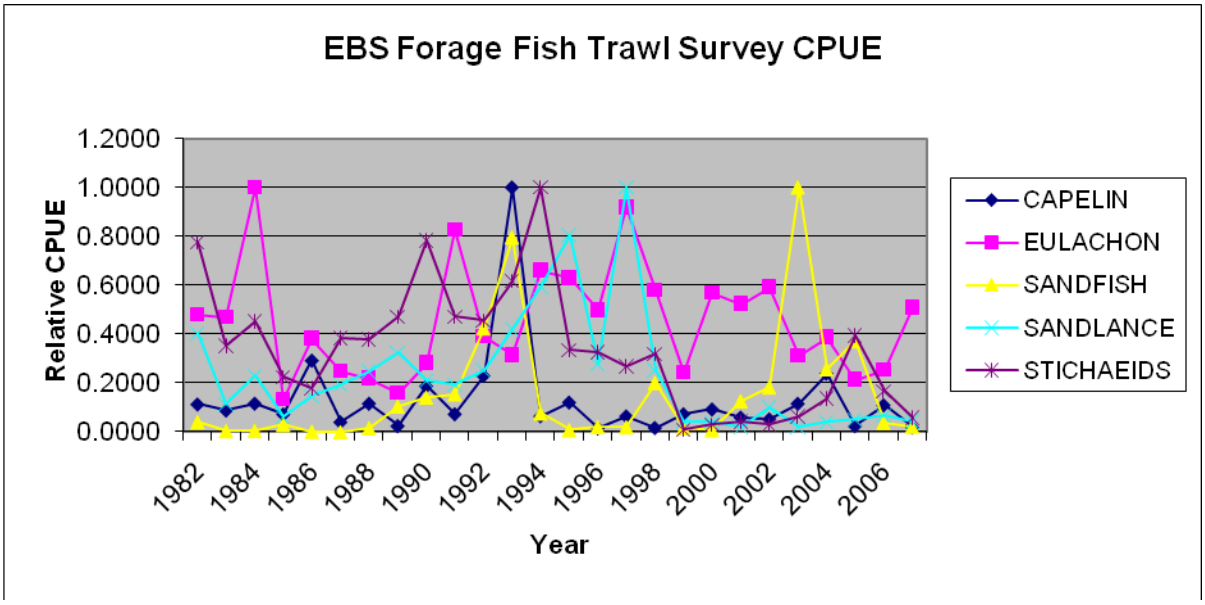
Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Pelagic Fish - Forage Fish Trawl Survey CPUE



Target: Pelagic Fish
KEA/Indicator: Population size & dynamics / Forage Fish Trawl Survey CPUE
Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:
Notes: Management Council defined several groups as forage species for management purposes. These groups include: gunnels, lanternfish, sandfish, sandlance, smelts, stichaeids, and euphausiids. Some of these groups are captured incidentally in the RACE bottom trawl survey of the eastern Bering Sea shelf, which may provide an index of abundance. Sandfish are generally in low abundance in the trawl surveys and are usually caught in high abundance in only a few hauls in the shallower stations. Stichaeids, which include the longsnout prickleback (*Lumpenella longirostris*), daubed shanny (*Lumpenus maculatus*) and snake prickleback (*Lumpenus sagitta*), are small benthic-dwelling fish. Their relative abundance in trawl survey catches was generally higher in trawl survey catches prior to 1999. Similar to stichaeids, the relative CPUEs of sandlance were generally higher prior to 1999. Eulachon relative CPUE was higher than the past four years. Capelin catches in the survey have been relatively low, with the exception of one year (1993) when CPUE was very high.
For each species group, the largest catch over the time series was arbitrarily scaled to a value of 1 and all other values were similarly scaled. The standard error (+/- 1) was weighted proportionally to the CPUE to get a relative standard error.
Working Group Members: Bruce Robson
References: Forage - Eastern Bering Sea Contact: Robert Lauth, AFSC Bob.Lauth@noaa.govThe North Pacific Fishery

Bottom Dwelling Fish & Crab - Blue King Crab (Nearshore species population)

Target: Bottom Dwelling Fish & Crab

KEA/Indicator: Population size & dynamics / Blue King Crab (Nearshore species population)

Justification for Indicator:

Long-term Viability Goal:

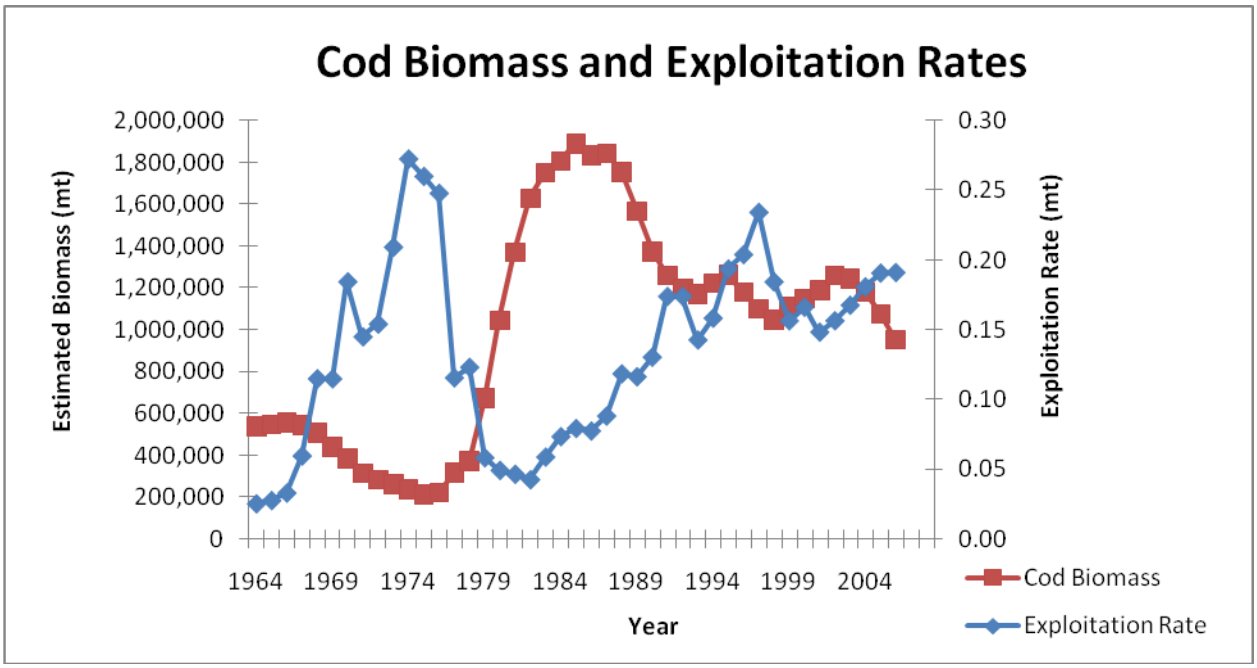
Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Bottom Dwelling Fish & Crab - Eastern Bering Sea/Aleutian Islands Pacific Cod Biomass (Shelf species population)



Target: Bottom Dwelling Fish & Crab

KEA/Indicator: Population size & dynamics / Eastern Bering Sea/Aleutian Islands Pacific Cod Biomass (Shelf species population)

Justification for Indicator:

Long-term Viability Goal:

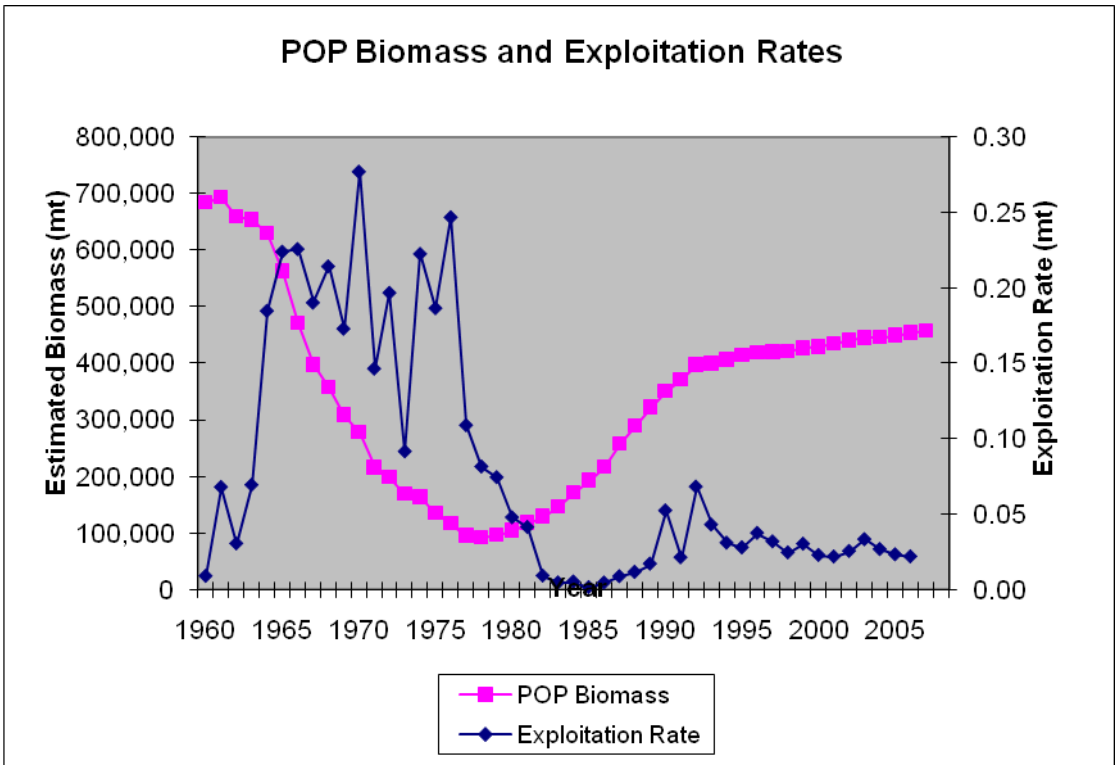
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Bottom Dwelling Fish & Crab - Pacific Ocean Perch Biomass (Shelf break species population)



Target: Bottom Dwelling Fish & Crab

KEA/Indicator: Population size & dynamics / Pacific Ocean Perch Biomass (Shelf break species population)

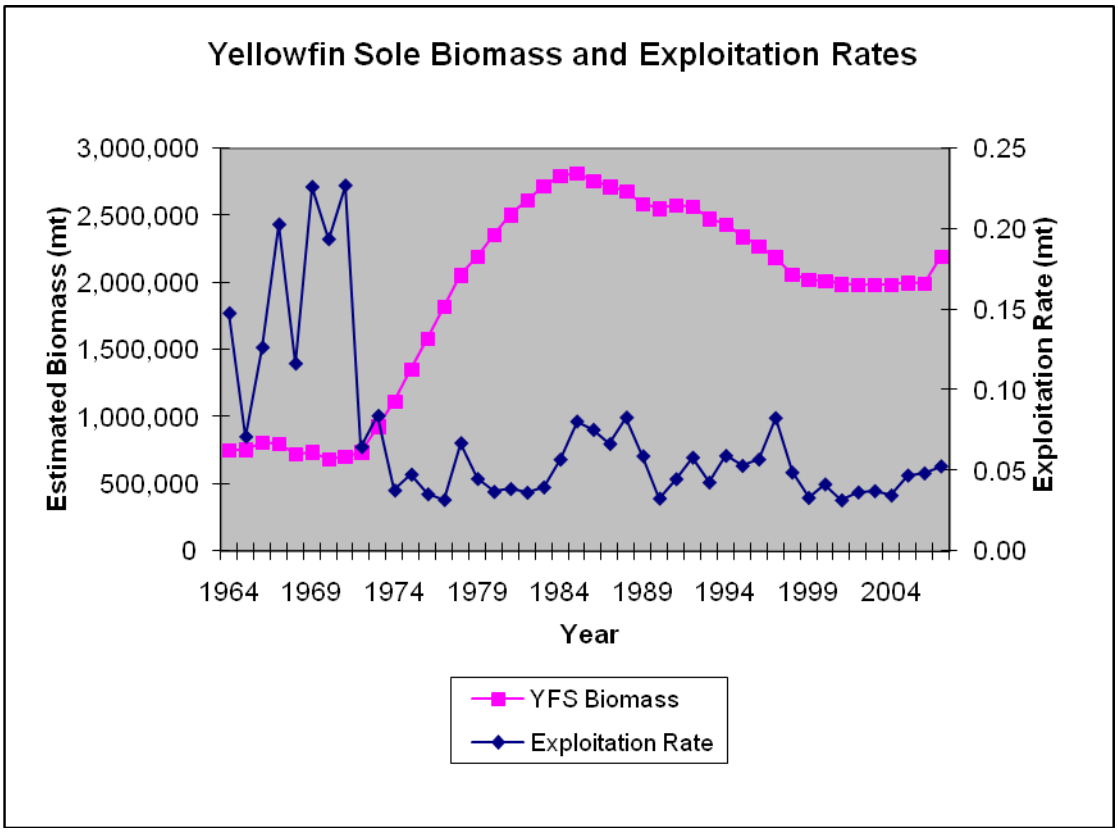
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:
Notes:
Working Group Members:
Bruce Robson

References:

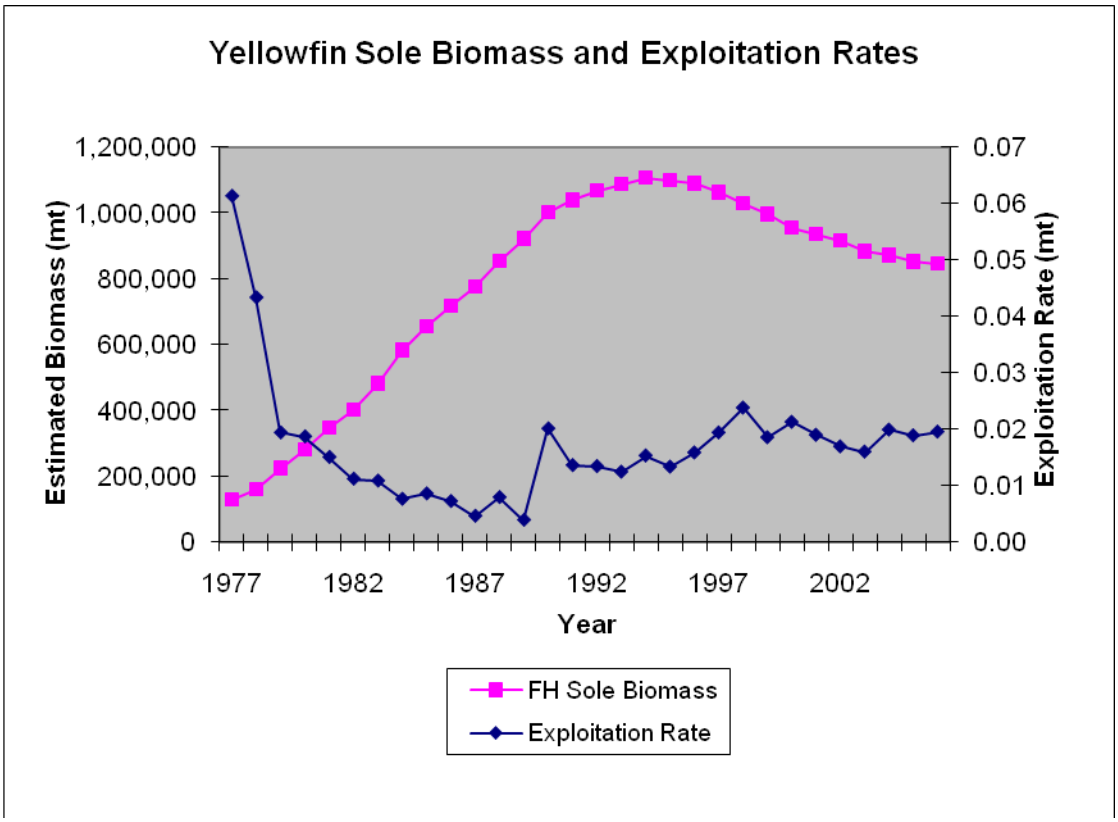
Bottom Dwelling Fish & Crab - Eastern Bering Sea/Aleutian Islands Yellowfin Biomass(Mid-Shelf species population)



Target: Bottom Dwelling Fish & Crab
KEA/Indicator: Population size & dynamics / Eastern Bering Sea/Aleutian Islands Yellowfin Biomass(Mid-Shelf species population)
Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:
Notes:
Working Group Members: Bruce Robson

References:

Bottom Dwelling Fish & Crab - Eastern Bering Sea/Aleutian Islands Flathead Sole Biomass (Outer-Shelf species population)



Target: Bottom Dwelling Fish & Crab

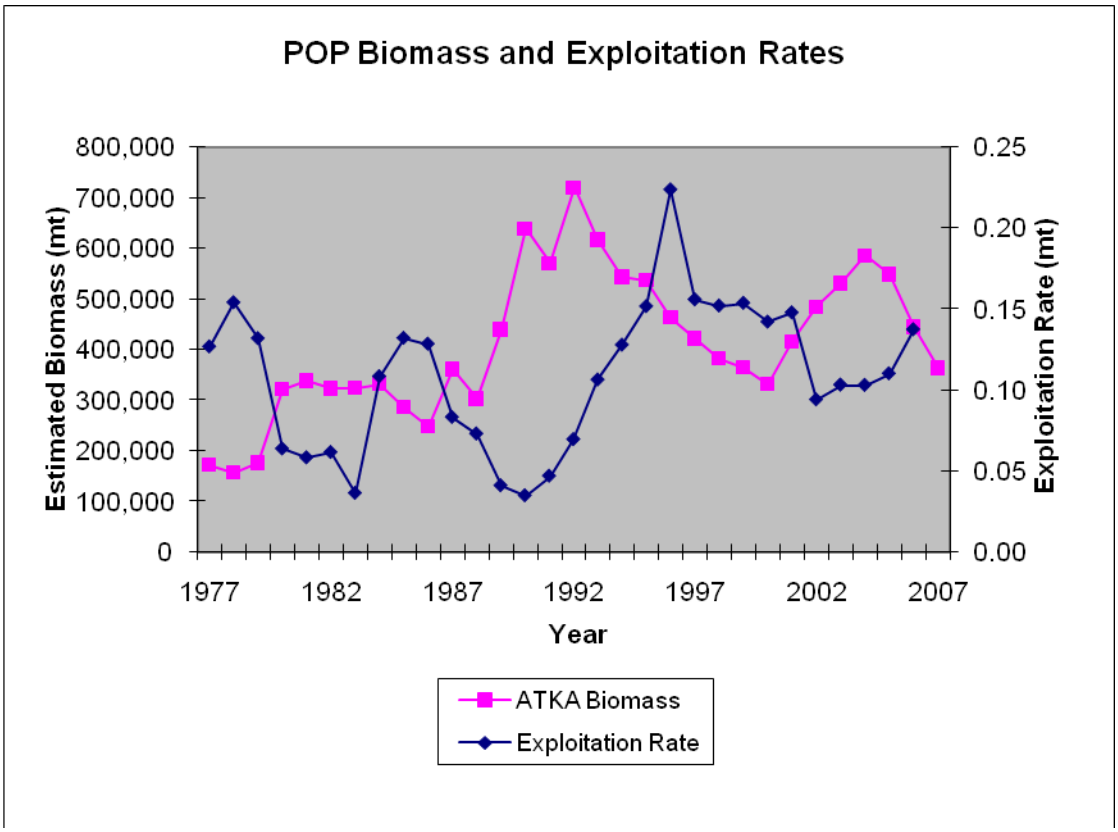
KEA/Indicator: Population size & dynamics / Eastern Bering Sea/Aleutian Islands Flathead Sole Biomass (Outer-Shelf species population)

Justification for Indicator:

Long-term Viability Goal:

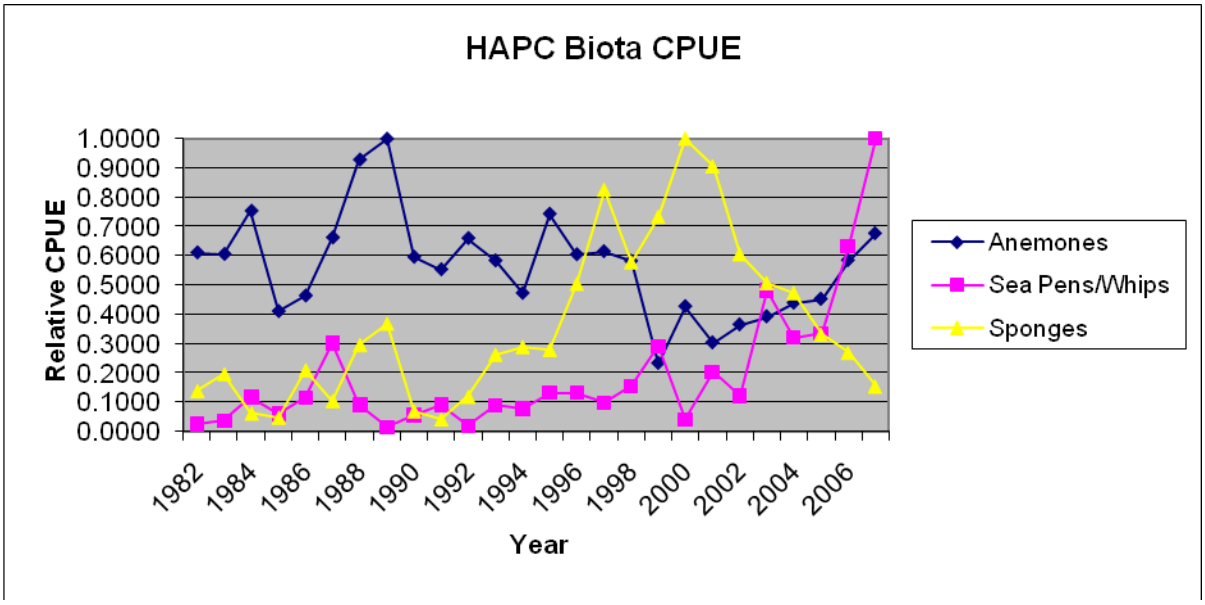
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:
Notes:
Working Group Members: Bruce Robson
References:

Bottom Dwelling Fish & Crab - Eastern Bering Sea/Aleutian Islands Atka Mackerel Biomass



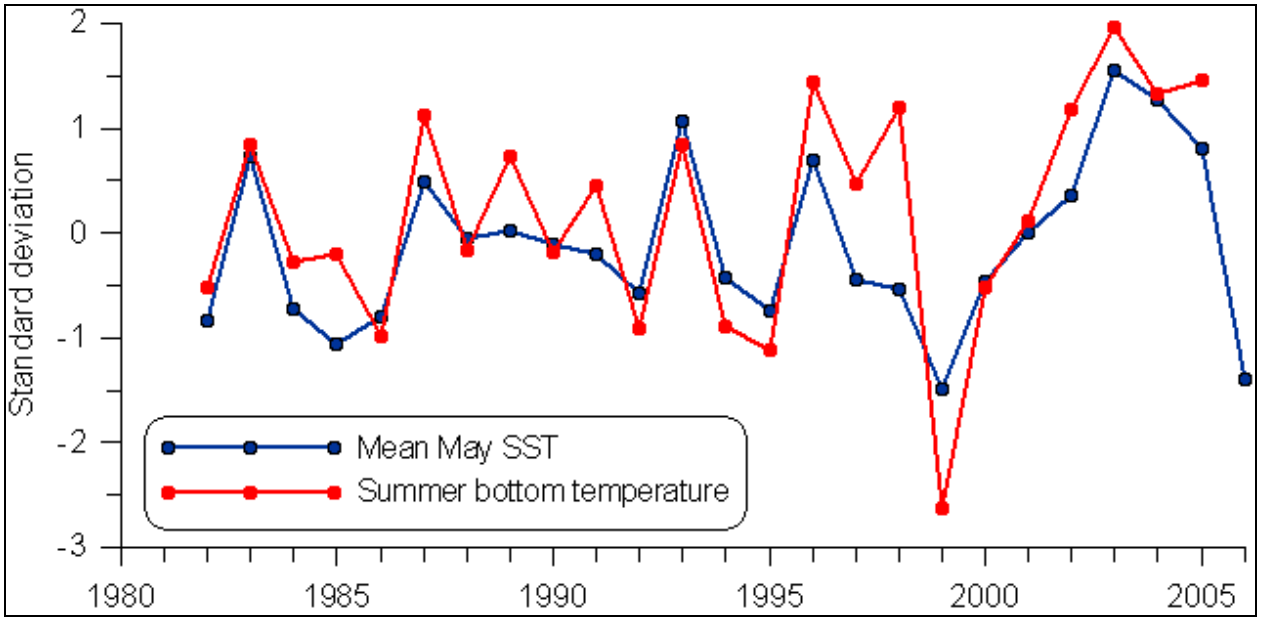
Target: Bottom Dwelling Fish & Crab
KEA/Indicator: Population size & dynamics / Eastern Bering Sea/Aleutian Islands Atka Mackerel Biomass
Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:
Notes:
Working Group Members: Bruce Robson
References:

Coral/sponge Gardens - HAPC Biota Trawl Survey CPUE - Eastern Bering Sea



Target: Coral/sponge Gardens
KEA/Indicator: Size, extent, and architechture of coral/sponge communities / HAPC Biota Trawl Survey CPUE - Eastern Bering Sea
Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:
Notes: For each species group, the largest catch over the time series was arbitrarily scaled to a value of 1 and all other values were similarly scaled. The standard error (+/- 1) was weighted proportionally to the CPUE to get a relative standard error. The NMFS bottom trawl survey does not sample any of the HAPC fauna well. The survey gear does not perform well in many of the areas where these organisms are prevalent and survey effort is quite limited in these areas as a result. Even in areas where these habitats are sampled, the gear used in the survey is ill-suited for efficient capture of these organisms. Variability is also an important issue as point estimates are often strongly influenced by a very small number of catches. Therefore, the survey results provide very limited information about abundance or abundance trends for these organisms.
Working Group Members: Bruce Robson
References:
HAPC Biota - Eastern Bering Sea
Robert Lauth, AFSC
Bob.Lauth@noaa.gov

Climate change - SST in May in the southeastern Bering Sea



Target: climate change

KEA/Indicator: Sea Surface Temperature / SST in May in the southeastern Bering Sea

Justification for Indicator:

Long-term Viability Goal:

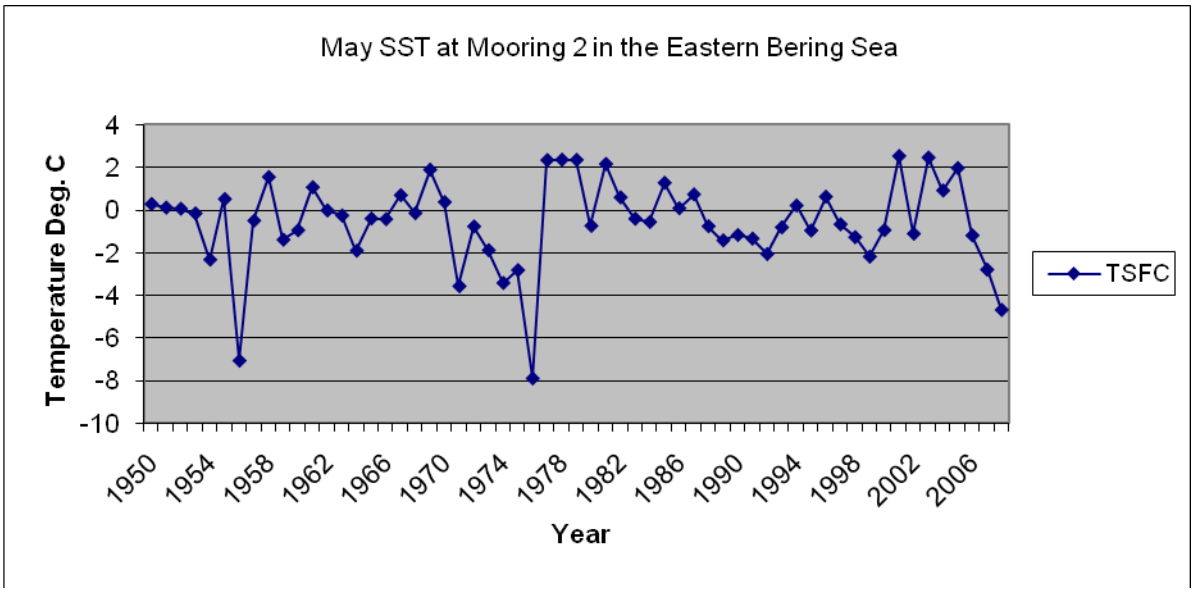
Monitoring Approach:
When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

climate change - Average SST from Mooring 2 for January 15 through April 15



Target: climate change

KEA/Indicator: Sea Surface Temperature / Average SST from Mooring 2 for January 15 through April 15

Justification for Indicator:

Long-term Viability Goal:

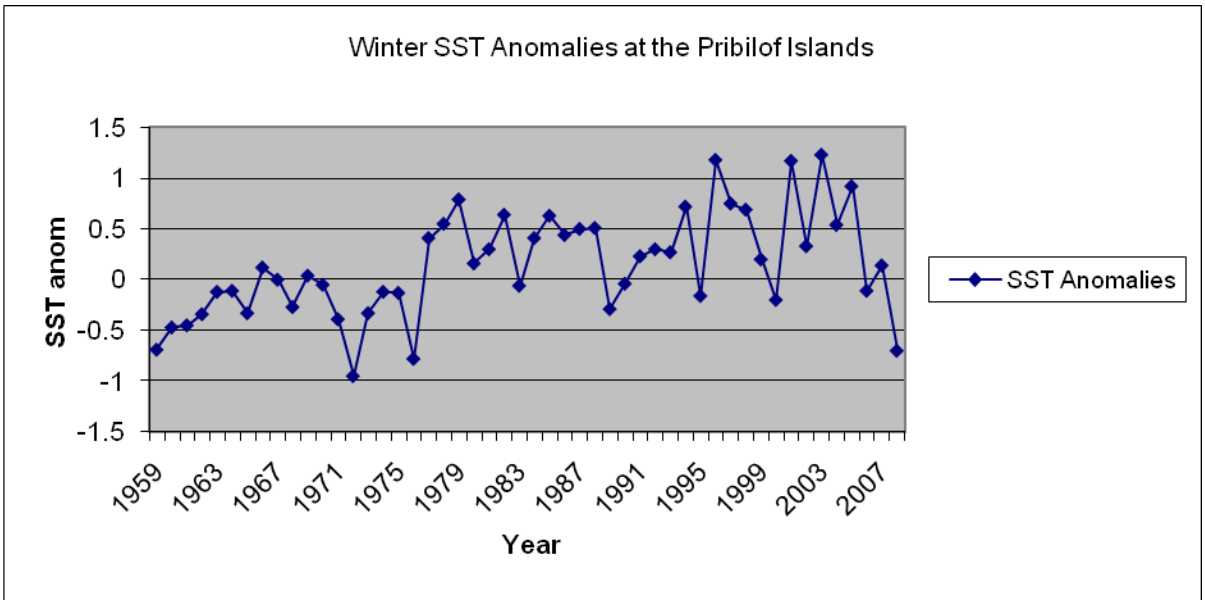
Monitoring Approach:
When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

climate change - Winter Sea Surface Temperature, Pribilof Is.



Target: climate change

KEA/Indicator: Sea Surface Temperature / Winter Sea Surface Temperature, Pribilof Is.

Justification for Indicator:

Long-term Viability Goal:

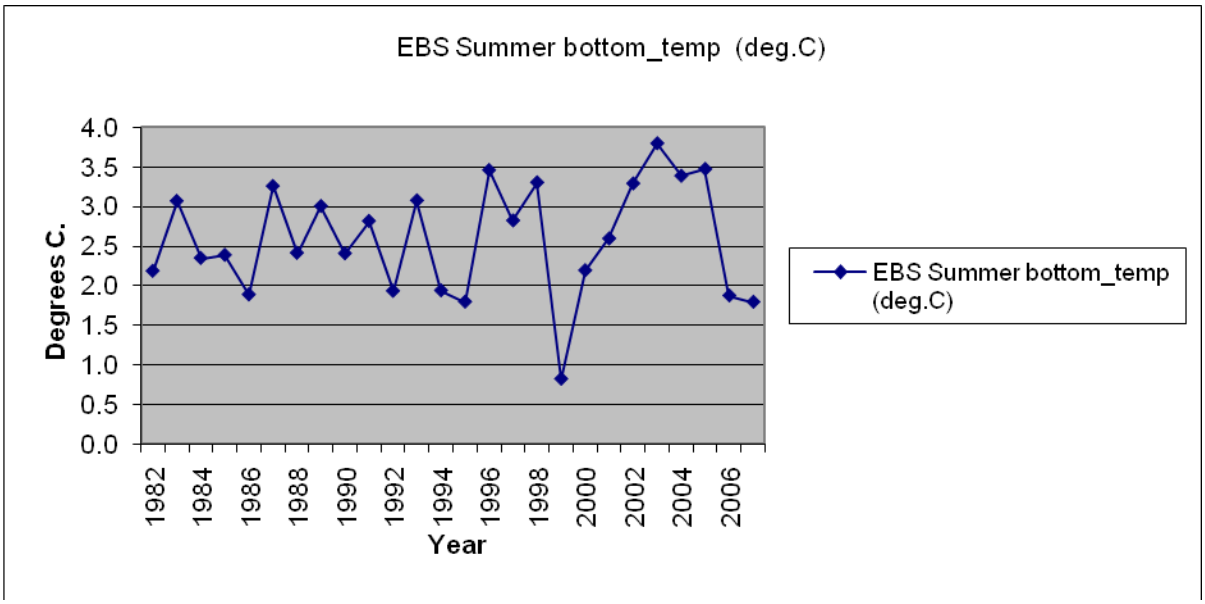
Monitoring Approach:
When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

climate change - Summer Bottom Temperature on the EBS Shelf



Target: climate change

KEA/Indicator: Bottom Temperature / Summer Bottom Temperature on the EBS Shelf

Justification for Indicator:

Long-term Viability Goal:

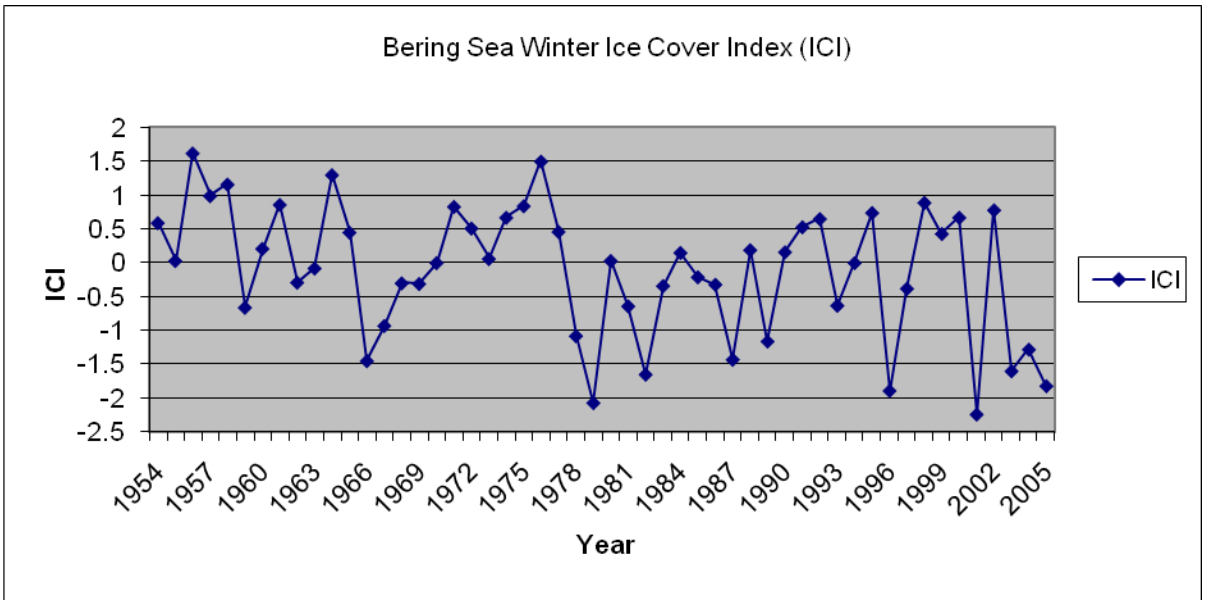
Monitoring Approach:
When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page
Future Indicator Development Required:

Notes: Summer bottom temperatures from the NMFS bottom trawl survey in the eastern Bering Sea, 1982-2007.

Working Group Members: Bruce Robson

References:
Robert Lauth, AFSC (Bob.Lauth@noaa.gov)

climate change - Ice Cover Index



Target: climate change
KEA/Indicator: Sea Ice / Ice Cover Index
Justification for Indicator: The ice cover index is the average ice concentration for Jan 1-May 31. Ice concentraion data are from the National Snow and Ice Data Center (NSIDC) using the Bootstrap algorithm for historical data (through ~2006) and the NASA Team algorithm for more current data. The data start from late 1978 and are daily time series calculated by Sigrid Salo (NOAA/PMEL) to give average ice concentration in a 2-deg x 2-deg box (56-58°N, 163-165°W). The final index is given as normalized anomalies for each year, based on the mean (7.15) and standard deviation (4.01) for the period 1981-2000.

Relevance to Ecosystem

The highly varying sea ice cover of the Bering Sea has a profound influence on the physical and biological ocean environment. The Bering Sea is free of ice from late June to late October, with the greatest coverage in February-March (Mysak and Manak, 1989). In its most extensive years, sea ice arrives in January and remains to May.

The formation of the ice is best described by "conveyor belt" analogy (Overland and Pease 1982). Ice forms along the leeward side of the coasts and islands in polynyas (open regions of water). As ice moves southward under prevailing northerly winds it encounters warmer surface water and, upon reaching its thermodynamic limit, melts. This cools the surface water and allows the next southward bound ice movement to advance further.

The amount of seasonal sea ice in winter is determined by atmospheric temperature and by storm tracks generated by the Aleutian Low Pressure System (Overland and Pease, 1982; Cavalieri and Parkinson, 1987; Fang and Wallace, 1994). The strength of the Aleutian Low can be characterized by the North Pacific index, but what is particularly important for the Bering Sea is the position of the Aleutian low (Rodionov et al., 2005). Air temperature and ice extent in winter depend largely on the relative frequency and magnitude of low-pressure systems moving in from the south, which effectively pump warm maritime air poleward, as opposed to high-pressure centers moving in from the north and off Siberia, which effectively transport cold continental air equatorward (Overland and Pease, 1982).

Maximum extent years tend to coincide with negative values of the Pacific Decadal Oscillation (PDO). Thus, in the early 1970s there was extensive winter ice cover before the 1977 shift in the PDO and, to some extent, the Arctic Oscillation (AO). The late 1970s and 1980 we considered warm years with reduced ice cover. In the 1990s winter ice has again become more common after the 1989 shift in the AO, although not to the extent observed in the early 1970s. There appears to be a slight reduction in ice cover during El Niño

events (Niebauer, 1989), but the relationship is weak and appears to have changed in sign since the major climate shift of 1977 (Niebauer 1998).
Cooling and mixing associated with ice advance help to condition the entire water column over the shelf (Stabeno at al., 1998). With seasonal heating, the lower layer becomes insulated and temperatures often remain below 2.0°C persist through the summer as the cold pool. The cold pool is better developed and more extensive in summers that follow deep southward penetration of winter sea ice. Ice and the cold pool both influence distributions of higher trophic level biota (Ohtani and Azumaya, 1995; Wyllie- Echeverria and Wooster, 1998).
Interannual and decadal-scale variations in the distributions of some fish stocks reflect those of ice and thermal conditions. In particular, the distribution of walleye pollock, varies significantly with multi-annual cool and warm years while Arctic cod, is only present within the cold pool.

Recent Trends

After the major shift in the North Pacific climate in the late 1970s, the winters from 1978 through 1989 were very mild in the Bering Sea (Fig. 1-T). The period 1990-2000 was relatively cold, with the exception of the winter of 1996. In 2001, the Ice Cover Index (ICI) reached the lowest value for the entire period of observation. It is possible that this year marks the beginning of a new warm multi-year regime in the Bering Sea, as discussed by Overland and Stabeno (2004). Three mild winters in a row, 2003-2005, reinforced that expectation. The index value for 2006 is preliminary, based only on the ice cover extent along 169W. See also the description of recent trends in the ice retreat index (IRI).

Long-term Viability Goal:

Monitoring Approach:

When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page

Future Indicator Development Required:

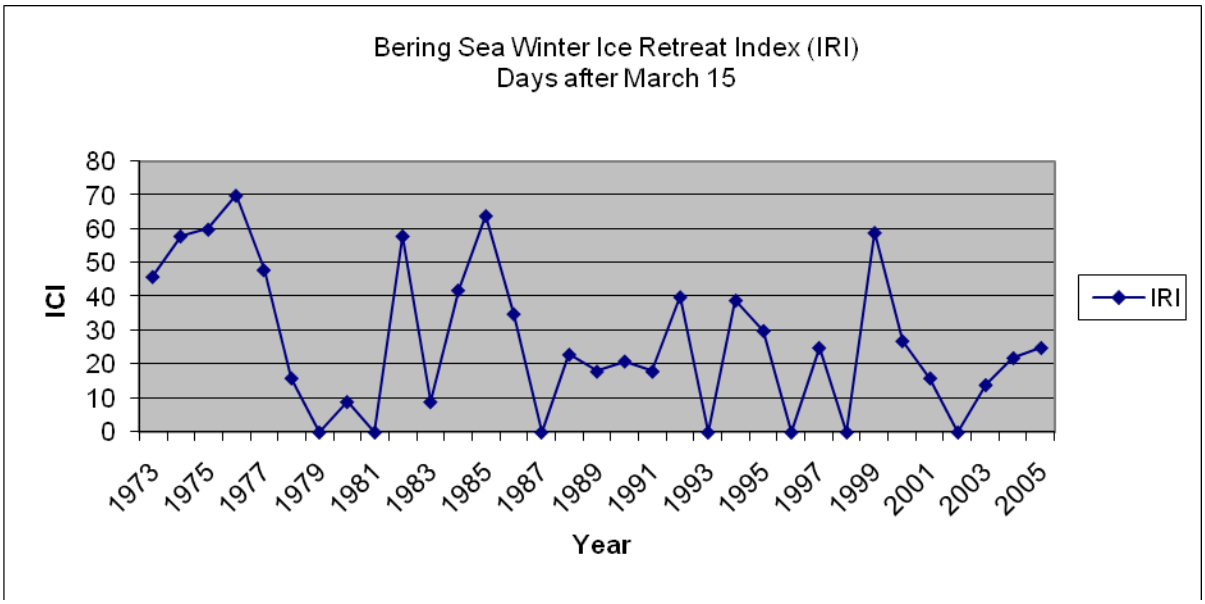
Notes:

Working Group Members: Bruce Robson, James E. Overland (beringclimate@noaa.gov)

References:

Cavalieri, D. J., and Parkinson, C. L., 1987: On the relationship between atmospheric circulation and the fluctuations in the sea ice extents of the Bering and Okhotsk seas. J. Geophys. Res., 92, 7141-7162.
Fang, Z., and J.M.J. Wallace, 1994: Arctic sea ice variability on a time scale of weeks and its relation to atmospheric forcing, J. Climate, 7, 1897-1914.
Mysak, L. A., and D.K. Manak, 1989: Arctic sea-ice extent and anomalies, 1953-1984. Atmosphere-Ocean, 27, 376-405.
Niebauer, H.J., 1988: Effects of El Niño-Southern Oscillation and North Pacific weather patterns on interannual variability in the subarctic Bering Sea, J. Geophys. Res., 93, 5051-5068.
Niebauer, H.J., 1998: Variability in Bering Sea ice cover as affected by a regime shift in the Pacific in the period 1947-1996. J. Geophys. Res., 103, 27717-27737.
Ohtani, K., and T. Azumaya, 1995. Influence of interannual changes in ocean conditions on the abundance of walleye pollock (Theragra chalcogramma) in the eastern Bering Sea. In: R.J. Beamish (ed). Climate Change and northern fish populations. Can. Spec. Publ. Fish. Aquat. Sci., 121, 87-95.
Overland, J.E., and C.H. Pease, 1982: Cyclone climatology of the Bering Sea and its relation to sea ice extent.. Mon. Wea. Rev., 110, 5-13.
Overland, J.E., and P. Stabeno, 2004: Is the climate of the Bering Sea warming and affecting the ecosystem? EOS Transactions, American Geophysical Union, 85, 309-316.
Rodionov, S.N., J.E. Overland, and N.A. Bond, 2005: The Aleutian low and winter climatic conditions in the Bering Sea. Part I: Classification. J. Climate, 18, 160-177
Stabeno, P.J., J.D. Schumacher, R.F. Davis, and J.M. Napp, 1998: Under-ice observations of water column temperature, salinity and spring phytoplankton dynamics: Eastern Bering Sea shelf. J. Mar. Res., 56, 239-255.
Wyllie-Echevarria, T, and W.S. Wooster, 1998: Year-to-year variations in Bering Sea ice cover and some consequences for fish distributions. Fisheries Oceanography, 7, 159-170.

climate change - Ice Retreat Index



Target: climate change

KEA/Indicator: Sea Ice / Ice Retreat Index

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Data is supposed to be updated annually
Where: http://www.beringclimate.noaa.gov/data/index.php
How: Download updated index data from Bering Sea Climate Theme Page
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

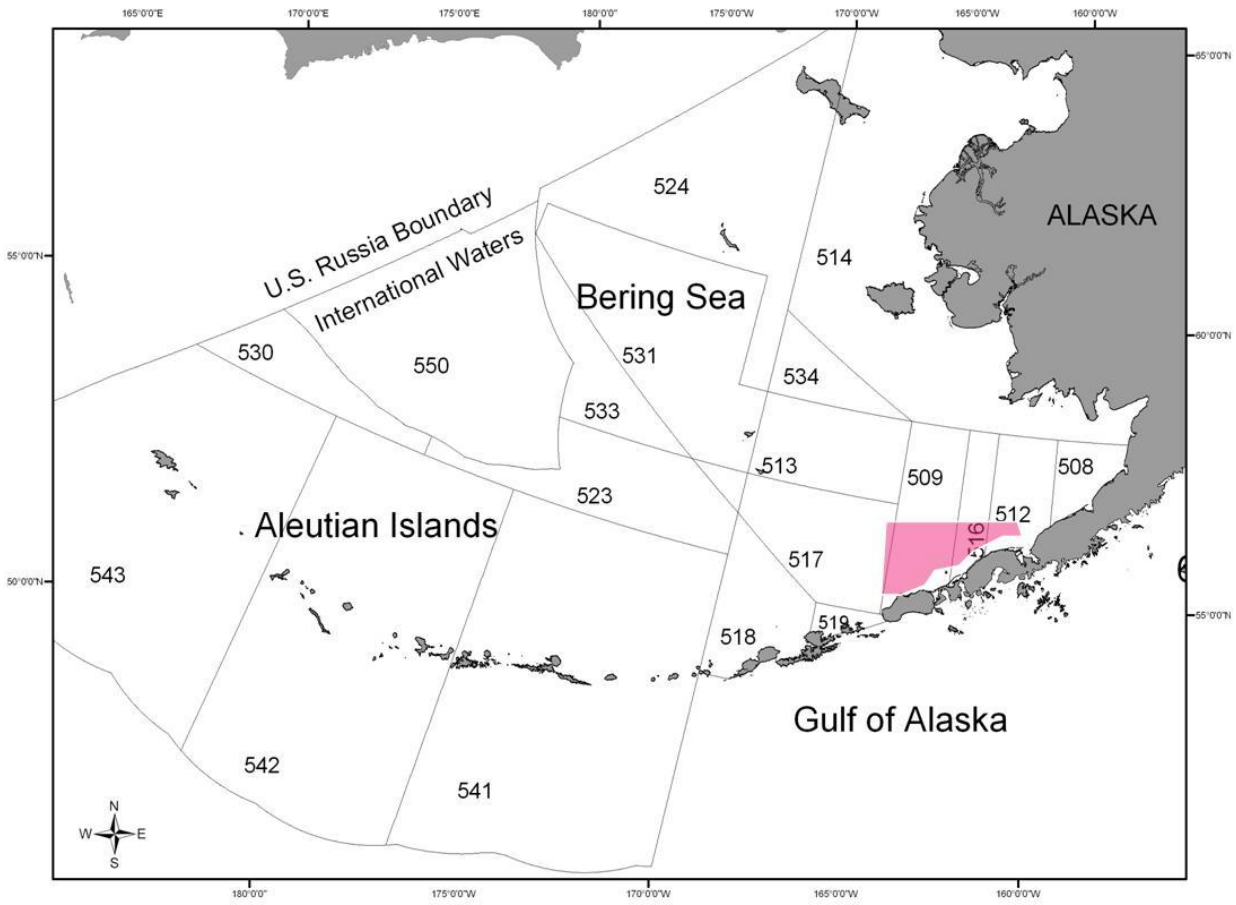
Threats

Threat	Key Attribute	Indicators
Oil & Gas development	offshore facilities	area of lease tracts
	offshore facilities	location, footprint, number of sites
	onshore facilities	area of footprint
	onshore facilities	landscape fragmentation
	oil spills (onshore facilities)	location
	oil spills (onshore facilities)	distribution of impact
	oil spills (onshore facilities)	remediation state
Shipping	groundings/wrecks/disablement/spills from ship transport	location
	groundings/wrecks/disablement/spills from ship transport	distribution of impact
	groundings/wrecks/disablement/spills from ship transport	remediation state
	groundings/wrecks/disablement/spills from ship transport	shipwreck response time
	shipping volume and traffic	pass routes
	shipping volume and traffic	Bering strait traffic
	shipping volume and traffic	routes in BS/CS
	shipping volume and traffic	changing patterns?/future route
Fishing	destructive	Bottom Trawl Area
	destructive	Bottom Trawl Amount
	destructive	Pelagic Trawl Area
	destructive	Pelagic Trawl Amount
	destructive	Bycatch of Prohibited Species
	destructive	Bycatch of Non-Target Species
	marine trophic index/trend	FIB
	Overfishing	EBS Pollock Exploitation Rate
	Overfishing	AI Pollock Exploitation Rate
	Overfishing	Bogoslof Pollock Exploitation Rate

Threat	Key Attribute	Indicators
	Overfishing	EBS/AI Pacific Cod Exploitation Rate
	Overfishing	EBS/AI Pacific Ocean Perch Exploitation Rate
	Overfishing	EBS/AI Islands Yellowfin Sole Exploitation Rate
	Overfishing	EBS/AI Flathead Sole Exploitation Rate
	Overfishing	EBS/AI Atka Mackerel Exploitation Rate
	Overfishing	Eastern Bering Sea Pollock Stock Status
	Overfishing	Aleutian Islands Pollock Stock Status
	Overfishing	Bogoslof Pollock Stock Status
	Overfishing	EBS/AI Pacific Cod Stock Status
	Overfishing	EBS/AI Pacific Ocean Perch Stock Status
	Overfishing	EBS/AI Yellowfin Sole Stock Status
	Overfishing	EBS/AI Flathead Sole Stock Status
	Overfishing	EBS/AI Islands Atka Mackerel Stock Status
	Overfishing	Halibut Exploitation Rate
	Overfishing	Crab Exploitation Rate
	Overfishing	(& #spp. w/declining TACs)
	Overfishing	(ecologically distributed spp.)
	Bycatch	Percent of female northern fur seals entangled/year
	Bycatch	Incidental catch of NFS in commercial fisheries/year
	Bycatch	Incidental catch of SSL in commercial fisheries/year

Threat	Key Attribute	Indicators
	Bycatch	Incidental catch of Fin whales in commercial fisheries/year
Introduced/Invasive Species	rats	presence confirmed
	rats	new introductions

Oil & Gas development - area of lease tracts



Target: Oil & Gas development

KEA/Indicator: offshore facilities / area of lease tracts

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Oil & Gas development - location, footprint, number of sites

Target: Oil & Gas development

KEA/Indicator: offshore facilities / location, footprint, number of sites

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Oil & Gas development - area of footprint

Target: Oil & Gas development

KEA/Indicator: onshore facilities / area of footprint

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where:
How:
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Oil & Gas development - location

Target: Oil & Gas development

KEA/Indicator: oil spills (onshore facilities) / location

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Oil & Gas development - distribution of impact

Target: Oil & Gas development

KEA/Indicator: oil spills (onshore facilities) / distribution of impact

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:
Working Group Members:
Bruce Robson

References:

Oil & Gas development - remediation state

Target: Oil & Gas development

KEA/Indicator: oil spills (onshore facilities) / remediation state

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - location

Target: Shipping

KEA/Indicator: groundings/wrecks/disablement/spills from ship transport / location

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - distribution of impact

Target: Shipping

KEA/Indicator: groundings/wrecks/disablement/spills from ship transport / distribution of impact

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - remediation state

Target: Shipping

KEA/Indicator: groundings/wrecks/disablement/spills from ship transport / remediation state

Justification for Indicator:

Long-term Viability Goal:

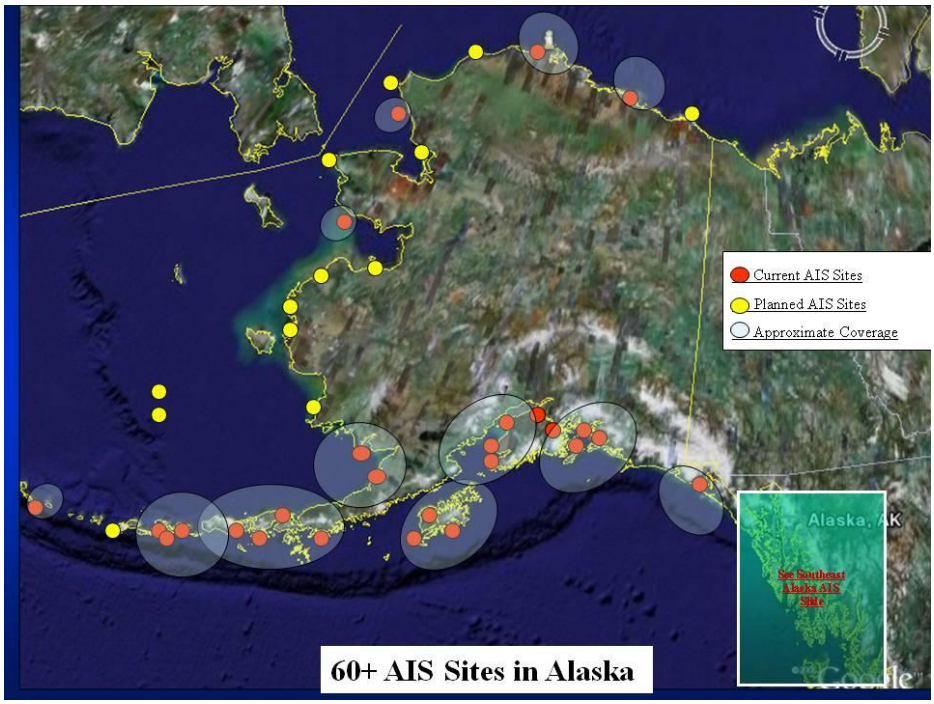
Monitoring Approach:
When: Database is updated on an ongoing basis
Where: Alaska Department of Environmental Conservation, Division of Spill Prevention and Response
How: Data is available on-line, however a special data request may be preferable
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - pass routes



Target: Shipping

KEA/Indicator: shipping volume and traffic / pass routes

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Data collected on an ongoing basis - annual update is possible
Where: Marine Exchange of Alaska (http://www.mxak.org/)
How: Special Data Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - bering strait traffic

Target: Shipping

KEA/Indicator: shipping volume and traffic / bering strait traffic

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Data collected on an ongoing basis - annual update is possible
Where: Marine Exchange of Alaska (http://www.mxak.org/)
How: Special Data Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - routes in BS/CS

Target: Shipping

KEA/Indicator: shipping volume and traffic / routes in BS/CS

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Data collected on an ongoing basis - annual update is possible
Where: Marine Exchange of Alaska (http://www.mxak.org/)
How: Special Data Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Shipping - changing patterns?/future route

Target: Shipping

KEA/Indicator: shipping volume and traffic / changing patterns?/future route

Justification for Indicator:

Long-term Viability Goal:

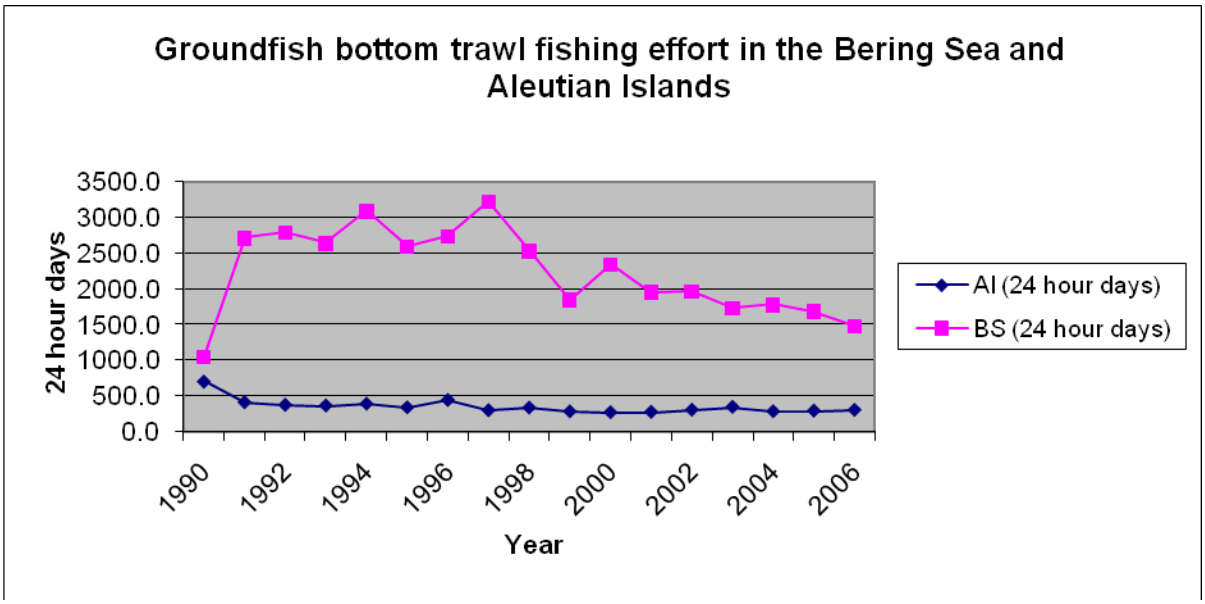
Monitoring Approach:
When: Data collected on an ongoing basis - annual update is possible
Where: Marine Exchange of Alaska (http://www.mxak.org/)
How: Special Data Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bottom Trawl Area



Target: Fishing

KEA/Indicator: destructive / Bottom Trawl Area

Justification for Indicator:

Long-term Viability Goal:

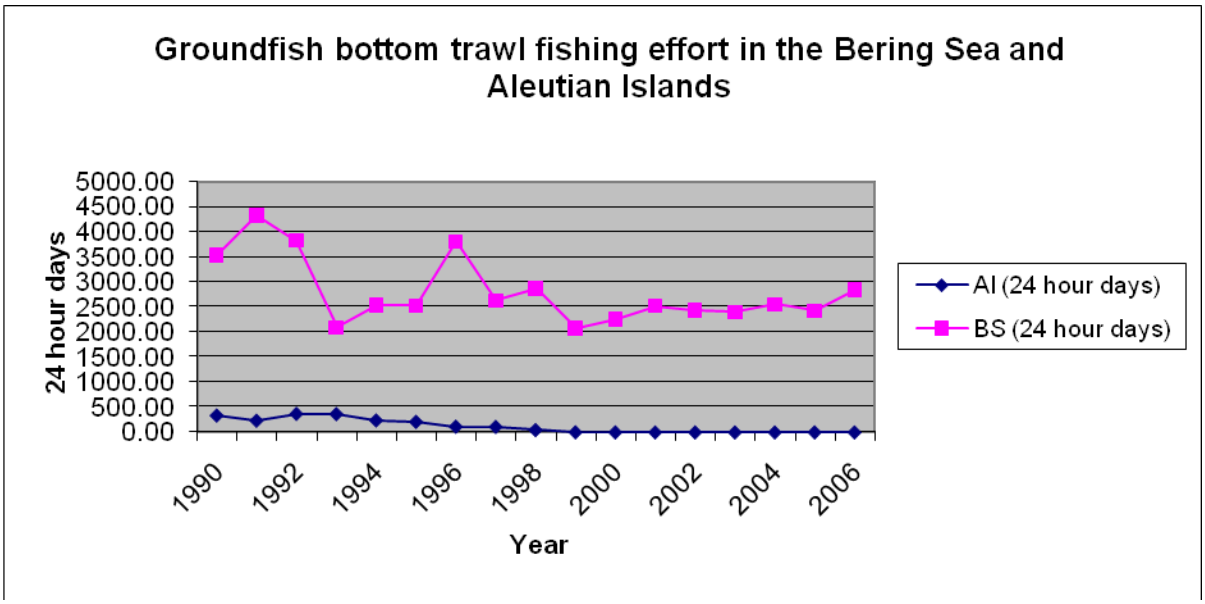
Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bottom Trawl Amount



Target: Fishing

KEA/Indicator: destructive / Bottom Trawl Amount

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Pelagic Trawl Area

Target: Fishing

KEA/Indicator: destructive / Pelagic Trawl Area

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Pelagic Trawl Amount

Target: Fishing

KEA/Indicator: destructive / Pelagic Trawl Amount

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bycatch of Prohibited Species

Target: Fishing

KEA/Indicator: destructive / Bycatch of Prohibited Species

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bycatch of Non-Target Species

Target: Fishing

KEA/Indicator: destructive / Bycatch of Non-Target Species

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - FIB

Target: Fishing

KEA/Indicator: marine trophic index/trend / FIB

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm (Ecosystem web page link)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS Pollock Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS Pollock Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - AI Pollock Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / AI Pollock Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bogoslof Pollock Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / Bogoslof Pollock Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Pacific Cod Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Pacific Cod Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Pacific Ocean Perch Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Pacific Ocean Perch Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Islands Yellowfin Sole Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Islands Yellowfin Sole Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Flathead Sole Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Flathead Sole Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Atka Mackerel Exploitation Rate

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Atka Mackerel Exploitation Rate

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Eastern Bering Sea Pollock Stock Status

Target: Fishing

KEA/Indicator: Overfishing / Eastern Bering Sea Pollock Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Aleutian Islands Pollock Stock Status

Target: Fishing

KEA/Indicator: Overfishing / Aleutian Islands Pollock Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Bogoslof Pollock Stock Status

Target: Fishing

KEA/Indicator: Overfishing / Bogoslof Pollock Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Pacific Cod Stock Status

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Pacific Cod Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Pacific Ocean Perch Stock Status

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Pacific Ocean Perch Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Yellowfin Sole Stock Status

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Yellowfin Sole Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Flathead Sole Stock Status

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Flathead Sole Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - EBS/AI Islands Atka Mackerel Stock Status

Target: Fishing

KEA/Indicator: Overfishing / EBS/AI Islands Atka Mackerel Stock Status

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: Annual report released in Fall/Winter
Where: Resource Ecology and Fishery Management Division AFSC/NMFS/NOAA
How: Download from internet: http://www.afsc.noaa.gov/REFM/stocks/assessments.htm
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Incidental catch of NFS in commercial fisheries/year

Target: Fishing

KEA/Indicator: Bycatch / Incidental catch of NFS in commercial fisheries/year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Incidental catch of SSL in commercial fisheries/year

Target: Fishing

KEA/Indicator: Bycatch / Incidental catch of SSL in commercial fisheries/year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Fishing - Incidental catch of Humpback whales in commercial fisheries/year

Target: Fishing

KEA/Indicator: Bycatch / Incidental catch of Humpback whales in commercial fisheries/year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When: NMFS Annual Stock Assessment (SAR) Report
Where: National Marine Fisheries Service, National Marine Mammal Laboratory (http://www.nmfs.noaa.gov/pr/sars/region.htm)
How: Download from internet: (http://www.nmfs.noaa.gov/pr/sars/region.htm)
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Conservation Management

Conservation Management	Key Attribute	Indicators
Protected Area Representation	Representation of habitats in management and protected areas	
	Protected Area representation of priority areas	
	Protected Area Management Effectiveness?	
	Marine Management effectiveness	
conservation policy	Conservation Funding	
	Enforcement	
capacity		
sustainable finance		
ecoregion conservation		

Social Indicators

Target	Key Attribute	Indicators
wealth/economic well-being	Per Capita Income	$/руб. per person/year*
	Income	" from Marine Resources
	Income	Total income per sector
	Employment	% Adults in wage labor*
	Employment	" by Sector*
	Cost of Living	Cost of Food
	Cost of Living	Cost of Fuel
	Access to Information/ Communication	% communities w/ high speed internet
health	Nutrition	% children with low birth weight (World Health Org - WHO)
	Mortality	% children die before 1 year
	Health Care Access	% community w/ access to: Health Facility, MD, Nurse, Community Health Worker (& Russian equivalents)*
political empowerment	Marine Resource Rights	-% communities involved in CDQ
	Marine Resource Rights	% harvest allocated to CDQ
	Marine Resource Rights	marine mammal co-management and/or local participation in fisheries management board and councils
	Marine Resource Rights	[local ownership of quota/salmon permits]
	Marine Resource Rights	-access/use
	Marine Resource Rights	-mgmt/decision-making
	Local governance capacity	% communities w/ civil society organizations [avg per community?]
	Women's empowerment	% Community org officials are women
	Rights - self-determination (?)	# of times Traditional Ecological Knowledge represented in formal hearings
education	Enrolment	% school age kids enrolled in: primary, secondary, tertiary (split by gender)
	Literacy	Literacy rate of population, (split by gender)
	Ecological Knowledge	% communities w/ culture camps
	Ecological Knowledge	*% school districts w/ traditional knowledge programs*
	Ecological Knowledge	other methods of capturing elder

Target	Key Attribute	Indicators
		knowledge
culture	Contact with Nature (Divorce from Nature?)	Needs to be developed.
	Native language Education Access (cross w/ culture)	% communities w/ formal instruction in native language
Cross-Cutting	Population Change/Dynamics	% change in overall population*
	Population Change/Dynamics	% change native population*
	Subsistence economy/culture	% Adults in subsistence (Key Analysis to pull from data: % participation in subsistence harvesting - total adults in subsistence/total population)
	Subsistence Harvest	harvest per capita meat & fish – x spp. Marine & terrestrial (Key analysis to develop from this data: Changes in proportion of species or category used in subsistence; e.g., from mari
	Subsistence Harvest	% harvest shared with other households

Economic well-being - $/руб. per person/year

Target: Economic well-being

KEA/Indicator: Per Capita Income / $/руб. per person/year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Economic Well-Being - % Adults in wage labor

Target: Economic Well-Being

KEA/Indicator: Employment / % Adults in wage labor

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Economic Well-Being - Employment -% Adults by Sector

Target: Economic Well-Being

KEA/Indicator: Employment / " by Sector

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Health - % community w/ access to: Health Facility, MD, Nurse, Community Health Worker (& Russian equivalents)

Target: Health

KEA/Indicator: Health Care Access / % community w/ access to: Health Facility, MD, Nurse, Community Health Worker (& Russian equivalents)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Cross-Cutting - % change in overall population

Target: Cross-Cutting

KEA/Indicator: Population Change/Dynamics / % change in overall population

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Cross-Cutting - % change native population

Target: Cross-Cutting

KEA/Indicator: Population Change/Dynamics / % change native population

Justification for Indicator:

Long-term Viability Goal:

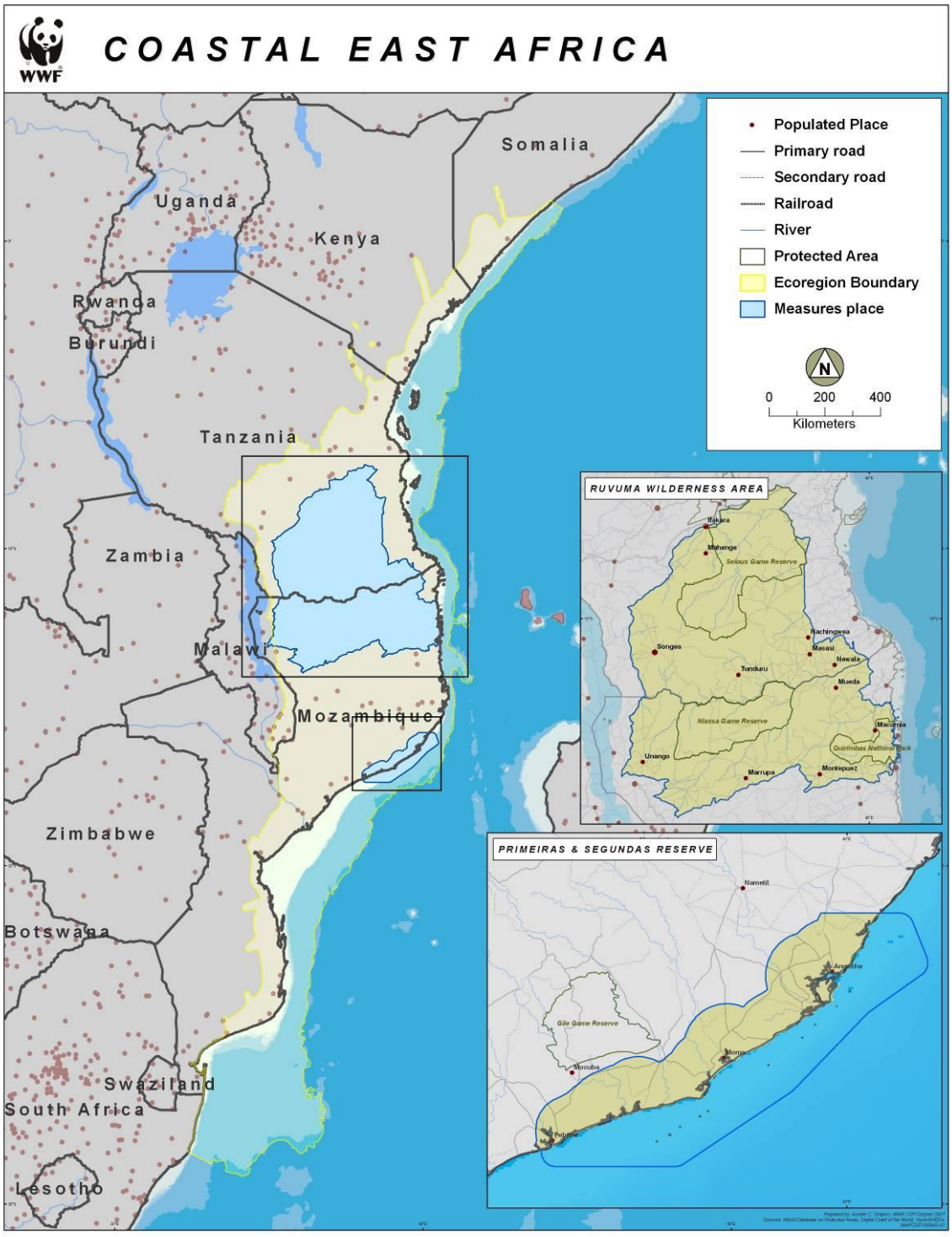
Monitoring Approach:
When:
Where: NOAA/AFSC Community Profile Database
How: Request
Future Indicator Development Required:

Notes:

Working Group Members:
Bruce Robson

References:

Appendix 2- Coastal East Africa



The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

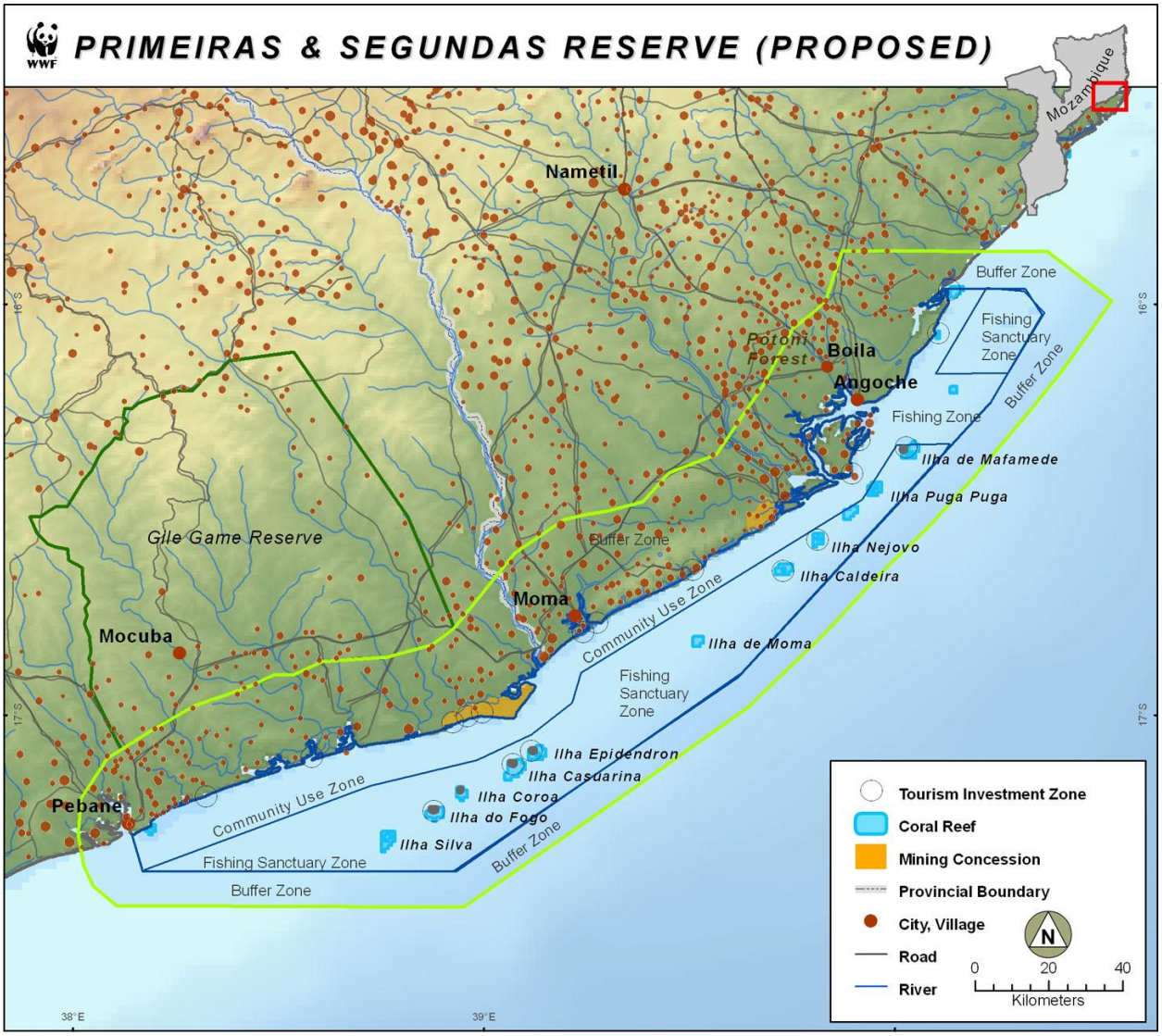
Credits:
The data presented in the following pages is the product of over a year of work by teams in Tanzania and Mozambique.

A WWF team from each country compiled this data for the Conservation Measures pilot project.

The team members from WWF-Mozambique were led by Aramindo Araman, and included Marcelino Denja, Yolanda Sambane, and Tomas Buruwate. They received assistance from Peter Bechtel, Alice Costa, Sean and Country Representative, Helena Motta.

The team from Tanzania consisted of Cyprian Malima and Nalimi Madatta. They were assisted by Dr. Kassim Kulindwa a consultant with the Economic Research Bureau.

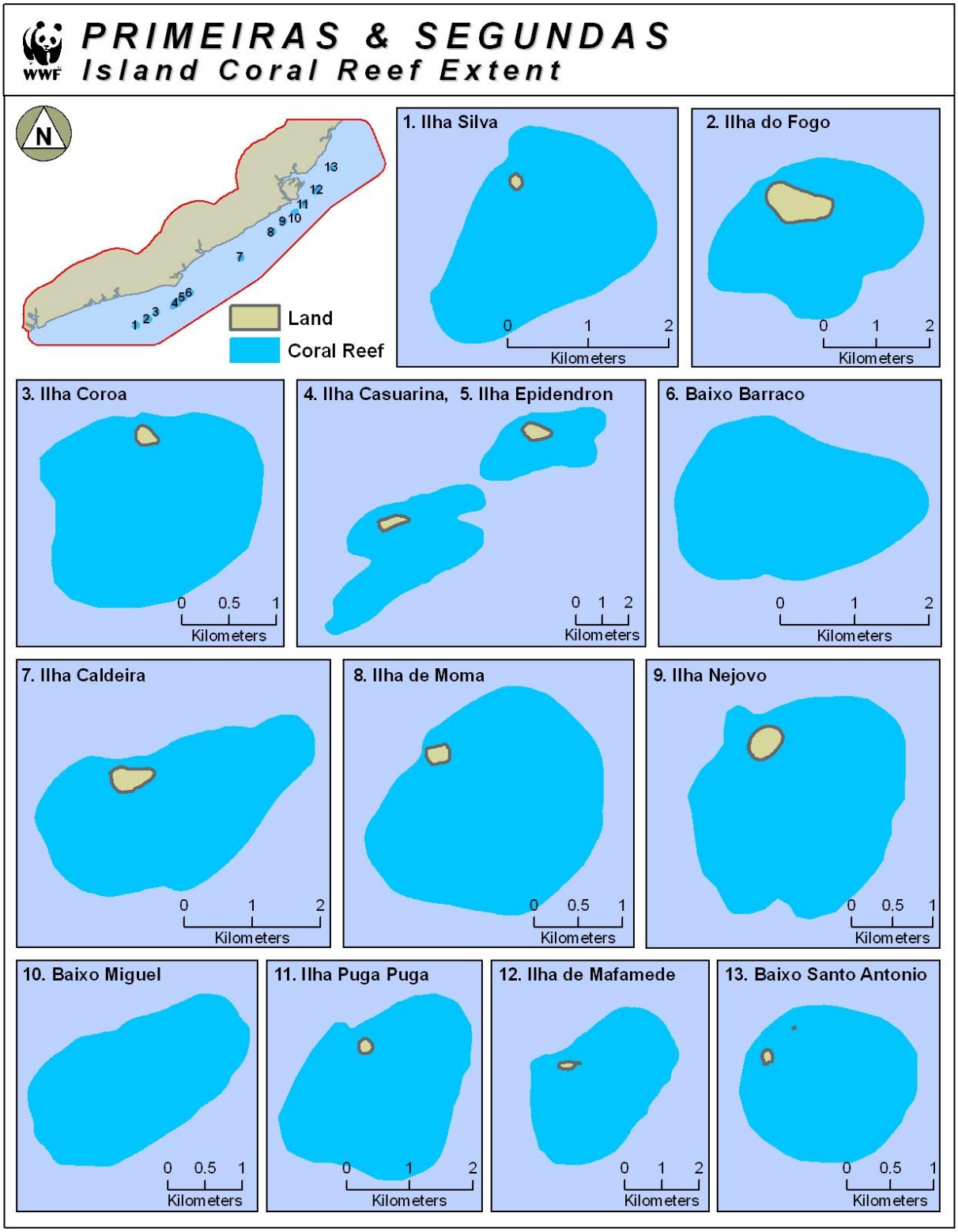
Premieras E Segundas

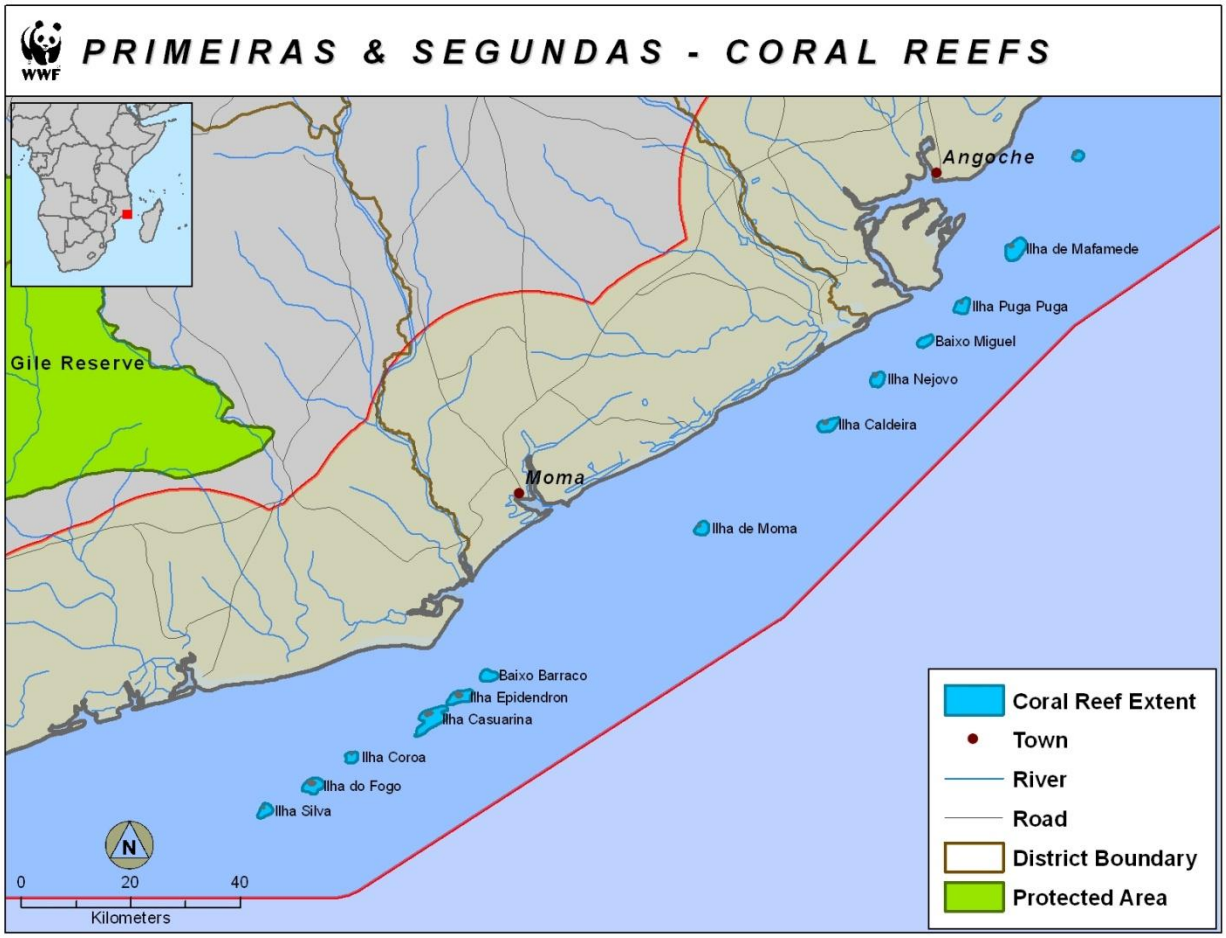


Biological Targets

Target / Domain	*Key Attribute*	Indicators
Coastal Forest	*Extent*	% Historical Coastal Forest
Coastal Forest	*Wildlife Spp Diversity*	Density of Key Species
Coral reefs*	*Extent*	extent km sq
Elephants	*Spatial Distribution and Population Size*	Estimated # elephants by management zone -Gile Reserve
Elephants	*movement/migration*	Gile/P&S Corridor
Elephants	*Population Structure*	Male/Female Ratio
Estuary habitat	*Extent*	seagrass bed extent
Mangroves*	*Extent*	% of historical mangrove cover
Mangroves	*Crown Cover*	%/Ha
Mangroves	*Species Diversity*	species composition (% change in presence/absence of Avicenia marina, Rhizohora mucronata, Bruguierna gimnorhiza)
Miombo*	*Extent*	% of Historic Forest
Miombo	*Wildlife Spp Diversity*	Density of Key Species
Offshore islands *	*Extent*	% forest cover
Reef/non-reef fish		Catch Per Unit Effort
Sea turtles	*Population Size*	# nests
Wetland*	*Extent*	% Historical Wetland area (km^2)
Wetland	*Persistance/ Permanence*	% of Historical wetlands that dry up seasonally (compared to Past)

Coral Reefs- Extent





Target: Coral Reefs

KEA/Indicator: Extent

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

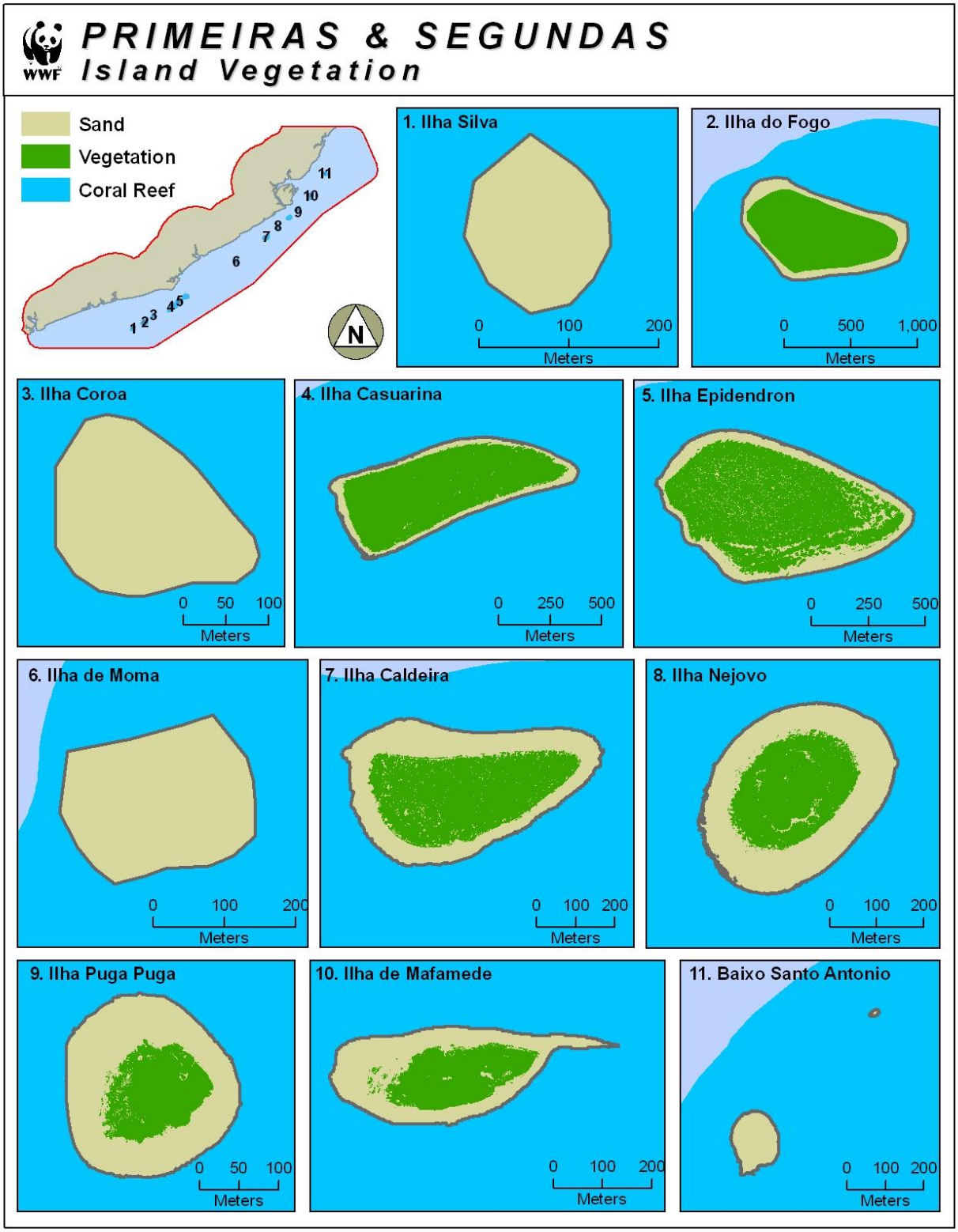
Future Indicator Development Required:

Notes: mapped shallow water coral reef (<90 feet deep) from available Landsat and QuickBird and IKONOS Imagery

Working Group Members:

References:

Offshore Islands - Vegetation cover



Target:
Offshore islands

KEA/Indicator: Extent vegetation cover

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

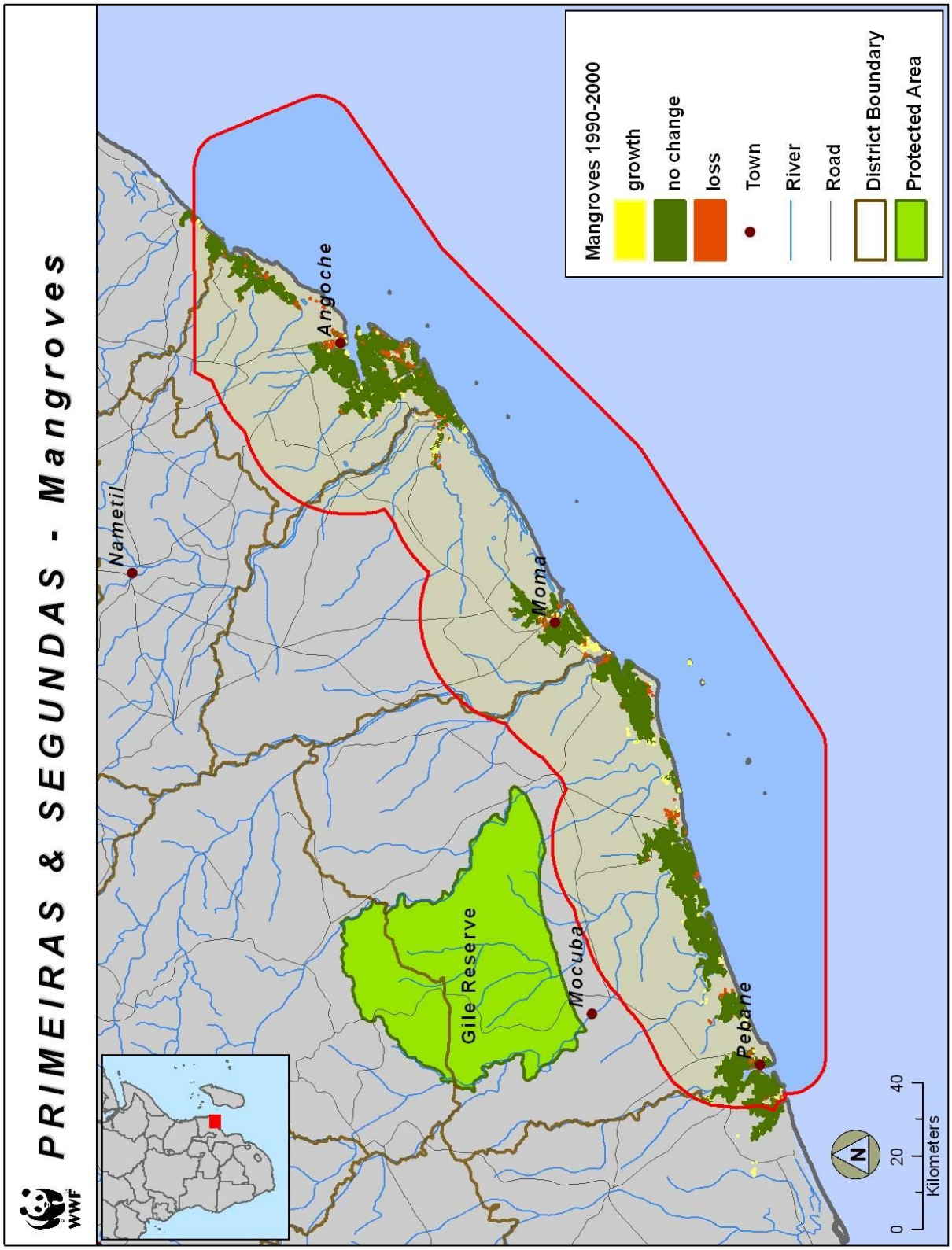
Future Indicator Development Required:

Notes: Mapped vegetated areas from Landsat, Quickbird and IKONOS data

Working Group Members:

References:

Mangroves- mangrove extent in 1990 and 2000



Target: Mangroves

KEA/Indicator: Mangrove extent in 1990 and 2000

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

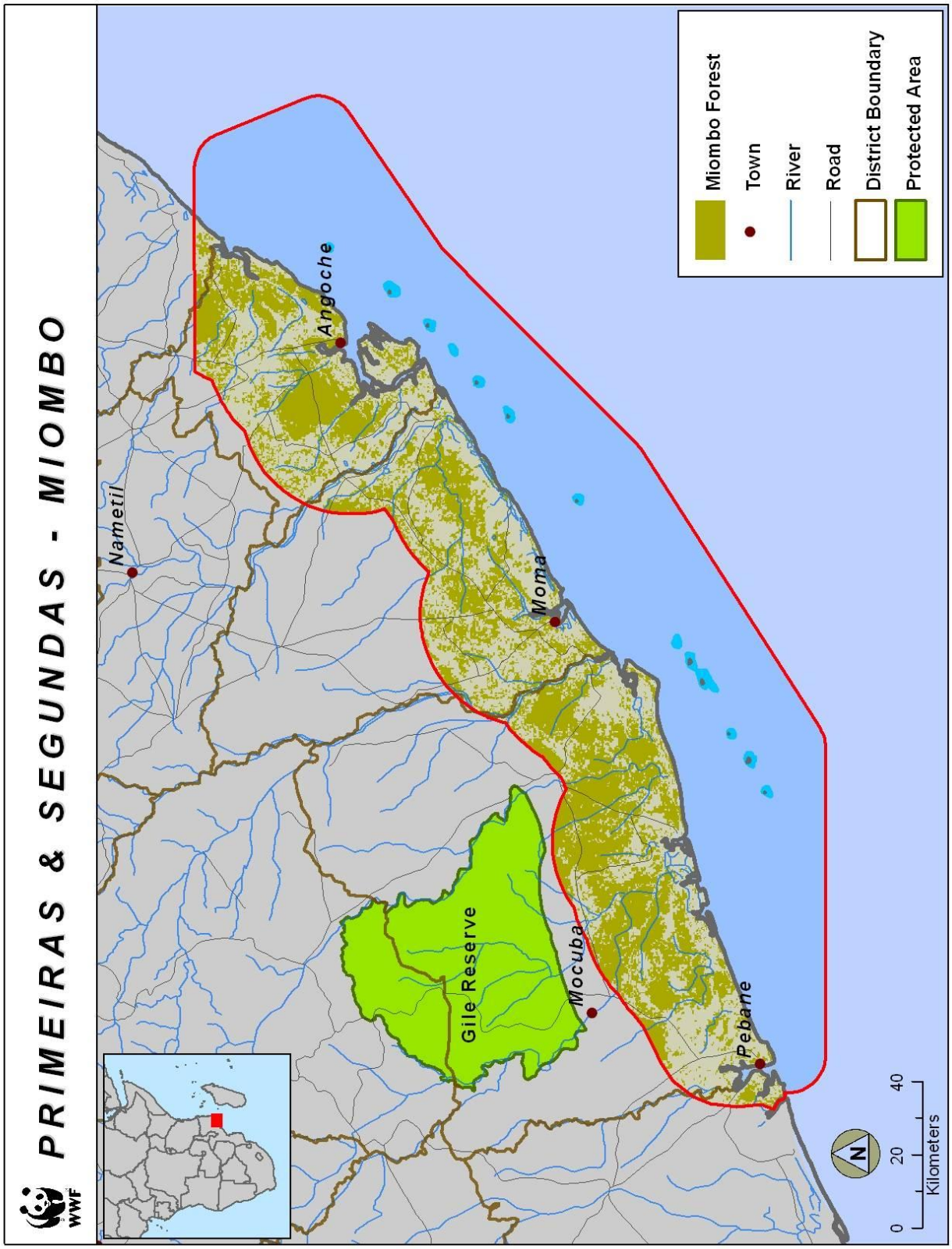
Future Indicator Development Required:

Notes: Extracted mangroves from 1990 and 2000 Landsat imagery and determined growth, loss, no change

Working Group Members:

References:

miombo forest- miombo forest complex



Target: Miombo forest

KEA/Indicator: Miombo forest complex

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

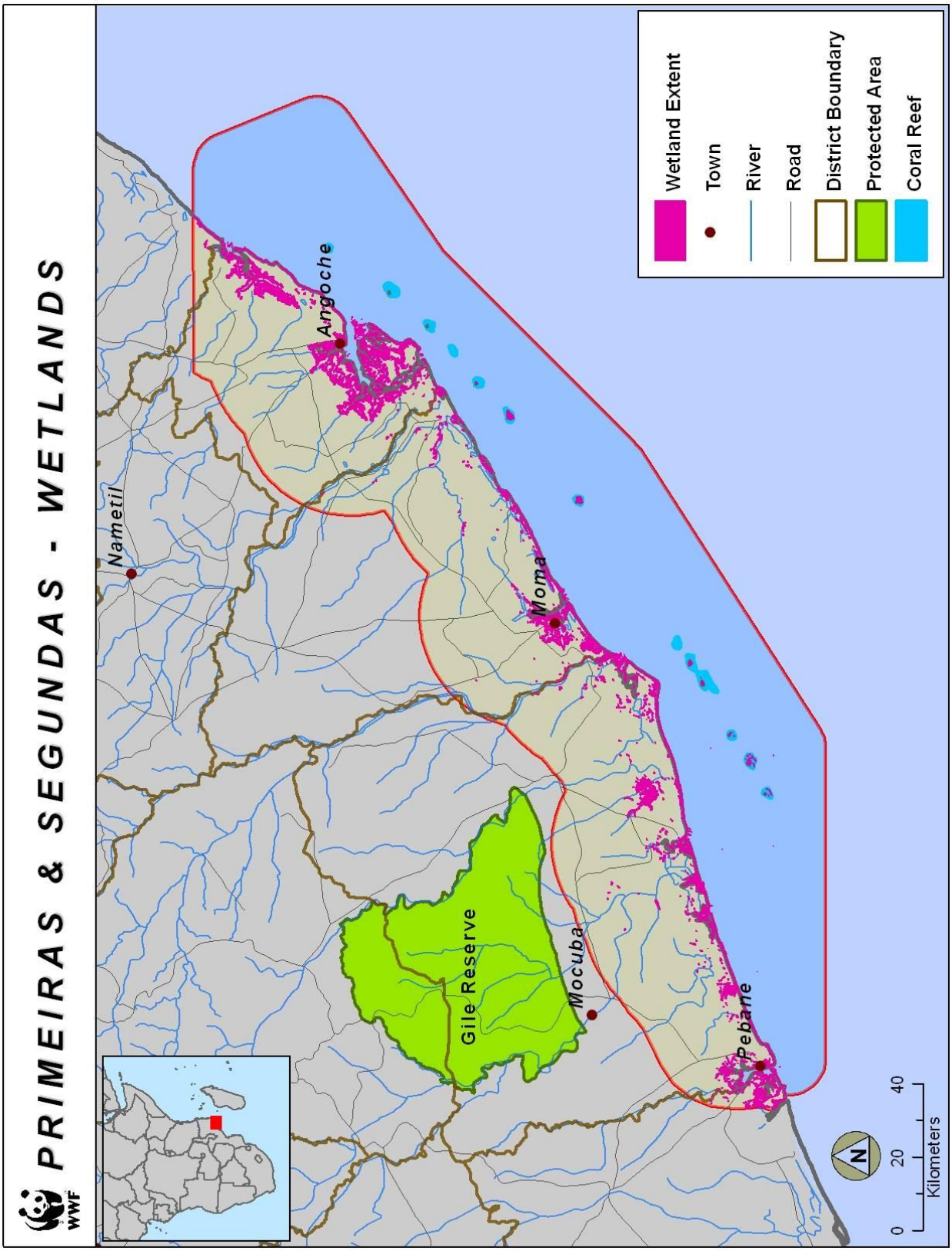
Future Indicator Development Required:

Notes: Total area of woody vegetation, savanna, shrub, or herbaceous landcover from GlobCover.

Working Group Members:

References:

wetlands- wetland area in P&S



Target: Wetlands

KEA/Indicator: Wetland area in P&S

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes: Permanent herbaceous wetlands from Geocover-LC (1990 data)

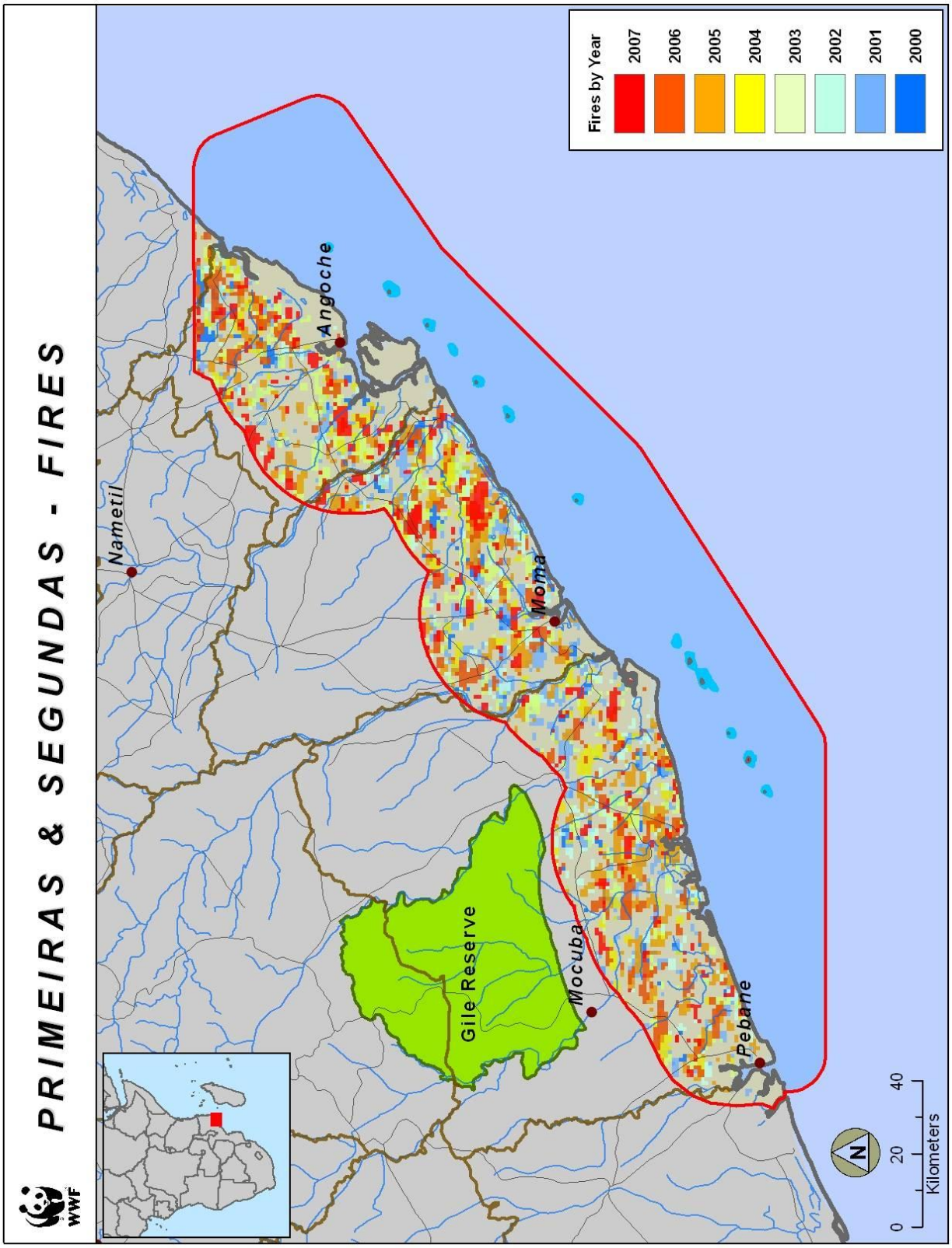
Working Group Members:

References:

Threats

Threat	*Attribute*	Indicator
Agricultural Conversion		Area of conversion by area and habitat type
Fire*	*Fire Intensity and Frequency*	Intensity and frequency
Infrastructure Development		Area of New infrastructure (km^2, Ha, Km) by type
Poaching		Poaching activity

Fires- Fire activity in P&S since 2000



Target: Fires

KEA/Indicator: Fire activity in P&S since 2000

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes: Used MODIS thermal anomalies to determine seasonal fire frequency and coverage

Working Group Members:

References:

Conservation Management

Conservation Management	*Attribute*	Indicator
Conservation financing		By source of funding
Protected Area Representation		by Habitat

Socioeconomic Condition

Domain	*Attribute*	Indicator
culture	*Sacred Places*	# of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments)) (comparison to Historic?)
education	*School enrolment*	status/change in ratio of girls to boys in primary education (MDI)
education	*Literacy*	Adult literacy rate (male/female)
education	*School enrolment*	status/change in net enrolment ratio in primary education (MDI)
health	*Water security*	% of population with access to improved water source
health	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
health	*Child mortality*	status/change in overall community health (e.g. infant mortality rate per 1,000 live births (MDI); under 5 mortality rate per 1,000 live births (MDI))
political empowerment	*Political Involvement*	political capacity/opportunities for women (% district/provincial leadership=women) (MDI variation)
wealth/economic well-being	*income*	Income from fishing (rendimento do ultimo dia da pesca)
wealth/economic well-being	*income*	monthly income of families
wealth/economic well-being	*Material assets*	status/change in housing materials

Ruvuma Wilderness

Tanzanian Technical Progress Report

MEASURES WORK TECHNICAL PROGRESS REPORT

1. Project/ Programme Title:	Mtwara Development Corridor: Sustainable Livelihoods in Tanzania
2. International Project Number(s):	**3. 9F71000**
4. Reporting Period:	**5. 1st Jjuly 2007 – 30th August 2008**
6. Name (writer(s) of this report):	**7. Cyprian Malima and Nalimi Madatta**
8. Position/ Title:	**9. Project Executant & Project Technical Assistant**
10. Organization:	**11. WWF Tanzania Programme Office**
12. Date:	**13. 15th October 2008**

11) **GLOBAL PROGRAMME FRAMEWORK**

The Conservation and Management of Selous Game Reserve contributes to Coastal East Africa, Miombo Woodlands (**Priority Places)** and African Elephants and Black Rhino.

2. PROJECT SUCCESSES

Project Measures work: The biological and socio-economic targets, threats to those targets, and indicators that have been developed helps WWF to monitor the status of those targets and threats as well as measuring conservation status in the areas where WWF works. Also the indicators allow WWF to track progress towards its goals, understand the challenges and opportunities we face, and describe the context for our work.

3. PROGRESS ON ACTIVITIES

This is a co-funded project whereby Sall Grant funded the following components:-

A) Project measures work:

i) *Workshop to formulate indicators for the baseline data on socio-economic and environmental survey*: A workshop which drew participants from Mozambique and Tanzania was convened

in Pemba Mozambique - November 12-16, 2007. Both biological and socio-economic targets, threats to those targets, and indicators were developed during this workshop. The indicators are important because they allow the monitoring of the status of those targets and threats. Also the indicators allow the tracking of progress towards goals, understand the challenges and opportunities we face, and describe the context for our work.

The Pemba workshop was followed with meeting in Kilwa (attended by Annie Claus WWFUS and Cyprian& madatta –WWF TPO) whereby data indicator list was reviewed and reorganized to suit the Tanzanian context. Also a monitoring plan was established.

ii) *Support rapid assessment of socio-economic and ecological data in the Selous – Niassa eastern Corridor*: The Socio-economic survey of communities living in Ruvuma Wilderness-Selous – Niassa Eastern corridor and villages bordering Selous eastern zone was conducted in April 2008. This study was undertaken in the districts of Rufiji, Kilwa, Nanyumbu, Liwale in 8 villages of Ngarambe (Rufiji), Miguruwe, Mtepela and Zinga Kibaoni villages (Kilwa), Mkumbaru and Masuguru villages (Nanyumbu) and Mpigamiti and Barikiwa villages in Liwale. Final report has been submitted and circulated to stakeholders. The information collected forms the baseline data for monitoring the impact of indicators that the effectiveness of WWF and other stakeholders interventions in the Ruvuma Wilderness- Coast East Africa (CEA) NI.

Threats: Most of these threats (especially infrastructure development, fire, logging and agricultural conversion) were to be undertaken through remote sensing at higher level or by consultancy. Unfortunately there were no funds allocated for this activity**.** On the other hand scanty information has been made available for poaching incidences because this activity is done secretly and in remote areas.

Conservation management: Like threats, protected area presentation was to be undertaken through remote sensing exercises. Luckily a workshop was held in Masasi to identify and classify status of forests located within Selous –Niassa Eastern corridor in Masasi, Nanyumbu, Nachingwea and Liwale districts.

4. PROBLEMS AND CONSTRAINTS

Poor Information Management: In the Ruvuma wilderness data collection is not harmonized and it is collected by individuals in accordance to their respective requirements. There is no central hub where one could go and access data easily.

Inaccessibility of project area during the wet season: The geographic location of the Ruvuma Wilderness (Tanzanian Side) poses problems for the majority of the communities leading to difficulties in accessing markets for their agricultural produce.

Annual wildfires: Fire lit by different land users has negative impact to the conservation of wildlife and their critical habitats. This has been one of the causes of human-wildlife conflict in the area.

Illegal harvesting of wildlife resources: This is a major problem in the area because most of the societies living in the Ruvuma wilderness are poor; a situation which drives them into poaching activities. Awareness about wildlife management is still lacking.

Lack of Village Use Plans: Due to inadequate funding by the Government, most of the villages in the Ruvuma wilderness lack land use plans. Where these plans exist, the enforcement of these plans is very weak. Consequently there have been lots of competitions over the resources between different land users.

Human Elephant Conflict: As both Human population and associated activities increase with time, the rate of elephant habitat and migratory corridors/routes get interfered. Also this situation aggravates the rate of human – elephant conflict in the Ruvuma Wilderness area.

5. UNEXPECTED EFFECT

None during this reporting period.

6. LEARNING AND SHARING

a) Both parties and/or stakeholders (local communities, district councils and government) based in the Ruvuma Wilderness have shown positive willingness and participation in the implementation of project activities.

b) Livelihoods of communities living in The Great Ruvuma Wilderness (GROW) which runs from Lake Niassa/ Nyasa/ Malawi to the Indian Ocean, along the Ruvuma River catchment area, and includes parts of both northern Mozambique and Southern Tanzania are generally based on direct exploitation of the resource base through fishing, hunting, and farming using slash and burn methods. Current methods and levels of resource exploration are resulting in exhaustion of the resource base which threatens the survival of future generations.

7. ADAPTIVE MANAGEMENT

At present it is too early to anticipate any changes on the project objectives and activities because the implementations of activities have just started. However, the implementation of the measures field activities needs a full time employee who will not be assigned other duties. The current funding under the measures has no provision for paying for this employee.

8. COMMUNICATION/ STORIES

Socio-economic study report for the Greater Ruvuma Wilderness is a valuable document that can be used as baseline information to track changes not only by WWF but also with other stakeholders interested in the development of the Corridor.

9. FUTURE ISSUES AND CHALLENGES

i) Provide communities with ongoing M& E training and other support, on demand, to the extent possible

ii) Compile available spatial data into a GIS and produce maps as needed to show geography

iii) One face-to-face meeting of core collaborators each year to discuss progress, present results-to-date, explore means of better collaboration, and identify next steps.

iv) Work with technical experts to develop indicators and monitoring that will be done by means other than community observation e.g. remote sensing and other spatial methods.

v) Ensure regular and sustained opportunities for communication, collaboration, and relationship building between WWF-Mz and WWF-Tz.

10. OVERALL ASSESSMENT OF PROGRESS

The project is good as it has embarked the programme that aims at delivering concrete conservation results on the ground while fully integrating measures of biological and socioeconomic impact into WWF's strategic framework. This programme is a bold expansion of WWF's work with local communities to conserve critical habitats and sustain local livelihoods, and will enable us to better measure the impact of WWF efforts and make informed management decisions for conservation and development in the Ruvuma Wilderness (Tanzania side).

Biological Targets

Place	Target / Domain	*Key Attribute*	Indicators
Ruvuma	**Coastal Forest***	*Extent*	% Historical Coastal Forest
Mozambique	**Coral reefs***	*Extent*	extent km sq
Tanzania	**Elephant***	Movement/ migration	# elephants moving through natural corridor at specific times of year (Selous-Niassa Eastern Corridor and Western Cooridor)
Tanzania	**Elephant**	Population Structure	Calf/Adult Ratio
Tanzania	**Elephant**	Spatial Distribution and Population Size	Estimated # elephants by management zone - Selous-Niassa East Cooridor, West Cooridor and Selous GR
Mozambique	**Elephants**	*Spatial Distribution and Population Size*	Estimated # elephants by management zone - Niassa, NQ Cooridor, Quirimbus
Mozambique	**Elephants**	*Population Structure*	Male/Female Ratio
Mozambique	**Elephants**	*movement/migration*	Niassa Quirimbus Cooridor
Mozambique	**Estuary habitat**	*Extent*	seagrass bed extent
Mozambique	**Inselbergs**		Fauna spp composition at the selected inselbergs
Mozambique	**Inselbergs**		Flora spp composition at selected inselbergs
Mozambique	**Mangroves***	*Extent*	% of historical mangrove cover
Ruvuma	**Miombo***	*Extent*	% of Historic Forest
Tanzania	**Miombo**	*Wildlife Spp Diversity*	(#) Presence of Wildlife Species
Mozambique	**Miombo**	*Wildlife Spp Diversity*	Density of Key Species
Mozambique	**Offshore islands**	*Extent*	% forest cover
Mozambique	**Reef and non reef fish**		% change in presence/absence
Mozambique	**Reef and non reef fish**		Catch per unit effort
Ruvuma-Tnz	**Rhinos**	*Habitat Extent*	% of Historic Thicket Habitat (ha/km^2) TNZ (remote sensing) (?)
Ruvuma-Tnz	**Rhinos**	*Spatial Distribution and Population Size*	Estimated # of Black Rhinos in Selous GR – Tanzaina
Mozambique	**Sea turtles**	*Population Size*	# nests
Ruvuma	**Wetland***	*Extent*	% Historical Wetland area (km^2)
Ruvuma	**Wetland**	*Persistance/ Permanence*	% of Historical wetlands that dry up seasonally (compared to Past)
Tanzania	**Wild Dogs**	*Habitat Extent*	# of Blocks of a minimum size (?) for relatively open habitat (?) that are interconnected
Tanzania	**Wild Dogs**	*Spatial Distribution and Population Size*	# of Packs
Tanzania	**Wild Dogs**	*Population Structure*	% Age Classes
Tanzania	**Wild Dogs**	*Spatial Distribution and Population Size*	Estimated # of Wild Dogs by Mgt Zone
Tanzania	**Wild Dogs**	*Population Structure*	Male/Female Ratio
Tanzania	**Wild Dogs**	*Population Structure*	Pack sizes

Coastal Forest - % Historical Coastal Forest

Target: (All Ruvuma) Coastal Forest

KEA/Indicator: Extent / % Historical Coastal Forest

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

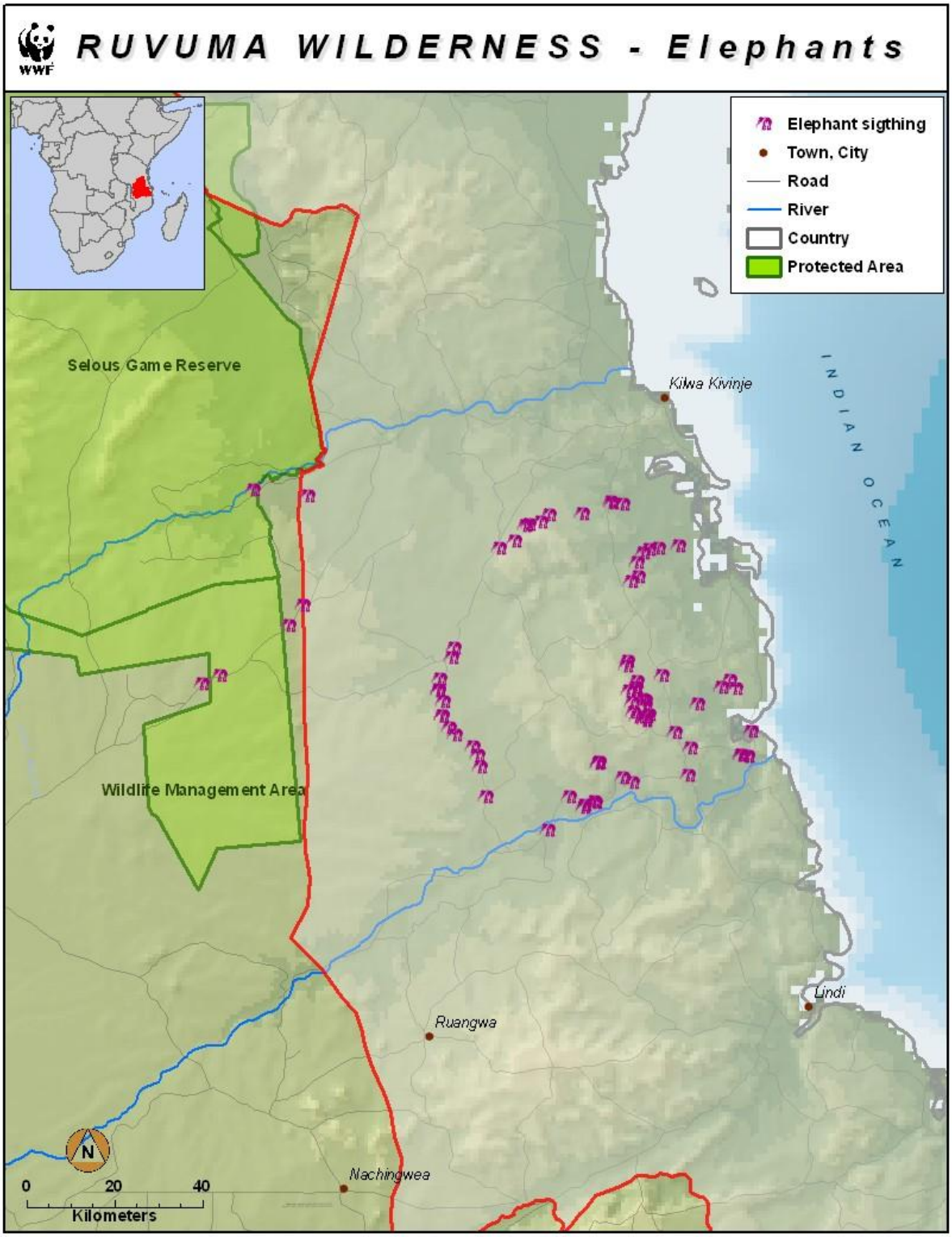
Future Indicator Development Required:

Notes: Coastal Forest blocks for MZ from Neil Burgess, for TZ used Africover

Working Group Members:

References:

Elephants - Movement and Migration



Target: (Tanzania) Elephants

KEA/Indicator: Movement/Migration / # elephants moving through natural corridor at specific times of year (Selous-Niassa Eastern Corridor and Western Cooridor)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

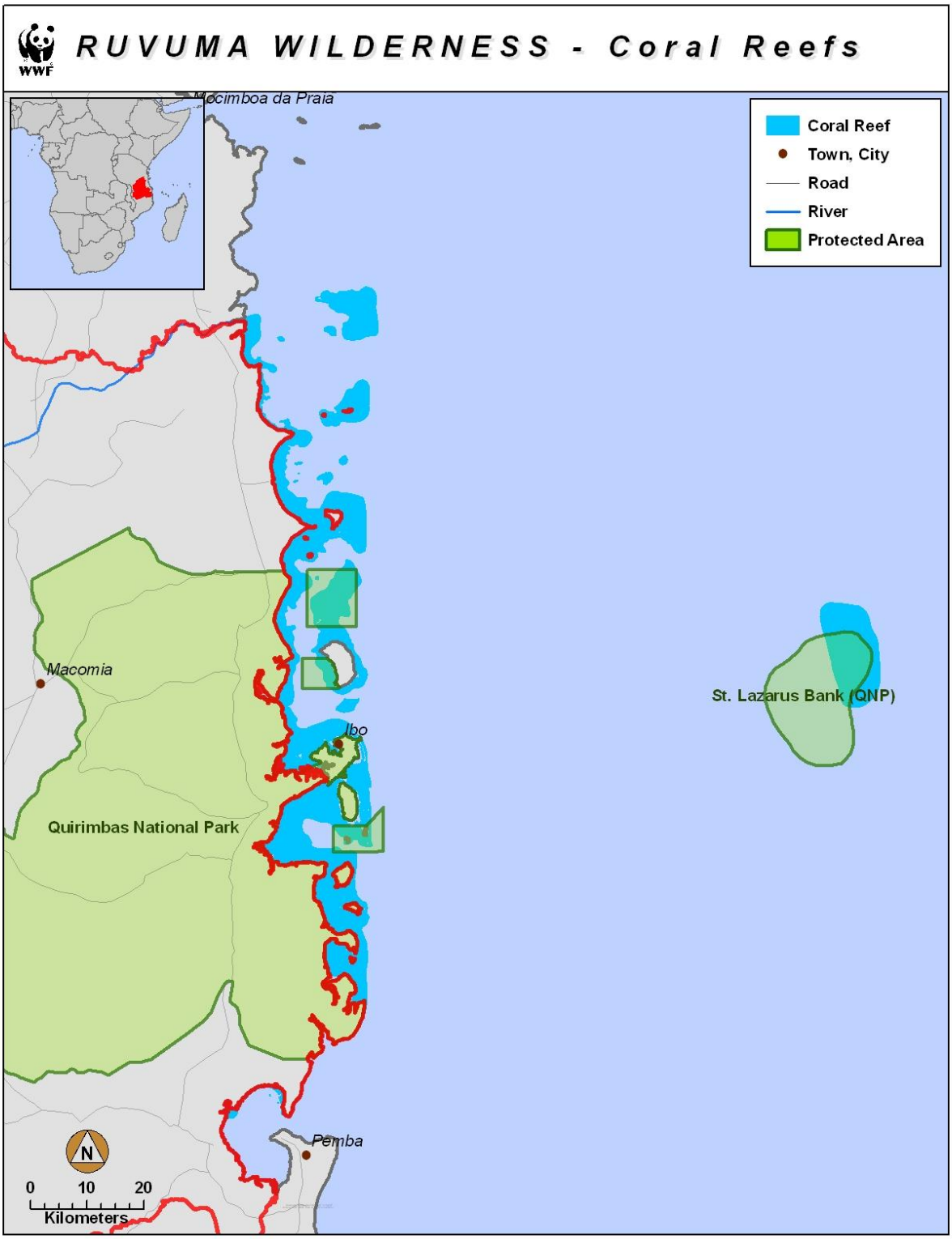
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Coral reefs - extent km sq



Target: (Mozambique) Coral reefs

KEA/Indicator: Extent / extent km sq

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

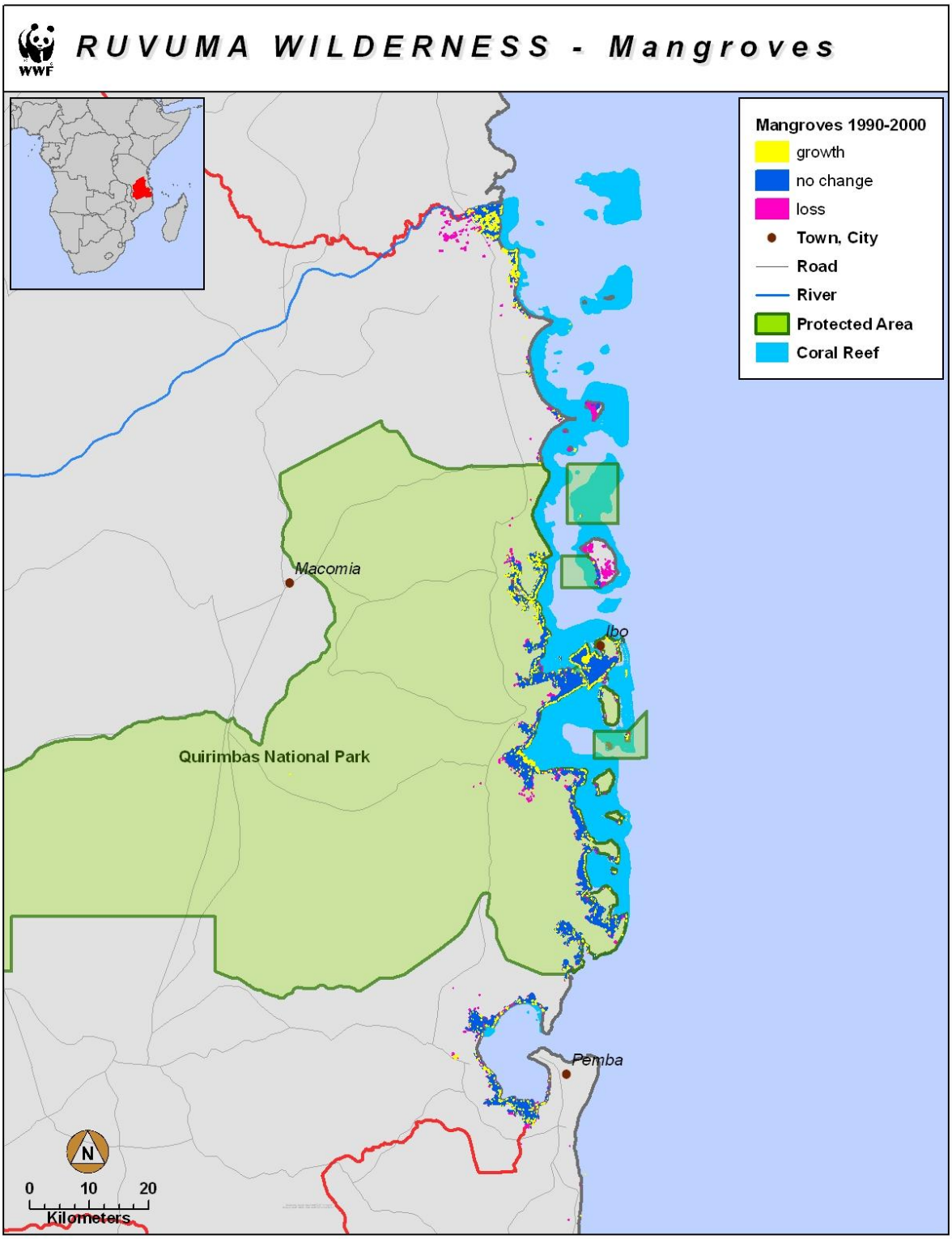
Future Indicator Development Required:

Notes: mapped shallow water coral reef (<90 feet deep) from available Landsat Imagery

Working Group Members:

References:

Mangroves - % of historical mangrove cover



Target: (Mozambique) Mangroves

KEA/Indicator: Extent / % of historical mangrove cover

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

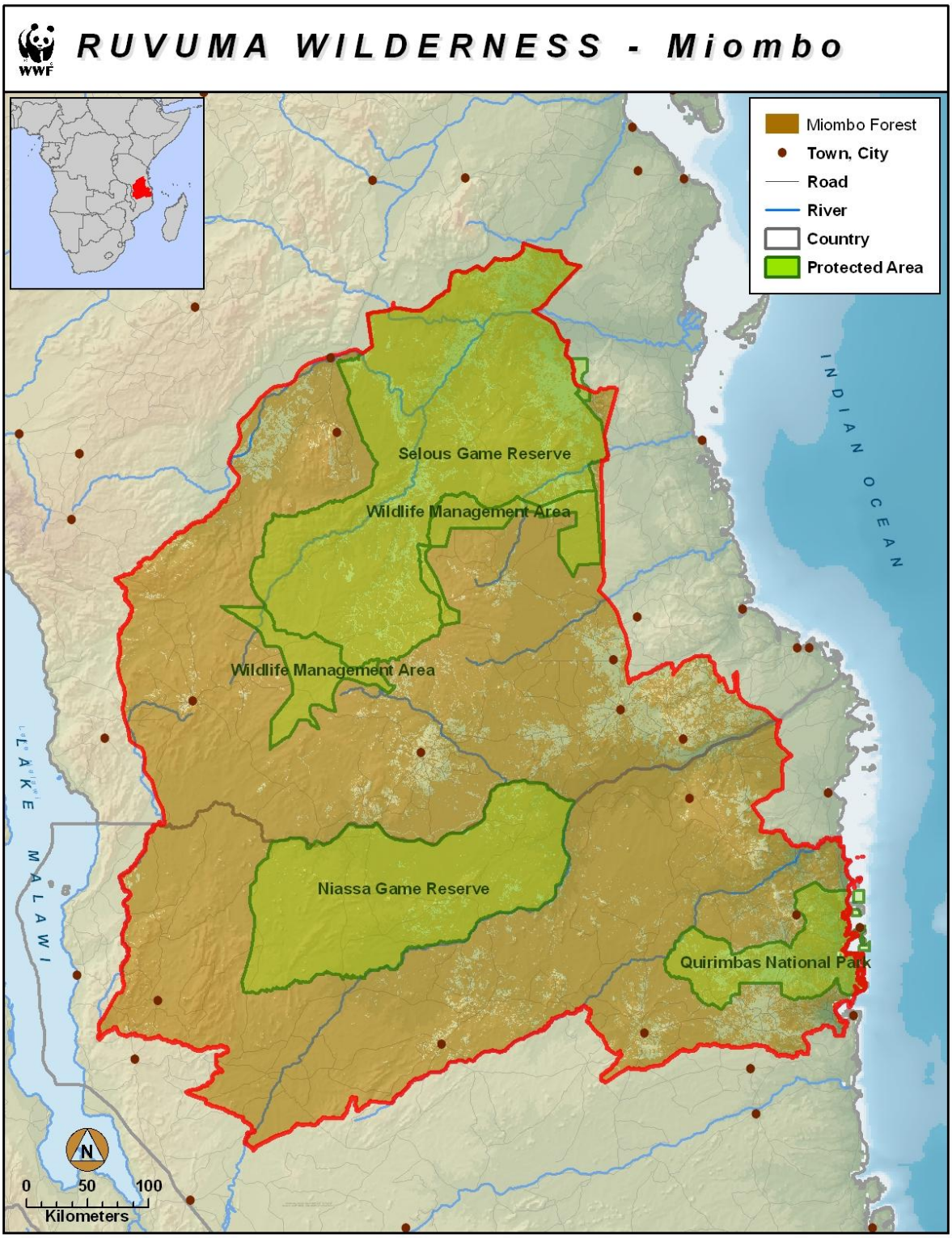
Future Indicator Development Required:

Notes: extracted mangroves from 1990 and 2000 Landsat imagery and determined growth, loss, no change

Working Group Members:

References:

Miombo - Extent



Target: (All Ruvuma) Miombo

KEA/Indicator: Extent

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

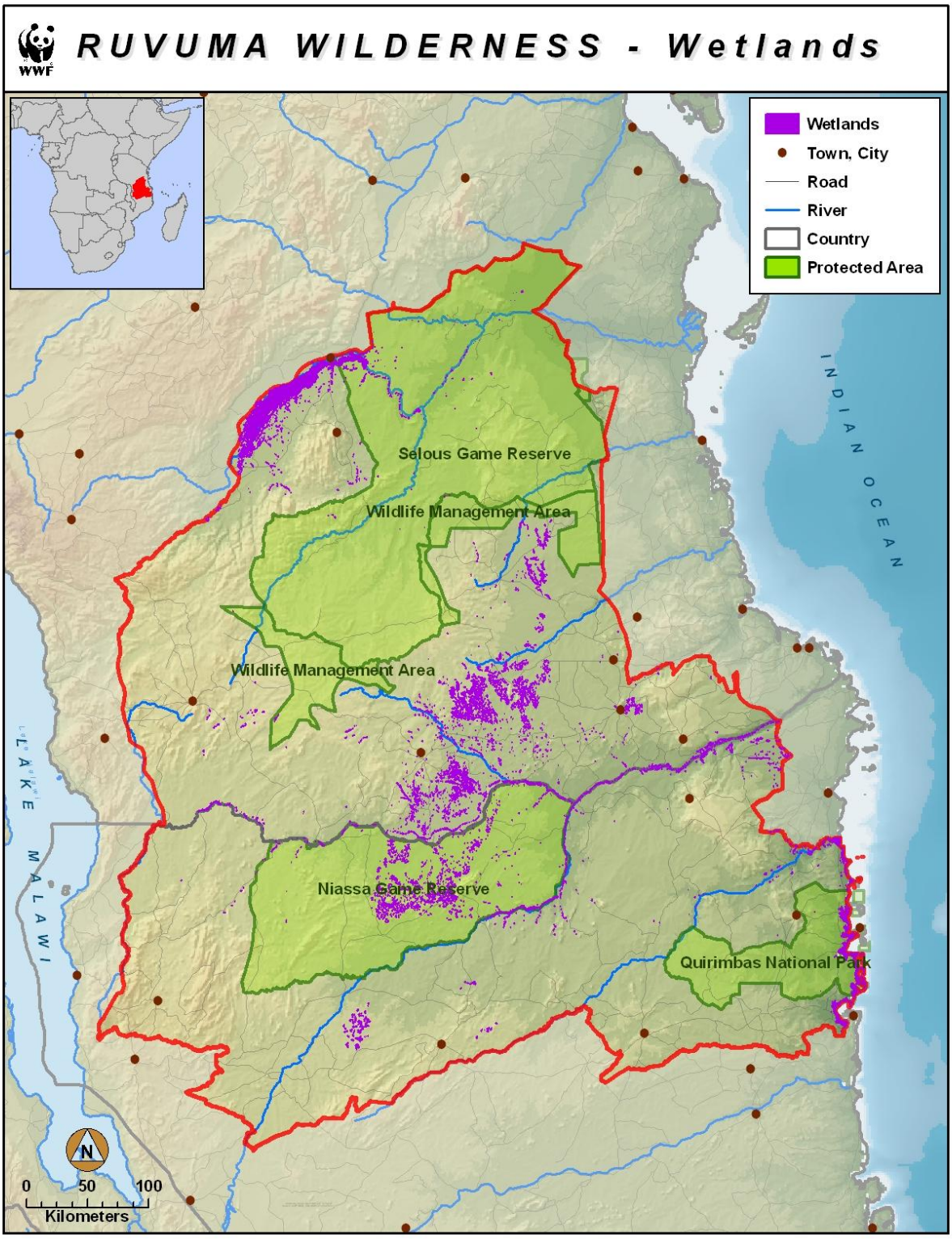
Future Indicator Development Required:

Notes: total area of woody vegetation, savanna, shrub, or herbaceous landcover from GlobCover

Working Group Members:

References:

Wetland - Extent (km^2)



Target: (All Ruvuma) Wetland

KEA/Indicator: Extent

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes: permanent herbaceous wetlands from Geocover-LC (1990 data)

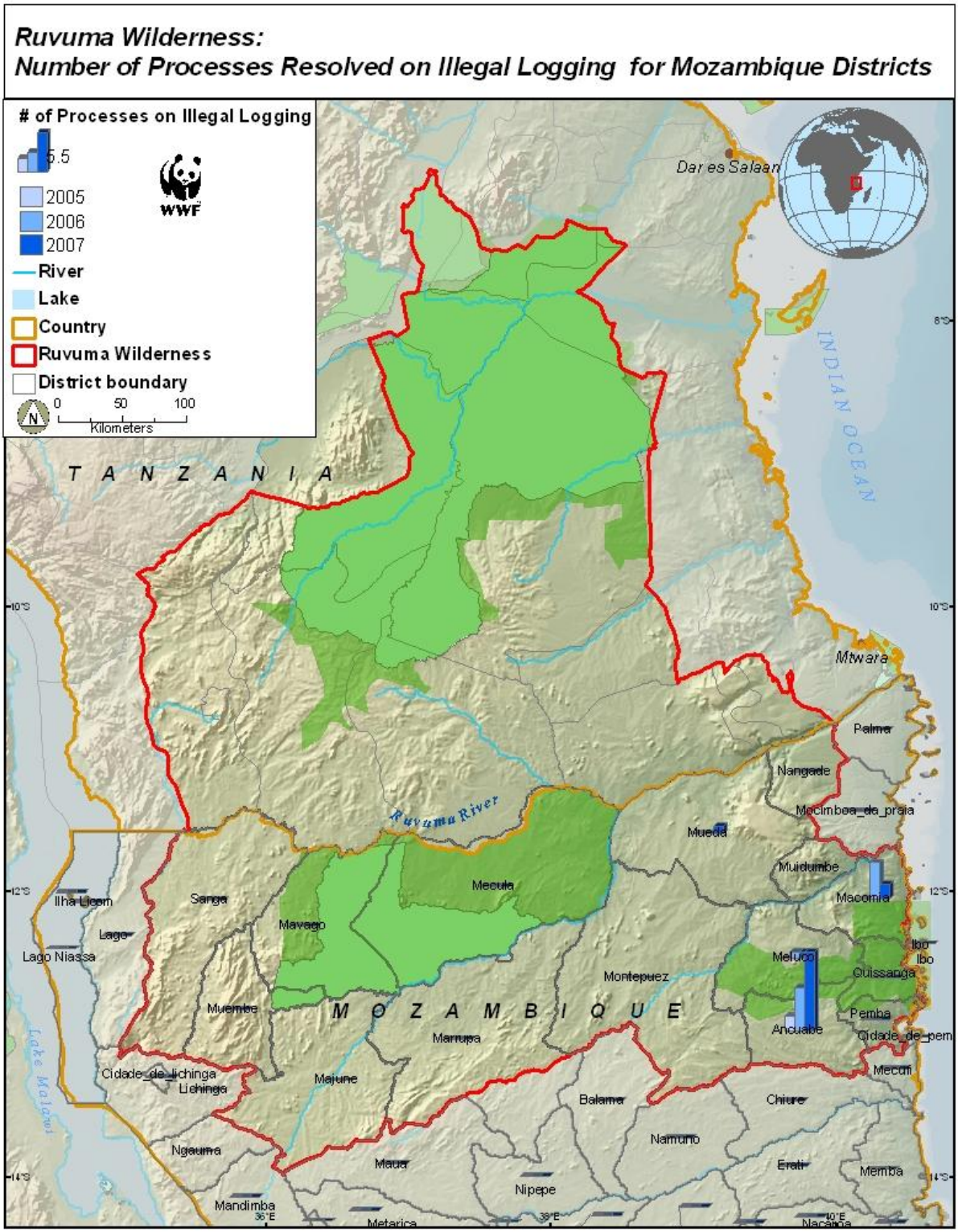
Working Group Members:

References:

Threats

Place	Threat	*Key Attribute*	Indicator
Mozambique	**Poaching**		number of incidences recorded on illegal logging
Mozambique	**Poaching***		Number of processes resolved on illegal logging
Mozambique	**Poaching***		number of incidences recorded on fauna
Mozambique	**Poaching**		Number of processes resolved on fauna
Ruvuma	**Fire***	*Fire Intensity*	Intensity during dry season (remote sensing) (?)
Ruvuma	**Agricultural Conversion***		Area of conversion by area and habitat type

Poaching - number of processes resolved on illegal logging



Target: (Mozambique) Poaching

KEA/Indicator: / number of processes resolved on illegal logging

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

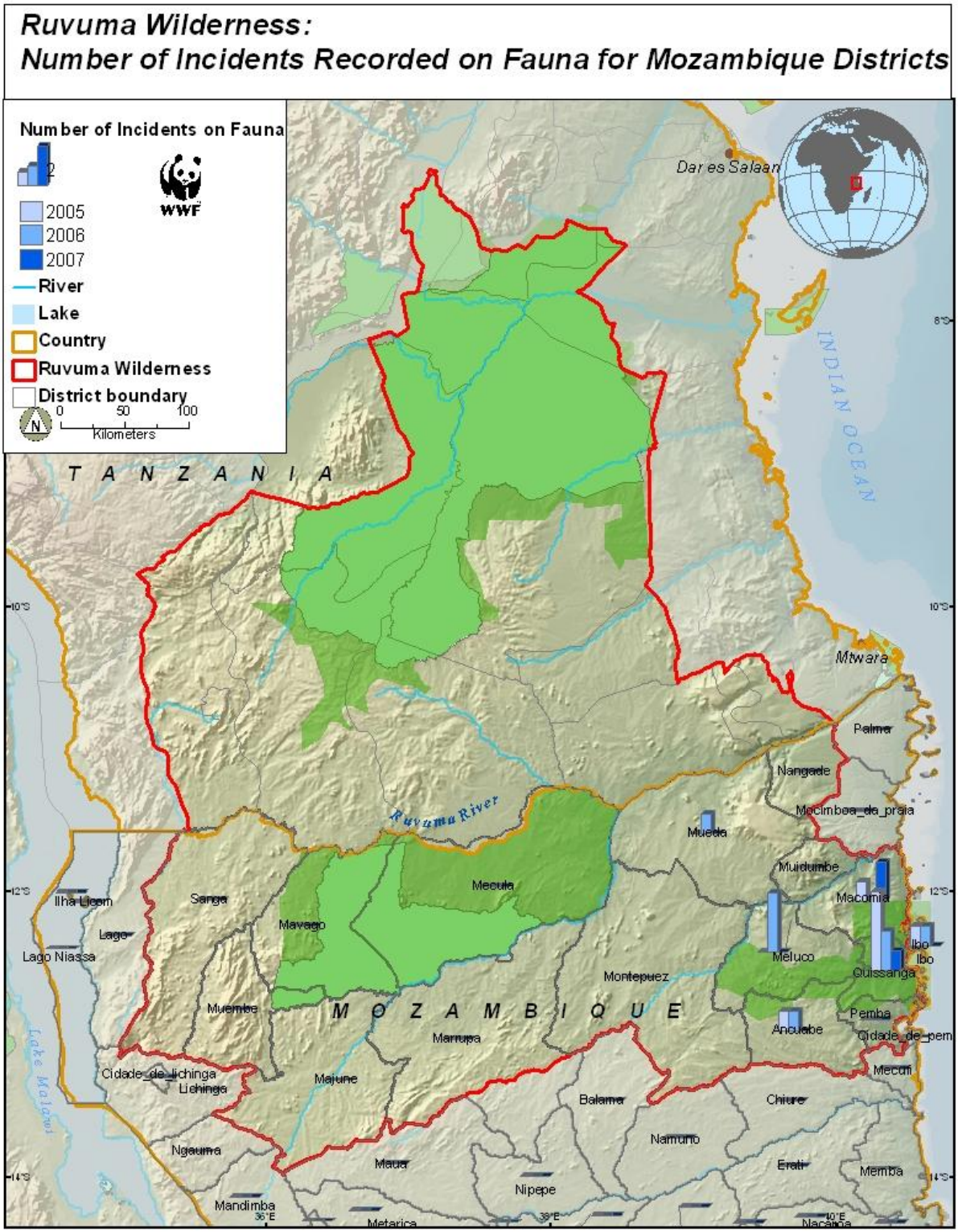
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Poaching - number of incidences recorded on fauna



Target: (Mozambique) Poaching

KEA/Indicator: / number of incidences recorded on fauna

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

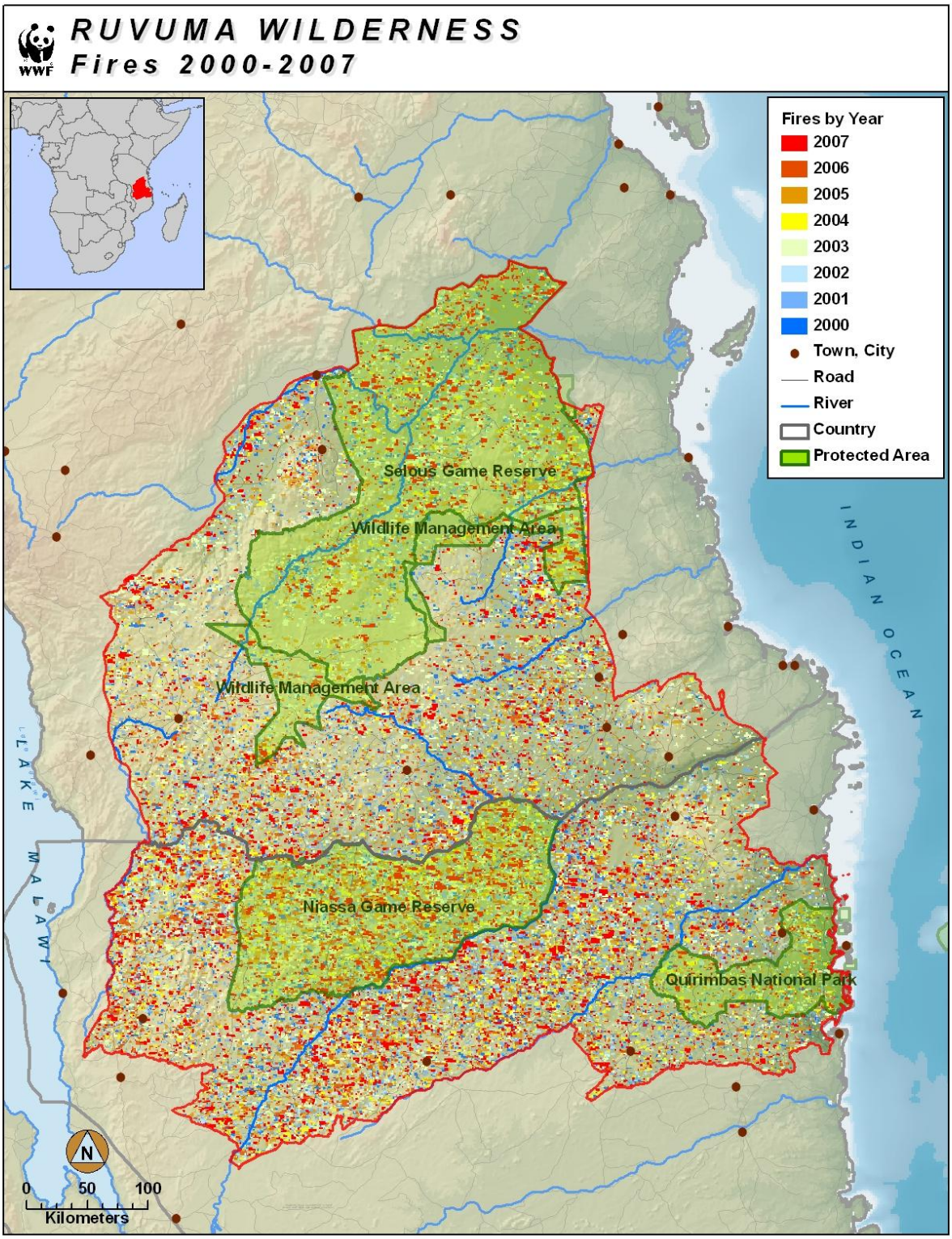
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Fire - Intensity during dry season (remote sensing)



Target: (All Ruvuma) Fire

KEA/Indicator: Fire Intensity / Intensity during dry season (remote sensing)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

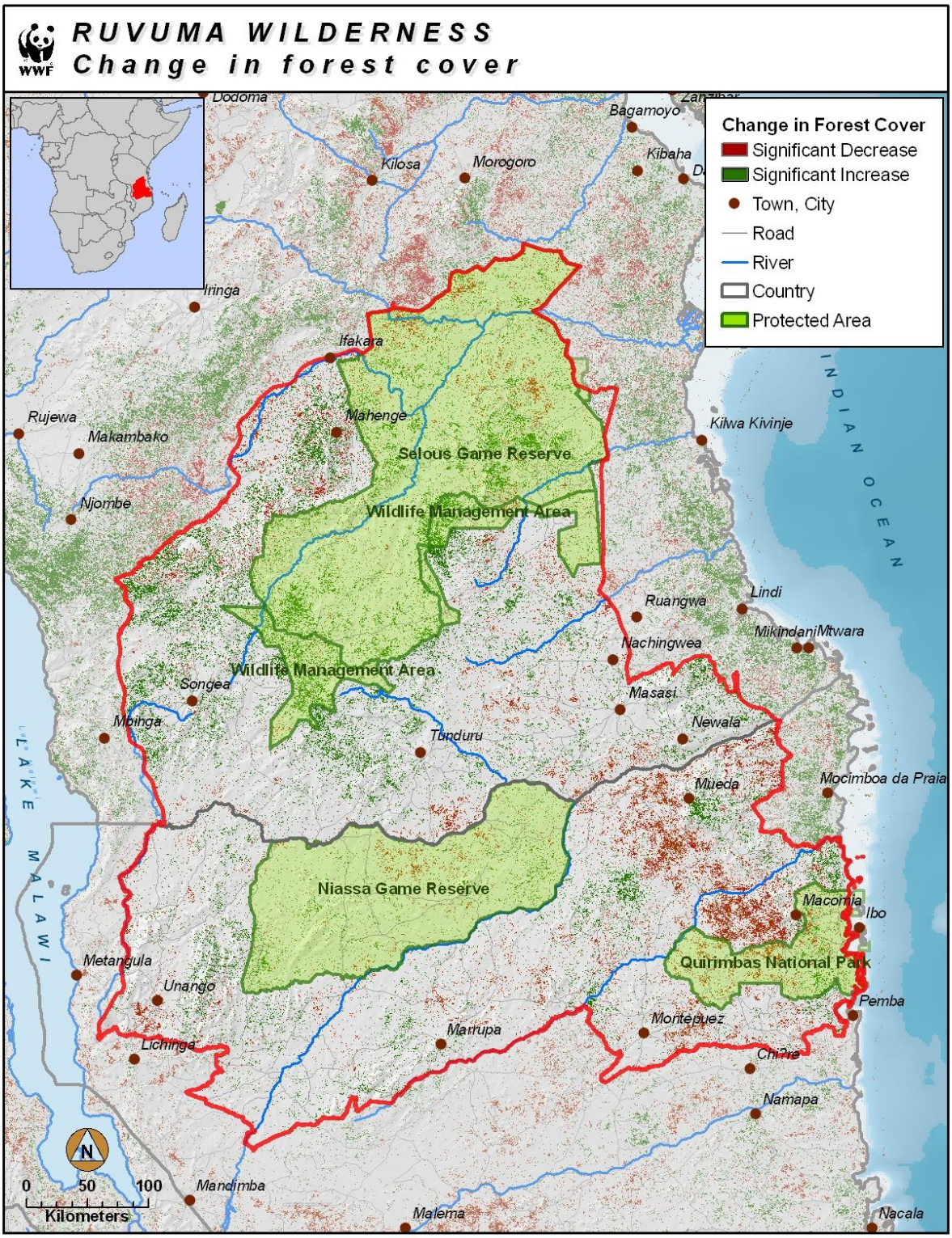
Future Indicator Development Required:

Notes: used MODIS thermal anomalies to determine seasonal fire frequency and coverage

Working Group Members:

References:

Agricultural Conversion - Area of conversion by area and habitat type



Target: (Mozambique) Agricultural Conversion

KEA/Indicator: Area of conversion by area and habitat type

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes: used MODIS VCF (Vegetation continuous fields) and subtracted 2005 from 2000 to get a net change in % forest

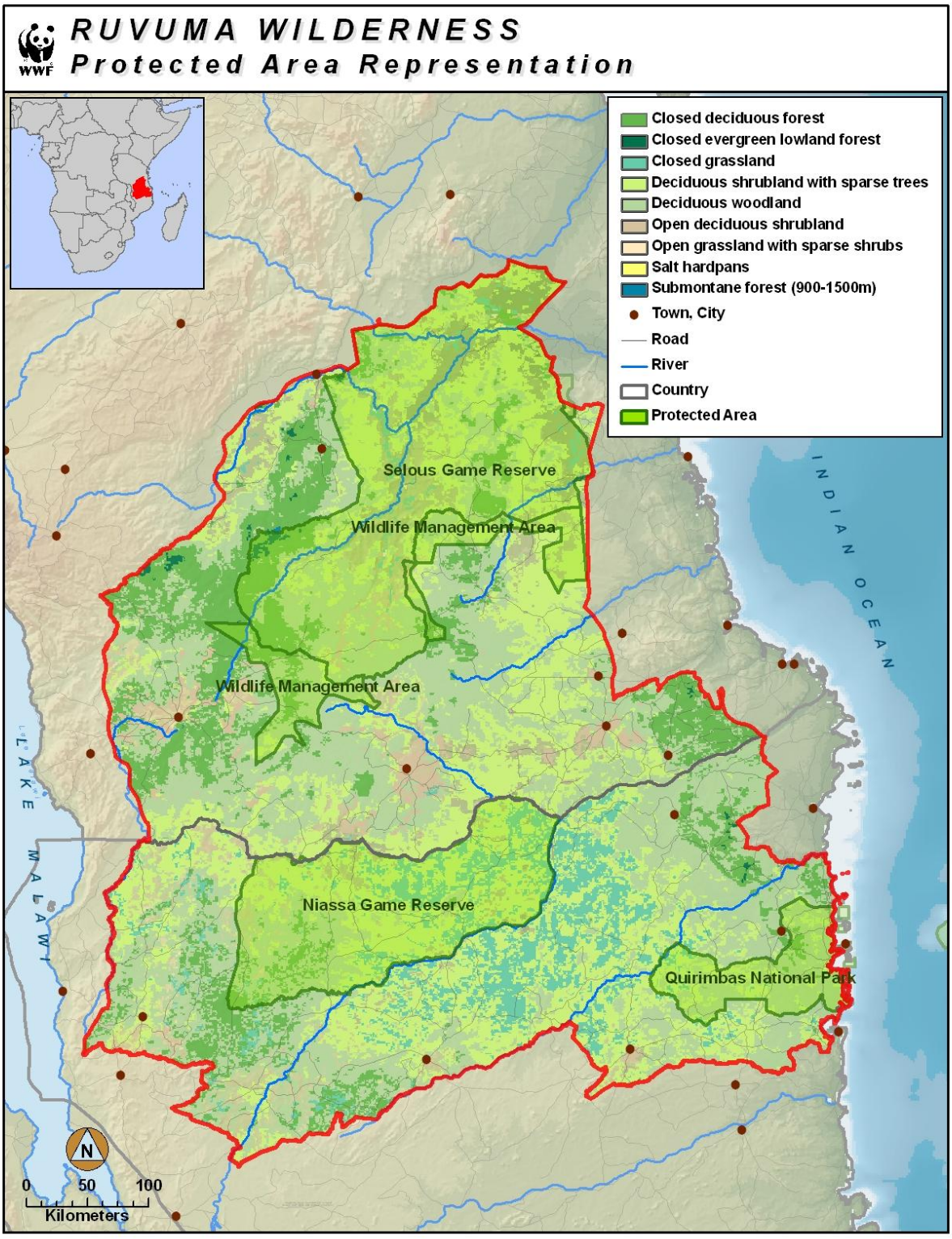
Working Group Members:

References:

Conservation Management

Place	Conservation Management	*Attribute*	Indicator
Mozambique	**Conservation Financing**		By source of funding
Tanzania	**Conservation Financing**		% of funding from each source for each protected area
Ruvuma	**Protected Area Representation***		by Habitat

Protected Area Representation - by Habitat



Target: (All Ruvuma) Protected Area Representation

KEA/Indicator: by Habitat

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes: gap analysis with Selous, Niassa, Quirimbas and WMAs using GLC 2000 landcover

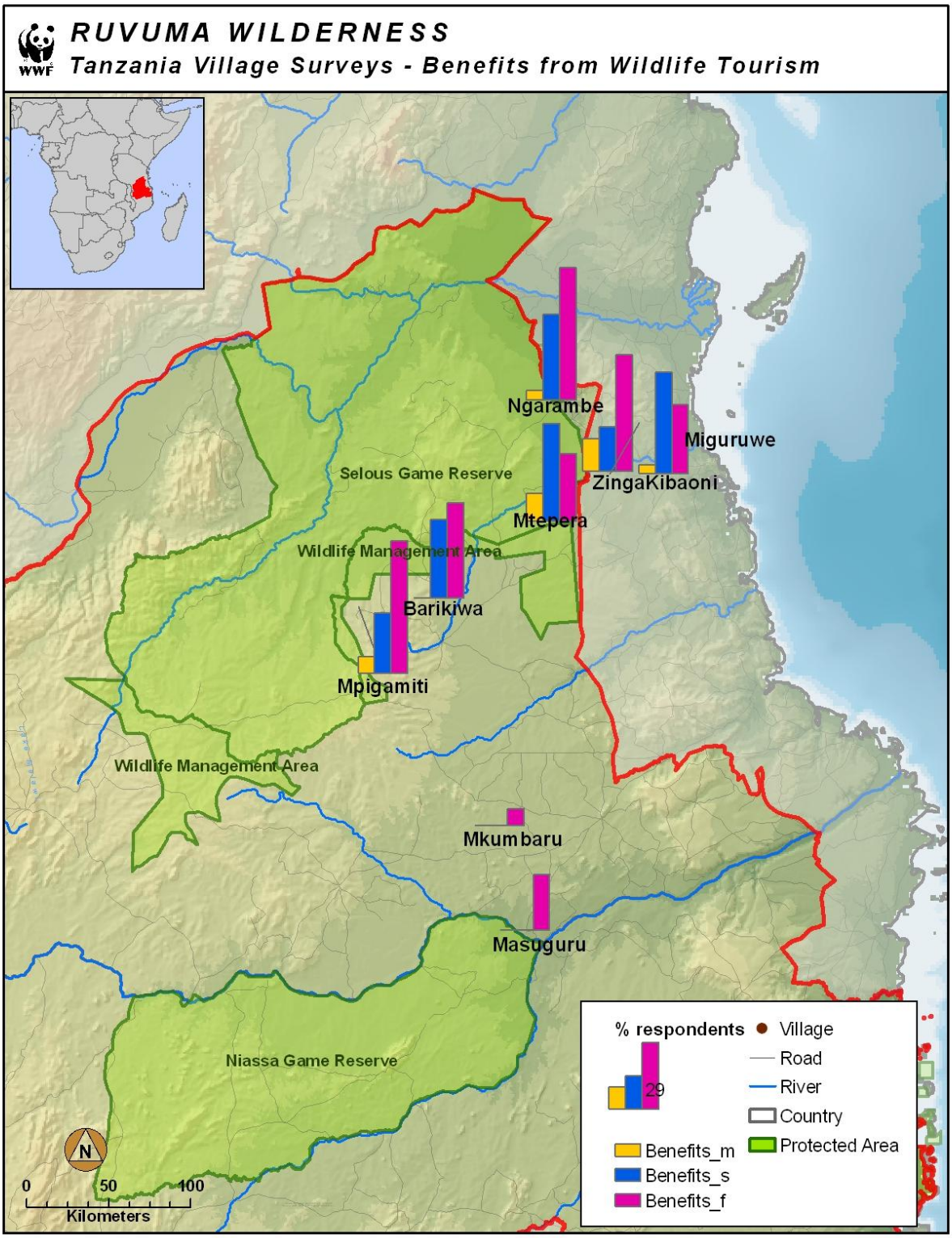
Working Group Members:

References:

Socio-Economic Condition

Place	Target / Domain	*Key Attribute*	Indicators
Tanzania	**Economic Well-Being**	*Employment/Occupational status*	% of community employed by govt, private companies, agriculture, NGOs, etc.
Tanzania	**Economic Well-Being***	*income*	Amount of funds generated from hunting concessions that are returned to communities (for each concession)
Mozambique	**Economic Well-Being**	*income*	monthly income of families
Tanzania	**Economic Well-Being***	*Material assets*	status/change in households with particular housing materials
Mozambique	**Economic Well-Being**	*Material assets*	status/change in housing materials
Mozambique	**Economic Well-Being**	Income	income from fishing per month
Mozambique	**Economic Well-Being**	Income	monthly family income
Mozambique	**Economic Well-Being**	income	status change in housing materials
Tanzania	**Health**	*Access*	% of population with access to a staffed health clinic
Tanzania	**Health***	*Child mortality*	Infant Mortality Rate per 1,000 live births (MDI)
Mozambique	**Health**	*Child mortality*	status/change in overall community health (e.g. infant mortality rate per 1,000 live births (MDI); under 5 mortality rate per 1,000 live births (MDI))
Mozambique	**Health**	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
Tanzania	**Health**	*Nutrition*	status/change in individuals/households with adequate caloric intake (e.g.% children under age 5 underweight for age (MDI))
Tanzania	**Health**	*Water security*	% of population with access to improved water source
Mozambique	**Health**	*Water security*	% of population with access to improved water source
Mozambique	**Health***		child mortality rate 0-5yrs
Mozambique	**Health***		nutrition 0-5 yrs %
Tanzania	**Political Empowerment**	*Community organization*	measure of status/change in capacity to address conservation issues (e.g., % change in # of community associations; % change in number of people belonging to community associations)
Mozambique	**Political Empowerment**	*Political Involvement*	political capacity/opportunities for women (% district/provincial leadership=women) (MDI variation)
Tanzania	**political empowerment**	*Resource rights:*	# of villages within WMA lands who benefit from WMA resources
Mozambique	**Political Empowerment**		# of woman/men involved in district/provincial leadership
Tanzania	**Education**	*# of Schools*	# of primary and secondary schools which are adequately staffed
Mozambique	**Education**	*Literacy*	Adult literacy rate (male/female)
Tanzania	**Education***	*Literacy*	Adult literacy rate (male/female)
Tanzania	**Education***	*School enrolment*	status/change in net enrolment ratio in primary and secondary education (MDI)
Mozambique	**Education**	*School enrolment*	status/change in net enrolment ratio in primary education (MDI)
Tanzania	**Education**	*School enrolment*	status/change in ratio of girls to boys in primary and secondary education (MDI)
Mozambique	**Education**	*School enrolment*	status/change in ratio of girls to boys in primary education (MDI)
Mozambique	**culture***	*Sacred Places*	# of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))
Tanzania	**culture***	*Sacred Places*	# of Sacred/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))

Economic well-being - Amount of funds generated from hunting concessions that are returned to communities (for each concession)



Target: (Tanzania) Economic well-being

KEA/Indicator: income / Amount of funds generated from hunting concessions that are returned to communities (for each concession)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

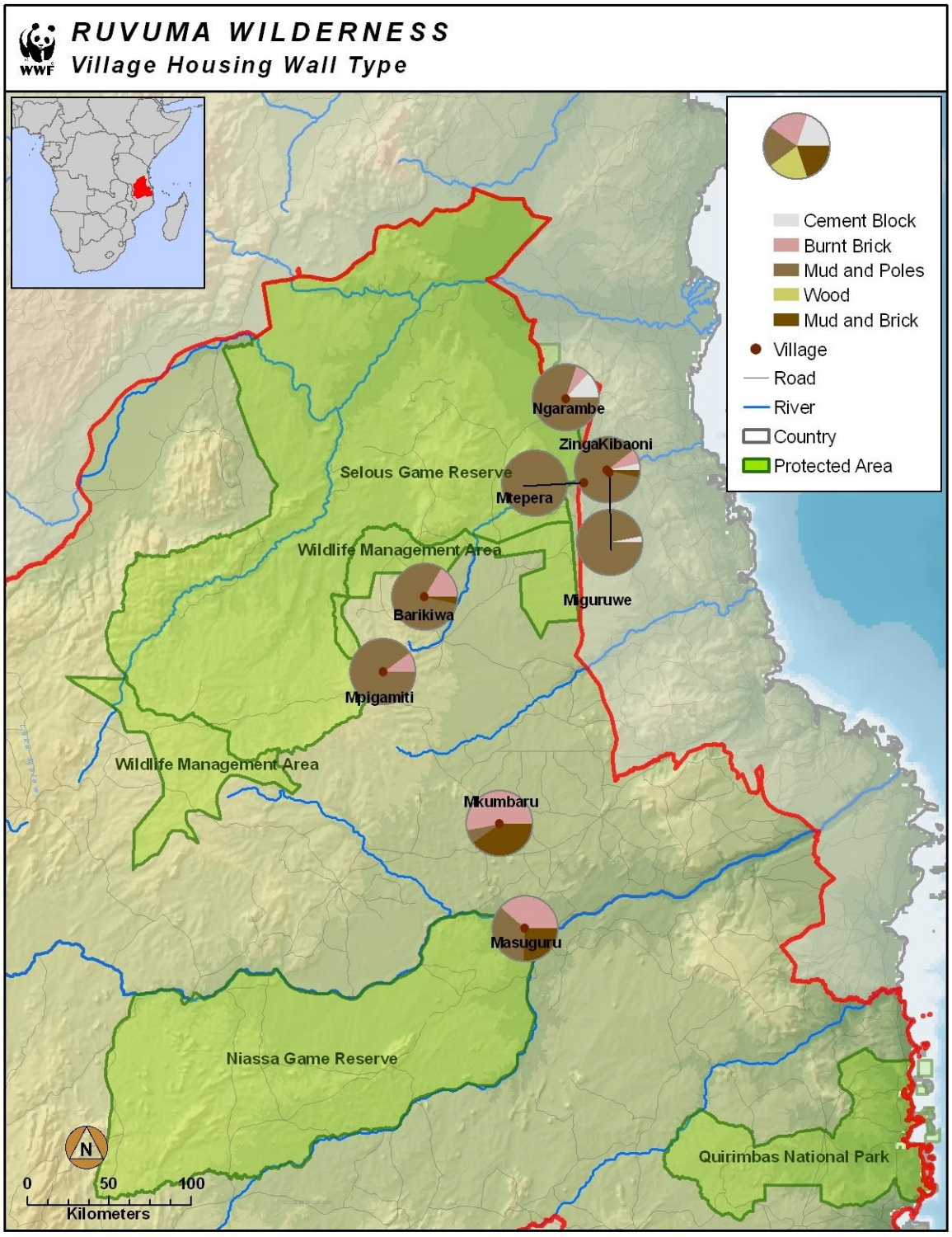
Future Indicator Development Required:

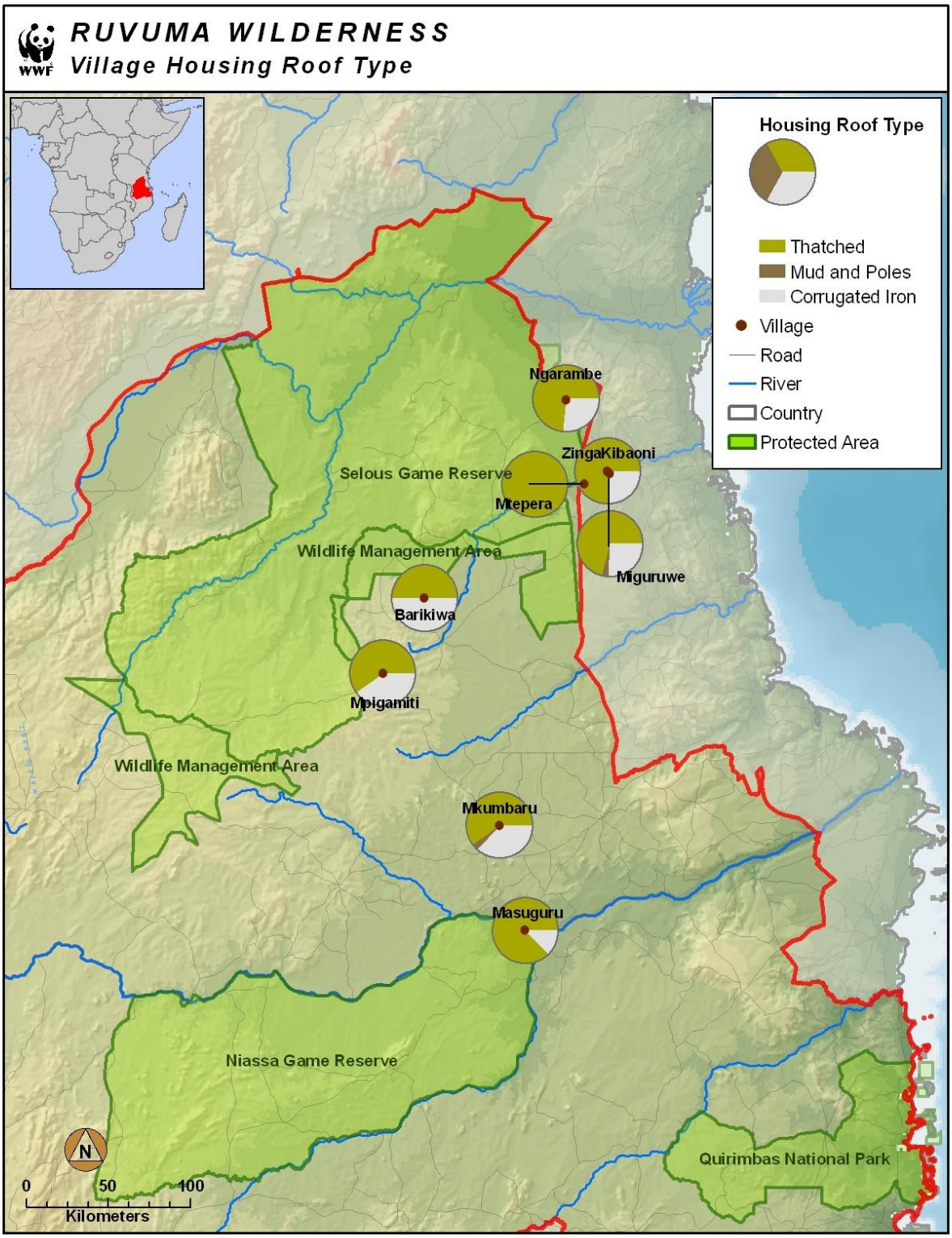
Notes:

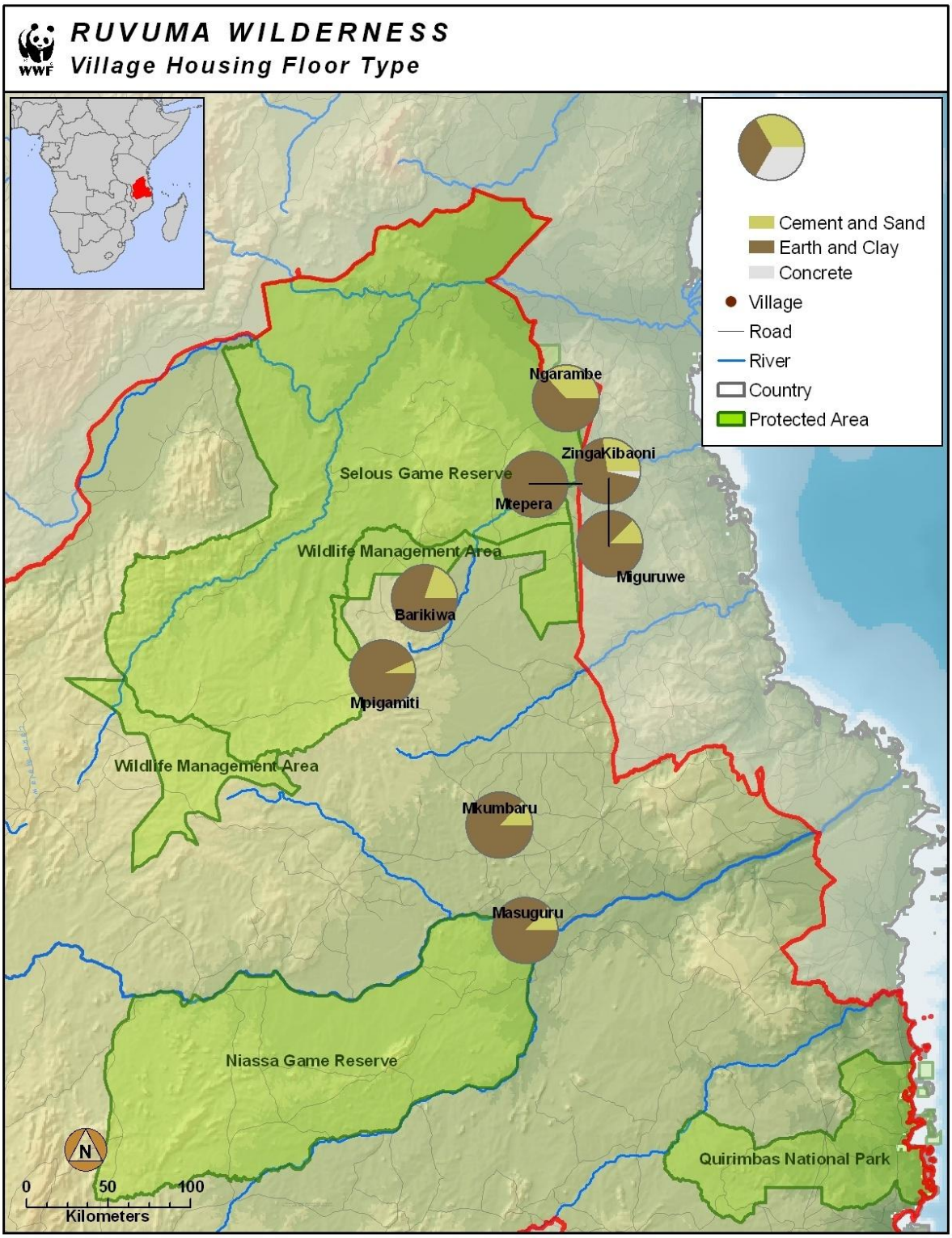
Working Group Members:

References:

Economic Well-being - status/change in households with particular housing materials




RUVUMA WILDERNESS
Village Housing Roof Type
Housing Roof Type
Thatched
Mud and Poles
Corrugated Iron
Village
Road
River
Country
Protected Area
Ngarambe
ZingaKibaoni
Selous Game Reserve
Mtepera
Wildlife Management Area
Miguruwe
Barikiwa
Mpigamiti
Wildlife Management Area
Mkumbaru
Masuguru
Niassa Game Reserve
Quirimbas National Park
N
0
50
100
Kilometers


RUVUMA WILDERNESS
Village Housing Floor Type
Cement and Sand
Earth and Clay
Concrete
Village
Road
River
Country
Protected Area
Ngarambe
ZingaKibaoni
Selous Game Reserve
Mtepera
Wildlife Management Area
Miguruwe
Barikiwa
Mpigamiti
Wildlife Management Area
Mkumbaru
Masuguru
Niassa Game Reserve
Quirimbas National Park
N
0
50
100
Kilometers

Target: (Tanzania) wealth/economic well-being

KEA/Indicator: Material assets / status/change in households with particular housing materials

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

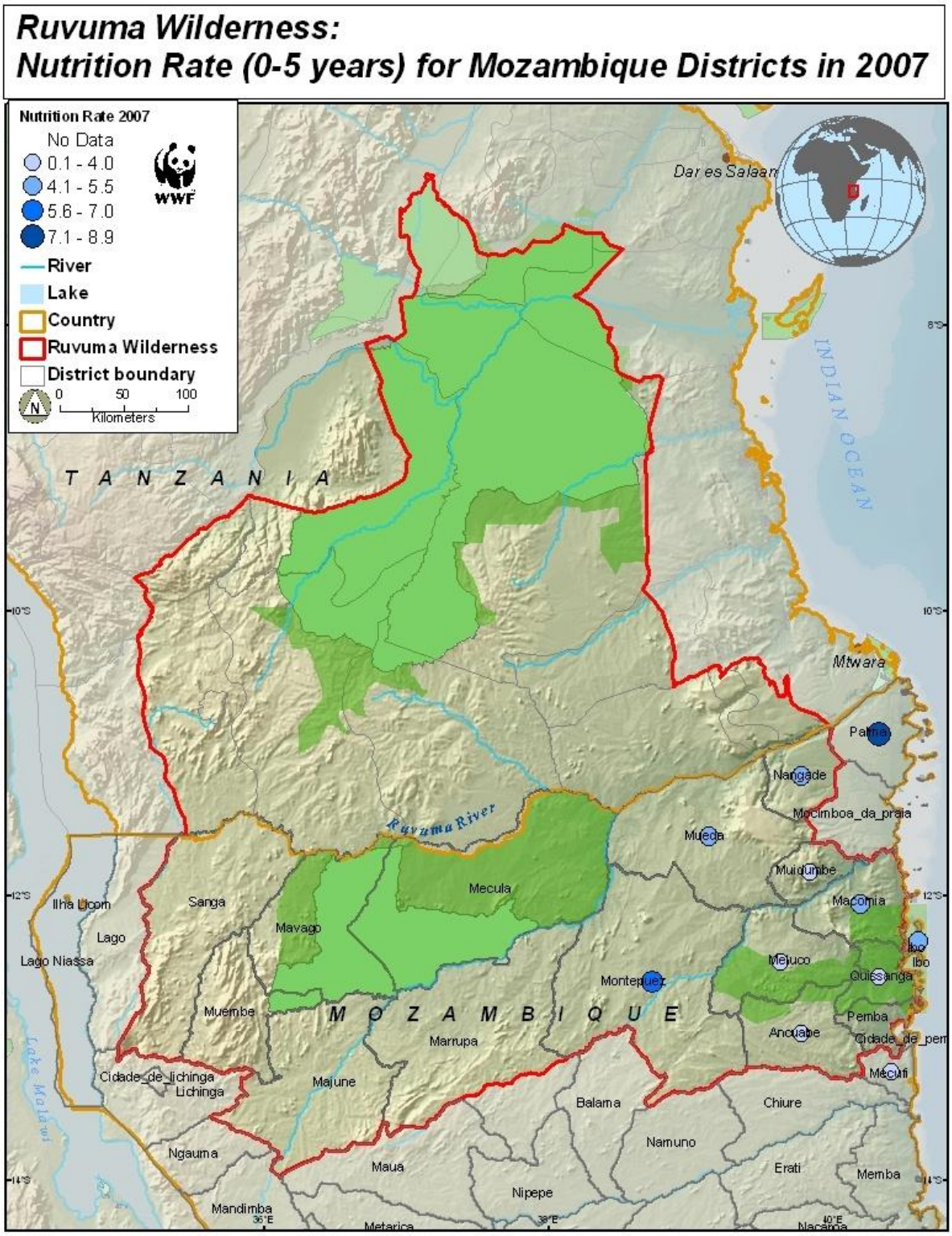
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Health - nutrition 0-5 yrs %



Target: (Mozambique) Health

KEA/Indicator: / nutrition 0-5 yrs %

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

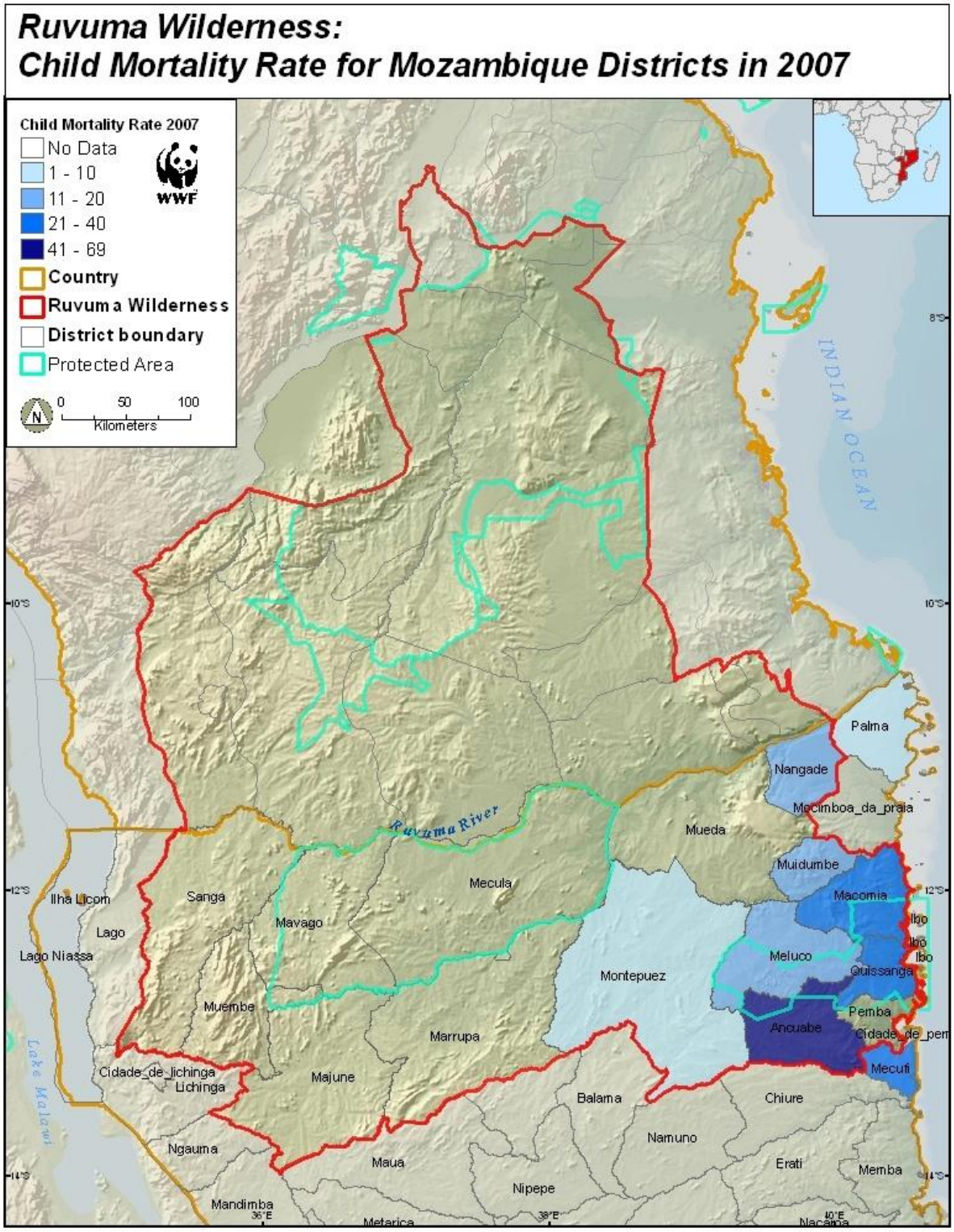
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Health - child mortality rate 0-5yrs



Target: (Mozambique) Health

KEA/Indicator: / child mortality rate 0-5yrs

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

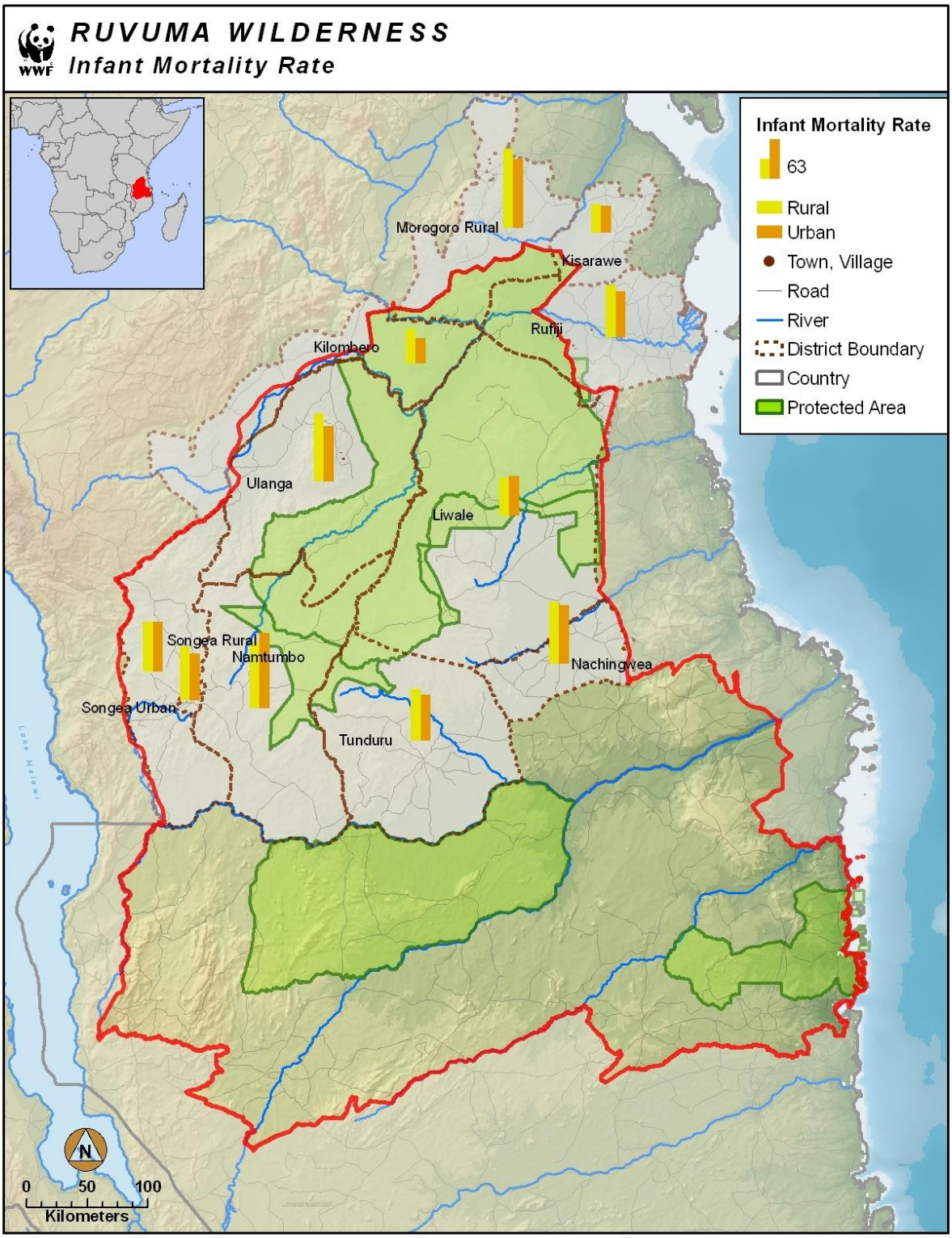
Future Indicator Development Required:

Notes: These rates are questionable based with national averages for Mozambique

Working Group Members:

References:

Health - Infant Mortality Rate per 1,000 live births (MDI)



Target: (Tanzania) Health

KEA/Indicator: Child mortality / Infant Mortality Rate per 1,000 live births (MDI)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

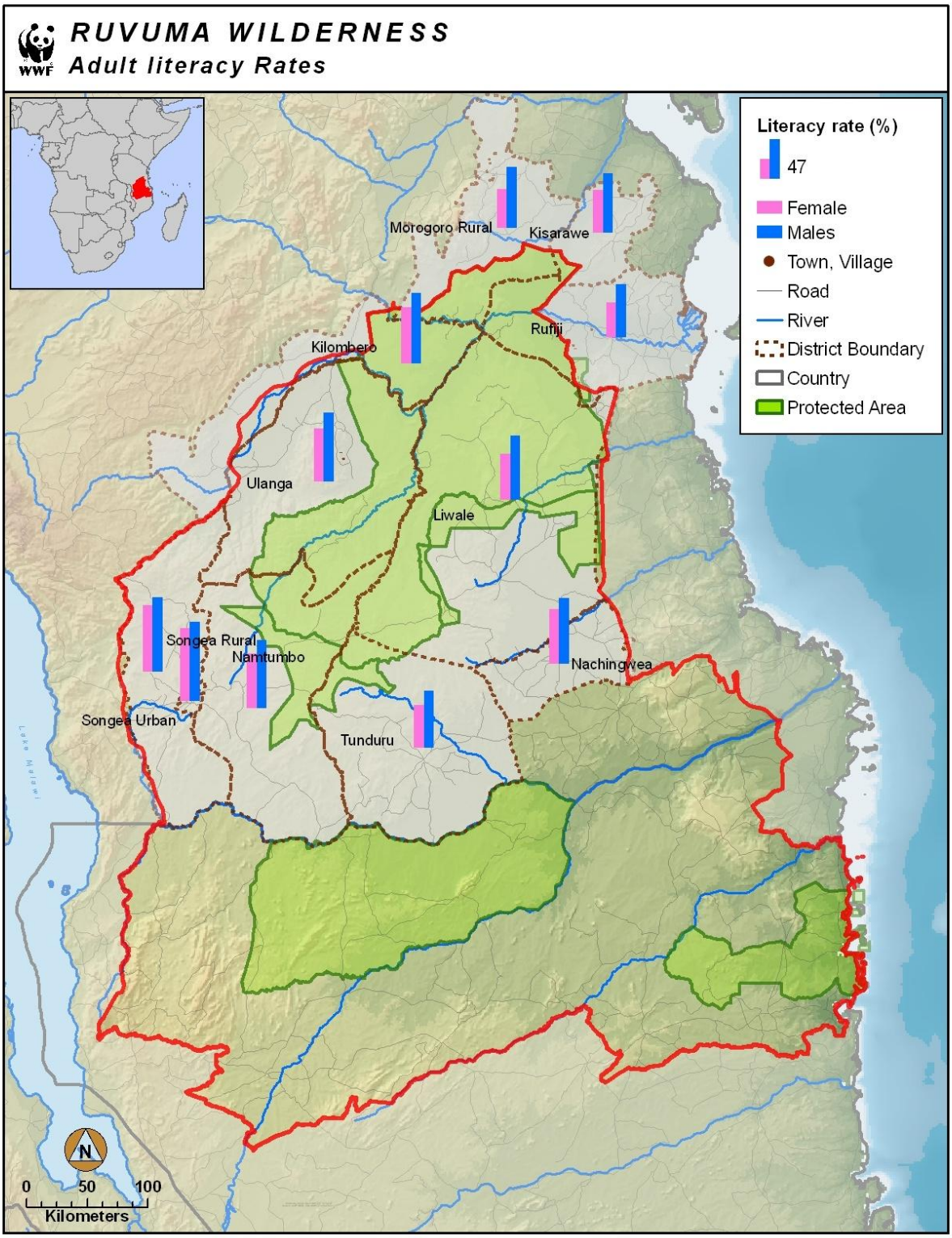
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Education - Adult literacy rate (male/female)



Target: (Tanzania) Education

KEA/Indicator: Literacy / Adult literacy rate (male/female)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

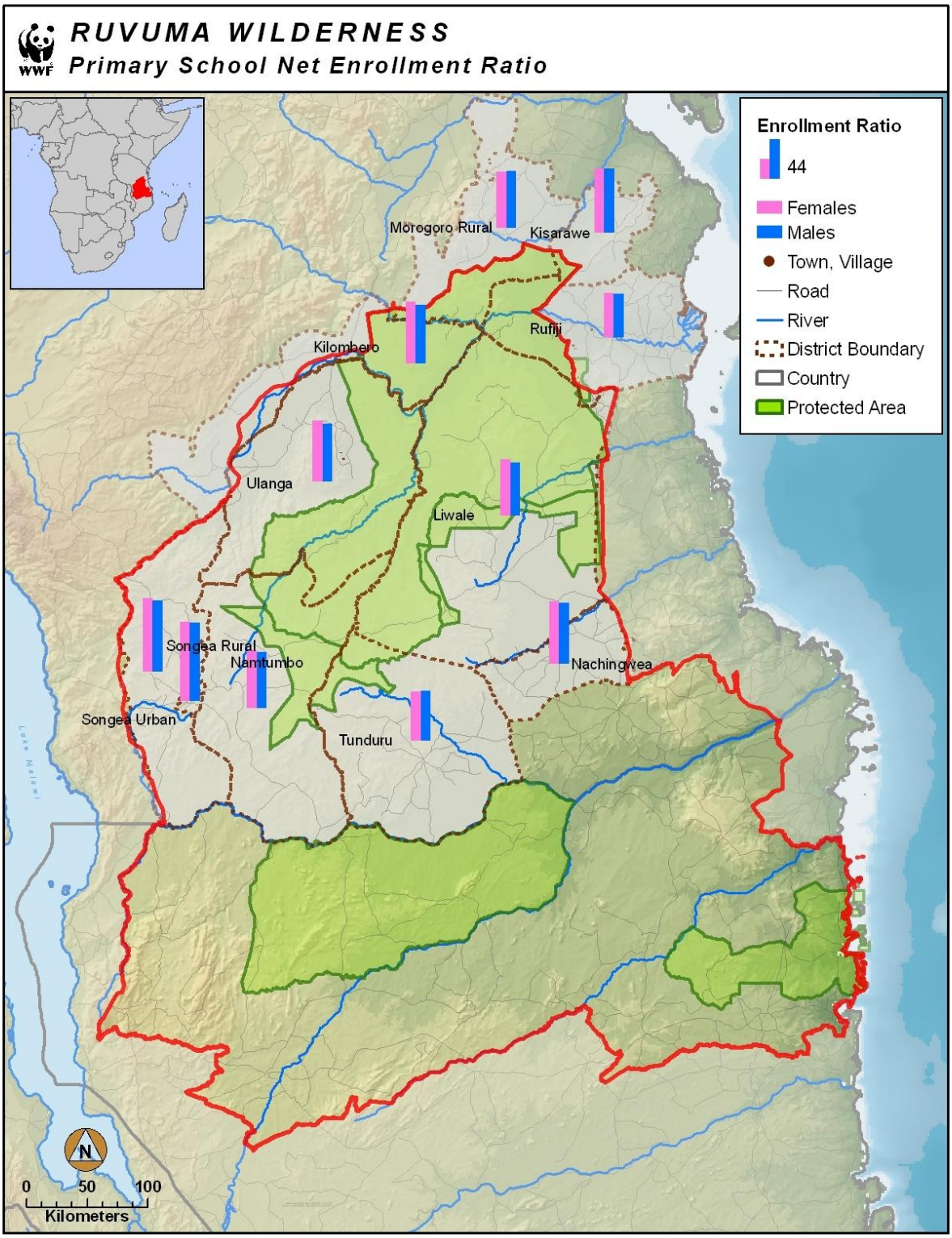
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Education - Status/change in net enrolment ratio in primary and secondary education (MDI)



Target: (Tanzania) Education

KEA/Indicator: School enrolment / status/change in net enrolment ratio in primary and secondary education (MDI)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

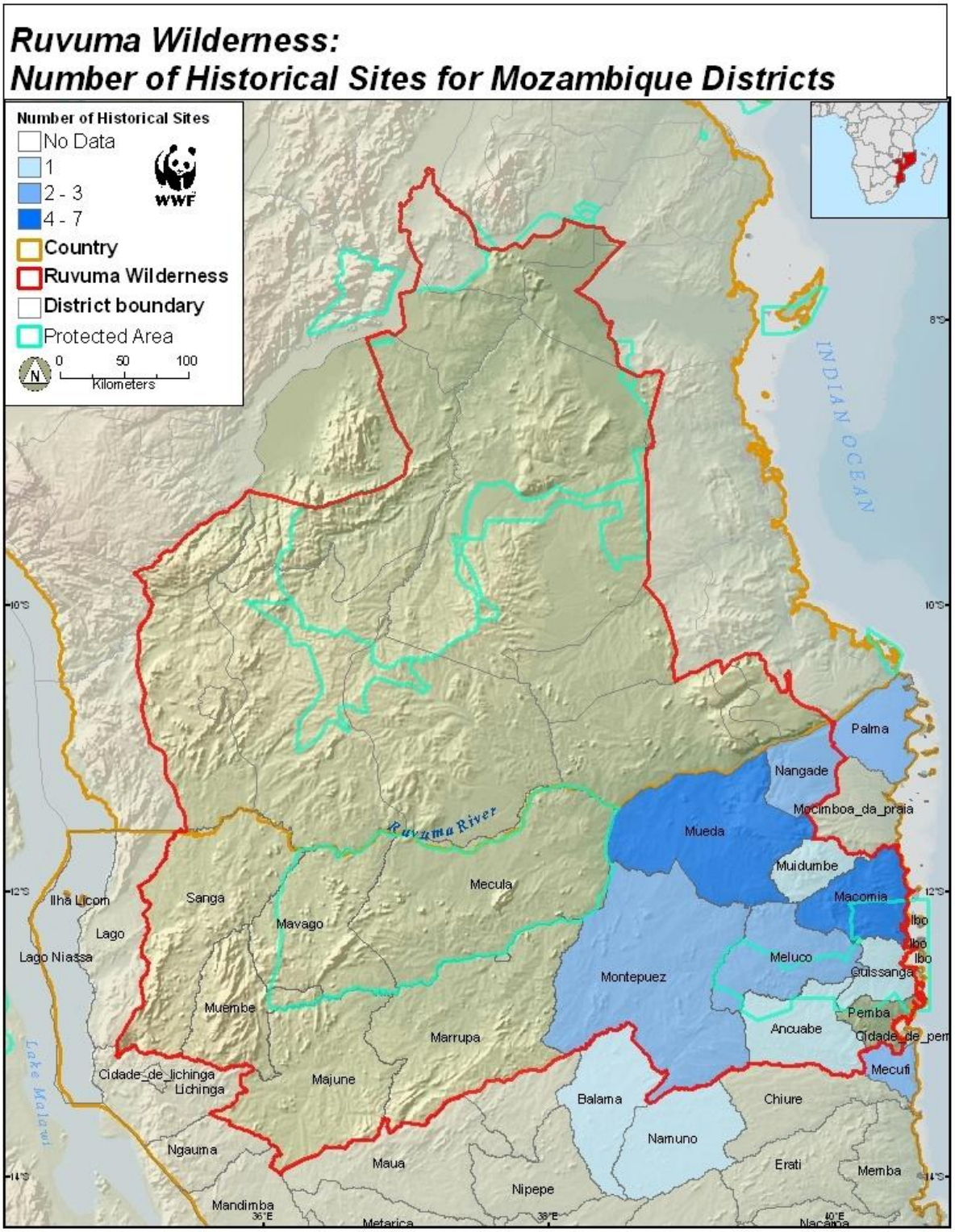
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Culture - # of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))



Target: (Mozambique) culture

KEA/Indicator: Sacred Places / # of Sacred/cultural/historical places maintained (rivers, stones, trees/forests, sources of water (catchments)) (comparison to Historic?)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

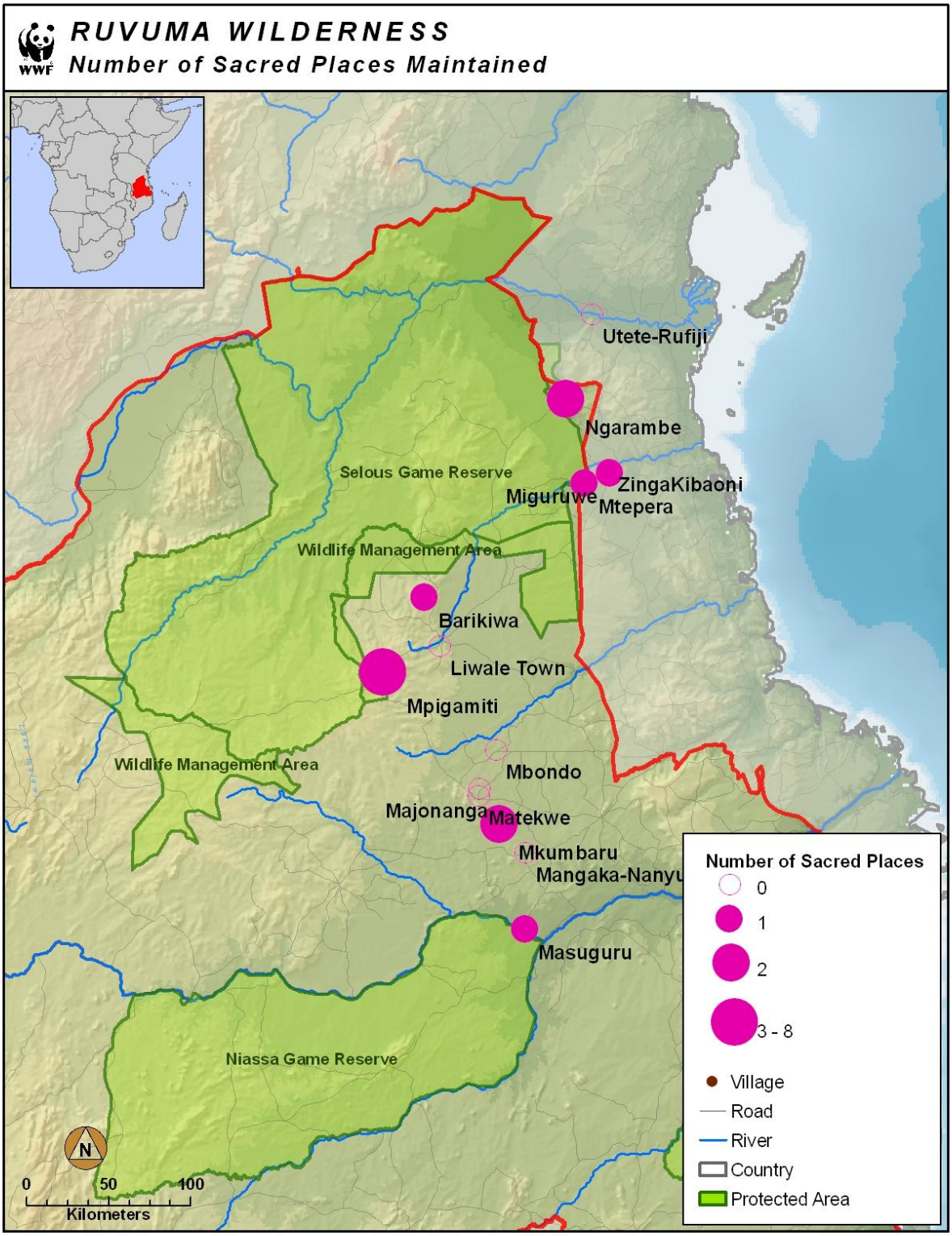
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Culture - # of Sacred/historical places maintained (rivers, stones, trees/forests, sources of water (catchments))



Target: (Tanzania) culture

KEA/Indicator: Sacred Places / # of Sacred/historical places maintained (rivers, stones, trees/forests, sources of water (catchments)) (comparison to Historic?)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

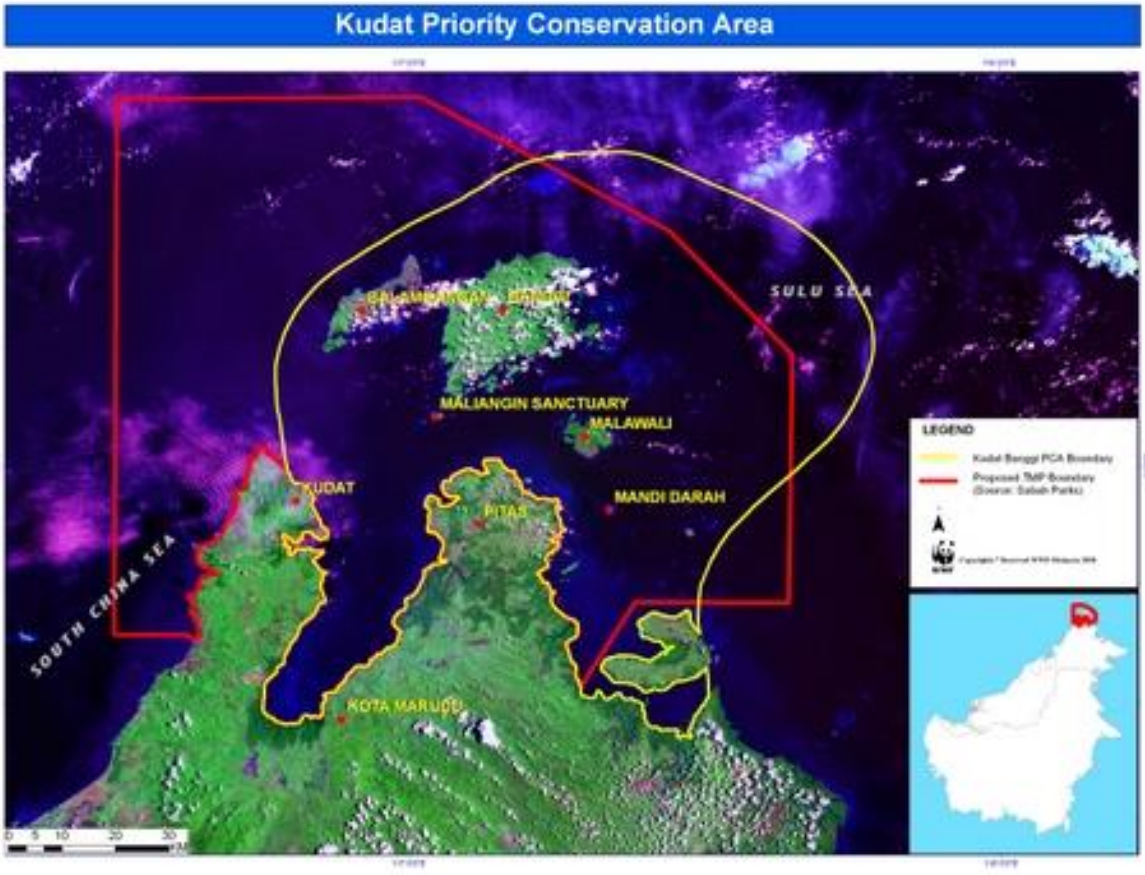
Notes:

Working Group Members:

References:

APPENDIX 3- CORAL TRIANGLE

(Tun Mustapha Park)



The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

Credits:
WWF-Malaysia, the Kudat Team work to compile the data depicted in this Appendix. The Team was managed by Dr. Annadel Cabanban supported by field staff – Robecca Jumin, Lee Yoke Lee, Sikula Magupin, Suziana Ramlee and assisted by Asri Barail and Damsek Hassan. They collaborated with Sabah Parks (Justinus Guntavid, Rahim Sirukam, Kamin Baluat, Ludi Apin, Fatimah Simin, Paul Basintal, Dr. Jamili Nais) in the collection of socio-economic and resource use data, and with Sabah Fisheries Department, Universiti Malaysia Sabah and Sabah Parks for the collection of ecological data around Maliangin Islands.

Technical Progress Report

H. WWF TECHNICAL PROGRESS REPORT

I. (suggested LENGTH 3-6 pages)

1. Project/ Programme Title:	2. Coral Triangle, Malaysia
3. International Project Number:	4.
5. Reporting Period:	6. May 2007 – April 2008
7. Name (writer(s) of this report):	8. Annadel S. Cabanban, Robecca Jumin, Sikula Magupin, Marina Aman Sham,Yoke Lee Lee,
9. Position/ Title:	10. Sulu-Sulawesi Marine Ecoregion Manager, Team Leader, and Community and Public Awareness Officer, SSME Communication Officer, (former) Marine Biologist, (respectively)
11. Organisation :	12. WWF-Malaysia
13. Date:	14. 20th June 2008

15.

12) **Global Thematic Programme, Ecoregional Targets, or Global Policy Initiatives:**
State contributions achieved towards targets/ milestones in this reporting period (if any) and contributions expected in the project lifetime. (Keep this brief – half a page)

This Project contributes to the Global Thematic Programme on Marine Protected Areas in building capacity for collaborative management of MPAs and in improving documentation and monitoring of benefits from MPAs. It also contributes to the targets of the Sulu-Sulawesi Marine Ecoregion Conservation Plan on management (Objectives 1[8] and 5[9]),

[8] Establish management strategies and coordinated institutions for effective ecoregional conservation;

[9] Enhance understanding of biodiversity resources and factors affecting them to form basis for management decisions;

capacity of stakeholders (Objective 8[10], and fisheries management (Objective 10[11]). Furthermore, it contributes to the Plan of Action for Protected Areas, Convention on Biological Diversity in establishing new protected areas in the marine ecosystem by 2012.

At the national level, this project contributes to the WWF-Malaysia's marine targets as follows:

Target 1 – Sustainable fisheries in Kudat and Semporna PCA

Goal 1 - Ecosystem based management [Ecosystem Approach (EsA)] of coastal fisheries is practiced in Kudat and Semporna PCA by 2010

Target 2 – Marine Turtles

Goal 1 - Increase nesting populations of turtles in Tun Mustapha Park (Kudat PCA), Sipadan and Turtle Islands Park

Goal 2 - Key turtle habitats are protected in the SSME portion of Malaysia.

Also at the end of Section 1, please explain the linkages between your sub-project and regional/global policy formulation by WWF and/or other organizations.

13) **Project Successes:** Highlight at least three successes for this reporting period, such as progress towards the project goal and objectives. For example, improvements relating to key species, habitats or ecological processes, direct or indirect threats, policy changes or behavioural changes. They may be the same as the project's most important contributions to TDP/ Ecoregion targets. (For the mid year report, these successes may be at the Output/ Activity level).

a. Maliangin Sanctuary – establishment of baseline data and capacity building for biodiversity monitoring;

One of the strategies of WWF-Malaysia in building support for the gazettement of the proposed Tun Mustapha Park is to demonstrate the benefits of protected area. Maliangin Sanctuary is proposed to be established as a pilot demonstration site to demonstrate:

- fisheries benefits in terms of increased fisheries catch;
- socio-economic benefits in terms of development of alternative livelihood;
- biodiversity benefits in terms of maintained or improved biodiversity (species and habitat);
- the implementation of the "Collaborative Management Concept".

Effort to establish Maliangin Sanctuary is on-going. Preliminary works include the establishment of ecological baseline data for use in designing of zones and for future monitoring; and capacity building for staff of government agencies and members of local communities in biodiversity monitoring.

This project supported the collection of baseline data and capacity building for biodiversity monitoring in Maliangin Sanctuary. Two Reef check, two SCUBA diving, and 1 discover

[10] Build and enhance capacity of stakeholders to effectively manage the conservation of SSME;

[11] Improve coastal, oceanic and other types of fisheries resource condition and management by developing a framework strategy, institutions and appropriate interventions.

SCUBA diving (DSD) trainings were conducted. Six personnel of Sabah Fisheries Department, Sabah Parks and Universiti Malaysia Sabah (2 staff for each organisation) and 3 staff of WWF-Malaysia were trained as ecodivers[12], and two were trained to be reef check trainers[13]. Four members of the local community (two are WWF staff) were trained in SCUBA diving. 10 members of the local community (1 WWF staff) were introduced to basic SCUBA diving and underwater world through the DSD training.

Nine (9) survey and monitoring sites were established; selected randomly to represent leeward and windward sides of the island and possible reef units. Surveys employ various methodologies including reef check and underwater visual census methodology. Parameters collected include (i) percent cover of substrate, (ii) fish abundance, (iii) abundance of invertebrates, and (iv) sizes of giant clams.

Four (4) sets of sediment traps were deployed at Pulau Pangasaan and Pulau Maliangin Besar. These sediment traps were deployed to monitor sedimentation rates that could potentially increase due to surface runoff from land clearing.

Monitoring of catch of Southern Banggi's small-scale fishers is conducted in collaboration with students from the University of British Columbia.

b. Tun Mustapha Park – establishment of baseline data on socio-economic and community profile

WWF-Malaysia and Sabah Parks collaborated to conduct a community survey to establish socio-economic and community profile of TMP, and gathered ethno-biological information on habitat, species and fisheries in the area. The output of this community survey will be used in:

- the designing of the management plan and zoning system for TMP;
- the preparation of a communication, education and public awareness (CEPA) strategy[14] to build support for the Park;
- future monitoring of changes within the area.

The community survey was conducted from September 2006 to June 2007. In summary the survey covered:

- 53 coastal villages were surveyed;
- 509 respondents were interviewed; and
- 1,192 coastal residents have attended group meetings and discussions for the Rapid Rural Appraisal (RRA) sessions.

Data analysis started in July 2007 and was completed in March 2008. The output of the community survey was presented to the managers and officials of Sabah Parks, as input to the Management Plan of TMP. The community survey has improved knowledge on socio-economic and community profile for TMP (See attached extract of output in Appendix 4).

In summary, the community survey found and concludes that:

[12] Certified by Reef Check Malaysia to conduct reef check according to global standard

[13] Certified by Reef Check Malaysia as reef check trainer

[14] Refer to Nattana Simon & Robecca Jumin (2006), Workshop Report on establishing Communication, Education, Participation and Awareness (CEPA) Strategy for Tun Mustapha Marine Park, Kudat, 18-19 May 2006 (unpublished).

- the primary resource-users in the proposed Tun Mustapha Park are:
    - mostly poor and low income earners;
    - mostly have little education;
    - mostly engaged in fishing throughout the 3-nautical miles zone of islands;
    - aspiring for alternative livelihoods
- the local knowledge of the primary resource-users on diversity of marine ecosystems and species include:
    - Important fishing ground;
    - declining fish catch and income;
    - spawning events and aggregation;
    - the presence of migratory species;
    - the presence of sea turtle nesting beaches;
- primary resource users are interested in collaborative management, but:
    - have little knowledge of TMP and Sabah Parks;
    - have no experience in collaborative management (in a top-down system);
    - accustomed to receiving subsidies.
- Indicator for management effectiveness:
    - Huge data on socio-economic and local knowledge
    - this form baseline information
    - relevant to natural resource management as:
        - indicators to assess socio-economic condition of resource users
        - indicators to measure benefits of establishing TMP biodiversity and socio-economic benefits)
        - reference to establishing a management plan for TMP.

c. Designing a participatory zoning system and map

According to Kelleher (1999)[15], in a large multiple-use Marine Protected Area (MPA), the zoning plan is the primary document for management. The proposed Tun Mustapha Park (TMP) encompasses an area approximately 1.2 million hectares. The proposed management mechanism is through the establishment of multiple-use zoning system managed through collaborative management; involving both formulation of management and zoning plans. A multi-disciplinary team, knowledgeable in socio-economics and ecological aspects of TMP with technical skills in modelling and software such as MARXAN, is required for this purpose.

This project supported the establishment of a draft set of biological, ecological and socio-economic criteria for the TMP zoning system, and a training trip to Indonesia to work with The Nature Conservancy on zoning mapping and MARXAN.

One workshop was conducted in November 2007 to discuss and establish biological, ecological and socio-economic criteria for the TMP zoning system. The objectives of the workshop were:

i) to have a better understanding of the zoning process in TMP;
ii) to have a better understanding and agreement on the zones or potential zones in TMP;
iii) to have a better understanding of zoning criteria;
iv) to come to an agreement on how to move forward on establishing zoning for TMP.

[15] Kelleher, G. (1999). *Guidelines for Marine Protected Areas.* IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.

The workshop was able to achieve these objectives and enhance understanding on the process involved in the zoning of TMP. The output of the workshop is shown in **Appendix 5**.

Subsequent to this workshop, a series of training and practical session were organised to build capacity of staff to undertake and participate in the zoning process. Seven (7) staff of WWF-Malaysia, Sabah Parks, Department of Fisheries and the Universiti Malaysia Sabah underwent training in MARXAN, using available information to model areas for protection as reserves.

These initial modelling found that MARXAN is a useful tool in identifying areas for full protection with the least cost in establishing (cost in terms of socio-economic cost and ecological cost). MARXAN comes as a packaged tool that contains reserve-specific functions with capability to synthesize large amounts of data which make it an attractive tool for zoning and reserve designing. However, there are complexities in the settings of MARXAN and uncertainties associated with its use that give reason to consider returning to less complex methods of developing zoning such as the GIS-based multiple criteria analysis (MCA). A combination of both methods is recommended in the design of zoning system for TMP.

The 'modeling using MARXAN' exercise also surfaces gaps in data available. Local knowledge on species, habitat and ecology were useful in the initial modeling. However, there is insufficient scientific data on species, habitat and ecology (mangrove, seagrass and coral reefs ecology – density, cover, health etc.). Ecological surveys are needed to fill this gaps and it is recommended that future ecology surveys of these habitat will also enable verification and ground-truthing of local knowledge.

d. Information management - database

The process to establish Tun Mustapha Park will generate a large amount and various types of information which can assist in decision-making and building stakeholder support for the Park. To date, socio-economic data and ethno-biological information on coastal and marine ecosystems and its uses have been collected in 2006-2007 by WWF-Malaysia and Sabah Parks. It is important that this information is managed systematically and is accessible to a wide range of stakeholders to enable the planning and management of conservation and sustainable development.

A workshop was conducted to bring key stakeholders of TMP to discuss the establishment of a database for TMP. It was agreed that the establishment of a database for TMP will have the following benefits:

1. *Efficiency* – it avoids duplication in collection and generation of information;
2. *Accessibility* – it enables the sharing of information where necessary;
3. *Wide use of resources* – it enables maximization of use of resources (manpower, funds, time, etc.) of various stakeholders in generating information for TMP to support decision-making and management;
4. *Usefulness for conservation and sustainable development* – it allows long-term monitoring through the identification of information needs/gaps for TMP.

It was agreed that a database for TMP is important and that the key agencies present in the workshop (Sabah Parks, Department of Fisheries, Universiti Malaysia Sabah, and WWF-Malaysia) will collaborate in establishing the database which will be hosted by the Sabah Parks.

3. 0 Progress on Activities and related financial issues. 3. a. Provide a **brief** (half page) overview of progress at the main activity level, highlighting any areas that are well behind plan (link these to any progress on internal management processes or capacity). 3. b. Quantify and explain any financial consequences related to activities (e.g. any major deviations in budget or expenditure).

Also at the end of Section 3a, please make reference to your sub-project's policy character (environmental awareness, capacity development, production and consumption patterns, influencing of policy decisions).

In Section 3b, please make reference to any significant carry-forward of funds from 2006, and how your sub-project is seeking to ensure the disbursement of all 2006 / 2007 funds by 31 December 2007.

a) Overview of Progress at main activity level

There are four deliverables under this project grant, i.e. i) establishing baseline data and capacity building for biodiversity monitoring for Maliangin Sanctuary; ii) establishing socio-economic and community profile for the proposed TMP; iii) design a participatory zoning system for TMP; and iv) establish database for information management in TMP.

Progress in establishing baseline ecological data for Maliangin Besar and Maliangin Kecil as a basis for future monitoring in the area was initially hampered with the non-availability of SCUBA diving gears and compressed air. SCUBA gears and tanks were only purchased in June 2007 under this Project Grant. A Bauer compressor was also purchased to enable use of SCUBA gears since there is no diving shop offering this facility in Kudat. Staff of WWF-Malaysia is now trained in the use and maintenance of these equipment.

Since the purchase of the gears and a compressor, surveys to gather baseline data of coral reefs and fisheries had progressed well. Five out of nine sites were surveyed, using reef check methodologies. Capacity building training for collaborative monitoring of biodiversity were successfully conducted where six governmental staff were trained as reef checkers, 4 local community members trained as SCUBA divers, and 10 local community members undergone DSD training. Data collected from surveys were compiled and inputted into digital databases using standard data sheets for reef check, and also database established for the monitoring of catch data. The activities under this deliverable cannot be fully implemented since the Marine Biologist responsible for their implementation had left the project and a replacement is still being recruited.

On the second deliverable, analysis of socio-economic and ethnobiological data gathered through a community survey (September 2006 – June 2007) were conducted internally by the project staff. This is to build capacity of staff in report writing and scientific publications especially in peer reviewed journals. Analysis of this data has been completed, with data compiled in digital database and a 'power point' presentation prepared for sharing of information. The write-up of the analysis is planned to continue in July to September 2008. One component of activity under this deliverable, i.e. fishery observation on purse seine and trawl fishing is planned to be carried out in June to July 2008. This activity is delayed due to lack of manpower. The activity in June to July 2008 will be carried out in collaboration with the group of commercial fishers (Kudat Fishing Boat Owners' Association) by university students on practical attachment with the project.

A workshop to establish sociological and biological zoning criteria for TMP was able to achieve its target (to establish criteria) and at the same time outline the process and steps forward in designing and establishing zoning system for TMP. High level consultations are needed to digest and process

input from community (gathered through the community survey). Training in MARXAN software was conducted and preliminary trial run using MARXAN to model potential sites for protection was conducted successfully. These trial runs were able to surface gaps in information especially ecological data throughout the proposed TMP area. Spatial data produced from the community survey (community mapping) needed ground truthing and further ecological data gathering, especially on mangrove species and density, and coral cover and health is needed to support the zoning process as well as for future monitoring purposes. It is recommended that this project be extended to cover these activities.

A framework for the establishment of a database for TMP is available as an output of a workshop where key stakeholders (Sabah Parks, Sabah Fisheries Department, Universiti Malaysia Sabah and WWF-Malaysia) has agreed on the need to establish the database. Three type of database were recommended, i.e. (i) database on human dimension for TMP, (ii) fisheries database and (iii) ecological database. The structure and metadata for the database is shown in Appendix 5. The full implementation of this deliverable up to establishing the database and populating it with data cannot be achieved during the period of this Grant due to the lack of staff having technical skill in establishing this database, and gaps in available information in a ready and suitable format (e.g. fisheries data held by the Sabah Fisheries Department and ecological data held by various individuals in the Universitiy Sabah Malaysia). Sabah Parks was identified as the host for the database with replica database available with each participating agency; however, it was noted that hosting and maintaining the database will involve a significant cost. It is recommended that this component of the project be outsourced to companies/organisations or consultant that has the technical skill to establish a full-fledge database system for TMP.

b) Quantify and explain any financial consequences related to activities (e.g. any major deviations in budget or expenditure)

No major deviations in budget and expenditure occurred under this project. Cost savings were achieved when internal analysis of community survey data were conducted and the fund budgeted to hire a consultant were not utilised. The budget for hiring a consultant is RM15, 000.00. It is proposed that this fund goes into the hiring of consultant for the ecological survey and establishment of a database. Since write-up is still on-going, publication of reports and maps are also delayed, therefore this fund is not fully utilised yet. As of March 2008, the remaining fund for publication and printing is RM21, 800.00.

Cost saving were also achieved under the conference facility since the criteria for zoning was established in one workshop. However, discussions on zoning system and criteria should continue until a zoning system is in place. The fund available under the conference facility is RM14, 138.65. This fund can be utilised to support a higher level discussion on zoning.

There are a few significant carry forward of fund under this grant:

1. Consultancy fee (RM15,000.00) – will be utilised for hiring consultants for ecological survey and establishment of database for TMP;
2. Conference facilities (RM14,138.65) – will be utilised to support further work and discussions on zoning system for TMP;
3. Printing and publication (RM21,800.00) – will be utilised for the publication of reports and maps of the community survey report;
4. Fuel for vehicles (RM35,002.20) – will be utilised to support ecological survey for TMP;

5. Computer (RM11,000.00) – will be used to purchase a computer for the project tem, for the Community and Public Awareness (CEPA) Officer, to continue engaging community to sustain support for TMP;

WWF-Malaysia seeks a no-cost extension to continue work on establishing monitoring and zoning system in TMP.

4.0 Problems and Constraints. Highlight any failures, problems, or constraints that have affected progress, and describe the measures taken to respond to them. List any significant changes to the external environment in which the project is operating (especially where these relate to risks identified in the project plan).

1. Manpower
   The project is still recruiting a replacement for the Marine Biologist whom left the project in February 2008. The departure of the Marine Biologist had left a gap in the implementing manpower for the establishment of baseline data and capacity building for the proposed Maliangin Sanctuary. Fortunately the former Marine Biologist continued to support the project through preparation of reports of her work with the project.

2. Technical skill
   The project lack a dedicated staff with the relevant technical skill needed to establish a database for TMP. Currently, a student is assigned to look into this, however, lack of technical skill hamper progress. Hiring a consultant or outsourcing this component to an organisation with the relevant skill can expedite this process.

   On establishing zoning system, this will require a constant involvement of staff with Geographical Information System (GIS) in the process and for the staff to be well-verse with MARXAN and other methods (e.g. Multi-Criteria Analysis) through regular practical use of the software.

3. Enabling environment
   a. Natural element
      The proposed TMP is influenced by two major wind patterns, i.e. the westerly and the easterly wind. The westerly wind normally blows in the month of July to October and can extend to November or December. The easterly wind normally starts to blow in January until March. Increasingly, occurrence of these winds had been unpredictable. Occurrences of storms in neighboring area (e.g. the Philippines and the South China Sea) also influence the weather pattern in the area and exacerbate the unpredictability of weather pattern in the area.

      These weather pattern influence work in the field including all surveys. The existing weather provides a small window of opportunity to conduct underwater surveys and safe travel between islands. The unpredictability complicates scheduling and planning of activities. The strong current generally experience within the area increase the risk of diving activities.

      Steps taken to overcome this natural phenomenon include maximising survey work during ‘good weather’ period, and involving a higher number of people to conduct surveys. Safety equipment is purchased and safety guidelines established to ensure safety of divers.

b. Dynamic of stakeholders
Successful gazettement of TMP requires cooperation of various governmental agencies, especially between Sabah Parks and the Department of Land of Survey in the initial stage. Different expectations and priorities hamper progress in the issuance of a gazette plan for TMP. The gazette plan is required for the process to gazette TMP to move forward with full cabinet approval and legal gazettement.

Recent leadership change within the Sabah Parks affected the existing dynamic between WWF-Malaysia and Sabah Parks. A different staff with a different perspective and priority towards TMP was assigned to the TMP, and this has affected the momentum of the implementation of activities and thus the achievement of part of this project.

This situation has intensified the impact of a previously identified gap within the management of Sabah Parks as far as TMP is concern. Sabah Parks has not assigned a dedicated staff to look into the gazettement and establishment of TMP and is unable to allocate fund for the hiring of new staff for this purpose until the legal gazettement of TMP.

c. Internal and organisational dynamics
There is a difficulty looking for a replacement for the marine biologist whom has left the project. This is generally perceived to be due to a lack of marine biologist in the state. However, this is further compounded with the long process and bureaucracy involved in hiring new staff. The organisation needs to have a more efficient recruitment process, to enable rapid hiring of new staff and replacement of staff that has left the project.

5.0 Unexpected effects. Describe any unexpected (positive or negative) consequences that have occurred as a result of the project and/ or any new opportunities that present.

The team while working on the community survey also set out to raise awareness on TMP and the process involved in its gazettement and management. This has to some extend raise expectation of communities, and they are expecting something to happen soon. Some members of the community are also eager to know more, especially the zoning system as they are interested to know how this will affect them and their livelihood. Some are eager to be involved in the consultation process, i.e. the commercial fisher group is eager to know the outcome of previous consultation and are awaiting for further consultations so they can comment and take part in deciding areas of specific zone. Some has even taken their own initiative to push forward suggestions that they would like to be adopted in the new management of TMP (e.g. exclusive fishing rights within TMP as a regulatory measure for fishing effort). In some areas, e.g. Tigabu Island, some member of the community expressed hope that the initiative will help bring development in the form of tourism to their area.

However, the slow progress in the gazettement and establishment of TMP has the opposite effect, it can lead to people feeling disillusion with the whole process. Sustaining support of 'converted' people need to be carried out.

6.0 Learning and Sharing. Describe key lessons learned, that are important to your project or that may be of use to others outside this project. They may relate to any of the following:

successes, strategies adopted, challenges you are facing, surprise results, management processes, or technical understanding.

In Section 6, please provide any significant lessons learned by your sub-project.

We are carrying out conservation work in an area that is very dynamic. In the past year, we witnessed major changes in Banggi: work in progress for a large-scale rubber plantation; building of a road network; water pipelines; improvement in telecommunication services and an election and change in political leaders. We also note plans for *Albizia* plantation; mining of limestone caves in Balambangan; and intensified efforts for fish cage culture.

As a result, the people we have been working with, be they fishers, young people or community leaders, have changed their jobs, moved away or develop different priorities. More significantly, their attitude toward conservation changed. They acknowledge the importance of conservation but have put it to a lower rank in priority in pursuit of economic improvement.

7.0 Adaptive Management. Based on your analysis of the situation and the project's progress, which project objectives and activities have been changed, or will need to be changed? Please attach latest versions of your action plan (e.g. logframe) and monitoring plan, if changes have been made.

No changes in project objectives and activities are needed. However, additional activities are needed. These additional activities are:

i) ecological surveys to complement ethno-biological data
ii) ground-truthing of ethno-biological / local knowledge

In relation to this, the project team is asking for a no-cost extension to continue implementing delayed existing workplan, as well as to carry out additional activities.

8.0 Communications/ Stories. Highlight any actions or successes meriting communications attention e.g. positive media coverage, success stories, contacts made (such as with government), major events.

Mameng News
A quarterly newsletter produced by the project team to communicate success and information on project activities to stakeholders.

WWF-Malaysia Newsletter 'Scapes'
A quarterly newsletter produced by WWF-Malaysia with features and updates on Kudat PCA project. This newsletter is distributed to WWF Network, major donors and key stakeholders.

WWF-Malaysia 'Green Heart'
Feature on training held on MARXAN software – highlight the importance of the software in identifying suitable areas for conservation, which is vital towards the identification of zones.

Press Coverage

- Local newspapers (See Hua, Daily Express, New Sabah Times) highlighted the identification of Maliangin Sanctuary as a model Marine Protected Area site, emphasizing the benefits of marine protected areas.

- Local newspaper (Daily Express) coverage on participation of local stakeholders in training to teach about enforcement of wildlife conservation.

Project / Programme Awareness through Exhibitions

- Universiti Malaysia Sabah – Pesta Mahligai (August 2007)
- Malaysian Royal Navy 'Freedom of Entry to the City' (April 2008)
- 7th IOC-WESTPAC Scientific Symposium (May 2008)

9.0 Future Issues/ Challenges. Highlight the 3 most significant issues/ challenges ahead for the project, focusing on the next 12 months, and explain how they will be addressed. (Concentrate on barriers to delivery that could lead to major changes to objectives or plans).

1. Speedy implementation of ecological surveys within limited window of good weather;
    a. A marine biologist is expected to be hired by July 2008;
    b. The team leader will work closely with the marine biologist to prepare workplan and implement ecological surveys to establish baseline ecological data on mangrove species and density, coral reefs survey and ground truthing of local knowledge on sea turtle nesting beaches;
    c. The project team will also work closely with the Universiti Malaysia Sabah to collaborate in some of the ecological survey (e.g. mangrove survey)

2. Sustaining support of stakeholders supportive of TMP;
    a. The project team will continue engaging stakeholders on the ground;
    b. Collaborative monitoring work for coral reefs and catch monitoring will be continued and local communities will be continuously engaged on this.
    c. Capacity building training will be organised in a smaller group but more frequently.

3. Advocating for a speedy gazettement of TMP and establishment of zoning system;
    a. An advocacy policy paper for TMP is being prepared that will guide the advocacy for the gazettement of TMP at the higher level of decision-making;
    b. Project team will conduct regular meeting with staff of Land & Survey Department to monitor progress of the preparation of the Gazette Plan;
    c. Project team will provide a complete socio-economic and community profile report for use in the preparation of the management plan, and the zoning system;
    d. The project team will advocate with Sabah Parks to continue working on the zoning plan, and follow through with the 'next steps forward' outlined in the zoning workshop.

10. Overall Assessment of progress. Assess whether the project has made the expected progress against the action plan, and whether planned the objectives will be achieved. (In the early stages of a project, this will be a somewhat subjective judgement. As the project progresses, this should be based on an assessment of progress against goals and objectives and the associated indicators.)

Based on the outlined workplan and activities, the overall progress of the project had been good and has help the project move forward in establishing baseline information for future monitoring and measure of management success for TMP.

On deliverable 1, three capacity building trainings had been conducted against planned four. Two successful collaborative reefs survey to establish baseline data for Maliangin Islands were carried out and future monitoring will be carried out to monitor changes in the area. A database for Maliangin Sanctuary

monitoring data is established, and work will continue to improve the database to be shared with the Sabah Department of Fisheries and Sabah Parks.

On deliverable 2, a training trip to Indonesia for WWF-Malaysia and government staff to work with TNC officers on zoning and MARXAN were organised. Staff from Sabah Fisheries Department, Sabah Parks and Universiti Malaysia Sabah learned the use of MARXAN in designing of zoning system. One workshop was held to establish biological, ecological and socio-economic criteria for Tun Mustapha Park zoning system were organised and the workshop was able to achieve the objective of establishing criteria for zoning in TMP. These criteria are important guidelines in establishing zones for TMP.

On deliverable 5, analysis of the previously collected socio-economic baseline data from 53 coastal villages in the Park was completed. Write-up of this analysis is still on-going, and will be published in peer-reviewed journal once completed. A part of the output of the survey will be presented at an international conference in July 2008. Fisheries observation trips on lighted purse seine and trawling boats in TMP were not implemented during the project period, but planning is on-going to implement it in June to July 2008.

On deliverable 6, a workshop with Sabah Parks and Sabah Fisheries Department to design a database for TMP was held. A database structure and metadata format was designed. However, the establishment of a database was not achieved.

14) **Learning and Sharing.** Describe key lessons learned, that are important to your project or that may be of use to others outside this project. They may relate to any of the following: successes, strategies adopted, challenges you are facing, surprise results, management processes, or technical understanding.

Due to its nature as a learning effort, the Conservation Measures program has developed the following questions to capture insights on specific components of our program. Your feedback will be incorporated into a final program report and recommendations for implementing Conservation Measures in the future.

a. Provide a brief summary of the results of the analysis of the Biological, Threat, Conservation Management and Social Condition status of the Coral Triangle – Maliangan Sanctuary.

Coral Triangle – Maliangin Sanctuary

Ecology - Maliangin Sanctuary has 376.5 hectares of coral reefs, small patch of mangrove forests, and an estimated seagrass bed of less than 1ha. No quantitative data are available on the species indicators, except for humphead wrasse (only 1 fish was found in 376.5ha area). Qualitative information is known for marine turtle nestings and sightings and status of coral reefs (assessed using Reef Check) range from fair to poor in various sites.

Socio-economic condition – Maliangin Sanctuary has a small population of approximately 108 people from 14 households. The community of Maliangin Sanctuary is mostly poor and is ihighly dependent on natural resources for their subsistence and livelihood. A large number of the population in Maliangin Sanctuary

has historically move out of the island (Maliangin Besar) to take advantage of education and other economic facilities in neighboring island, Banggi. There is ahigh level of awareness on the importance of conserving fisheries resources on the island, through the establishment of MPA.

Governance – There is no legal and institutional structure for the management of MPA in Maliangin Sanctuary. As part of the proposed Tun Mustapha Park (TMP), management framework compatible with MPA management is being established. Currently, legal and institutional structure exists through sectoral agencies that look into different aspects of natural resources/wildlife management such as Department of Fisheries, Forestry Department the Wildlife Department. Capacity building for collaborative management is on-going through WWF-Malaysia's inititative to establish Maliangin Sanctuary as a demonstration site to showcase benefits of MPAs.

Threats – Cyanide fishing and blast fishing occur and has been verbally reported in Maliangin Sanctuary. However, no quantitative data is available for the rate of cyanide fishing and blast fishing for the area. Reports has indicated reduced rate of blast fishing in Banggi in general (e.g. Daw et. al. 2004[16]).

Coral Triangle – Proposed Tun Mustapha Park (TMP)

Ecology – TMP has 48,396.7 hectares of coral reefs, and about 70,000 hectares of mangroves. Small beds of sea grass beds can be found through out the TMP and a confirmed area of 200 hectares of seagrass can be found in Wak Wak Bay, near Banggi Island. No quatitative data available on the species indicators, except for humphead wrasse (8 fishes were found in 1,306.5ha area). An estimated density of 0.024 ind/sqkm[17] is reported for the Humphead wrasse in TMP and Sabah in general. Qualitative information is known for marine turtle nestings and sightings (more than 20 nesting beaches were reported by local communities of TMP). Status of coral reefs (assessed using Reef Check) varies from fair to poor.

Socio-economics - On socio-economic indicators, it is learned that the communities of TMP are mostly poor and are highly dependent on natural resources for their subsistence and livelihood. They value education and see this as an opportunity to move them out of the circle of poverty. They are holders of rich local knowledge, awareness of their surrounding environment, and understanding of the impacts of their actions on the environment. They are willing to be involved in natural resource management through collaborative management and monitoring.

[16] Daw, t. 2004. Reef fish aggregations in Sabah, East Malaysia. A report on stakeholder interviews conducted for the Society for the Conservation of Reef Spawning Aggregations. Western Pacific Fisher Survey Series: Society for the Conservation of Reef Fish Aggregations. Vol 5.

[17] Cabanban et.al. (2008). Non-detrimental Finding Study of Mameng (humphead wrasse, Cheilinus undulatus), Sabah, Malaysia for the Regulation of its Export. Report prepared for the Department of Fisheries Sabah. TRAFFIC-SEA & WWF-Malaysia.

Governance – The establishment of TMP as a multi-use protected area is on-going. Management plan is being prepared and governance structure is being identified.

Threats – Local knowledge on threats in TMP identified destructive fishing methods (e.g. blast fishingm cyanide fishing), conflict of resource use (e.g. encroachment of trawlers and purse seiners into traditional fishing area) are among the main issues in the area.

b. Please comment on the following elements of the program:

i. **Human Capacity**: What capacity was employed to accomplish the objectives (staff, technical expertise, etc.)? Was this sufficient? If not, please comment on the gaps.

Five main staff were employed to accomplish the objectives. The technical expertise include i) Fish taxonomy and ecology; ii) marine biology, iii) social science, and iv) geography and GIS. The staff were assisted by two assistants who are highly knowledgeable of local culture and practices, and of the geographical features of the area.

Surveys to establish baseline data (used for indicators) were also conducted in collaboration with partners, i.e. Sabah Parks (Park Management), Department of Fisheries (Fisheries Resource Management) and Universiti Malaysia Sabah (Research and Development).

Human capacity was sufficient for the collection of baseline data on socio-economic but was insufficient in the collection of ecological data. Technical gaps also occurred in database establishment and management.

ii. **Methods:** Please evaluate the Conservation Measures methodology. What were its strengths and weaknesses? Please comment specifically on issues of data availability, analysis, & issues associated with scale.

The Conservation Measures methodology provided a list of indicators that can be used as a guide in establishing baseline data. It would be useful to have the list during the designing stage of a survey, so the survey can aim to collect information that can contribute as much to the Project objectives as possible.

On data availability, the Conservation Measures Project came when the community surveys were already on-going, past the designing stage of the survey. Therefore, information/data for some of the listed indicators cannot be established / collected. Secondary information is available for some of the listed indicators. In most cases, scarcity of data is hampering the completion of the analysis of current status of Maliangin Sanctuary/Tun Mustapha Park.

The Conservation Measures methodology will be useful in designing future ecological surveys within the TMP.

Rapid collection of primary data is possible for a smaller area, as compared to a larger area. The indicators can also be easily measured for a more specific and smaller area, compared to a general and larger area. For example, while it is difficult to calculate one representative measure for a large area, using one measure of an indicator for the whole TMP can also be misleading. It is much easier to established baseline for indicators for selected specific locations within a larger area such as TMP.

iii. **Resources:** Were there sufficient financial resources to accomplish the project objectives? If not, what would have been required?

Yes. But need more time to accomplish all of the objectives.

iv. **Time:** How much staff time was dedicated to this project? Was this sufficient to accomplish the objectives?

Time of staff is divided between 4 grants (including this project); therefore only 25% of staff time was dedicated for the implementation of this project. This was sufficient to achieve the deliverables outlined in the scope of work for the grant, but was not sufficient to achieve the Conservation Measure Project Objective, i.e. gathering baseline data for the listed indicators.

v. **Alignment:** How did the Measures work fit with the portfolio of activities in the Coral Triangle?

The establishment and gazettement of the proposed Tun Mustapha Park is currently on-going. Primary data is still being collected in most part of TMP, and management mechanism and conservation measures are still being established. This may not be able to fit very well in the Measures work that seems to be more advanced in terms of primary data collection and analysis of current status of success of conservation work.

The Measures work in the TMP fit the Coral Triangle Network Initiative, particularly the Sub-Initiative on Sustainable Financing of Marine Protected Areas. The TMP, that is located in the Sulu-Sulawesi Marine Ecoregion – the center of marine biodiversity - will be the second largest MPA in Southeast Asia. The TMP when gazetted can be a show-case of ecosystem-based management of a large MPA for fisheries, recreation, mariculture, and biodiversity conservation with enabling conditions, e.g., funding for a staff at Sabah Parks for a period of at least 3 years to facilitate the gazettement, the preparation of a Management Plan, and the establishment of the TMP management committee.

vi. **Organizational Structure:** To the extent applicable, please comment on any opportunities or challenges that emerged from the overall structure of the Conservation Measures Program (i.e., Washington core team and place-based team) and the structure of the program in your place (i.e. working across trans-national boundaries, etc.)

The structure of this programme was not obvious/clear from the beginning of the project. The linkages between the Washington core team and place-based team were not emphasised, therefore the team (place-based team) acted as an independent team. It was unclear at the beginning on how the work of the core team and the place-based team were to interact.

c. **Conservation Findings:** Did the analysis of the indicators result in any new insights about the Coral Triangle ?

Yes, it gave insights on the Coral Triangle Network Initiative (CTNI). The CTNI has many objectives that are the same as in the Tun Mustapha Park. All the indicators of conservation in the CTNI are desirable to have been used in the TMP at the outset however, this was not possible there were no sufficient funds available for gathering the data on the ecological indicators. The TMP Project took a step-wise approach based on the available resources (following the Ecosystem-based Management of Fisheries). It focused on the gathering of socio-economic and governance baseline levels (of socio-economic indicators) and local knowledge on species, use of marine ecosystems and resources; readiness of for collaborative management. The intention is to gather next ecological indicators throughout the TMP.

Summary of Status of Indicators

Coral Triangle – Maliangin Sanctuary

Ecology - Maliangin Sanctuary has 376.5 hectares of coral reefs, small patch of mangrove forests, and an estimated seagrass bed of less than 1ha. No quantitative data are available on the species indicators, except for humphead wrasse (only 1 fish was found in 376.5ha area). Qualitative information is known for marine turtle nestings and sightings and status of coral reefs (assessed using Reef Check) range from fair to poor in various sites.

Socio-economic condition – Maliangin Sanctuary has a small population of approximately 108 people from 14 households. The community of Maliangin Sanctuary is mostly poor and is ihighly dependent on natural resources for their subsistence and livelihood. A large number of the population in Maliangin Sanctuary has historically move out of the island (Maliangin Besar) to take advantage of education and other economic facilities in neighboring island, Banggi. There is ahigh level of awareness on the importance of conserving fisheries resources on the island, through the establishment of MPA.

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Threats – Cyanide fishing and blast fishing occur and has been verbally reported in Maliangin Sanctuary. However, no quantitative data is available for the rate of cyanide fishing and blast fishing for the area. Reports has indicated reduced rate of blast fishing in Banggi in general (e.g. Daw et. al. 2004[18]).

Coral Triangle – Proposed Tun Mustapha Park (TMP)

Ecology – TMP has 48,396.7 hectares of coral reefs, and about 70,000 hectares of mangroves. Small beds of sea grass beds can be found through out the TMP and a confirmed area of 200 hectares of seagrass can be found in Wak Wak Bay, near Banggi Island. No quatitative data available on the species indicators, except for humphead wrasse (8 fishes were found in 1,306.5ha area). An estimated density of 0.024 ind/sqkm[19] is reported for the Humphead wrasse in TMP and Sabah in general. Qualitative information is known for marine turtle nestings and sightings (more than 20 nesting beaches were reported by local communities of TMP). Status of coral reefs (assessed using Reef Check) varies from fair to poor.

Socio-economics - On socio-economic indicators, it is learned that the communities of TMP are mostly poor and are highly dependent on natural resources for their subsistence and livelihood. They value education and see this as an opportunity to move them out of the circle of poverty.

[18] Daw, T. 2004. ***Reef fish aggregations in Sabah, East Malaysia***. A report on stakeholder interviews conducted for the Society for the Conservation of Reef Spawning Aggregations. Western Pacific Fisher Survey Series: Society for the Conservation of Reef Fish Aggregations. Vol 5.

[19] Cabanban et.al. (2008). ***Non-detrimental Finding Study of Mameng (humphead wrasse, Cheilinus undulatus), Sabah, Malaysia for the Regulation of its Export.*** Report prepared for the Department of Fisheries Sabah. TRAFFIC-SEA & WWF-Malaysia.

They are holders of rich local knowledge, awareness of their surrounding environment, and understanding of the impacts of their actions on the environment. They are willing to be involved in natural resource management through collaborative management and monitoring.

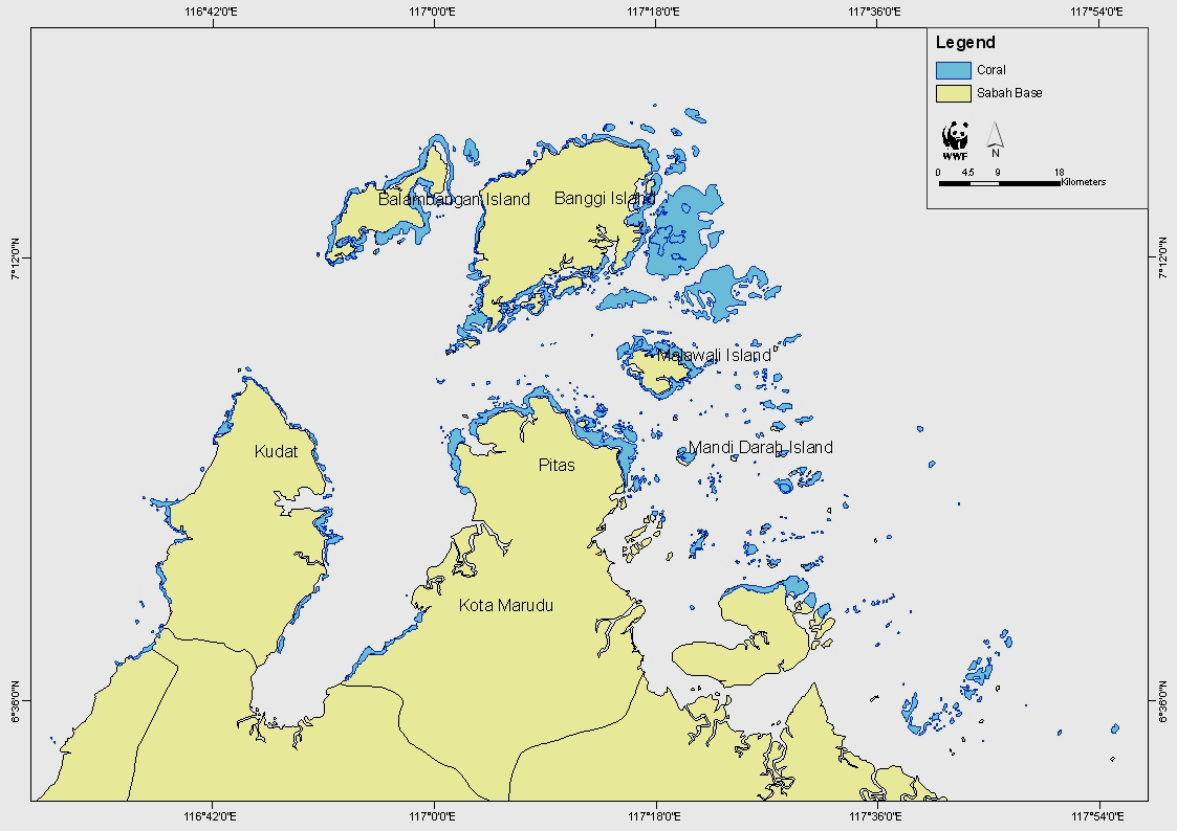
Governance – The establishment of TMP as a multi-use protected area is on-going. Management plan is being prepared and governance structure is being identified.

Threats – Local knowledge on threats in TMP identified destructive fishing methods (e.g. blast fishingm cyanide fishing), conflict of resource use (e.g. encroachment of trawlers and purse seiners into traditional fishing area) are among the main issues in the area.

Biological Targets

Target	Key Attribute	Indicator
Coral reef	Abundance	% Live hard coral cover - Maliangan Sanctuary (Lowest/Highest for Deep and Shallow transects
	Abundance	% Live hard coral cover - Northeast Banggi
	Abundance	% Live hard coral cover - Southeast Banggi
	Abundance	% Live hard coral cover - Southwest Balambangan
	Abundance	% Live hard coral cover - Southwest Banggi
	Extent	Extent of coral cover
Coral Reef Indicator Species	Abundance	# of species In Maliangin
	Abundance	# of species In Northeast Banggi
	Abundance	# of species In Southeast Balambangan
	Abundance	# of species In Southeast Banggi
	Abundance	# of species In Southwest Banggi
Mangroves	Extent	Extent of Mangrove habitat
Seagrass communities	Extent	Extent of Seagrass communities

Coral Reef - Extent of Coral Cover (Hectares)



Target:
Coral Reefs
KEA
Extent of coral cover
Indicator
coverage (hectarage)
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

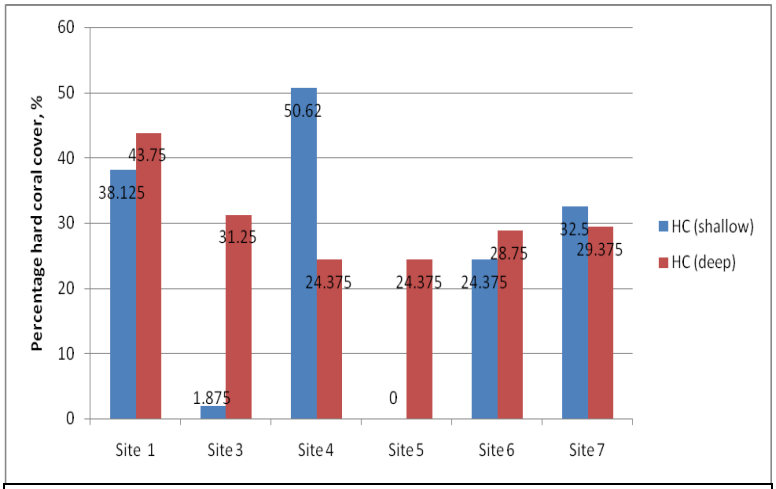
Working Group Members:

References:

Coral Reef – Abundance (% live coral cover)

Target:
Coral Reefs
KEA
Abundance
Indicator
% Coral Cover
Justification for Indicator:
% coral cover is a proxy to determine coral condition where status is based on the following range[20]:

100-75%	:	Excellent
74.9 – 40%	:	Good
49.9 – 25%	:	Fair
24.9 – 0%	:	Poor



Percentage of hard coral cover at shallow and deep transects for all sites surveyed around Maliangin Besar (Lee, Y.L., 2008)

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Lee, Y.L. 2008. **Maliangin Sanctuary Coral Reef Survey (2006-2007).** WWF-Malaysia. Unpublished data.

Koh, L.L., Chou, L.M. and Tun, K.P.P. 2002. The status of coral reefs of Pulau Banggi and its vicinity, Sabah, based on surveys in June 2002. **REST Technical Report 2/02**. Reef Ecological Study Team. Department of Biological Science. National University of Singapore.

Lee, W. and Chou, L.M. 2003. . The status of coral reefs of Pulau Banggi and its vicinity, Sabah, based on surveys in June 2003. **REST Technical Report 2/03**. Marine Biology Laboratory, Department of Biological Science, National University of Singapore.

Isa Tanzil, J.T. and Chou, L.M. 2004. The status of coral reefs of Pulau Banggi , Pulau Malawali and its vicinity, Sabah, based on surveys in June 2004. **REST Technical Report 6/2004**. Marine Biology Laboratory, Department of Biological Science, National University of Singapore.

Harding, S.P., Lowery, C., Wesson, H., Colmer, M. and TM Daw. 2001. **The Pulau Banggi Project for Coral Reef Biodiversity. 1st Annual Report (July 1999 – September 2000)**. Greenforce. 67+31pp.

[20] Gomez, E.D., P.M. Alino, W.R.Y. Licuanan and H.T. Yap. 1994. *Status report on coral reefs of the Philippines 1994.* UP MSI, Diliman, Quezon City

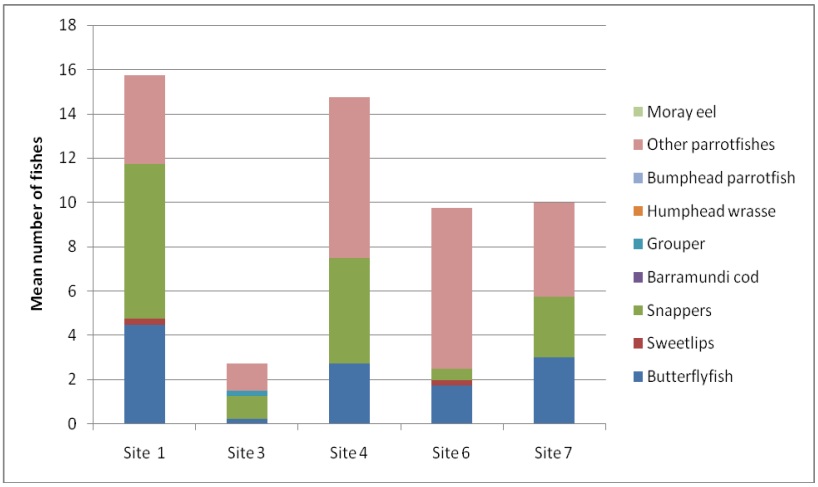
Coral Reef Indicator Species – Abundance

Target:
Coral Reef

KEA
Abundance of Indicator species

Indicator
Presence (number) of indicator species (fish or invertebrtaes)

Justification for Indicator:
Indicator species provide indication of the health of a coral reef, and the pressure/threat on the reefs.



Mean numbers of indicator fish species for all surveyed sites surveyed around Maliangin Besar (shallow transects) (Lee, Y.L.. 2008))

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Lee, Y.L. 2008. **Maliangin Sanctuary Coral Reef Survey (2006-2007).** WWF-Malaysia. Unpublished data.

Koh, L.L., Chou, L.M. and Tun, K.P.P. 2002. The status of coral reefs of Pulau Banggi and its vicinity, Sabah, based on surveys in June 2002. **REST Technical Report 2/02**. Reef Ecological Study Team. Department of Biological Science. National University of Singapore.

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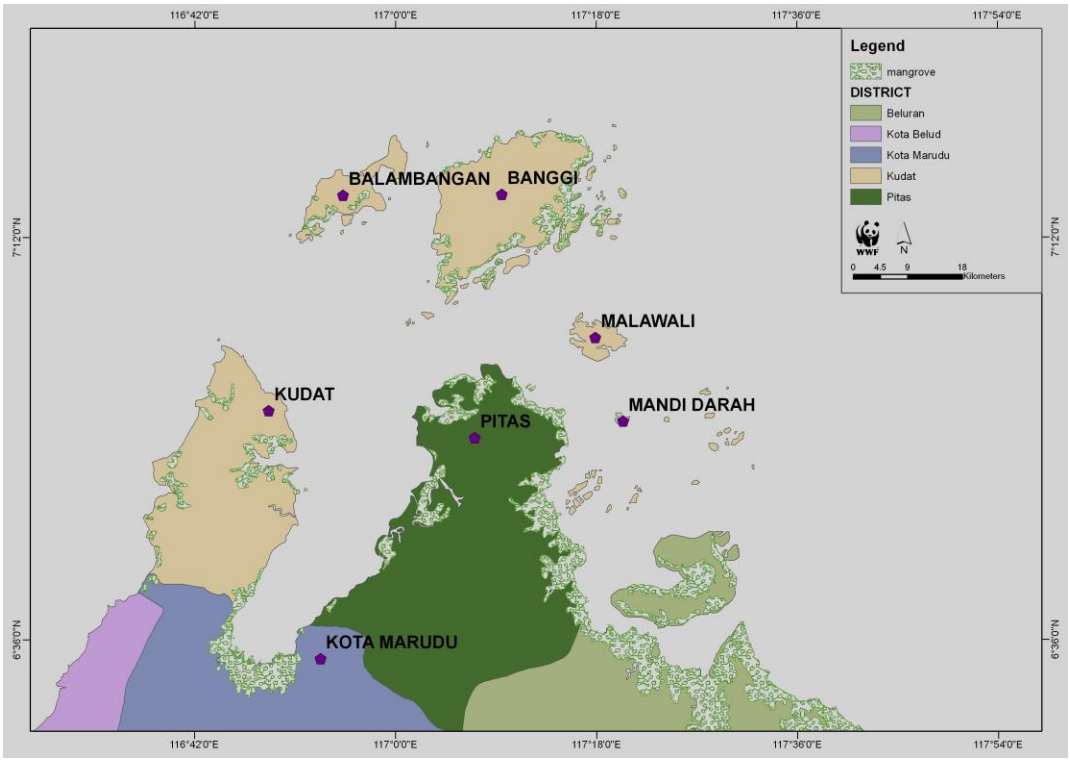
Mangroves - Extent of mangrove forest (Hectares)



Target:
Mangrove
KEA
Extent of mangrove forest
Indicator
Covergae (hectarage)
Justification for Indicator:
Changes in extent of mangrove forest over time will be used to indicate rate of coastal development, land clearing and land use. Mangroves forest provides habitat for wildlife and biodiversity and ecosystem services, and can be used to indicate health of the coastal/marine ecosystem.

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:
References:

Threats

Threat	Indicator
Bycatch - fish by catch on trawler	Endangerment (# of threatened or vulnerable species)
	Size (mean length/species)
	Type (# of species)
	Weight (kg, tons)
Bycatch - turtle by catch (gill net fishing and trawling)	No of fishermen reporting turtle by-catch
	Size (mean length/species)
	Type (# of species)
Climate change	Bleaching (# of bleached sites; % coral bleached)
	Ocean acidification (pH)
	Sea surface temperature
Destructive fishing practices	Blast fishing (# blasts/month)
	Bottom trawling (total area trawled: trawl area x trawl time) (m2)*
	Cyanide fishing (incidents reported/month)
Invasive species	Abundance (#; biomass)
	Density (#/area)
Pollution	Waste (volume/effort of trash collected on coastline) (ton/hour)*
Shipping	Distance to cruise or cargo shipping traffic routes (km)
	Frequency of oil spills (#/yr)
Water quality	Heavy metals
	Nutrients (N, P) and fertilizers
	Oxygen content
	Pathogens (E. coli, etc.)
	Pesticides and toxins
	Petroleum products
	Sedimentation rate
	Turbidity (Secchi disk)

Bycatch – fish by-catch on trawler

Target:
By-catch of fish fish by-catch on trawler
KEA/Indicator

- Endangerment (# of threatened or vulnerable species)
- Size (mean length/species)
- Type (# of species)
- Weight (Kg; tons)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Bycatch – fish by-catch on trawler

Target:
By-catch - fish by-catch on trawler
KEA/Indicator

- Endangerment (# of threatened or vulnerable species)
- Size (mean length/species
- Type (# of species)
- Weight (Kg; tons)

Justification for Indicator:
Composition of by-catch of fish is an indication of threat to biodiversity and need for fisheries management. It is also related to overfishing, where it can contribute towards overfishing through removal of undersized targeted fish.

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Bycatch – turtle by catch

Target:
By-catch of sea turtle (gill net fishing and trawling)

KEA/Indicator

- No. of fishermen reporting turtle by-catch
- Size (mean length/species)
- Type (# of species)

Justification for Indicator:
These indicators are able to indicate the level of threat to sea turtle in terms of numbers of incidents, at what stage of life cycle and to what particular species.

Long-term Viability Goal:

Monitoring Approach:

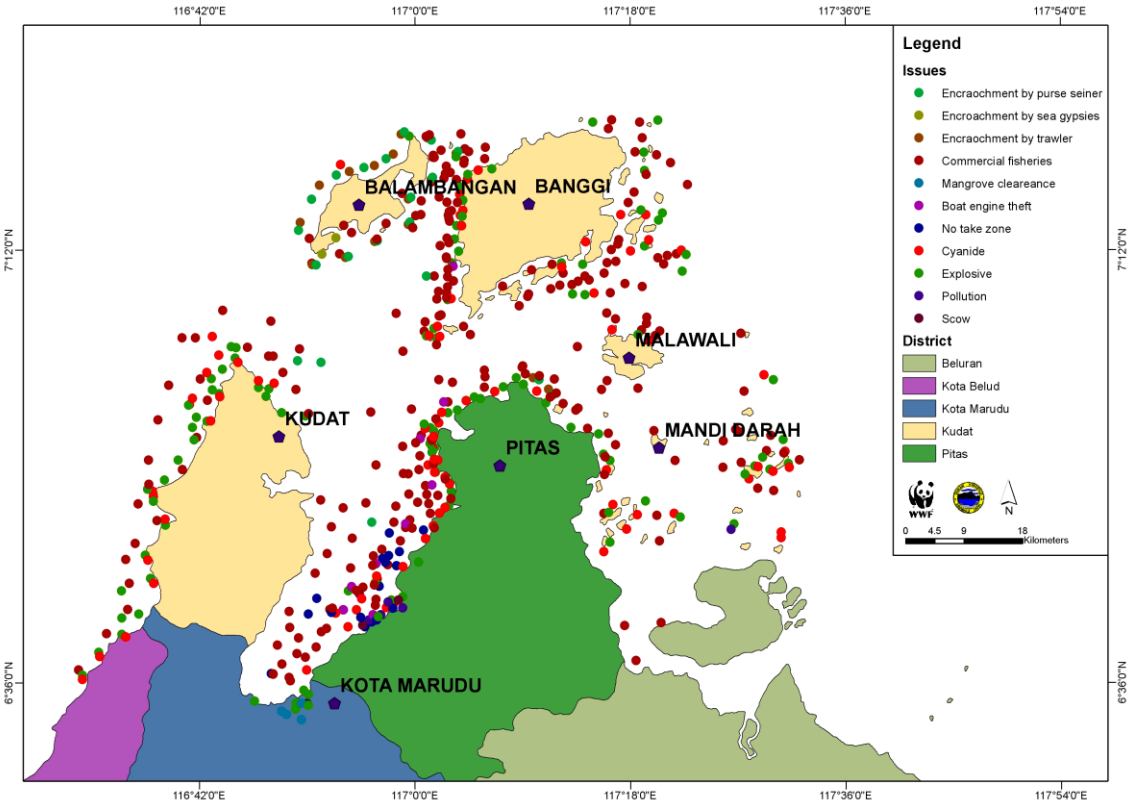
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Destructive Fishing Practices



Community map on environmental and fisheries issues in TMP

Target:
Destructive Fishing Practices

KEA/Indicator

- Blast fishing (# blast/month)
- Bottom trawling (total area trawled: trawl area x trawl time) (m^2)
- Cyanide fishing (incidents reported/month)

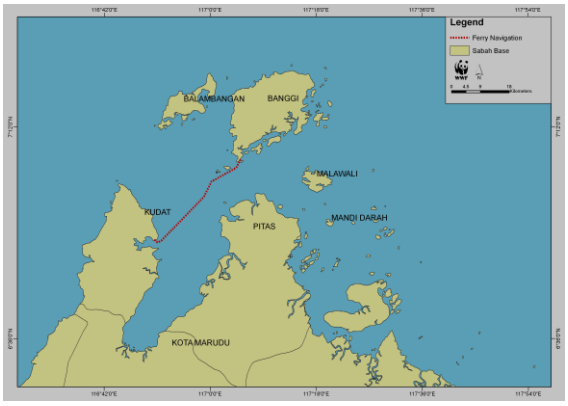
Justification for Indicator:

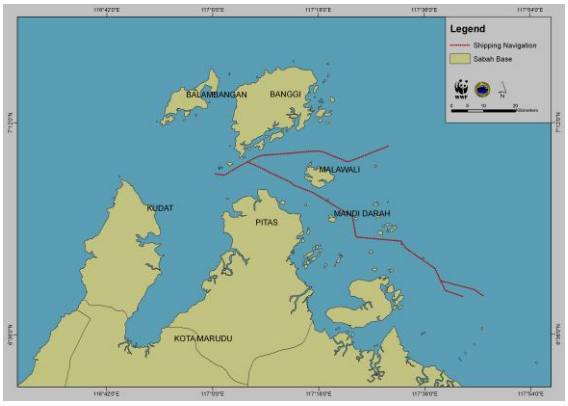
Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:
Notes:
Working Group Members:
References:

Shipping





Target:
Shipping

KEA/Indicator

- Distance to cruise or cargo shipping traffic routes (km)
- Frequency of oil spills (#/yr)

Justification for Indicator:
The proposed TMP is an important international shipping lane, and regular transportation occurs between the mainland (Kudat) and the island (Karakit, Banggi). These indicators would be useful in indicating the impact of shipping/navigation in the area, and the response needed.

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Conservation Management Indicators

Conservation Management	Key Attribute	Indicator
Monitoring and enforcement	Coverage	# of surveillance patrols/month
		# of patrols/area
		# of trained enforcement personnel; patrol man-hours/month)
Monitoring and enforcement	Openness	# of stakeholders involved in enforcement
		% of enforcement team comprised of community members)
Monitoring and enforcement	Procedure	# of reported violations
		# of successful prosecutions
		# of failed prosecutions as a result of unclear procedures or guidelines)
Capacity building	Effectiveness	Compliance (% whose understanding of regulations and enforcement has increased, or whose compliance behavior has changed, as a result of training [self-report]; No. passing the competency test (for HWW)
Capacity building		Participation (% whose support for the MPA has changed, or whose economic activities have improved, as a result of training [self-report])
Capacity building		Sustainable use (% whose understanding of sustainable use has increased, or whose resource use practices have changed, as a result of training [self-report])
Capacity building	Funding	Budget (amount of funding allocated to capacity-building; % of MPA budget devoted to capacity-building activities)
Capacity building	Funding	Sufficiency (% of MPA staff who feel budget is sufficient to meet capacity needs; survey instrument)
Capacity building	Information dissemination	Compliance (# trained in rules, regulations, and enforcement arrangements; # of workshops held) - No. appointed as HWW - No. trained in Wildlife regulations through the Honorary Wildlife Warden (HWW) training - No. seminar held (Seminar on Legislation relevant to resource management)
Capacity building	Information dissemination	Participation (# trained in co-management, guiding, or rangering; # of workshops held)

Conservation Management	Key Attribute	Indicator
Capacity building		Sustainable use (# trained in sustainable resource use; # of workshops held)
Capacity building	Stakeholder satisfaction	Staff (% of community satisfied with training skills of staff; survey instrument)
Capacity building		Training (% of community satisfied with workshops and training courses; survey instrument)
Legal & Institutional Structure	Framework	Collaborative management (ha under active co-management)
		Decision-making and/or management body (frequency of meetings; ordinal ranking of authority; ha under active management body)
		Formal legislation (ordinal ranking of compatibility with MPA goals)
		Management plan (ordinal ranking of completeness and enforceability; ha under active management plan)
	Funding	Governmental (funds committed by CT-6 nations)
		Non-governmental (funds committed by NGO partners)
		Private (funds committed by private sector)
		Sustainability (funds present in permanent trust funds; funds generated yearly for MPA operations)

Capacity Building

Target:
Capacity Building

KEA/Indicator

- Effectiveness:
    - Compliance (No. passing the competency test [for HWW]

Justification for Indicator:
The Honorary Wildlife Warden (WWW) training is provided by the Sabah Wildlife Department, to train the public or local community on legislations and regulations pertaining to wildlife management. The trainees will undertake a competency test to allow for official appointment as HWW which enable them to enforce the Wildlife regulations. The number of people passing the competency test would be a good indicator on the effectiveness of capacity building to increase compliance through good understanding of current laws and regulations.

Long-term Viability Goal:

Monitoring Approach:

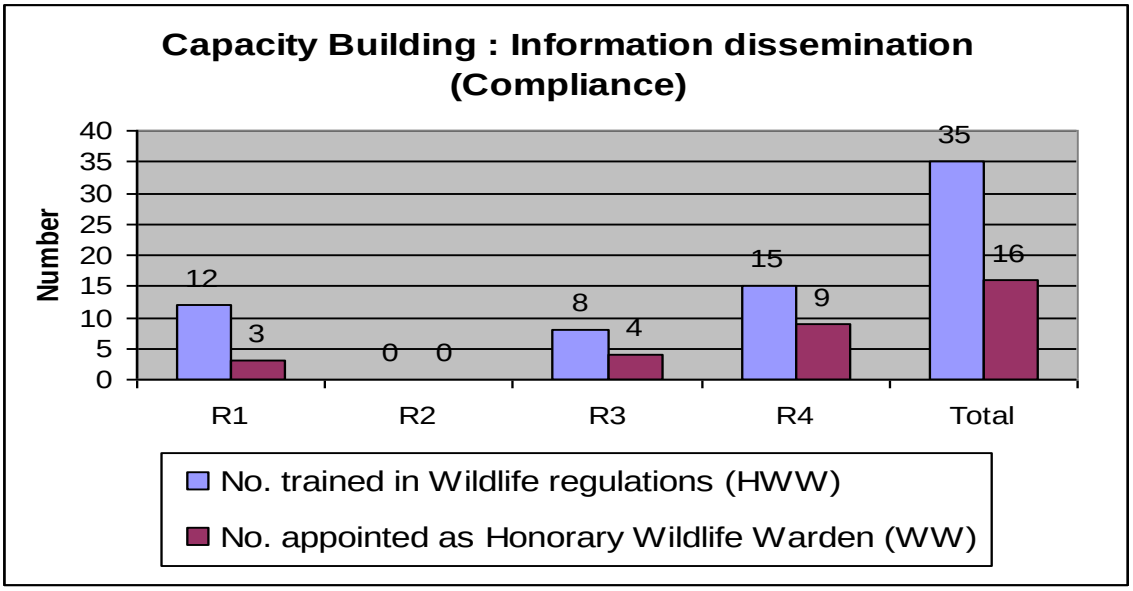
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Capacity Building



Target:
Capacity Building

KEA/Indicator

- Information dissemination
    - Compliance (# trained in rules, regulations, and enforcement arrangements; # of workshops held)
        - No. appointed as HWW
        - No. seminar held (Seminar on Legislation relevant to resource management)
        - No. trained in Wildlife regulations through the Honorary Wildlife Warden (HWW) training

Justification for Indicator:
Long-term Viability Goal:
Monitoring Approach:
Future Indicator Development Required:
Notes:
Working Group Members:

References:

Legal and Institutional Structure

Target:
Legal and Institutional Structure

KEA/Indicator

- Framework
  - Collaborative management (ha under active co-management)
  - Decision-making and/or management body (frequency of meetings; ordinal ranking of authority; ha under active management body)
  - Formal legislation (ordinal ranking of compatibility with MPA goals)
  - Management plan (ordinal ranking of completeness and enforceability; ha under active management plan)
- Funding
  - Governmental (funds committed by CT-6 nations)
  - Non-governmental (funds committed by NGO partners)
  - Private (funds committed by private sector)
  - Sustainability (funds present in permanent trust funds; funds generated yearly for MPA operations)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Social Indicators

Domain	Key Attribute	Indicator
Education	Scholastic	Achievement (% with high school diploma; % attending university - Highest education level in the house)
Education		Equity (ratio of girls:boys enrolled in primary education vs. ratio in population)
Education		Participation (% of youth enrolled in primary education)
Education	Environmental : "Formal" scientific knowledge	% with knowledge that coral reefs are important to prevent coastal erosion; % with knowledge that protection of coral reefs will benefit fisheries in the long run; % with knowledge that fisheries will decline without the mangrove ecosystems; % with knowledge that coral reefs has other importance other than fishing or SCUBA diving; % with hopes that mangroves and coral reefs will remain for their future generation to appreciate; % with knowledge that no-take-zone should be established or fishing effort limited in some areas to allow growth and recovery of fish and coral reefs; % with knowledge that sea grass has direct and indirect value to people.
Education	Environmental : "Local" knowledge of natural history	% with knowledge that turtle can live up to 100 years % with knowledge that out of 1,000 turtle hatchlings, only 1 will grow to adulthood % with knowledge that sea turtles are fully protected under the Sabah Wildlife Enactment % with knowledge that sea turtle population is declining globally %with knowledge that sea turtles are migratory species
Education	Environmental: MPA regime	% with knowledge or understand the meaning of collaborative management % with prior knowledge of the proposed Tun Mustapha Park, a proposed multiple-use MPA % with knowledge or understanding of the role of Sabah Parks in the management of MP % that agrees that coastal development need to be regulated/control to ensure conservation of nature for the enjoyment of future generation
Empowerment	Capacity	(# of community organizations organized to participate in management)

Domain	Key Attribute	Indicator
		- Membership in association/groups
Empowerment	Institutional framework	(# of scheduled stakeholder meetings with MPA managers and staff)
Empowerment	Interest	% interested to know more about collaborative management of fisheries resources with the government agency
Empowerment	Leadership	% having met the political representative of the area to discuss environmental issues, or to suggest solutions to problems in the area
Empowerment		% think that their opinion and suggestions in a meeting is taken seriously and into account
Empowerment	Participation	% have attended discussions or meeting on ways to take care of the fisheries resources, sea or the environment
Empowerment		% willing to care/manage the fisheries resources and surrounding marine area through collaborative management with Government Agency.
Empowerment	Satisfaction	% satisfied with degree of participation in collaboration
Health	Availability of health services	Choice of health care services (%)
Health	Child mortality	Infant [< 1 yr] (mortality rate/1,000 live births)
Health		< 5 yr (mortality rate/1,000 live births)
Health	Disease	Incidence of preventable disease (# present in community)
Health		Prevalence of preventable disease (rate/disease)
Health	Nutrition	Caloric intake (calories/day)
Health		Households w/consistent access to sufficient food (%)
Health	Water security	Distance to potable water source (m)
Health		Households w/consistent access to sufficient potable water (%) - Source of water supply by villages (%)
Wealth	Income	Quantity (% below national poverty line; mean % of national median) - (House) Income range (%,)
Wealth		Source (mean % of income reliant on fishing or extraction) - Livelihood/income source of household family members
Wealth	Material assets	Housing - Type of House (%)

Domain	Key Attribute	Indicator
		- No. of Bedrooms (%) - Roof Material (%) - Flooring Material (%) - Type of Toilet (%)
Wealth	Material assets	Technology - Power source (%) - TV (%) - Telephone (%) - Refrigerator (%) - Video camera(%) - CD/DVD Player (%)
Wealth	Material assets	Boat (%)
Wealth	Material assets	Car (%)

Education

Target:
Education

KEA – Scholastic

Indicator – Achievement (Level of education, %)

Justification for Indicator:
Level of education is a proxy to indicate level of dependence on natural resource for livelihood.

Long-term Viability Goal:

Monitoring Approach:

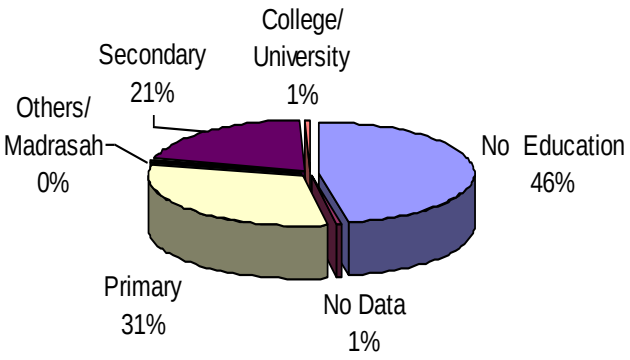
Future Indicator Development Required:
Need to link with other indicators for assessment.

Notes:

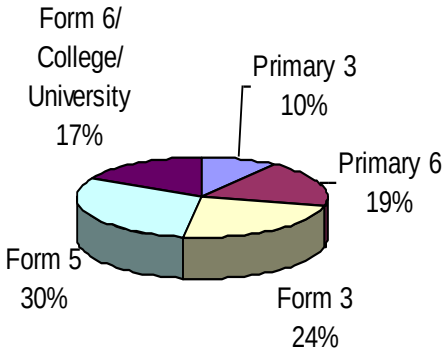
Working Group Members:

References:

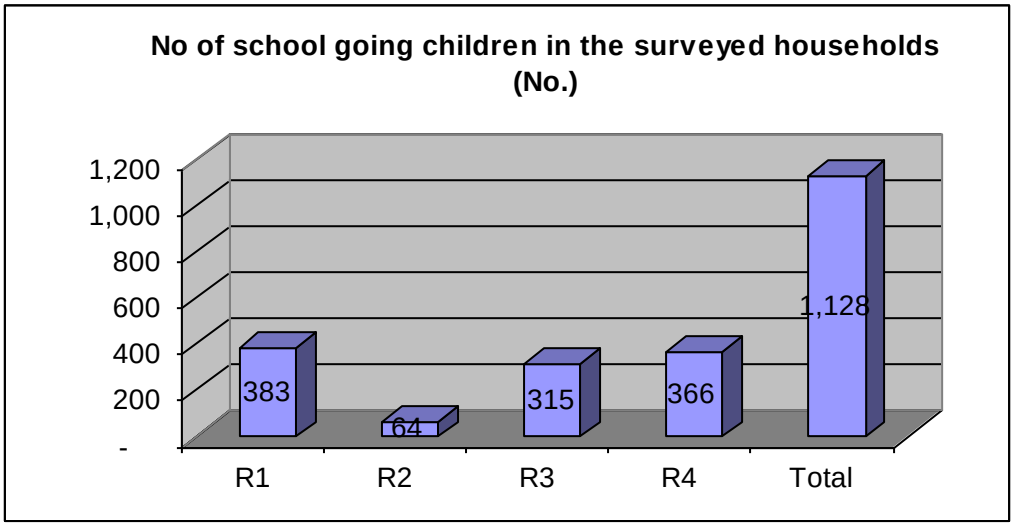
Level of Education (%, n=509)



Highest education level in the house (n=509)



Education



Target:
Education

KEA – Participation

Indicator – Number of school going children

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:
Need to link with other indicators for assessment.. Determine ration girls: boys.

Notes:

Working Group Members:

References:

Education

Target:
Education

KEA/Indicator

- Environmental : "Formal" scientific knowledge
  - % with knowledge that coral reefs are important to prevent coastal erosion;
  - % with knowledge that protection of coral reefs will benefit fisheries in the long run;
  - % with knowledge that fisheries will decline without the mangrove ecosystems;
  - % with knowledge that coral reefs has other importance other than fishing or SCUBA diving;
  - % with hopes that mangroves and coral reefs will remain for their future generation to appreciate;
  - % with knowledge that no-take-zone should be established or fishing effort limited in some areas to allow growth and recovery of fish and coral reefs;
  - % with knowledge that sea grass has direct and indirect value to people.

Justification for Indicator:
These indicators indicate the community's level of awareness on ecosystems, habitats and marine life.

Long-term Viability Goal:

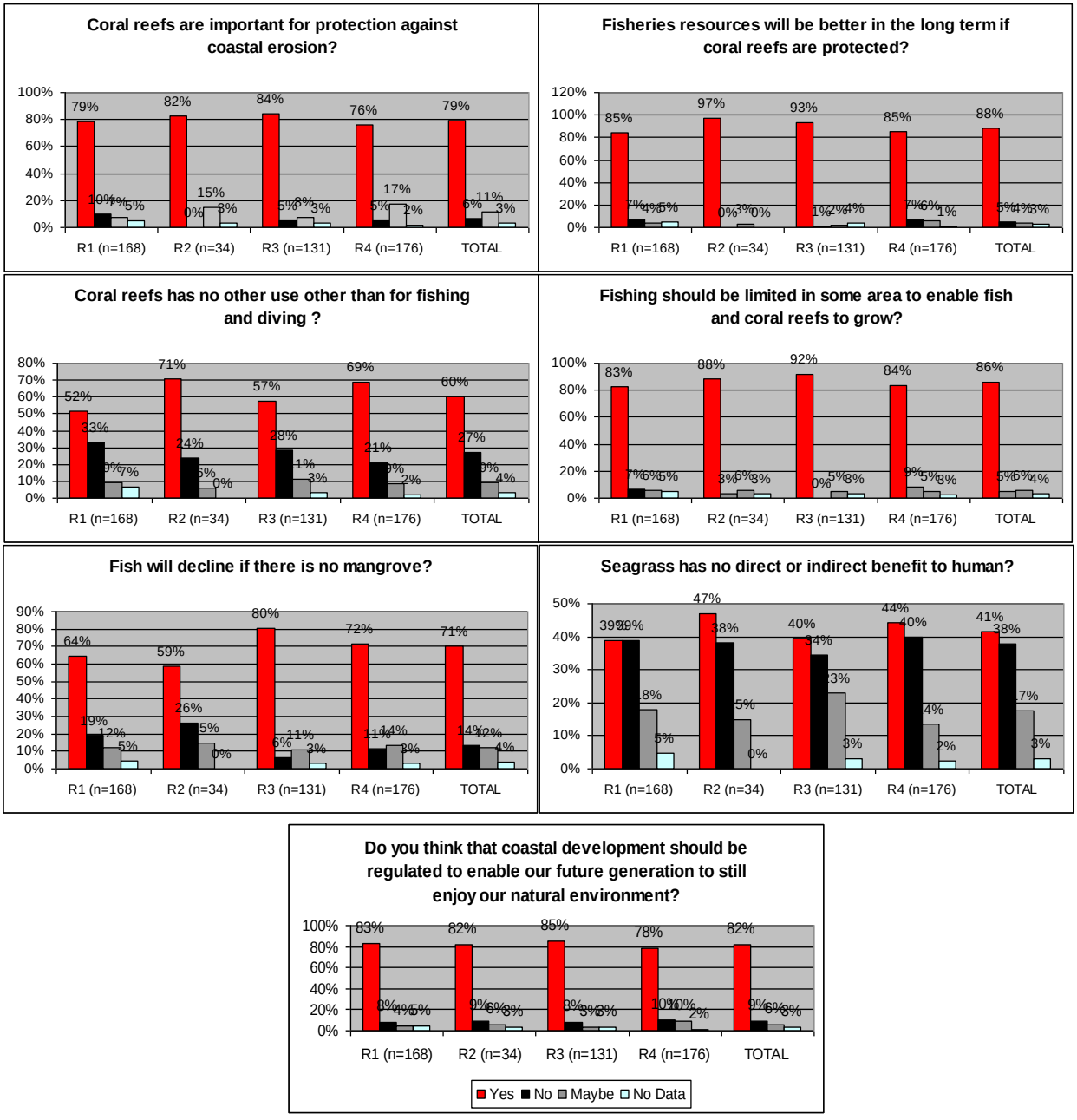
Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:


Coral reefs are important for protection against coastal erosion?
Fisheries resources will be better in the long term if coral reefs are protected?
Coral reefs has no other use other than for fishing and diving ?
Fishing should be limited in some area to enable fish and coral reefs to grow?
Fish will decline if there is no mangrove?
Seagrass has no direct or indirect benefit to human?
Do you think that coastal development should be regulated to enable our future generation to still enjoy our natural environment?
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL
Yes
No
Maybe
No Data

Education

Target:
Education

KEA/Indicator

- Environmental : Local" knowledge of natural history
  - % with knowledge that turtle can live up to 100 years
  - % with knowledge that out of 1,000 turtle hatchlings, only 1 will grow to adulthood
  - % with knowledge that sea turtles are fully protected under the Sabah Wildlife Enactment
  - % with knowledge that sea turtle population is declining globally
  - %with knowledge that sea turtles are migratory species

Justification for Indicator:
These indicators indicate the community's level of awareness on endangered species?

Long-term Viability Goal:

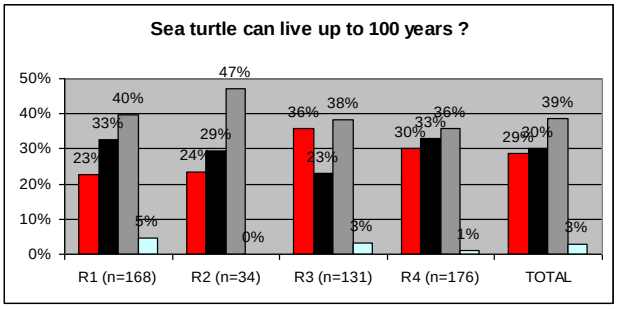
Monitoring Approach:

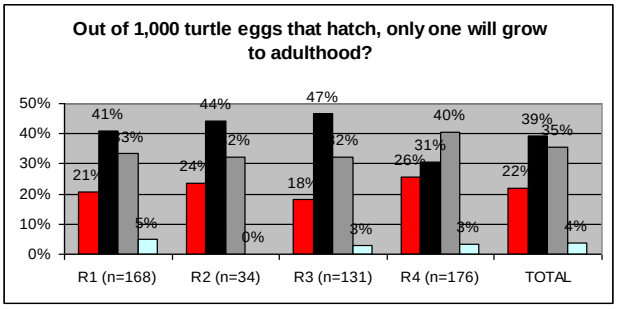
Future Indicator Development Required:

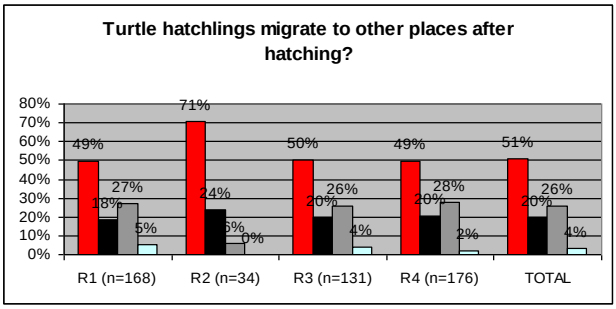
Notes:

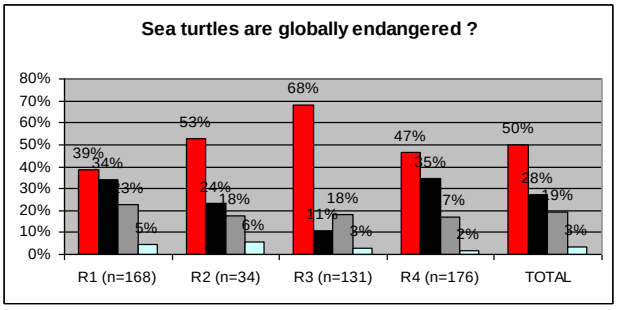
Working Group Members:

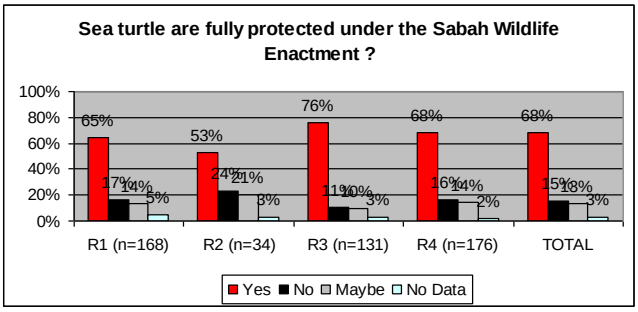
References:


Sea turtle can live up to 100 years ?
50%
40%
30%
20%
10%
0%
23%
33%
40%
5%
24%
29%
47%
0%
36%
23%
38%
3%
30%
33%
36%
1%
29%
30%
39%
3%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Out of 1,000 turtle eggs that hatch, only one will grow to adulthood?
50%
40%
30%
20%
10%
0%
21%
41%
33%
5%
24%
44%
32%
0%
18%
47%
32%
3%
26%
31%
40%
3%
22%
39%
35%
4%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Turtle hatchlings migrate to other places after hatching?
80%
70%
60%
50%
40%
30%
20%
10%
0%
49%
18%
27%
5%
71%
24%
6%
0%
50%
20%
26%
4%
49%
20%
28%
2%
51%
20%
26%
4%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Sea turtles are globally endangered ?
80%
70%
60%
50%
40%
30%
20%
10%
0%
39%
34%
23%
5%
53%
24%
18%
6%
68%
11%
18%
3%
47%
35%
17%
2%
50%
28%
19%
3%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Sea turtle are fully protected under the Sabah Wildlife Enactment ?
100%
80%
60%
40%
20%
0%
65%
17%
14%
5%
53%
24%
21%
3%
76%
11%
10%
3%
68%
16%
14%
2%
68%
15%
13%
3%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL
Yes
No
Maybe
No Data

Education

Target:
Education

KEA/Indicator

- Environmental : MPA regime
    - % with knowledge or understand the meaning of collaborative management
    - % with prior knowledge of the proposed Tun Mustapha Park, a proposed multiple-use MPA
    - % with knowledge or understanding of the role of Sabah Parks in the management of MP
    - % that agrees that coastal development need to be regulated/control to ensure conservation of nature for the enjoyment of future generation

Justification for Indicator:
These indicators indicate the community's level of awareness onMPA management in TMP.

Long-term Viability Goal:

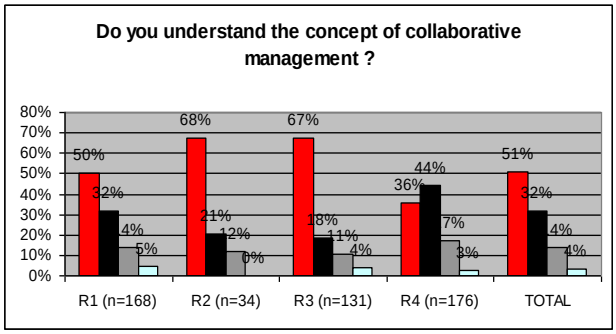
Monitoring Approach:

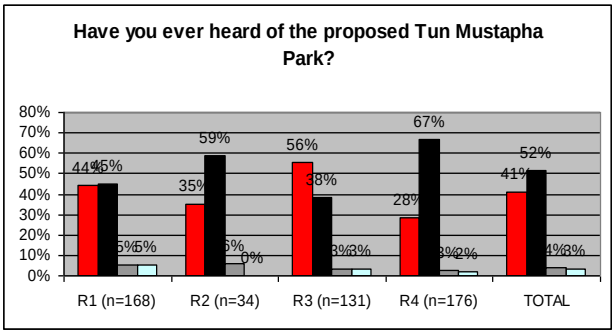
Future Indicator Development Required:

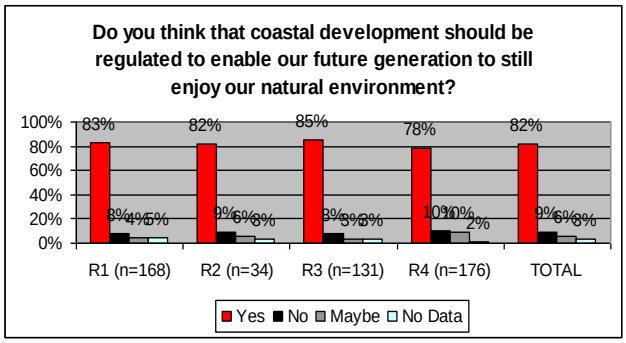
Notes:

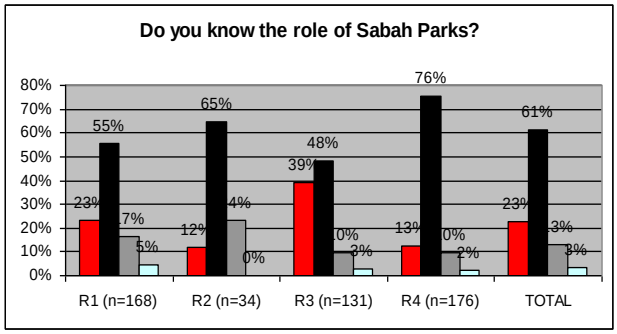
Working Group Members:

References:

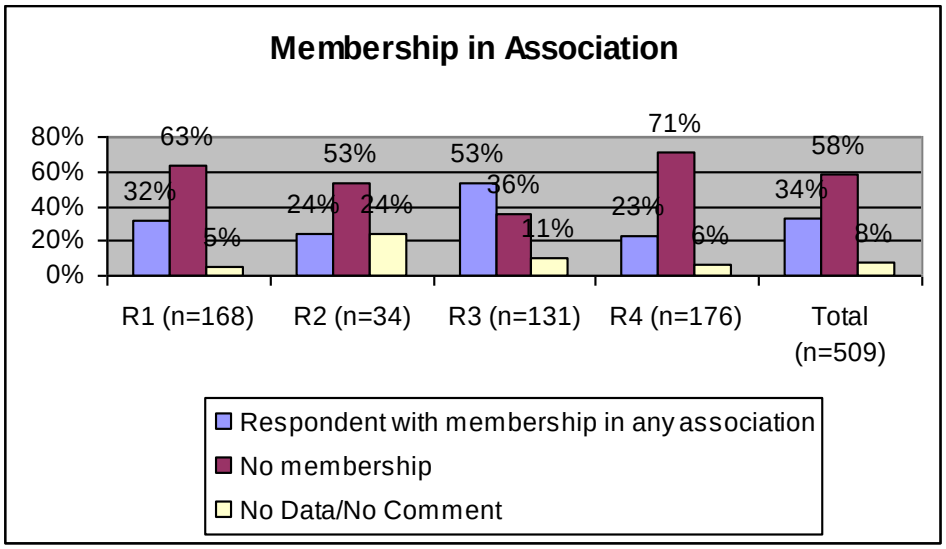

Do you understand the concept of collaborative management ?
80%
70%
60%
50%
40%
30%
20%
10%
0%
50%
32%
4%
5%
68%
21%
12%
0%
67%
18%
11%
4%
36%
44%
7%
3%
51%
32%
4%
4%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Have you ever heard of the proposed Tun Mustapha Park?
80%
70%
60%
50%
40%
30%
20%
10%
0%
44%
45%
5%
5%
35%
59%
5%
0%
56%
38%
3%
3%
28%
67%
3%
2%
41%
52%
4%
3%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL


Do you think that coastal development should be regulated to enable our future generation to still enjoy our natural environment?
100%
80%
60%
40%
20%
0%
83%
8%
4%
5%
82%
9%
6%
8%
85%
8%
3%
3%
78%
10%
10%
2%
82%
9%
6%
8%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL
Yes
No
Maybe
No Data


Do you know the role of Sabah Parks?
80%
70%
60%
50%
40%
30%
20%
10%
0%
23%
55%
17%
5%
12%
65%
24%
0%
39%
48%
10%
3%
13%
76%
10%
2%
23%
61%
13%
8%
R1 (n=168)
R2 (n=34)
R3 (n=131)
R4 (n=176)
TOTAL

Empowerment



Target:
Empowerment

KEA/Indicator

- Capacity
    - Membership in association/groups

Justification for Indicator:
Membership & Participation in Association – proxy indicator for decision making capability and empowerment

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Empowerment

Target:
Empowerment

KEA/Indicator

- Interest (% population interested in collaborative management)
    - % interested to know more about collaborative management of fisheries resources with the government agency
- Leadership (% of stakeholder groups represented in MPA management; # of individuals from each stakeholder group represented in MPA management)
    - % having met the political representative of the area to discuss environmental issues, or to suggest solutions to problems in the area
    - % think that their opinion and suggestions in a meeting is taken seriously and into account

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

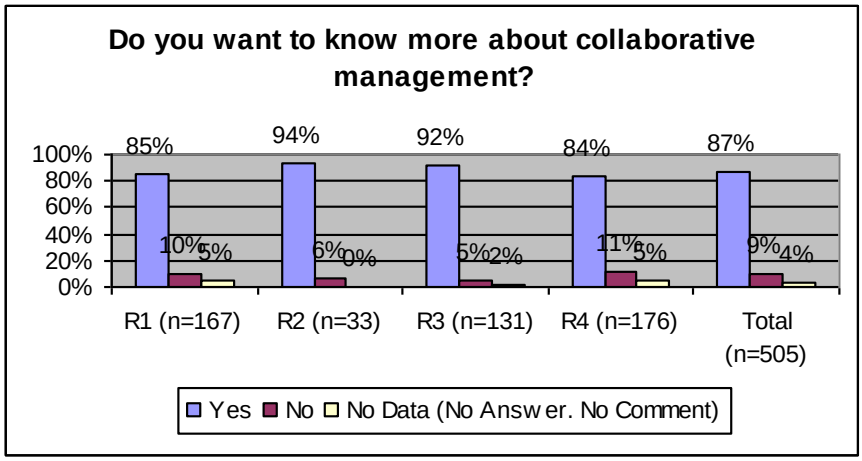
Future Indicator Development Required:

Notes:

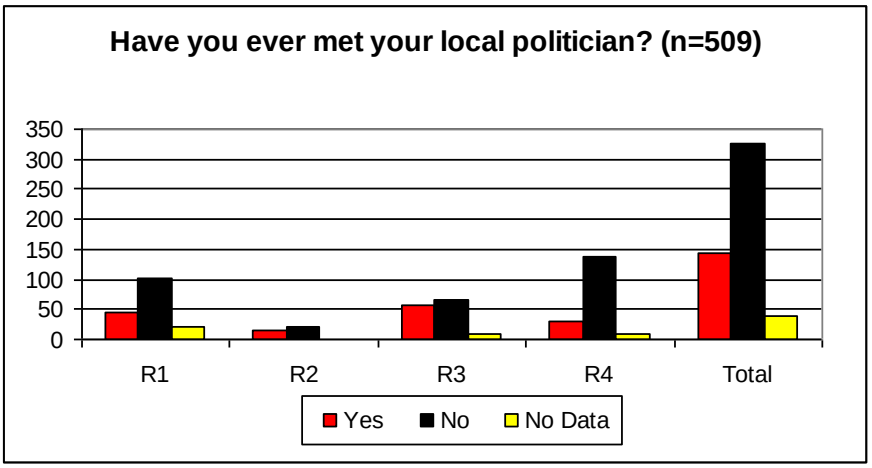
Working Group Members:

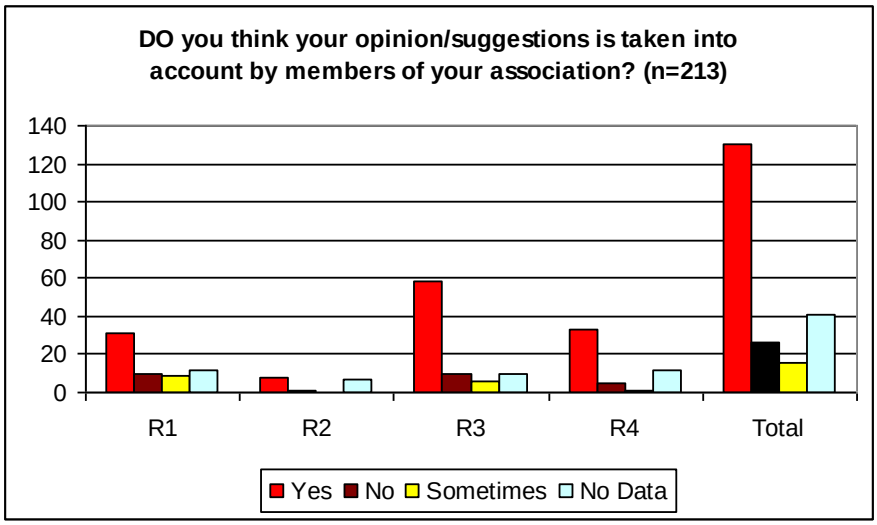
References:

Interest in collaborative management:



Leadership:



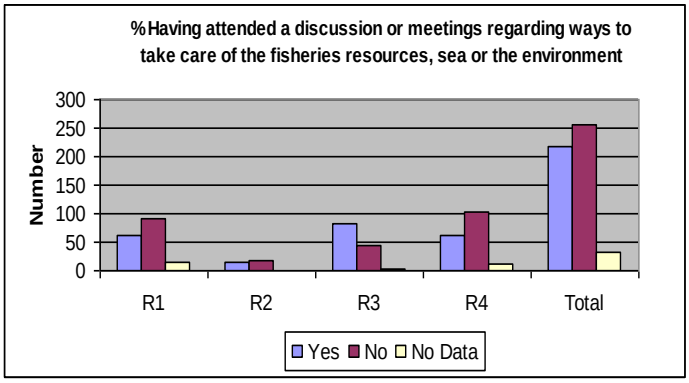


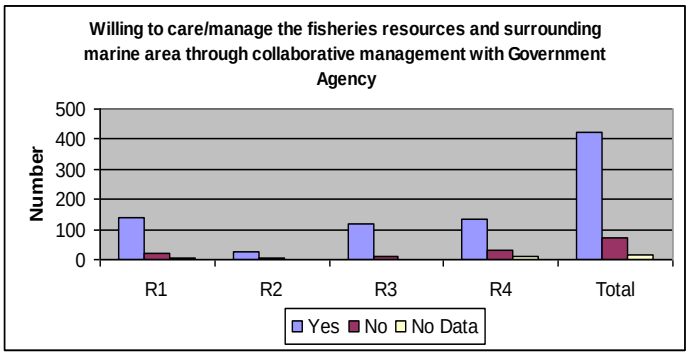
Empowerment

Target:
Empowerment

KEA/Indicator

- Participation
  - % have attended discussions or meeting on ways to take care of the fisheries resources, sea or the environment
  - % willing to care/manage the fisheries resources and surrounding marine area through collaborative management with Government Agency.





Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

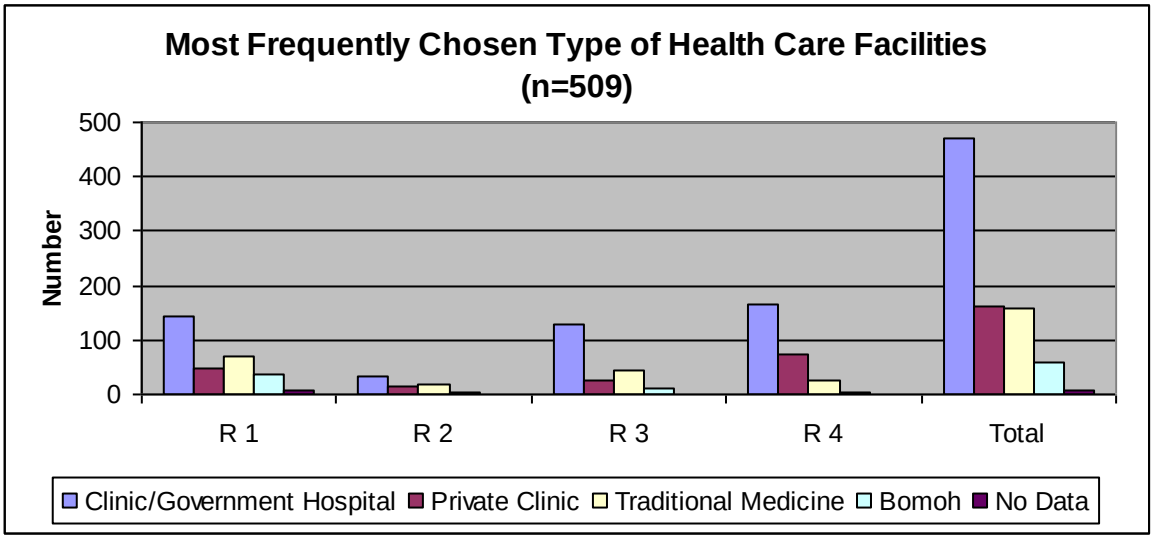
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Health



Target:
Health

KEA/Indicator

- Availability of health services (% w/access)
    - Choice of health care services (%)

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

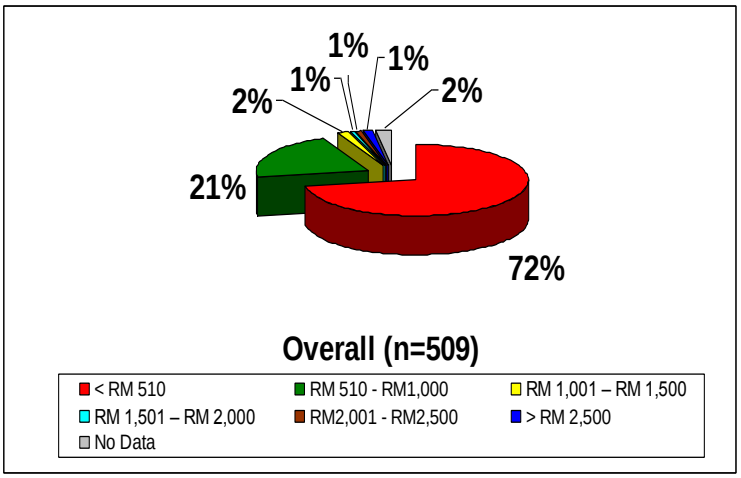
References:

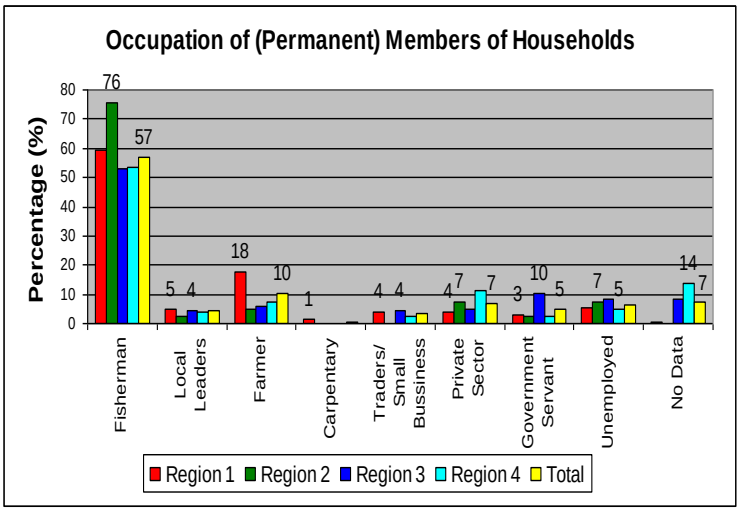
Wealth

Target:
Wealth

KEA/Indicator

- Income
  - Quantity (% below national poverty line; mean % of national median)
    - - (House) Income range (%,)
  - Source (mean % of income reliant on fishing or extraction)
    - - Livelihood/income source of household family members





Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Wealth

Target:
Wealth

KEA/Indicator

- Material Assets
    - Housing
        - Type of House (%)
        - No. of Bedrooms (%)
        - Roof Material (%)
        - Flooring Material (%)
        - Type of Toilet (%)

Justification for Indicator:

Long-term Viability Goal:

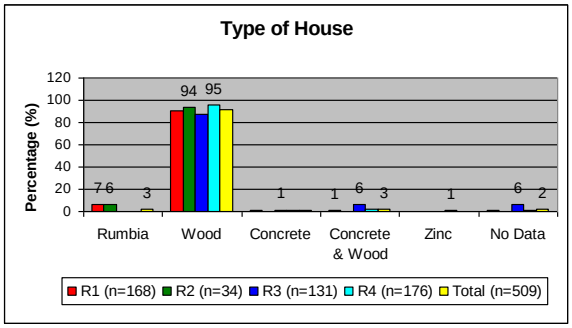
Monitoring Approach:

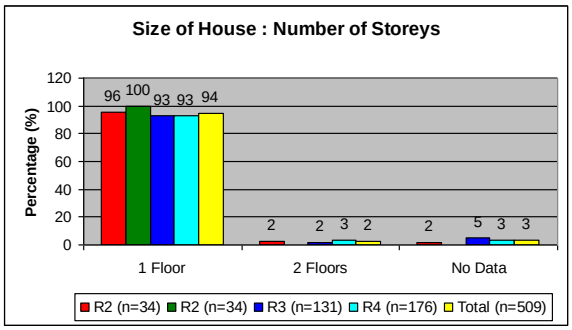
Future Indicator Development Required:

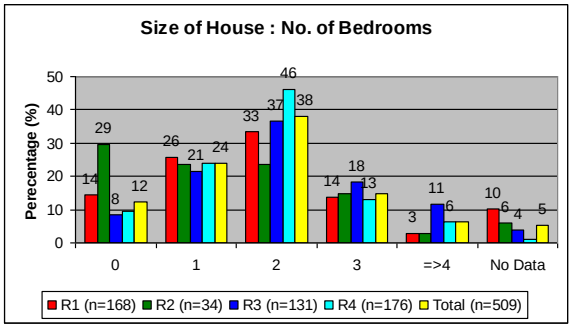
Notes:

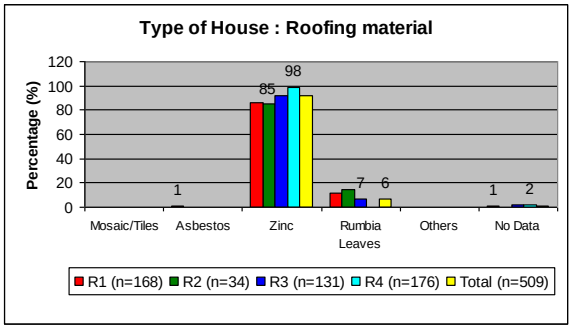
Working Group Members:

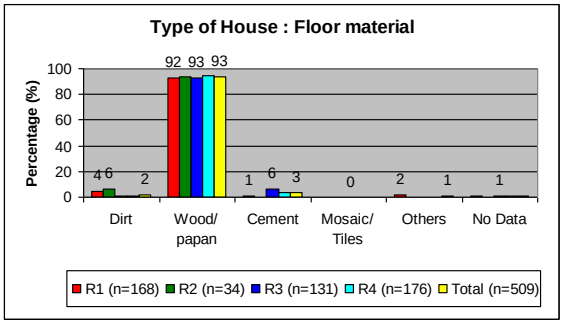
References:

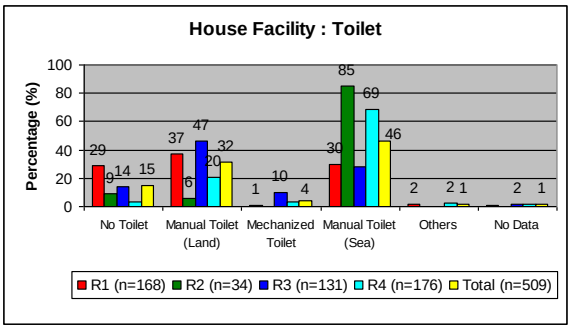

Type of House
Percentage (%)
120
100
80
60
40
20
0
7 6 3
94 95
1
1 6 3
1
6 2
Rumbia
Wood
Concrete
Concrete & Wood
Zinc
No Data
R1 (n=168) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)


Size of House : Number of Storeys
Percentage (%)
120
100
80
60
40
20
0
96 100 93 93 94
2
2 3 2
2
5 3 3
1 Floor
2 Floors
No Data
R2 (n=34) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)


Size of House : No. of Bedrooms
Perecentage (%)
50
40
30
20
10
0
14 29 8 12
26 21 24
33 37 46 38
14 18 13
3 11 6
10 6 4 5
0
1
2
3
=>4
No Data
R1 (n=168) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)


Type of House : Roofing material
Percentage (%)
120
100
80
60
40
20
0
1
85 98
7 6
1 2
Mosaic/Tiles
Asbestos
Zinc
Rumbia Leaves
Others
No Data
R1 (n=168) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)


Type of House : Floor material
Percentage (%)
100
80
60
40
20
0
4 6 2
92 93 93
1 6 3
0
2
1
1
Dirt
Wood/ papan
Cement
Mosaic/ Tiles
Others
No Data
R1 (n=168) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)


House Facility : Toilet
Percentage (%)
100
80
60
40
20
0
29 9 14 15
37 6 47 20 32
1 10 4
30 85 69 46
2
2 1
2 1
No Toilet
Manual Toilet (Land)
Mechanized Toilet
Manual Toilet (Sea)
Others
No Data
R1 (n=168) R2 (n=34) R3 (n=131) R4 (n=176) Total (n=509)

Wealth

Target:
Wealth

KEA/Indicator

- Material Assets
    - Technology
        - Power source (%)
        - TV (%)
        - Telephone (%)
        - Refrigerator (%)
        - Video camera (%)
        - CD/DVD Player (%)
    - Boat (%)
    - Car (%)

Justification for Indicator:

Long-term Viability Goal:

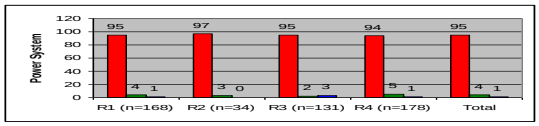
Monitoring Approach:

Future Indicator Development Required:

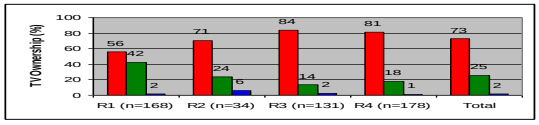
Notes:

Working Group Members:

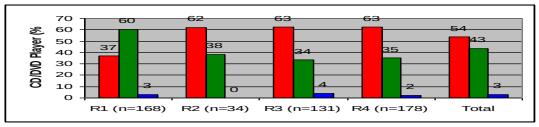
References:



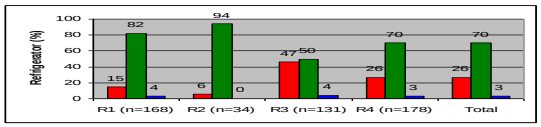
Power System



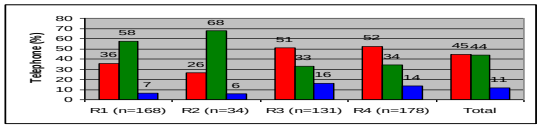
TV Ownership



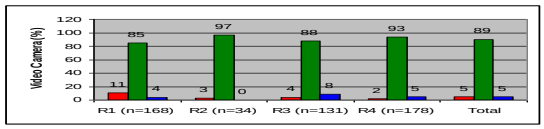
CD / DVD Player



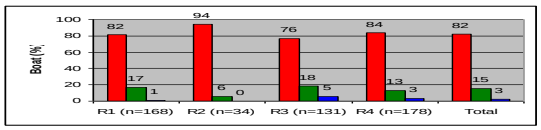
Refrigerator



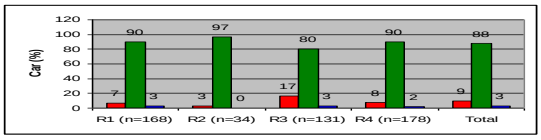
Telephone



Video Camera



Boat



Car

Ownership of material Assets

Legend:
Red = Yes, **Green** = No
(R1 – R4; Total)

APPENDIX 4

HEART OF BORNEO[21]

[21] This Appendix was updated on February 24, 2009 and replaces the original Heart of Borneo Appendix in the original report, released on January 30, 2009.

Appendix 4: Heart of Borneo

The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

Credits:
WWF-Indonesia and WWF-Malaysia staff collaborated to compile the data depicted within this appendix. WWF-Indonesia staff include Cristina Eghenter, Hanna Tobing and Stephan Wulfraat. WWF-Malaysian efforts were led by Dora Jok.

Technical Progress Report

CONSERVATION MEASURES TECHNICAL REPORT
"HEART OF BORNEO MEASURES PROGRAM"

I. PROJECT OVERVIEW

A. Title: Heart of Borneo Measures Program

B. Recipient: WWF-Indonesia

C. Project Period: October 2007 – October 2008 (effective)
(Original project period: July 2007 – June 2008)

The island of Borneo is one of the richest places in the world in terms of biodiversity. Most of the island is until recently covered by tropical rainforests. While some parts of the lowland areas have been converted to other land use types, much of the interior is still intact. This interior area, known as the Heart of Borneo, comprises the upstream sections of all the major river drainage areas of Borneo. The tropical rainforest of the Heart of Borneo covers almost 30% of the third largest island in the world and represents one of the largest contiguous forests remaining in all of Southeast Asia.

The Heart of Borneo area is known for the cultural and linguistic diversity of the several ethnic groups of Indigenous Peoples collectively known as Dayak. Local people depend on the forest for a variety of resources including: food, medicinal plants, non-timber forest products for trade, wild game, fish, construction materials and water. The traditional management practices of the Dayak communities have contributed to managing sustainably the natural resources of the area over the last centuries.

The area also represents one of the most biologically diverse habitats on earth. The highly diverse topography of Borneo resulted in the development of a high variety of forest ecosystems, ranging from swamp and Dipterocarp forests in the lowlands to upper montane cloud forests in the mountains. An extremely high number of plant and animal species have evolved in these forest ecosystems, and many of these are endemic to the island of Borneo. Most of the original forest ecosystems and wildlife of Borneo is still present and the preservation of the Heat of Borneo is being given the highest conservation priority.

In February 2007, through the signing of the HoB initiative, the governments of Indonesia, Malaysia and Brunei have agreed and committed to protecting the Heart of Borneo and promote sustainable use of resources in the area. A major conservation work of WWF focusing on the centers of Borneo is known as the HoB Program, which is one of WWF Network Initiative being hosted by WWF-Indonesia.

II. PROJECT DESCRIPTION

A. Project Objectives

The broader goal of the program is "development of a practical measures framework and data status for biological and socio-economic outcomes of conservation and community empowerment field activities". The HoB Measures is set-out to achieve two specific objectives:

1. Identification of parameters/indicators for measuring the socio-economic and biological status of Heart of Borneo

2. To apply as field trials the framework at the landscape of the HoB, to include two existing work sites of WWF in Indonesia: Kayan Mentarang and Betung Kerihun National parks.

Later, discussions for expansion to cover data collection from the Malaysian side of HoB arose. The process evolved gradually, but timely caught the assignment of a newly-hired HoB Malaysia staff in Kuching, in June 2008. Data collection from Malaysian Sarawak state initiated by then, which up to this point is partially completed.

B. Project Activities

1). Identification of HoB Status Measures

A number of ***biological*** indicators were defined during the workshop organized by WWF-US in Washington in November 2007. Measures on land use, major vegetation, habitats and distribution of key species are categorized to cover the indications for Biological status, Threat, and Conservation Management.

WWF-Indonesia and WWF-US agreed on the indicators to measure the ***socio-economic and cultural*** status in the HoB in the workshop held in Jakarta in December 2007. The parameter for measurement follows along five components: Health, Education, Political Empowerment, Culture, and Economic well-being (see Attachment 1). The indicators were largely made with reference to the Millennium Development Goals (MDGs), the global set of measurable objectives for development and poverty eradication.

2) Data collection

An ample of reliable sources for the biological data was basically straightforward and more accessible, as these are found to be WWF projects, program partners or consultants. While similarly easy to identify, the available sources for the requisite socio-economic data are scattered, and notably mostly among the government

institutions, which are less familiar to WWF. The case is proofed true for both WWF-Indonesia and WWF-Malaysia.
Data collection for the biological indicators was almost fully undertaken by own staff, who dedicated about 60% working time for the HoB Measures project. Considering time limitation for staff recruitment, data collection for the socio-economic and cultural data, on the other hand, was done through outsourcing. WWF-Indonesia hired two external data collectors, one each for working in East and West Kalimantan province. The management from Kayan Mentarang (East Kalimantan) and Betung Kerihun (West Kalimantan) assisted in supervising the data collection activity in each respective area. WWF-Malaysia engaged an external consultant for data collection in Sarawak, under the supervision of one Kuching-based HoB staff.

The overall data collection activity tentatively took place from March to July 2008 for Indonesia, and from June to August, 2008 for Malaysia. In the second week of August, 2008, the teams from both countries gathered in Jakarta for a joint review of data collection progress and results.

3) Compilation and preliminary analysis of data

During the period July-August, 2008, compilation and organization of data and preliminary analyses were done in Jakarta, with distance coordination to Kalimantan provinces as well as intermittent communications to WWF-US. More intensive meetings of the complete members of Measures team of Indonesia, for discussing on data gaps and conclusions were held in early September, 2008 in Jakarta.

C. Related Activities

The HoB Measures is corresponding to development of the ***Matrix Indicators for CE conservation performance***. By adopting the Community Empowerment (CE) as a conservation pillar, WWF-Indonesia aims to achieve sustainable conservation impacts while maintaining a fair distribution of conservation costs and benefits among stakeholders. WWF-Indonesia is interested in ensuring that its conservation work contributes to creating just and more equitable conditions, and that at least, it brings neither harm nor additional costs to the main stakeholders/partners local communities.

The matrix is a tool for measuring results (or success), that enables claiming of success that indeed belongs to WWF. Measurements recognize three key elements: equity (political, social, economic), partnership (power-sharing, collaboration), and sustainability (ecological, social, and economic). It measures both the outcome of socio-economic interventions (success in policy advocacy, in starting-up conservation-based enterprises) and their conservation impacts. This in turn helps measuring the accountability to all stakeholders, i.e., right holders, partners (especially the communities), donors and the general public.

Another activity, the ***surveys of peat swamp ecosystems and lowland ecosystems*** fits the HoB Measures to fill-in the information gap for the ecological indicators.

III. PROJECT ACCOMPLISHMENTS

A. Achievement/Results as related to Objectives

1) Biological Indicators

A number of thirteen biodiversity targets were selected and for each target indicators were developed that would provide significant measurable information. The indicators include biological, threat and conservation management indicators. Many of these indicators are in the form of spatial information, while additional field information was also compiled and integrated with the spatial data.

Two types of targets were recognized. The first group are the ecosystem targets, comprising all major ecosystems of Borneo (peat swamp, heath, limestone, lowland, upland, montane and river ecosystems) while the second groups concerns major keystone species (orangutans, endangered plant species, forest edge herbivores, rhinos and large number of bearded pigs).

The compilation and analyses of the status data for the ecosystems indicators went very well, and nearly all of the required information could be made ready. This was strongly facilitated by the recent availability of an up-to-date cloud-free satellite image mosaic for the whole of Borneo.

The identification and mapping of un-degraded forest (canopy cover >60 %) was the only issue that could not be done with these images, and this indicator data still needs to be investigated further. A second problem was with the illegal logging data, of which only a few point records are available. The same problem was encountered with tree species diversity in lowland forest ecosystems, since only few coordinate records exist for the selected endemic Dipterocarpaceae, Fagaceae and Moraceae.

The compilation and analyses of the status data for the keystone species indicators turned out to be a more complicated exercise. Extensive research has been done on orangutans, rhinos and elephants and spatial as well as field data was sufficiently available. The extent of suitable habitats for clouded leopards could be mapped by combining landscape ecological characteristics and ecological knowledge. Information on banteng distribution is very limited and the occurrence of these wild cattle cannot be directly correlated to landscape ecological characteristics. Good representatives for endangered plant species were found by selecting the rare endemic pitcher plants (Nepenthaceae), of which useful distribution records exist for most species. These pitcher plants serve as good indicator species since they grow mainly in fragile habitats.

Reliable and quantitative data on large numbers of bearded pigs exist only for a few study areas. It is still being investigated whether it is possible to extrapolate this information to other areas of Borneo.

2) Socio-economic and cultural indicators

At this trial stage, the focus is collection of statistical and secondary data as available from government institutions and researches previously conducted in the HoB area. Considering the huge area and complexity of the HoB landscape, data collection was decided to focus on two provinces: East Kalimantan and West Kalimantan. Provinces are geographically situated bordering to Sabah and Sarawak states of Malaysia. Further selection of four districts in each province was based on the combined criteria of being work site of WWF in the Indonesia-Malaysia borderline, or neither country border nor WWF site, but poorest district in the province by government definition.

In general data completion for all socio-economic parameter was well-achieved; though their levels of completeness or detail per each indicator are vary across district locations. Note has to be made on the unexpected absence of government data on "school graduation rate" for Kapuas Hulu district, substitute secondary information for which from other sources likewise non-exists.

Second note is limitation in the data on "housing ownership" for all eight districts; while it doesn't hamper the overall configuration of the economic well-being of the community. To this purpose, semi statistical information from researches and WWF-Indonesia projects provide adequate suffice. The data include, among others, ownership of household goods, access to credit, and membership in community organization with saving and loan services.

Detailed data on access and transportation were collected for areas where WWF is active and owning good knowledge of the field conditions. The data talks directly to the level of isolation and (long) distance from administrative and economic centers. However, they do not explicitly indicate the implied economic burden (or the cash needed by local people) to reach the sub-district and district centers from their respective villages.

For "culture" component, data collection was concentrated on indicators that could provide an objective measure of "culture" and a phenomenon like "cultural revival," for example the number of cultural associations and cultural events in the area. However, wary is noted of any attempt at measuring the "cultural integrity" as such, which ideologically and socially remains a problematic concept.

Data from the field on the use of traditional medicines is data on (still extensive) knowledge of traditional plants used for medicinal and other purposes by local communities. Quantitative data on use of medicinal plants are not available at present, however it can be stated that most commonly local people use a combination of medicinal options, including traditional methods and plants, and "a mix of different paradigms of healing" (Gollin, L., 2001).

B. Brief summary of data analysis for Heart of Borneo

1) Biological status, Threat, and Conservation Management

Biological status

Suitable habitats for *clouded leopards* could effectively be identified and mapped and the viability can still be classified as good, with relatively large areas still present. Orangutan distribution maps indicated the rapid decline of habitats. Only preliminary data on densities, mainly based on assumptions, exist.

The *elephants* of Borneo, which are mostly living in Sabah, have suffered from habitat conversion over the last decades. Extent of remaining habitats and connectivity will be the major indicators for measuring. The total population size remains in a way relatively stable, since elephant herds move from destroyed habitats into protected habitats.

Bantengs have only been documented from a few areas in Borneo. Although we know that they prefer grasslands and young secondary vegetation within forested areas, this does not imply that all these habitats have bantengs.

The presence of large numbers of *bearded pigs* is a good indicator for the functioning of forest ecosystems with special significance to the local communities, since wild pigs are some of their major sources of proteins. Obtaining this information is however more complicated than originally anticipated and will need large-scale field research.

The only location where there is still an opportunity for survival of the *Borneo Rhinoceros* is in a few protected areas in Sabah. The occasional records from other areas in Borneo concern most likely only single individuals and no viable populations.

The endemic *Nepenthaceae* was chosen for endangered plant species indicator. Most of these have a very limited distribution. A number of species occur only in locations without any legal protection status.

Peat swamp ecosystems occur mainly in the wide coastal lowlands. Many areas have either been converted or are highly disturbed. Interior peat swamp areas, which are within the Heart of Borneo, are generally in better conditions.

Limestone ecosystems occur scattered throughout Borneo, but the only large areas are at the Sangkuliran peninsula in East Kalimantan and in the northernmost part of South Kalimantan. These two areas are partly degraded while the smaller limestone areas in the all in good conditions. Degradation of limestone ecosystems is usually irreversible.

Originally there were large stretches of *heath forest* particularly in Indonesian Borneo. Our analysis shows however that few wide areas of heath forest are left, mainly in

central and east Kalimantan. Even these remaining areas are not completely in pristine conditions, as several parts got burnt in the last 25 years.

The project managed to produce an updated map of the extent of *lowland rainforest ecosystems* by applying the latest satellite images. This shows how little lowland forest is left. By further checking for logging and forest fires, it was found that primary lowland rainforest is becoming a rare ecosystem in Borneo.

The picture looks a bit brighter for *upland forest ecosystems*. Most of these are still in good and in many cases even primary conditions. The total area is however much smaller than lowland forest, although it is the major ecosystem of the Heart of Borneo area.

Montane forest ecosystems are generally still in primary conditions. Nearly all of the montane ecosystems are within the Heart of Borneo area. These areas have a very high rate of local endemism for animal and plant species.

An interesting map was created which shows the *forest cover* in percentages of the *drainage areas* of all the major rivers of Borneo. It is clearly visible from this map (by using color codes) that forest cover of the drainage areas in the southern and western part of Borneo is generally rather low, while in the northern part of Borneo conditions are better.

Threat

All potential and current threats were analyzed for scope, severity and irreversibility and a threat rating was done by using Miradi software. This clearly indicated the highest threats and the most threatened targets. We concentrated on these for our measures status data.

The threats classified as “very high” are industrial conversion of natural forests and forest fires. It was found that the most severe affected targets are lowland, peat swamp and heath forest ecosystems, and orangutans. These threats could be mapped, indicating the locations with the highest threats.

The threats classified as “high” are illegal logging, commercial unsustainable rates of legal timber extraction and mining. The same targets plus limestone ecosystems are the most severely affected. Only mining concessions could be mapped, while for the other threats much more field data is needed.

Conservation management

Conservation management indicators concentrated mainly identifying areas with a protected status for each target. Minimum area requirements were analyzed and connectivity was also taken into consideration.

2) Social Condition Status

Review of the indicators

The process of data collection and preliminary analysis of the results prompted the need to re-define some of the indicators (i.e., what do the indicators actually measure?) as initially agreed, and the identification of additional ones that would be important to consider in the future.

It was found that Credit Union, originally defined as an indicator of community organization, should indeed, and more appropriately, used as an indicator of economic strength of local communities. With regard to the listing of "Village organizations", and given the extensive, capillary penetration into the administrative and political life by the Indonesian state at all levels as part of the drive to build a unitary state and to shape consensus, including villages, these might be best captured as an indicator of political participation.

Food security might be best categorized under the economic well-being. This would also sit well with one of the most striking aspects of life of local people in the Heart of Borneo, i.e. the high reliance on a wide range of food sources and wild foods that help reduce their vulnerability to natural disasters and climatic changes.

In this regard, it was recognized that important aspects of livelihoods and well being have not been included in the initial indicators and consequently, not measured, including data on number of plants and natural resources used for food. This kind of data might not be available for all the areas or districts, but could be drawn from specific research projects (with sample communities) conducted on this topic. The number of hectares of lands under cultivation (swidden cultivation, permanent rice fields, gardens, agro-forestry plots) in each community might also be useful indicator of economic sustainability and security. The latter data could be compiled from the results of participatory community mapping.

The inclusion of these additional indicators would enable to see more clearly the multi-dimensional picture of "economic well-being" and "good livelihood." Areas that in government statistics are defined as "poorest of the poor" (including the Malinau district, for example) might actually be possibly "poor in cash" but enjoy additional levels of food security, land use security, and water availability, that might not existing in other areas.

Some features

Poverty and demography. Almost all eight district locations identified as "poor" area in the government poverty map. In Malinau (*BPS Kab. Malinau*, 2007), a portion of 72% of the total population lives below the national poverty line, and 99 out of its total 107 villages are categorized as "under-developed" villages. Population density varied across locations, and ranged from 6 persons / Km2 in Kutai Barat district, to 33 persons / Km2 in Landak district.

Infant Mortality & Disease rates. The level of "child mortality per 1000 live births" for Indonesia is 32 (UNDP, 2007). Data from eight district locations is strikingly different, with highest IMR rate in 2006 for Sintang district (140) and lowest for Kutai Barat (3.62). At the national level, a combination of three diseases (respiratory infection, prenatal complications, diarrhea), accounts for a 75 percent share of infant deaths. These are consistent with major diseases identified in the statistical data for eight locations, with addition of either malaria or tuberculosis in four top causes of child mortality.

Culture & rights. Some data on cultural integrity in daily live of Dayak ethnic group was obtained from East and West Kalimantan provinces. These were data on key cultural events, presence of sacred places, and management of customary lands/forests by the local ethnic people. While mostly non-statistical in nature, data from government office in Kapuas Hulu district proofs that around 60% of the forests area in the district is "owned" or being managed by the local community. The local ethnic groups are highly interested in conserving their natural resources (land, lake, and forest areas) as these are recognized as source of freshwater, foods, and plants for cultural functions. Recognition of customary rights, through adoption in government regulations also appear in Kapuas Hulu data.

For the purpose of the HoB Measures data collection, the project has for practical reasons relied on secondary sources that are mostly formal publications from government sectors. This goes with the assumption that these, as being regularly published, are continuously available data sources. Experience from this initial stage however demonstrates that such availability (while not mentioning the level of its "accessibility") is not either automatically guaranteeing data completeness. Cautions as well should be maintained for checking on the right sources for the right information for each location. The right statistics, being known as reliable tools for gaining the macro level configuration at a certain "data collection unit", is equally confirming its insufficiency to provide the micro level explanations. To gain more meaningful comprehension of the local dynamics and realities in the specific HoB areas, complementary sets of field information and professional knowledge are equally essential.

C. Please comment on the following elements of the program:

i. **Human Capacity** (What capacity was employed to accomplish the objectives: staff, technical expertise, etc.? Was this sufficient? If not, please comment on the gaps)

One WWF-Indonesia staff dedicated about 60% time for the HoB Measures project, and was responsible for the "biology" component. Two more staff worked part time (contributing 30% and 20% working time each) for the overall project management and coordination, as well for handling the "socio-economic-cultural" component. In addition, as indicated earlier in Section B. point 2), the project employed two data collectors for Kalimantan provinces, each of whom working on a three-month contract base. For the project in Malaysia, one HoB-staff who was newly-hired and based in Kuching, worked for a tentative two-month period, and supervised one hired external consultant.

Personnel gaps would be the supposedly assignment of one full-time monitoring officer for each provincial location. Recruitment did not turn-out as planned, pertaining to time constraints and the administrative limitations.

ii. **Methods (**Please evaluate the Conservation Measures methodology. What were its strengths and weaknesses? Please comment specifically on issues of data availability, analysis, & issues associated with scale.)

Sampling strategies

The huge area coverage of HoB locations and high diversity with different level of accessibility to data sources came facing the HoB measures team in the first place. This was partially true with the biological data, but more for the socio-economic and culture component. The fact that data are not always comparable across all data collection units and limited time to compile data from research reports were next challenges in the process.

Since the onset of data collection, WWF-Indonesia Measures team decided to prioritize sampling areas. The focus on eight districts in two provinces for the socio-economic indicator is the result of this decision (see Table 1). The selected districts are areas where WWF has been most active, are key areas of future growth and directly in the larger HoB program, and also appear as especially isolated and poor according to government statistics.

Table 1. Locations of data collection for HoB Measures

A. Indonesia		
West Kalimantan **Districts**		
Kapuas Hulu	- tans-bordering Indonesia – Malaysia	- WWF work site
Sintang	- tans-bordering Indonesia – Malaysia	- Some WWF work
Melawi	- tans-bordering Indonesia – Malaysia	- Non-WWF site
Landak	- poorest district in West Kalimantan	- Non-WWF site
East Kalimantan **Districts**		
Malinau	- tansbordering Indonesia – Malaysia	- WWF work site
Nunukan	- tansbordering Indonesia – Malaysia	- Some WWF work
Kutai Barat	- tansbordering Indonesia – Malaysia	- Non-WWF site
Kutai Kertanegara	- poorest district in East Kalimantan	- Non-WWF site
B. Malaysia		

Sarawak Long Lawas Long Lama	- trans-bordering Malaysia - Indonesia - trans-bordering Malaysia - Indonesia	 Non-WWF site Non-WWF site

Data source selection

A variety of sources were used for collecting the socio-economic secondary data. Sources vary with regard to reliability, scope, richness of detail. Statistics from the local government Statistical Bureau *BPS* office (the "District Annual Figures/*Kabupaten Dalam Angka*") were used for the general demographic/social/economic and political empowerment data, as well as information on health and educational facilities. For comparison and acquiring more details data on the employment, health conditions, and schooling achievements, checking was made with other publications as available from the relevant government sector. For East Kalimantan province, the research by CIFOR-GTZ on poverty provided insight on the economic conditions of sampled communities in Malinau and Kutai Barat districts. This is true with regard to health (drinking water, diseases, infant mortality), and the local economic wealth in connection to use of forest products. In the absence of similar research in West Kalimantan, data collector extracted study results from a number of thesis researches by graduate students from the local University. These provided useful data on biological indicators and information on protected areas.

WWF offices, through project reports, survey data, and staff experience offered important data on local access and transportation, knowledge of traditional medicines, community organizations, and cultural traditions from the ethnic groups in two National Parks.

The publications from the Central Statistical Bureau, the National Development Planning Board and UNDP were used for few comparative data at the provincial and national levels; especially relate to the achievements of the MDGs targets. While data from the national level on the MDGs statuses are directly feeding the needs, warning is that "the national indicators disguise considerable regional/provincial disparities" (UNDP, 2007). Similar concern would certainly be applicable for the consecutive lower administrative structures.

iii. **Resources** (Were there sufficient financial resources to accomplish the project objectives? If not, what would have been required?)

The resources are sufficient for the HoB Measures activities. But certainty on temporal project framework was lacking and with a late project start-up. A 2-year span would allow more efficient use of the resources

iv. **Staff Time** (How much staff time was dedicated to this project? Was this sufficient to accomplish the objectives?)

Please refer to Section C.1. Human Capacity.

v. **Alignment** (How did the Measures work fit with the portfolio of activities in HoB)

For the socio-economic component, alignment looks limited for the CE matrix; more attention should be paid for doing better in the future. Currently the HoB program has limited operational activities; in addition that the socio-economic no monitoring is not in place as yet.

The data collection, and to some extent analysis of the data proceeded separately. More integration between socio-economic and biological data might help interpretation of the data and highlight the dynamic interactions of biological and socio-economic factors.

vi. **Organizational Structure** (To the extent applicable, please comment on any opportunities or challenges that emerged from the overall structure of the Conservation Measures Program (i.e. Washington core team and place-based team) and the structure of the program in your place (i.e. working across trans-national boundaries, etc.)

Communications and interactions are limited between offices, especially on the socio-economic part, except for the workshop in Washington.

Need to better define modes of interaction: for planning, sharing during the implementation, and evaluation?

vii. **Conservation Findings** (Did the analysis of the indicators result in any new insights about HoB?)

The MDGs indicators are not outstanding indices for “conservation program” & intervention level at locations, considering the long presence of WWF in the HoB ecoregion/landscape. But these sets of statistical indicators would potentially be lobbied by the Management of the HoB Network Initiative for adoption by the HoB tri-national governments (Indonesia-Malaysia-Brunei), upon improvements as recommended based on the experience of HoB Measures Phase I.

The Measure project would also need to think of how to link more specifically the data/indicators to the overall the WWF Global Program Framework (which is developing indicators for food printing and consumption).

The use of the secondary data from WWF-offices also suggests that the Measure project might more profitably be linked in the future to areas where indeed WWF and activities have been occurring, so as to enable measurement of the socio-economic and conservation impacts of WWF interventions. This issue should be discussed at some depth with other WWF offices at the workshop.

D. Recommendations for Project Follow-up

For implementation of the next phase, HoB Measures needs to consider the assignment of monitoring officers at the provincial offices. Four officers are required, one each in Malinau (East Kalimantan) and Kapuas Hulu (West Kalimantan) for Indonesia; and one each in Kota Kinabalu and Kuching for Malaysia.

Data collection and monitoring should be expanded to Central Kalimantan Province, and to cover four districts: Murung Raya, Katingan, Barito Utara, and Gunung Mas.

IV. SUMMARY OF PROJECT FUNDING SOURCES

A. WWF Support - the source of funding is WWF-US Measures Program.

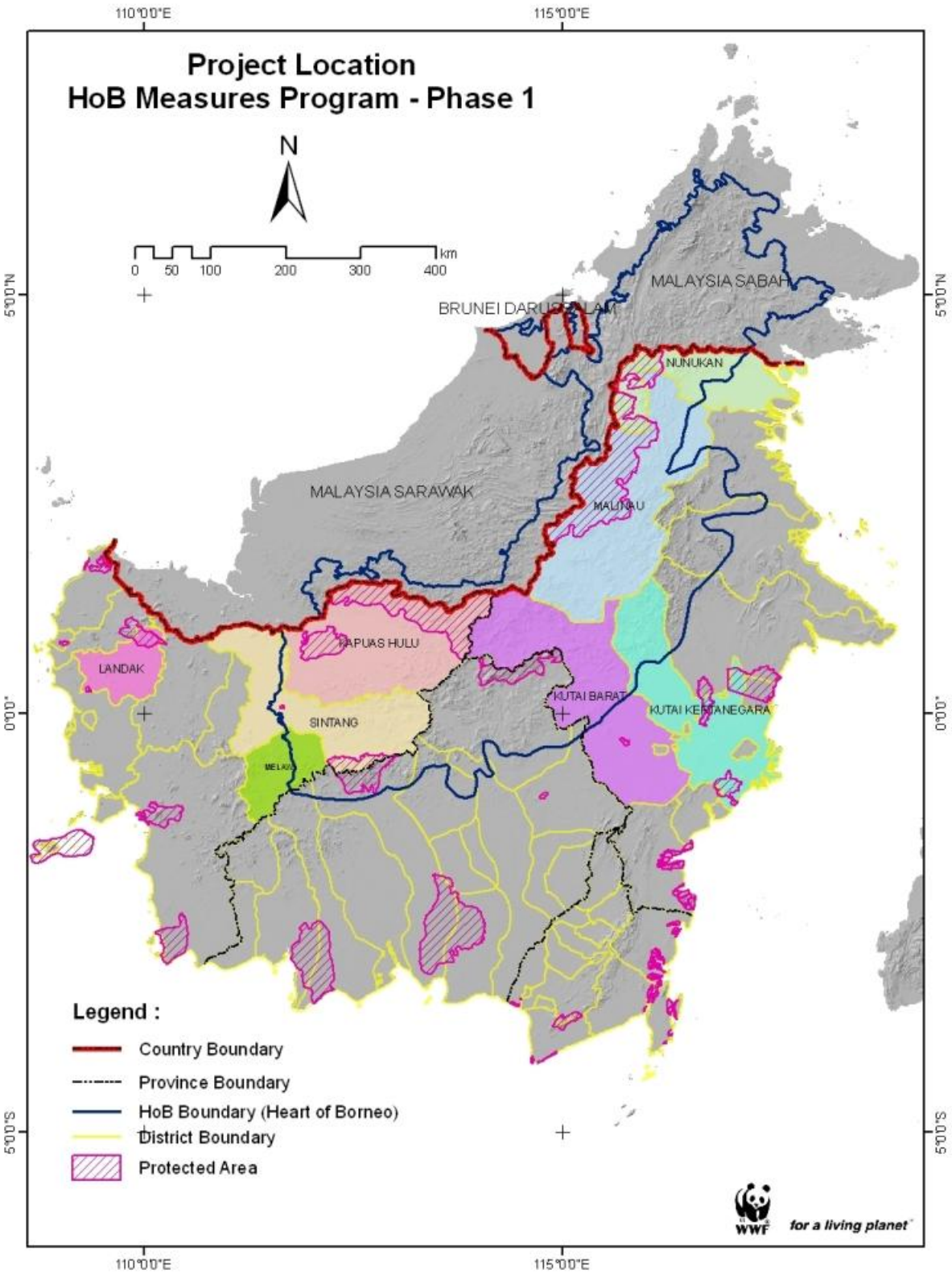
B. Support from Other Sources, if Applicable

V. APPENDICES

A. Indicators List

B. One page per indicator: brief description (what is indicator, why was it chosen, what do the data show?), + illustrative map and graphs.

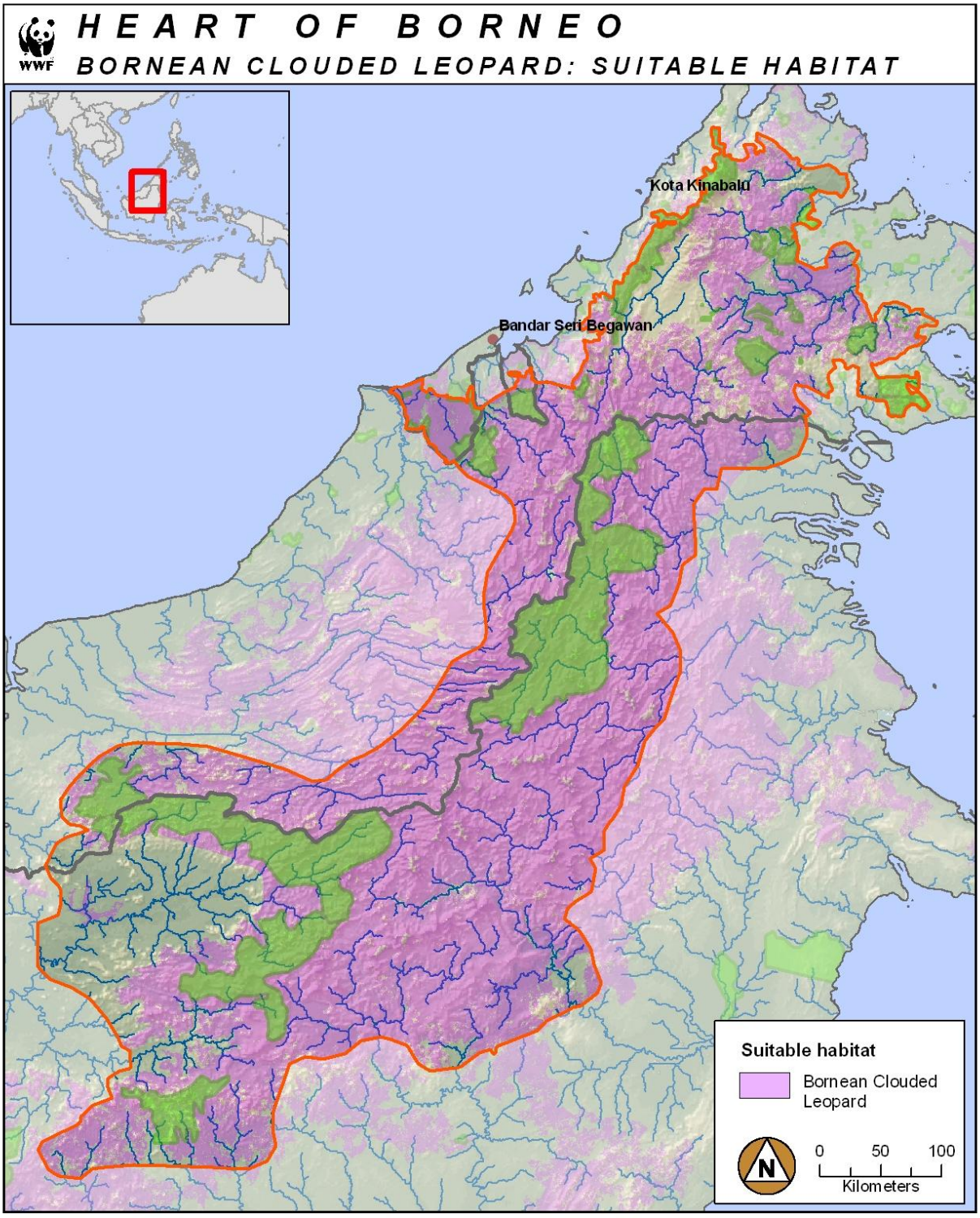
D. Conceptual model


Project Location
HoB Measures Program - Phase 1
N
0 50 100 200 300 400 km
110°0'0"E
115°0'0"E
5°0'0"N
0°0'0"
5°0'0"S
BRUNEI DARUSSALAM
MALAYSIA SABAH
MALAYSIA SARAWAK
NUNUKAN
MALINAU
KAPUAS HULU
LANDAK
SINTANG
KUTAI BARAT
KUTAI KERTANEGARA
Legend :
Country Boundary
Province Boundary
HoB Boundary (Heart of Borneo)
District Boundary
Protected Area
WWF
for a living planet

Biological Indicators

Target	Key Attribute	Indicator
Bornean clouded leopard*	Distribution & densities	km^2 of suitable habitats
Orangutans*	Presence of orang utans in peat swamp forests	Densities
Orangutans*	Presence of orang utans in protected areas	Densities
Orangutans*	Presence of orang utans in lowland forests	Densities
Endangered plant species*	Distribution	Historical locations that are still viable
Endangered Plant Species*	Endemic Nepenthaceae Distribution	Historical locations that are still viable
Forest edge herbivores	Distr. & dens. Bornean elephant	Total population size
Forest edge herbivores*	Distr. & dens. Bornean elephant	Total population distribution
Forest edge herbivores	Distr. & dens. Bornean elephant	Genetic connectivity
Forest edge herbivores	Distr. & dens. Bornean elephant	Extent suitable habitats
Forest edge herbivores	Banteng	Presence & numbers in known sites
Bearded pigs	Population size	Presence/densities @ rep. sites
Bearded pigs	Population size	Group size
Bearded pigs	Condition	Fat condition
Rhinoceros*	Population size	Number
Heath forest ecosystems*	Extend Borneo	% of historical
Peat swamp ecosystems*	Extend Borneo	% of historical
Peat swamp ecosystems	Condition	km^2 undegraded-%canopy cover
Peat swamp ecosystems	Freshwater integrity	disturbance at freshwater sources
Limestone ecosystems*	Extend Borneo	% of historical
Lowland forest ecosystems*	Extend	% of historical
Lowland forest ecosystems	Extend	≈ km2 uncleared
Lowland forest ecosystems	Extend& condition	km^2 undegraded
Lowland forest ecosystems	Size-landscape context	Connectivity
Lowland forest ecosystems	Species composition	Tree diversity Dipt. & Fag.
Upland forest ecosystems*	Extend	% of historical
Upland forest ecosystems	Extend	≈ km^2 uncleared

Bornean clouded leopard* - km2 of suitable habitats



Target:
Bornean clouded leopard*

KEA
Distribution & densities

Indicator
km2 of suitable habitats

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

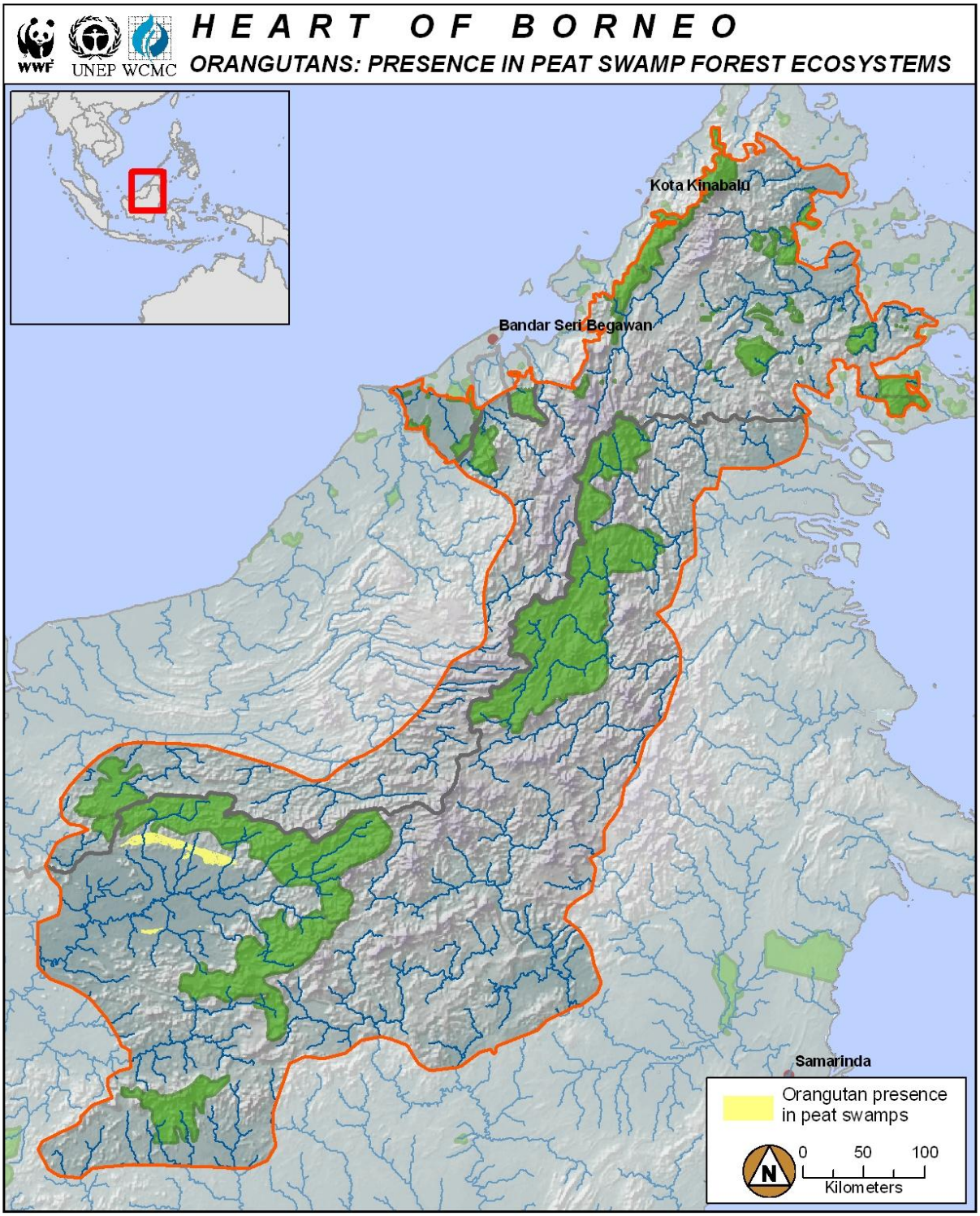
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Orangutans* - Densities in Peat Swamps



Target:
Orangutans*

KEA
Presence of orang utans in peat swamp forests

Indicator
Densities

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

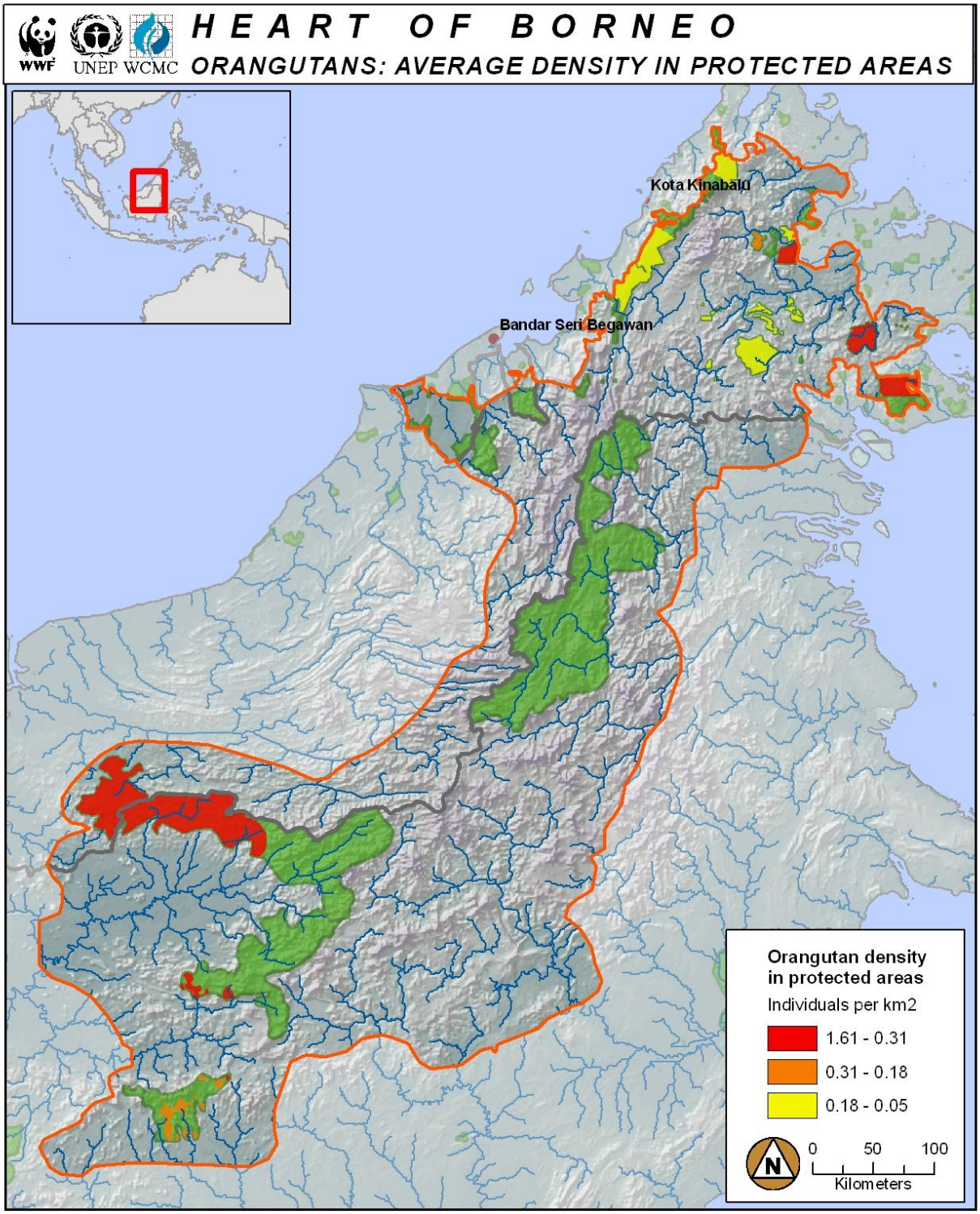
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Orangutans* - Densities in Protected Areas



Target:
Orangutans*

KEA
Presence of orang utans in protected areas

Indicator
Densities

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

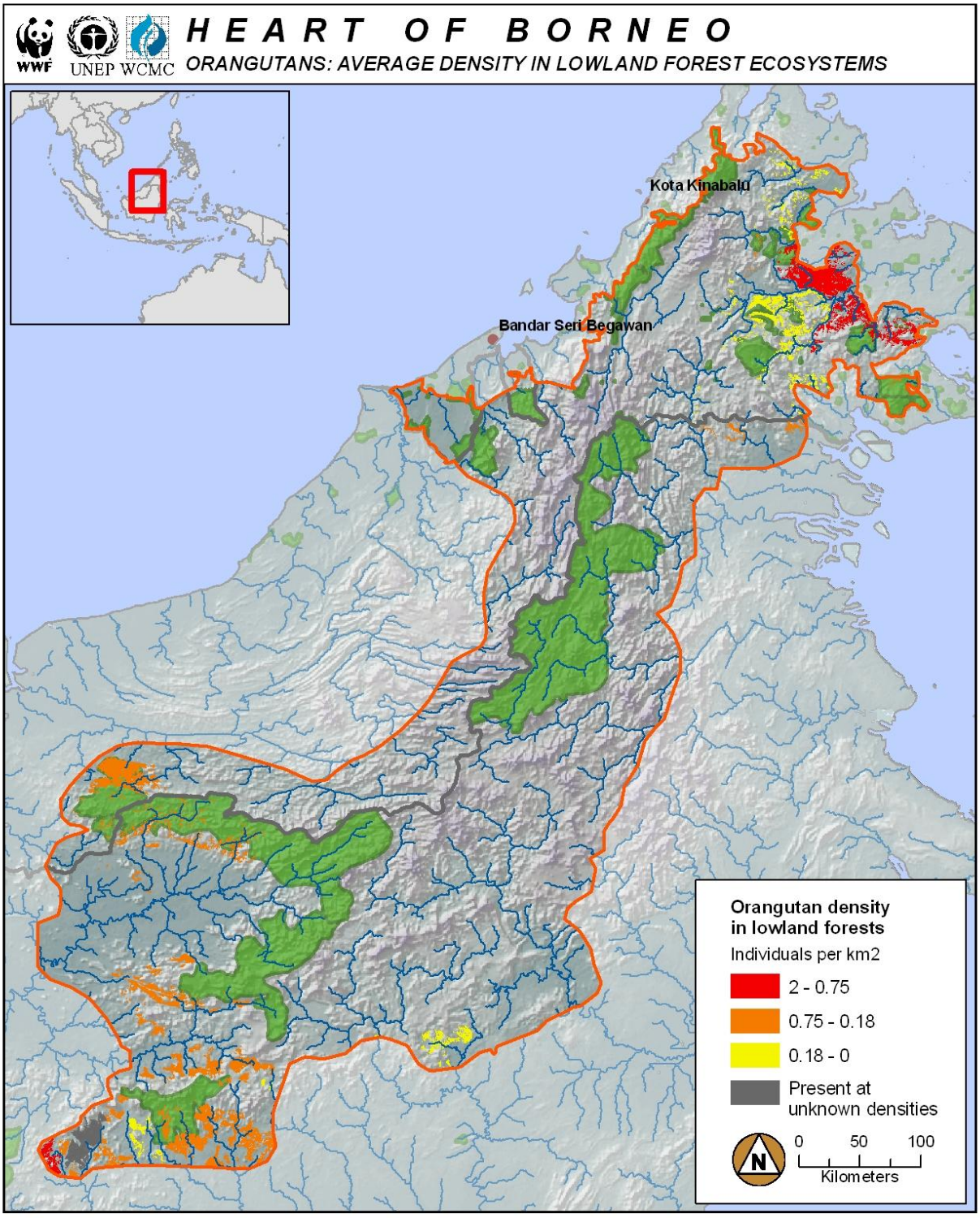
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Orangutans* - Densities in Lowland Forests



Target:
Orangutans*

KEA
Presence of orang utans in lowland forests

Indicator
Densities

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

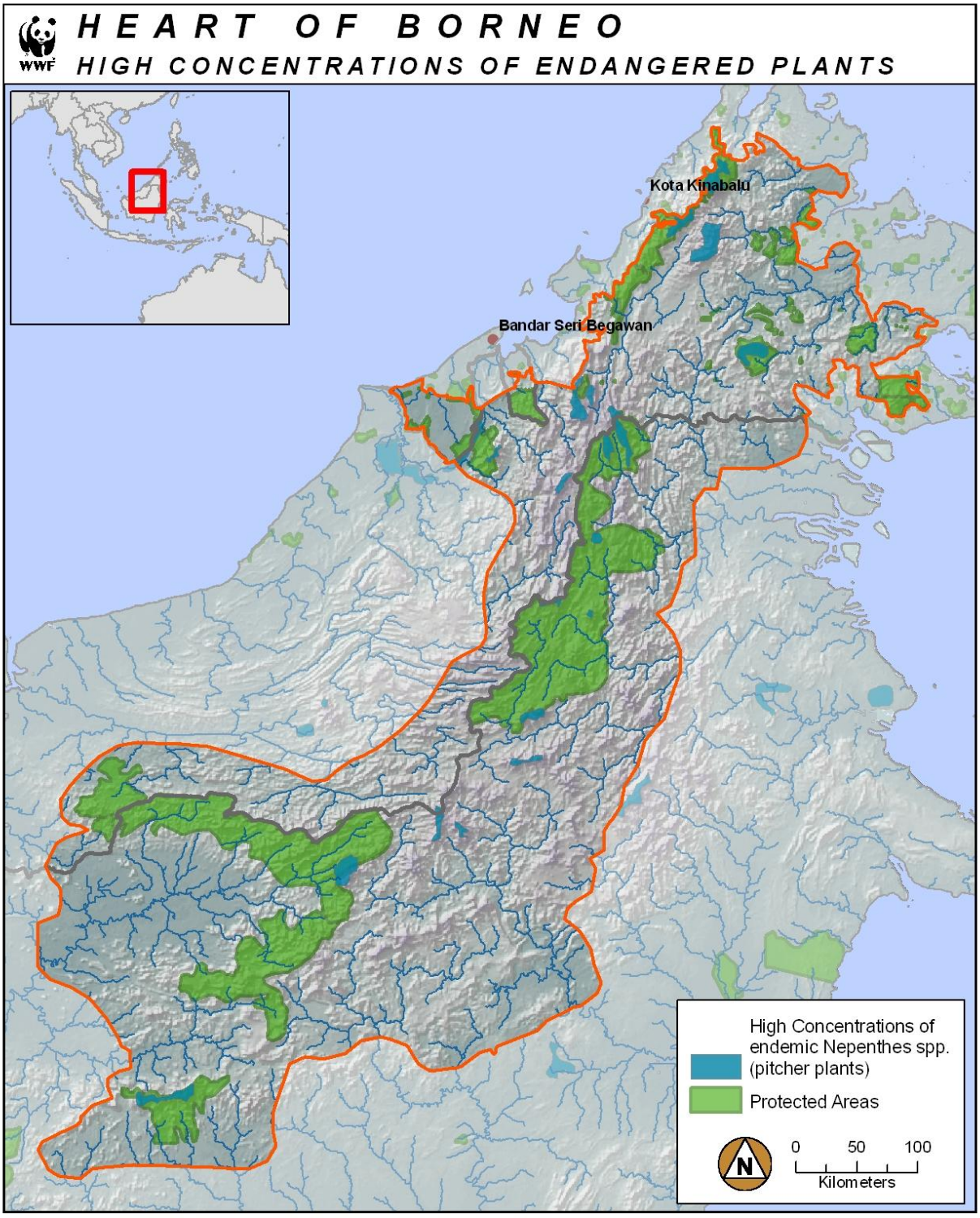
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Endangered plant species* - Historical locations that are still viable



Target:
Endangered plant species*

KEA
Distribution

Indicator
Historical locations that are still viable

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

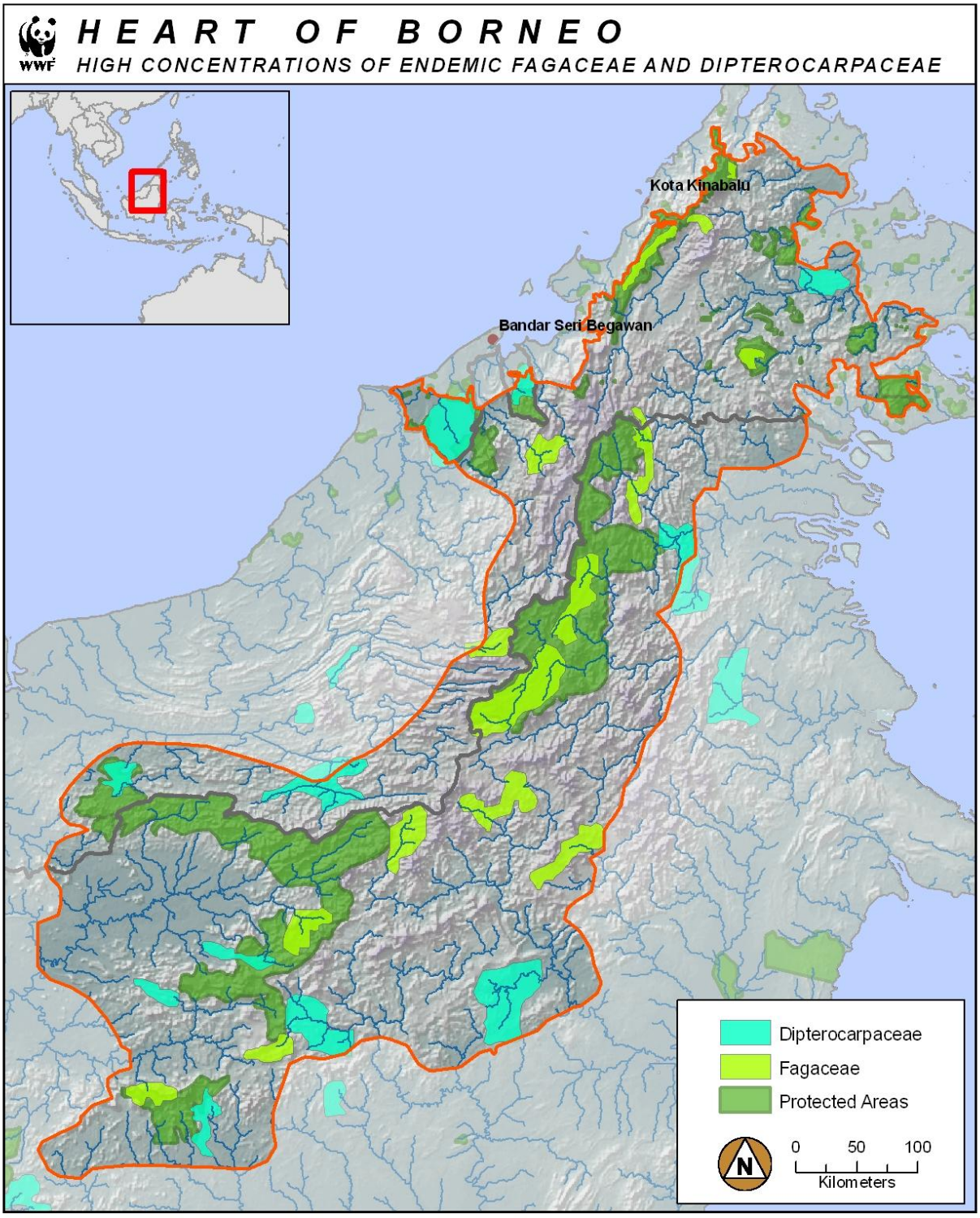
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Endangered Plant Species* - Historical locations that are still viable



Target:
Endangered Plant Species*

KEA
Endemic Nepenthaceae Distribution

Indicator
Historical locations that are still viable

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

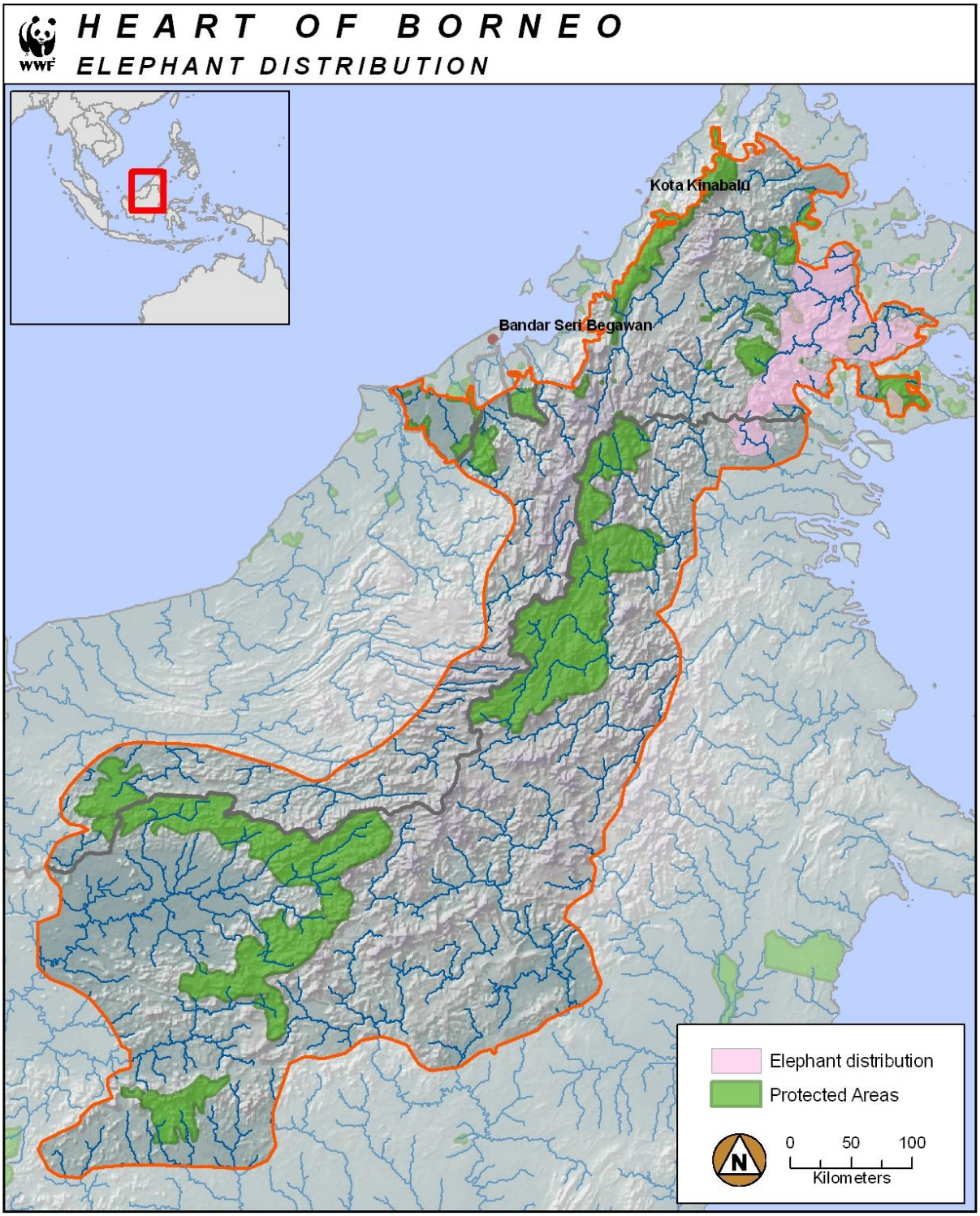
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest edge herbivores* - Total population distribution



Target:
Forest edge herbivores*

KEA
Distr. & dens. Bornean elephant

Indicator
Total population distribution

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

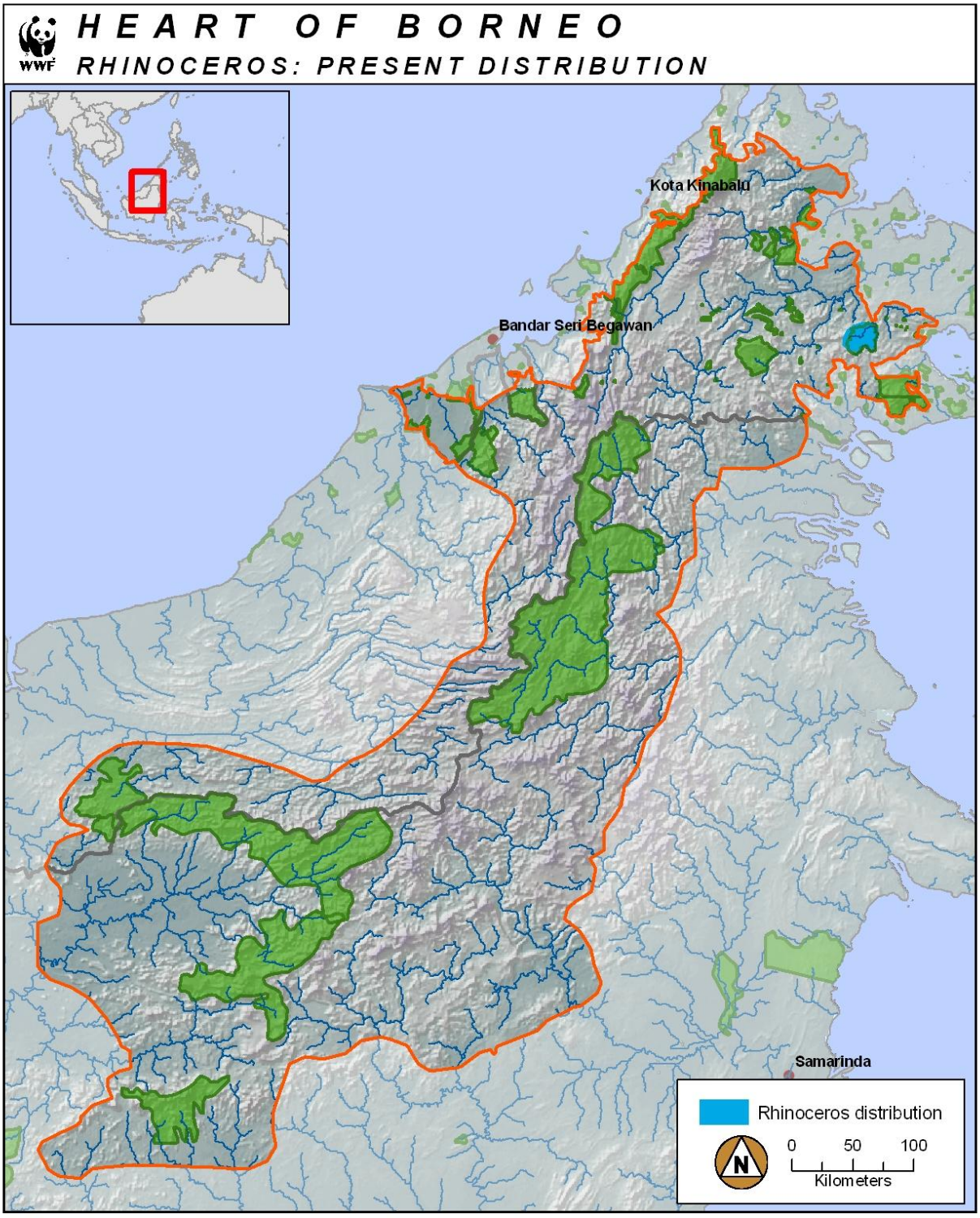
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Rhinoceros* - Number



Target:
Rhinoceros*

KEA
Population size

Indicator
Number

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

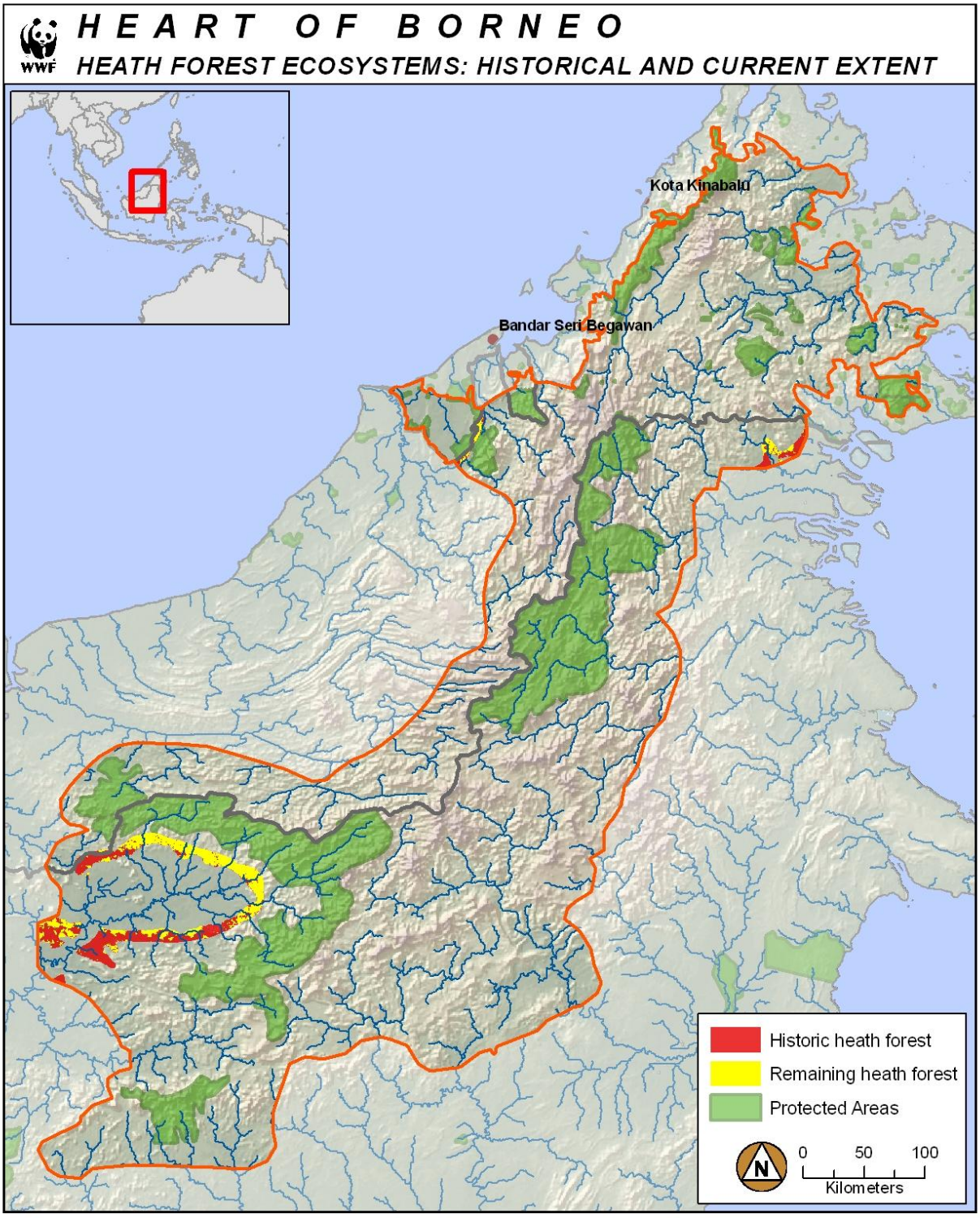
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Heath forest ecosystems* - % of historical



Target:
Heath forest ecosystems*

KEA
Extend Borneo

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

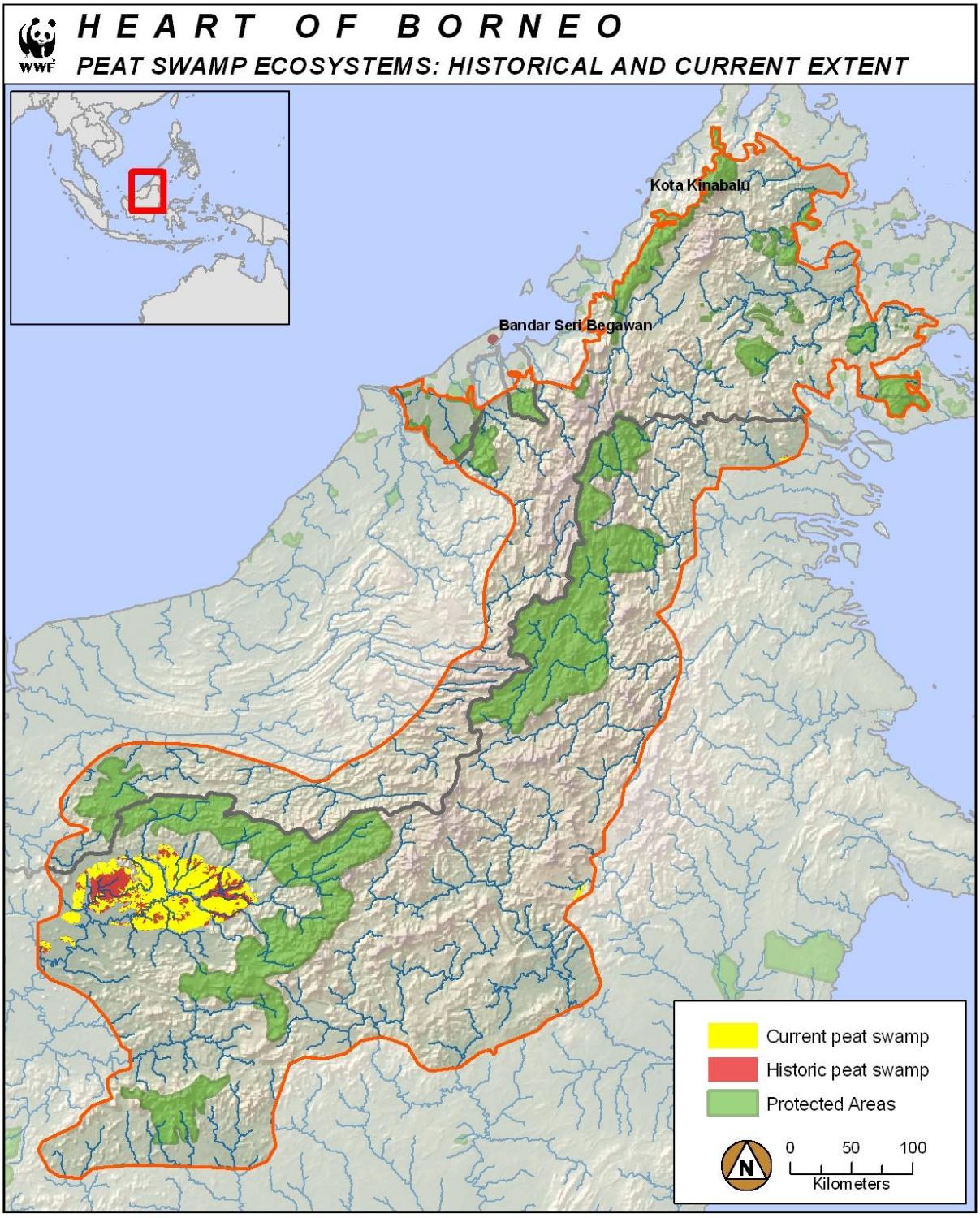
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Peat swamp ecosystems* - % of historical



Target:
Peat swamp ecosystems*

KEA
Extend Borneo

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

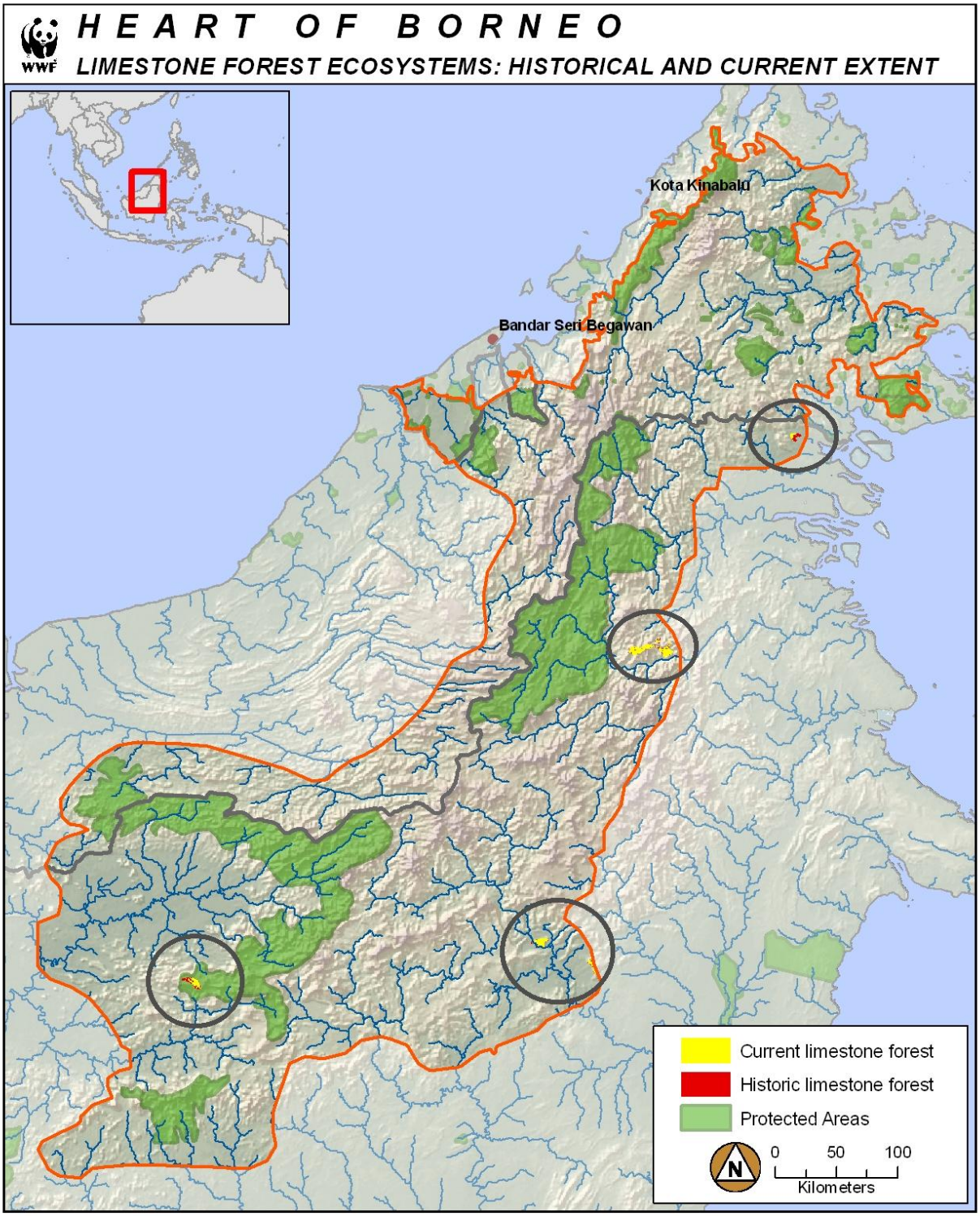
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Limestone ecosystems* - % of historical



Target:
Limestone ecosystems*

KEA
Extend Borneo

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

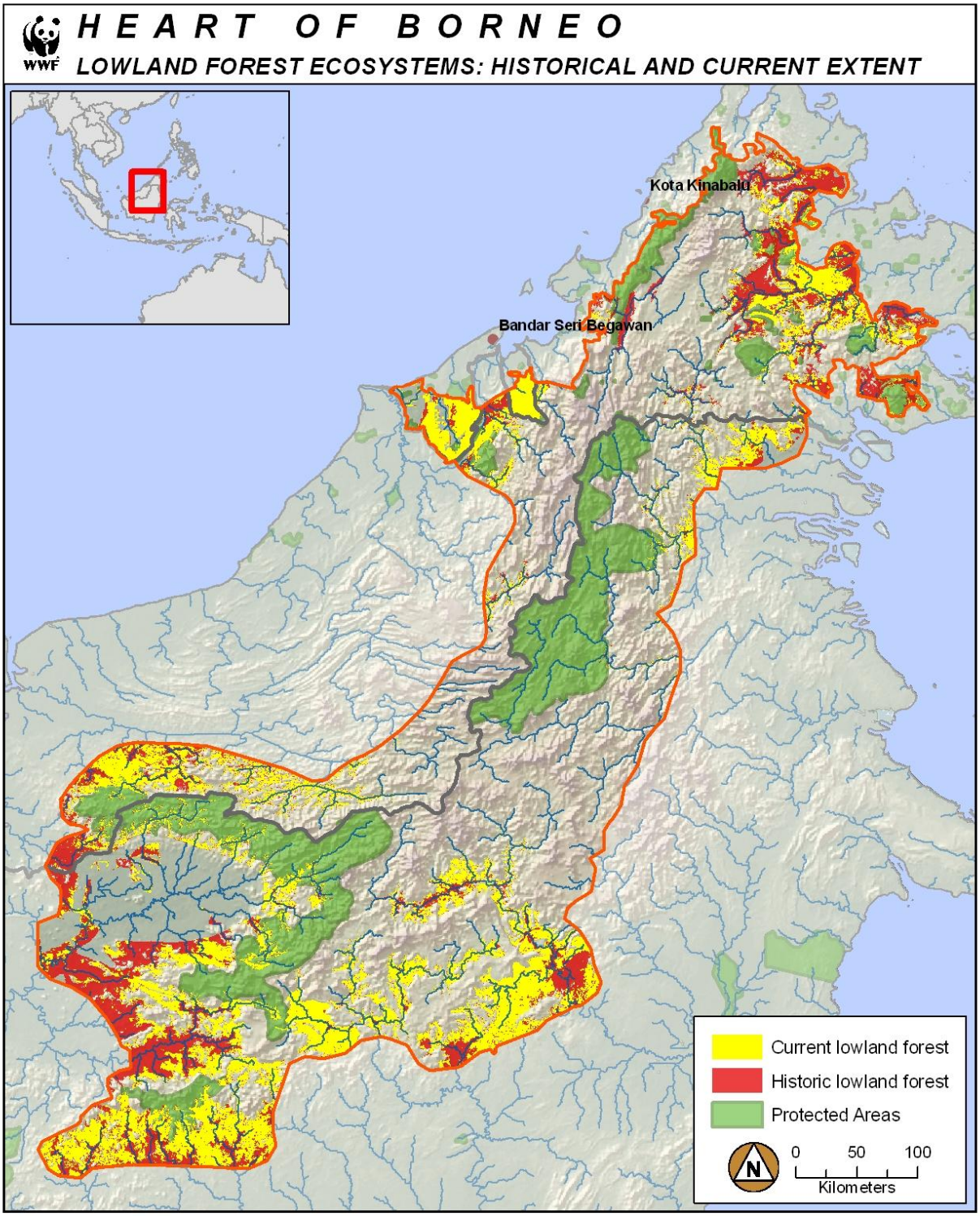
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Lowland forest ecosystems* - % of historical



Target:
Lowland forest ecosystems*

KEA
Extend

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

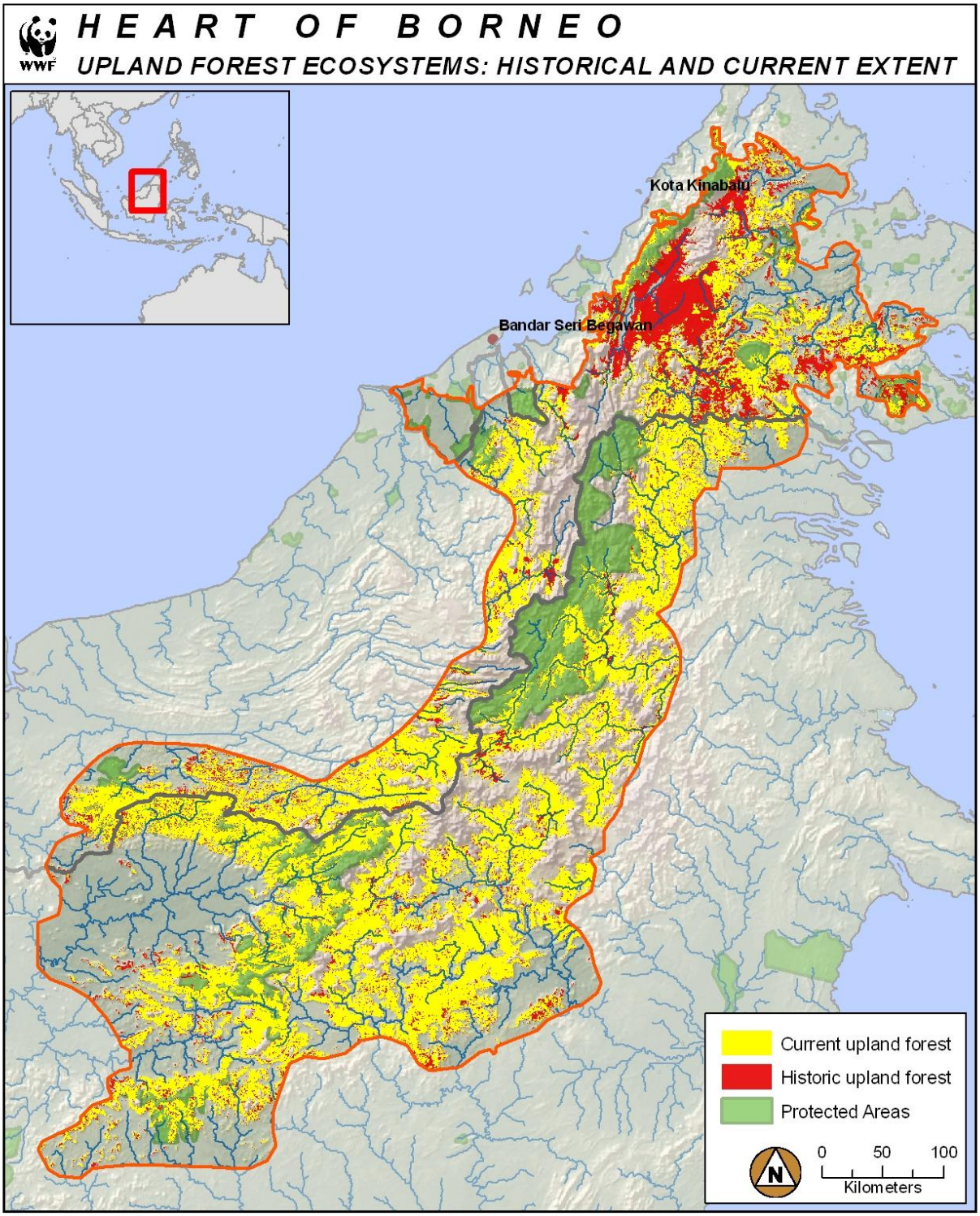
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Upland forest ecosystems* - % of historical



Target:
Upland forest ecosystems*

KEA
Extend

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

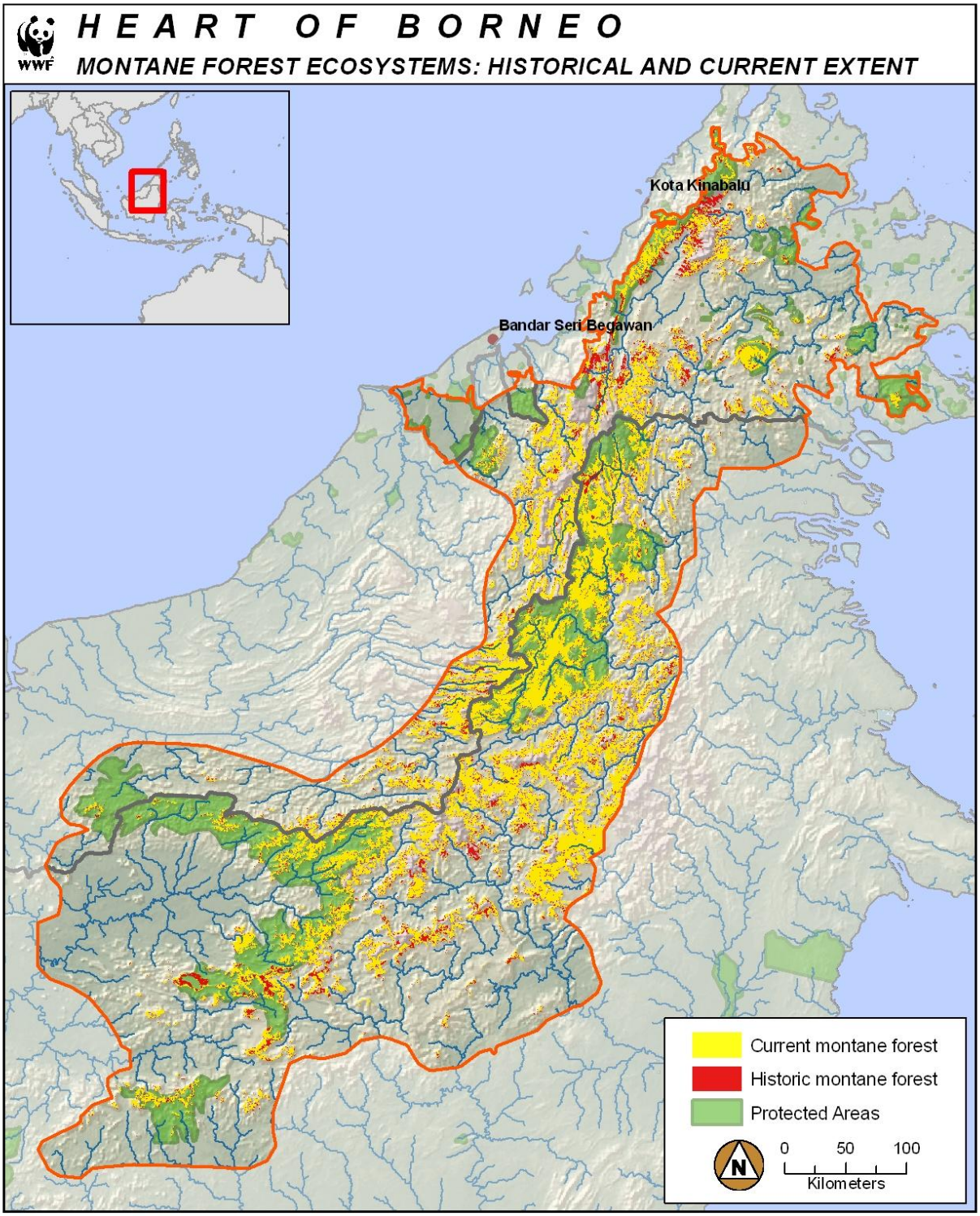
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Montane forest ecosystems* - % of historical



Target:
Montane forest ecosystems*

KEA
Extend

Indicator
% of historical

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

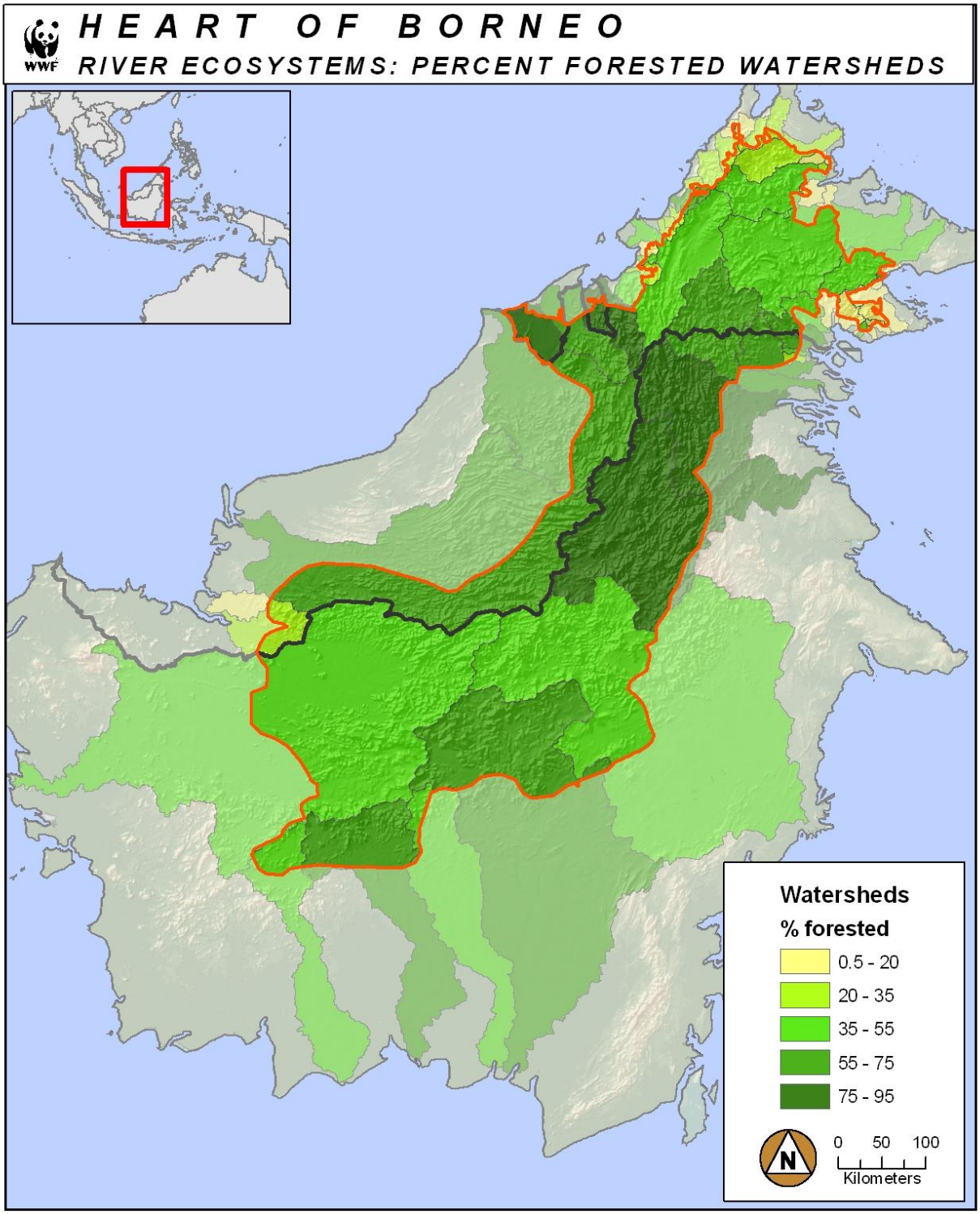
Future Indicator Development Required:

Notes:

Working Group Members:

References:

River ecosystems* - % intact watersheds



Target:
River ecosystems*

KEA
water quality

Indicator
% intact watersheds

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

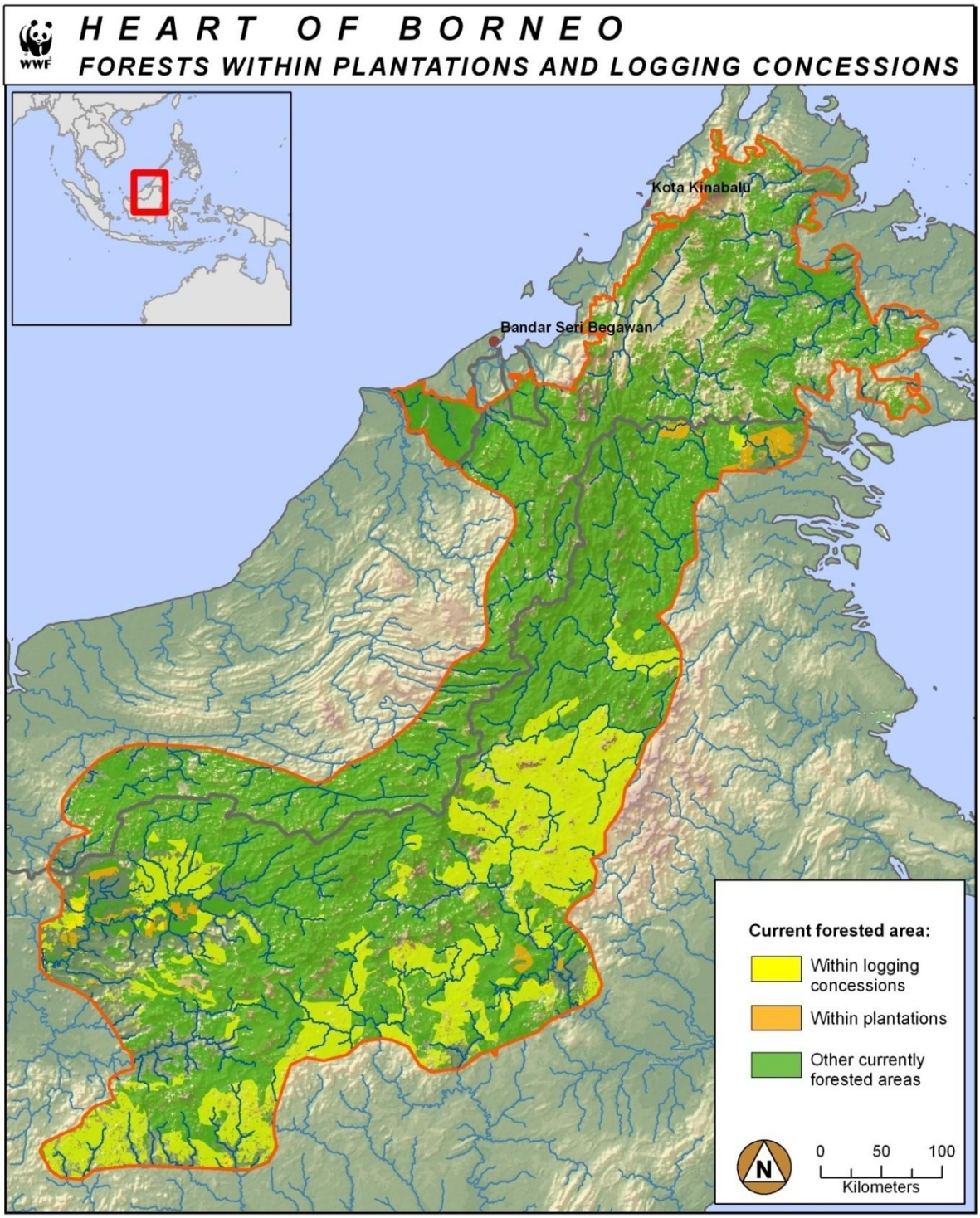
Working Group Members:

References:

Threat Indicators

Target	Key Attribute	Indicator
Industrial Forest Conversion		Annual conversion
Industrial Forest Conversion		Annual plans for conversion
Industrial Forest Conversion*		Forests within plantations and logging concessions
Legal unsustainable timber extraction		% crown cover in working forests
Illegal logging		Loss of forest (km^2)in protected areas
Forest fire*	Incidence	Fires in logging concessions
	Incidence	Fires in Upland forest ecosystems
	Incidence	Fires by Forest Habitat
	Incidence	Fires by year
	Incidence	Fires in Heath Forest Ecosystems
	Incidence	Fires in Lowland Forest Ecosystems
	Incidence	Fires in Montane Forest Ecosystems
	Incidence	Fires in Peat Swamp Ecosystems
Mining		Existing extent
Mining		Projected extent

Industrial forest conversion- Forests within plantations and logging concessions



Target:

Industrial forest conversion

Indicator
Forests within plantations and logging concessions

KEA
Incidence

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

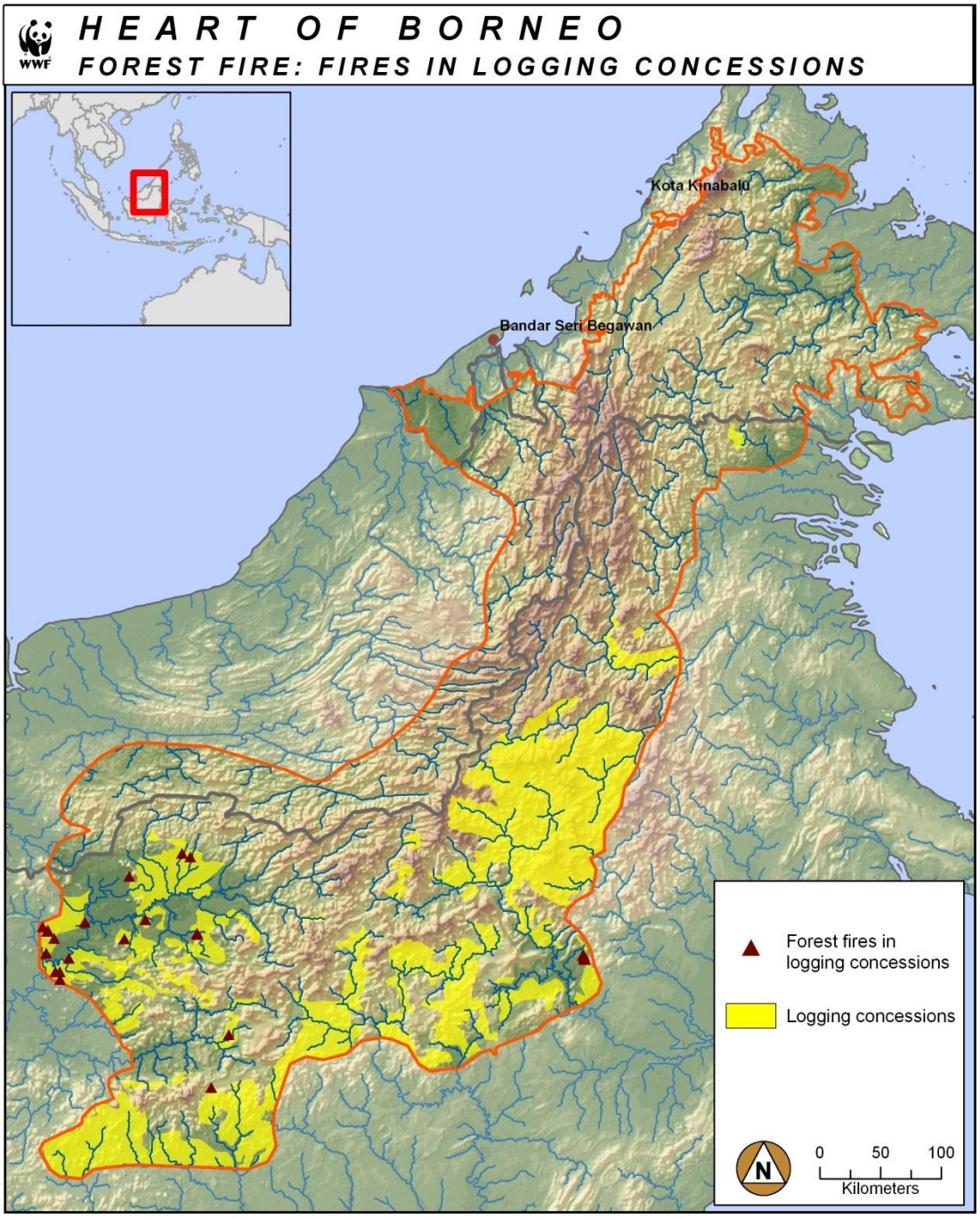
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire- Fires in logging concessions



Target:

Forest Fire

KEA
Incidence

Indicator
Fires in logging concessions

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

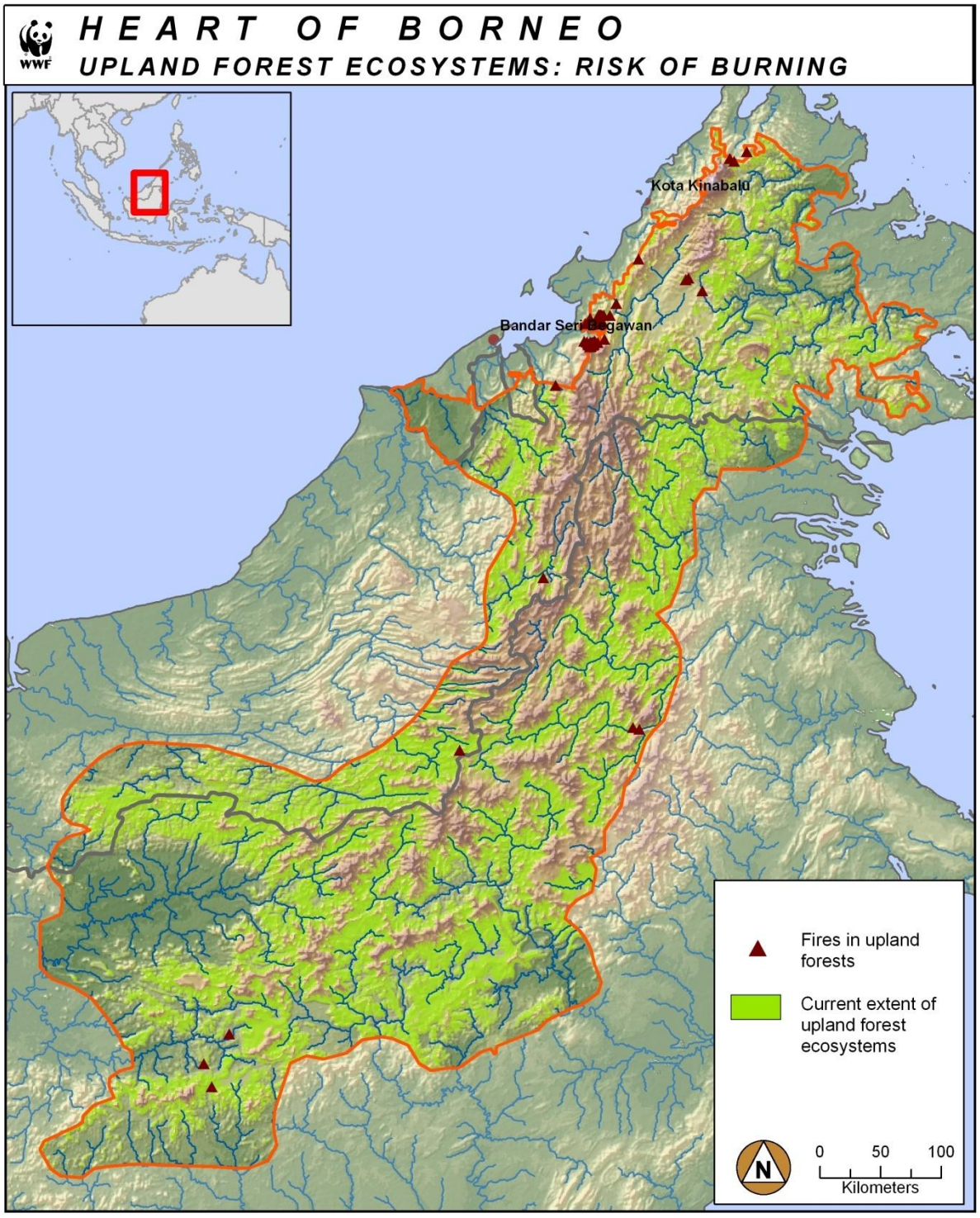
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire- Upland forest ecosystems



Target:

Forest Fire

KEA
Incidence

Indicator
Fires in Upland forest ecosystems

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

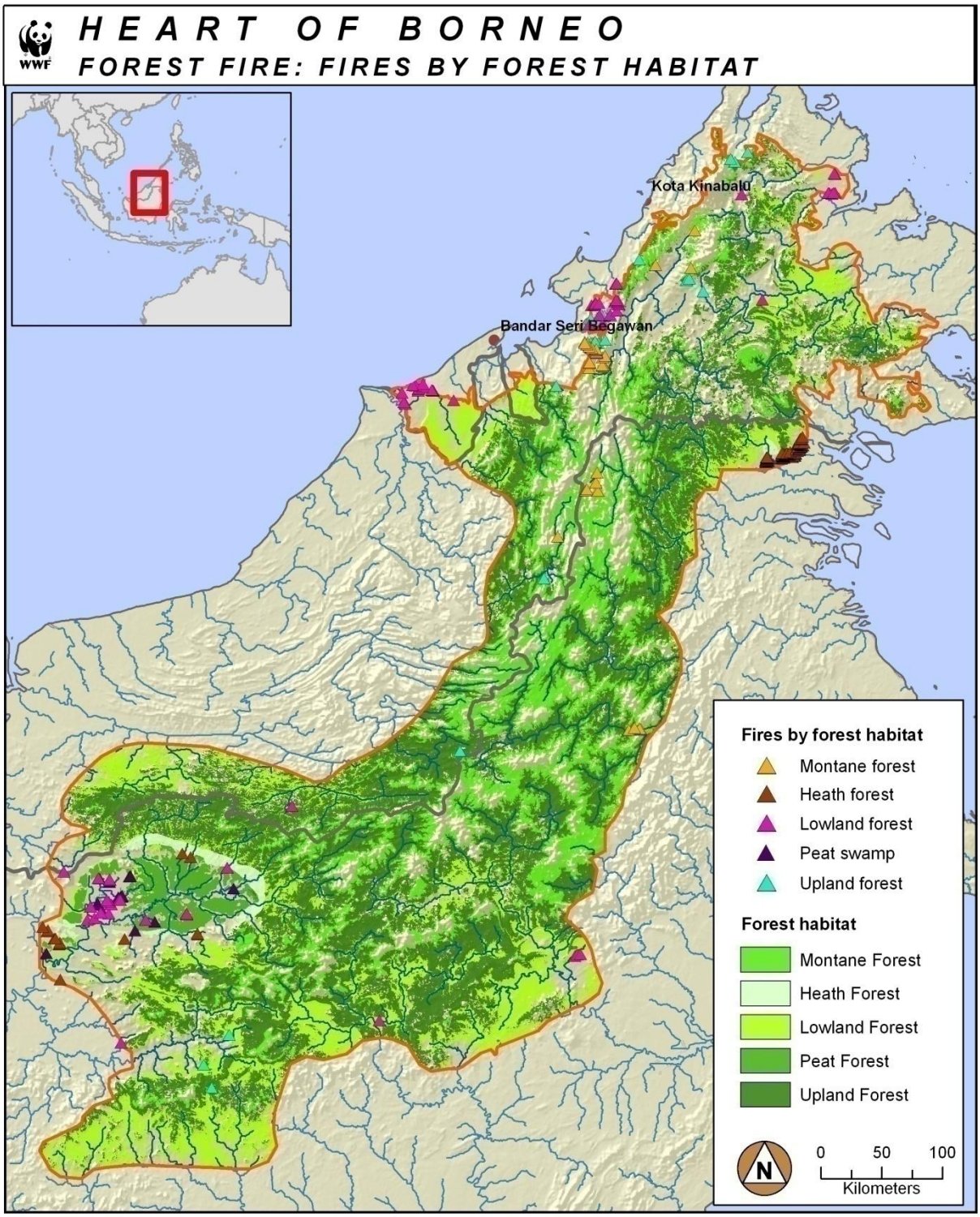
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire- Fires by forest habitat



Target:

Forest Fire

KEA
Incidence

Indicator
Fires by Forest Habitat

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

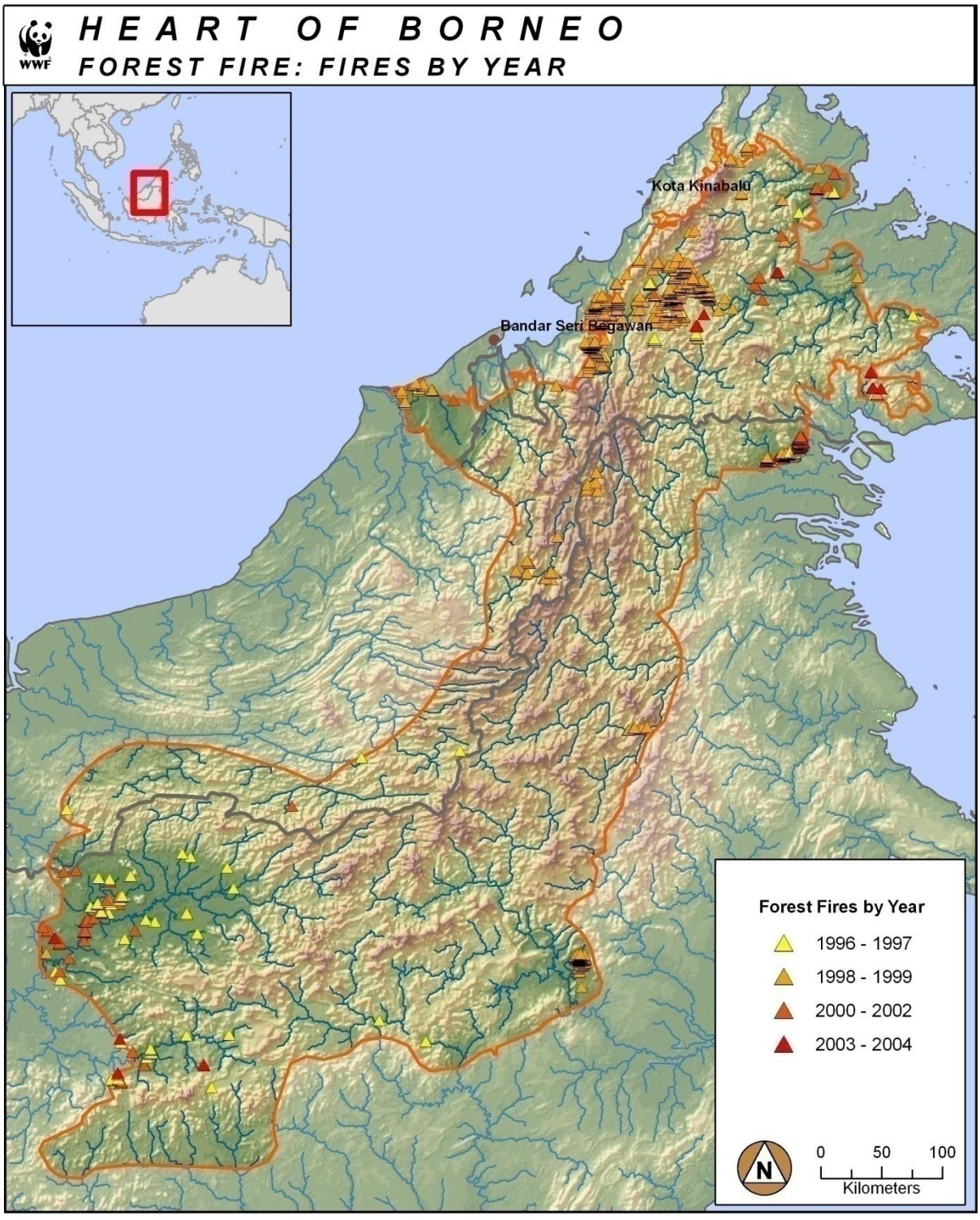
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Annual Forest fires



Target:

Forest Fire

KEA
Incidence

Indicator
Fires by year

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

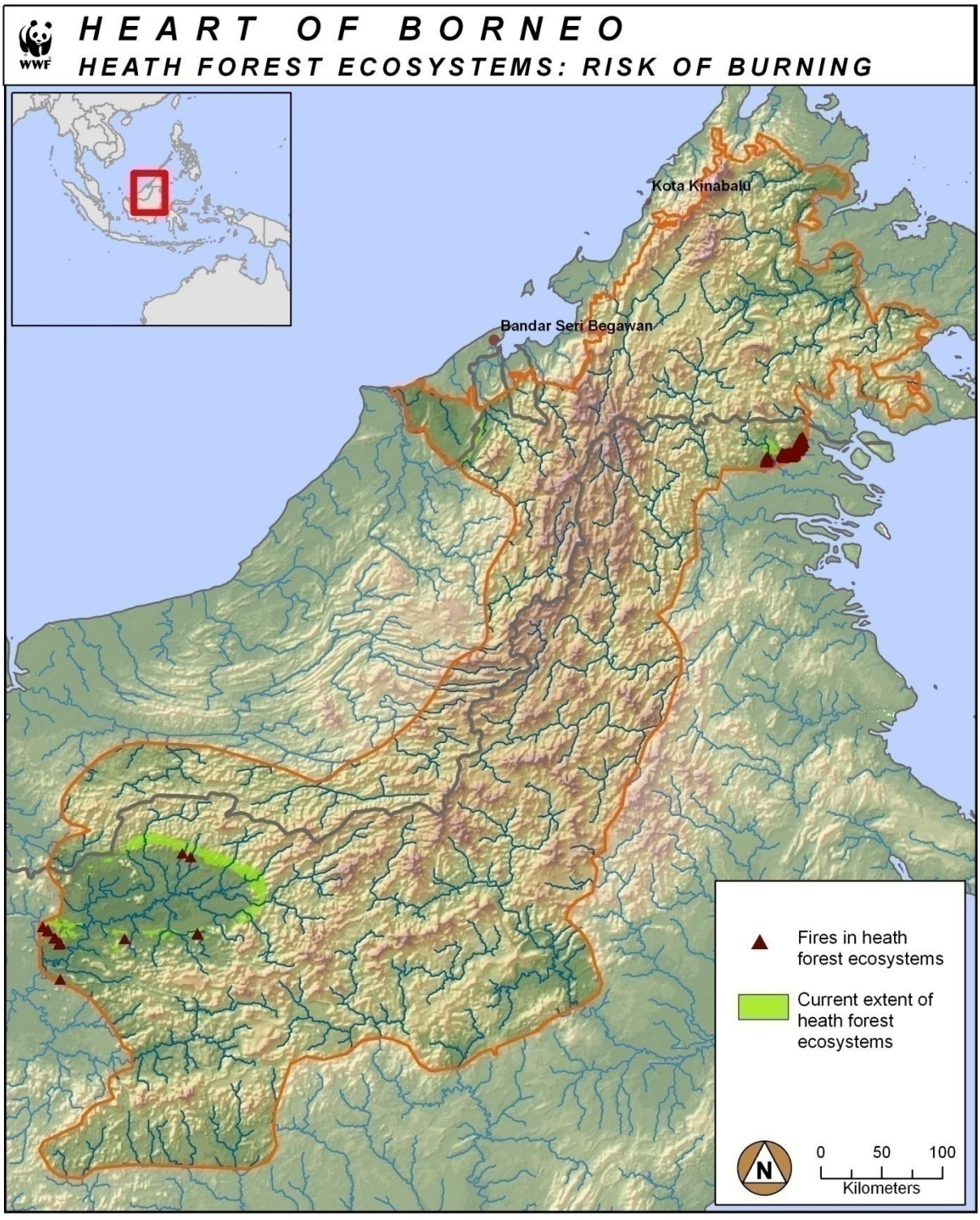
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire – Heath Forest Ecosystems



Target:

Forest Fire

KEA
Incidence

Indicator
Fires in Heath Forest Ecosystems

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

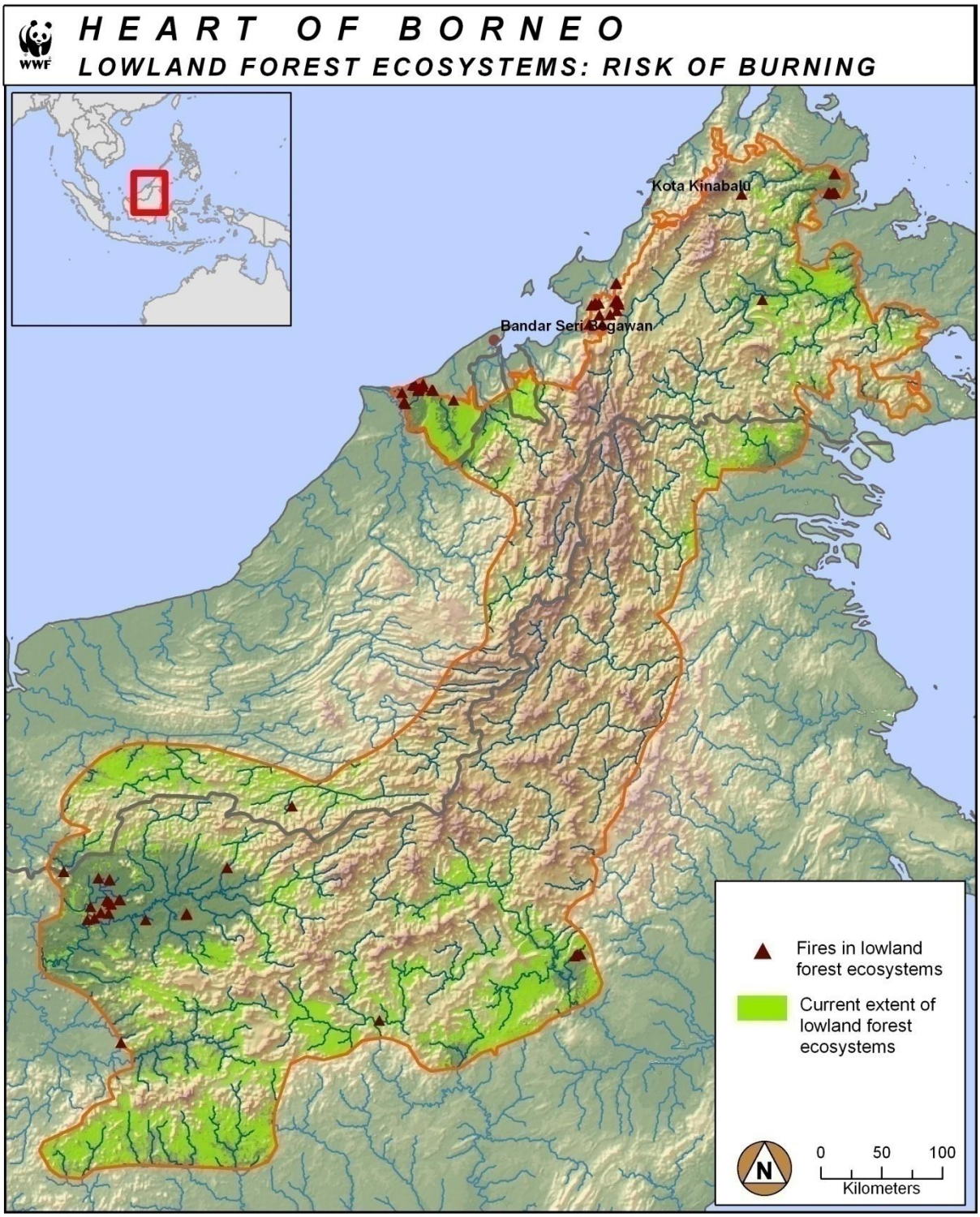
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire- Fires in Lowland Forest Ecosystems



Target:

Forest Fire

KEA
Incidence

Indicator
Fires in Lowland Forest Ecosystems

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

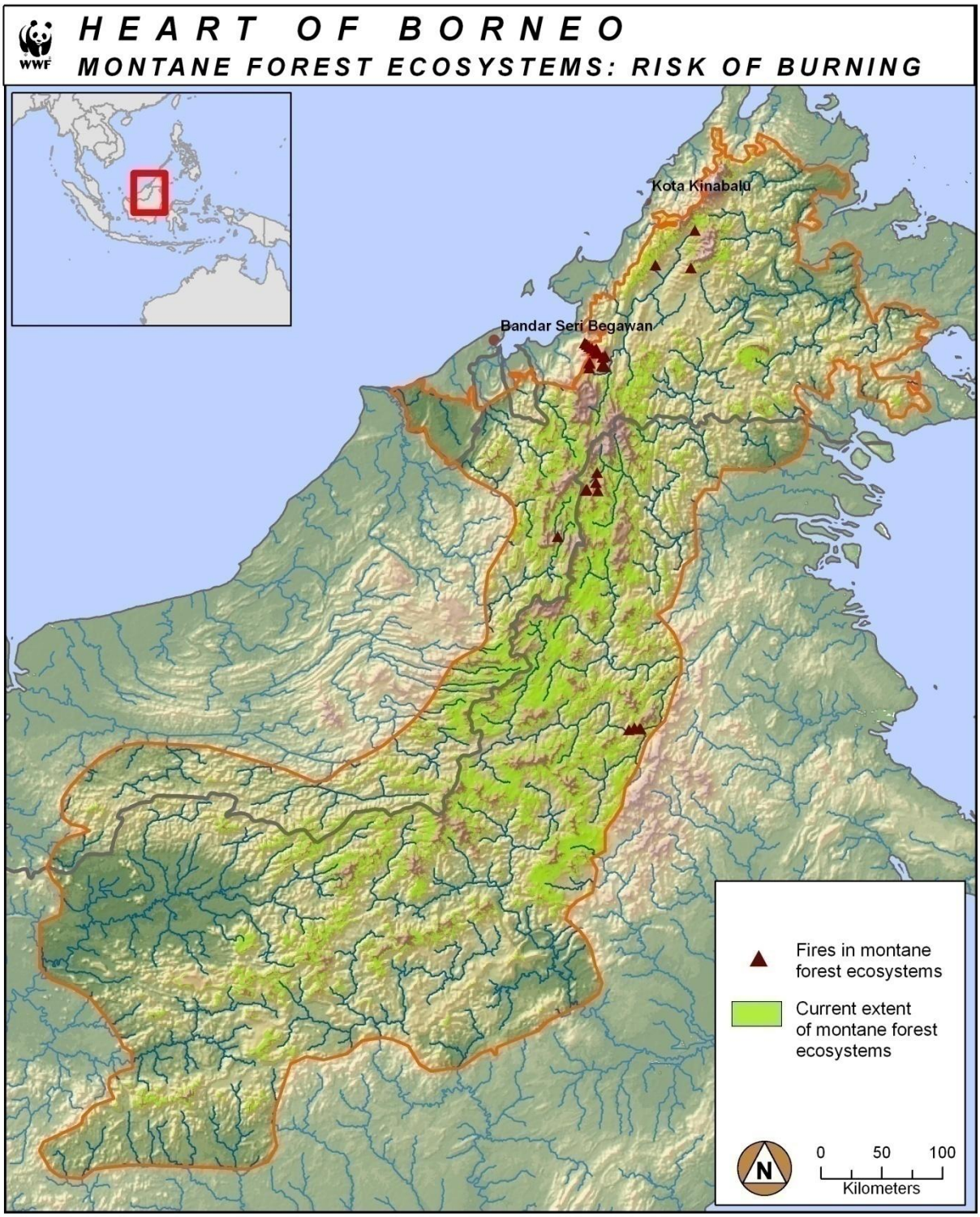
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire- Fires in Montane Forest Ecosystems



Target:

Forest Fire

KEA
Incidence

Indicator
Fires in Montane Forest Ecosystems

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

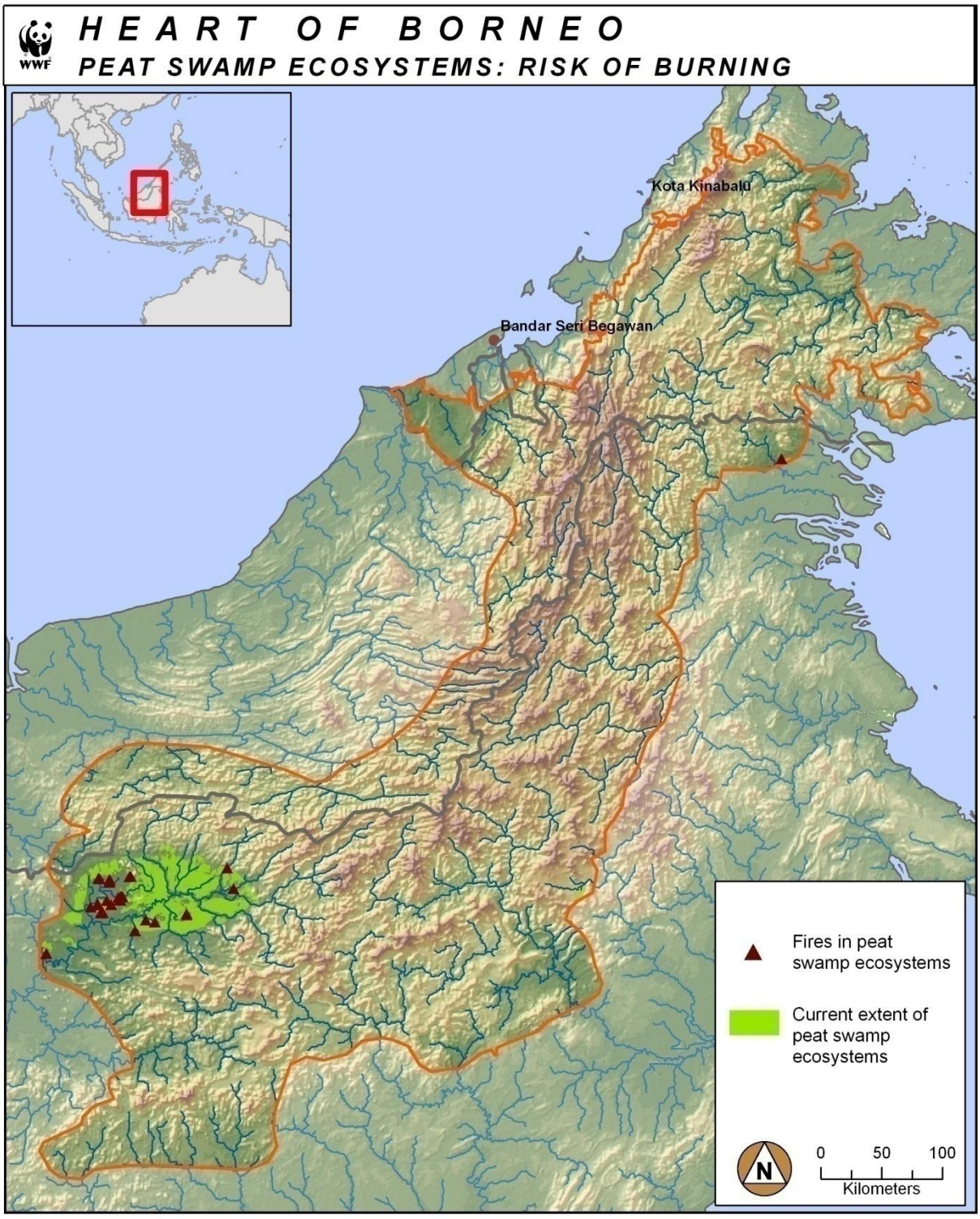
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Forest Fire – Peat Swamp Ecosystems



Target:

Forest Fire
KEA

Indicator
Fires in Peat Swamp Ecosystems

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

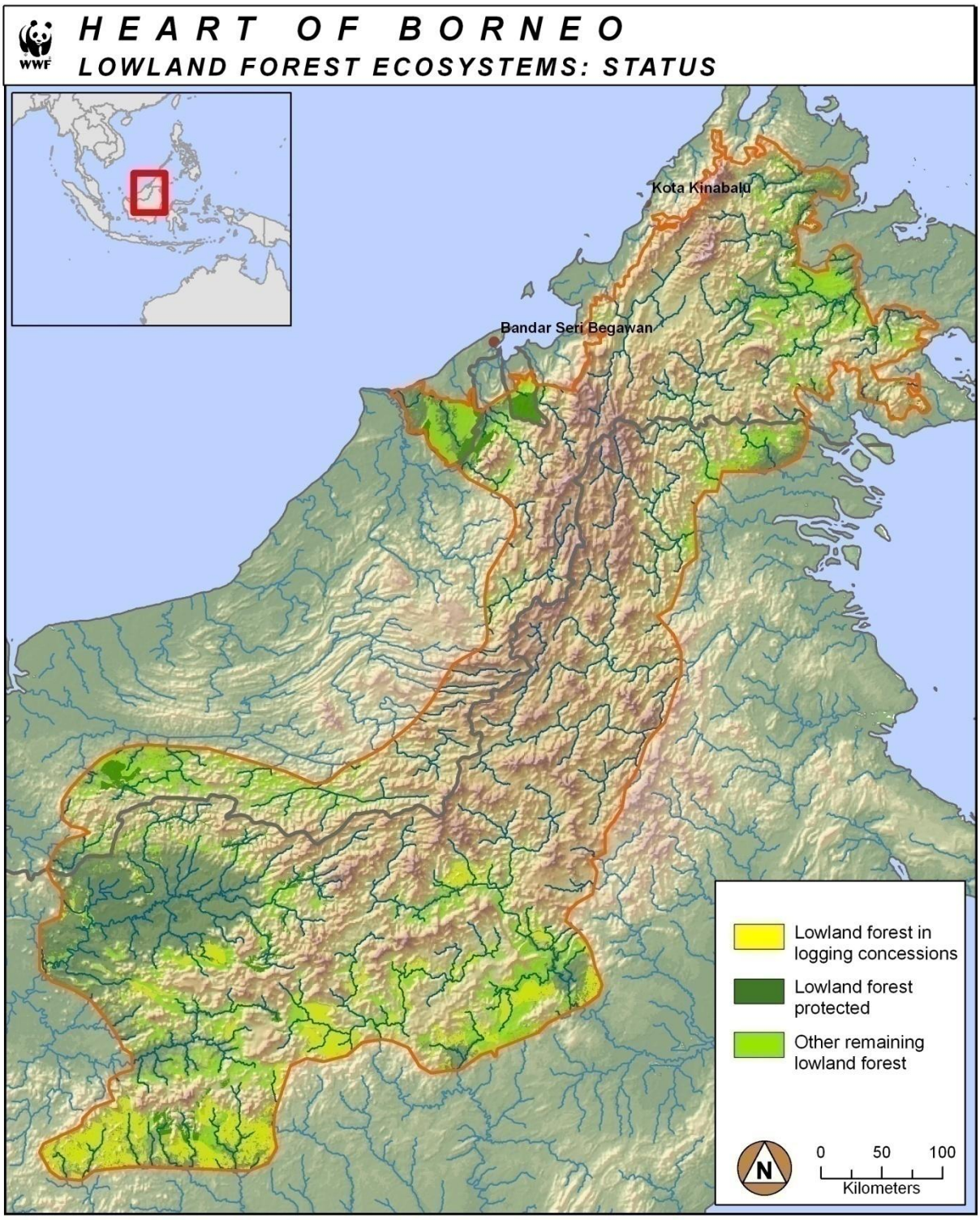
Working Group Members:

References:

Conservation Management Indicators

Target	Key Attribute	Indicator
Protected area representation*		% of Lowland Forest in a protected area
Protected area representation*		% of Montane Forest in a protected area
Protected area representation*		% of Upland Forest in a protected area
% of remaining forest in concessions		% of prod. forest that remains forest
enforcement of exist. legislation		Peat Conversion
Proposed protected areas		km2 of proposed protected areas by habitat
Protected area effectiveness		RAPPAM score
Regeneration in protected areas		Regeneration Post HoB

Protected area coverage- Lowland Forest in existing protected areas



Target:

Protected area coverage
KEA
Extent
Indicator
Lowland Forest in existing protected areas

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

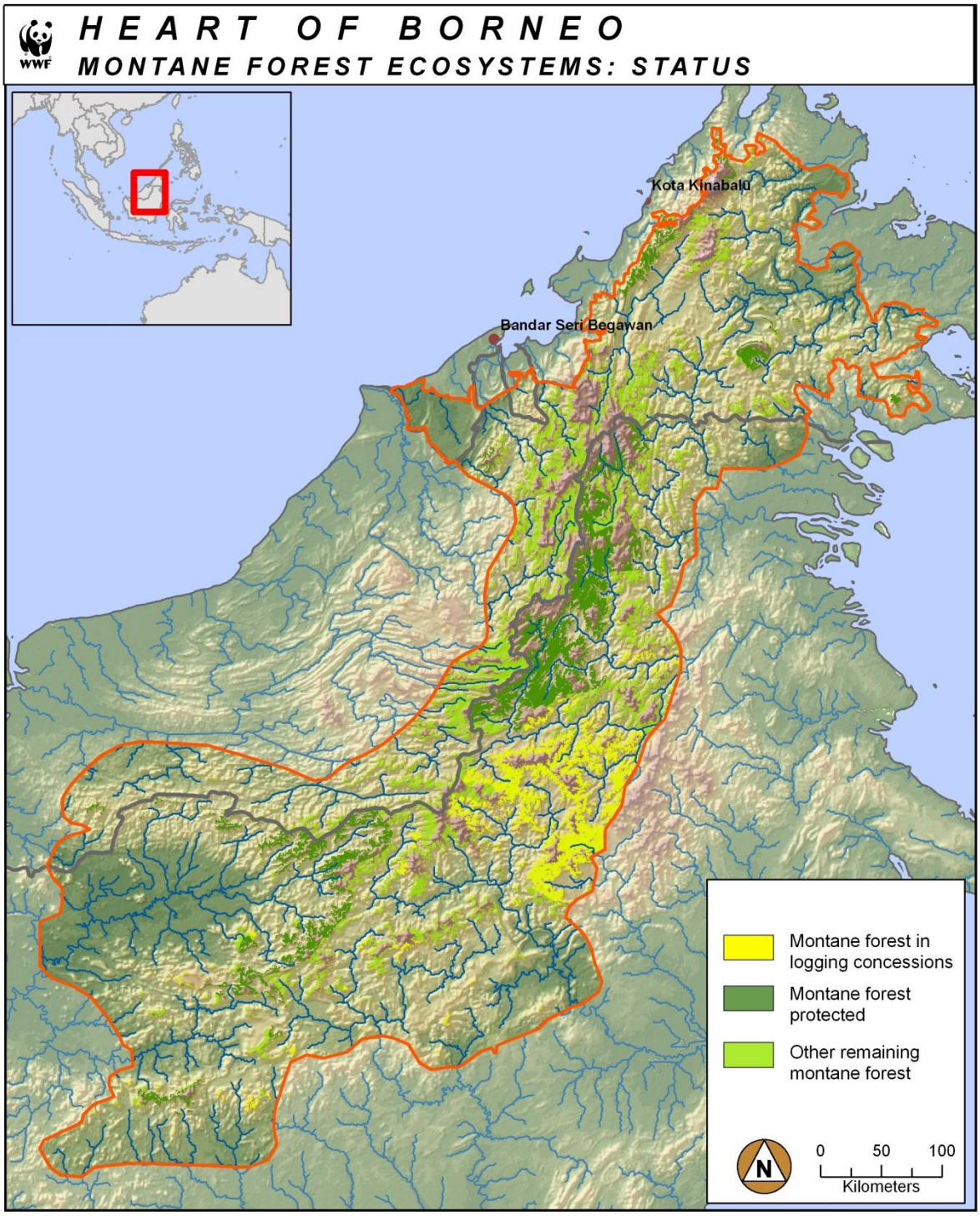
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Protected area coverage- Montane Forest in existing protected areas



Target:

Protected area coverage
KEA
Extent
Indicator
Montane Forest in existing protected areas

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

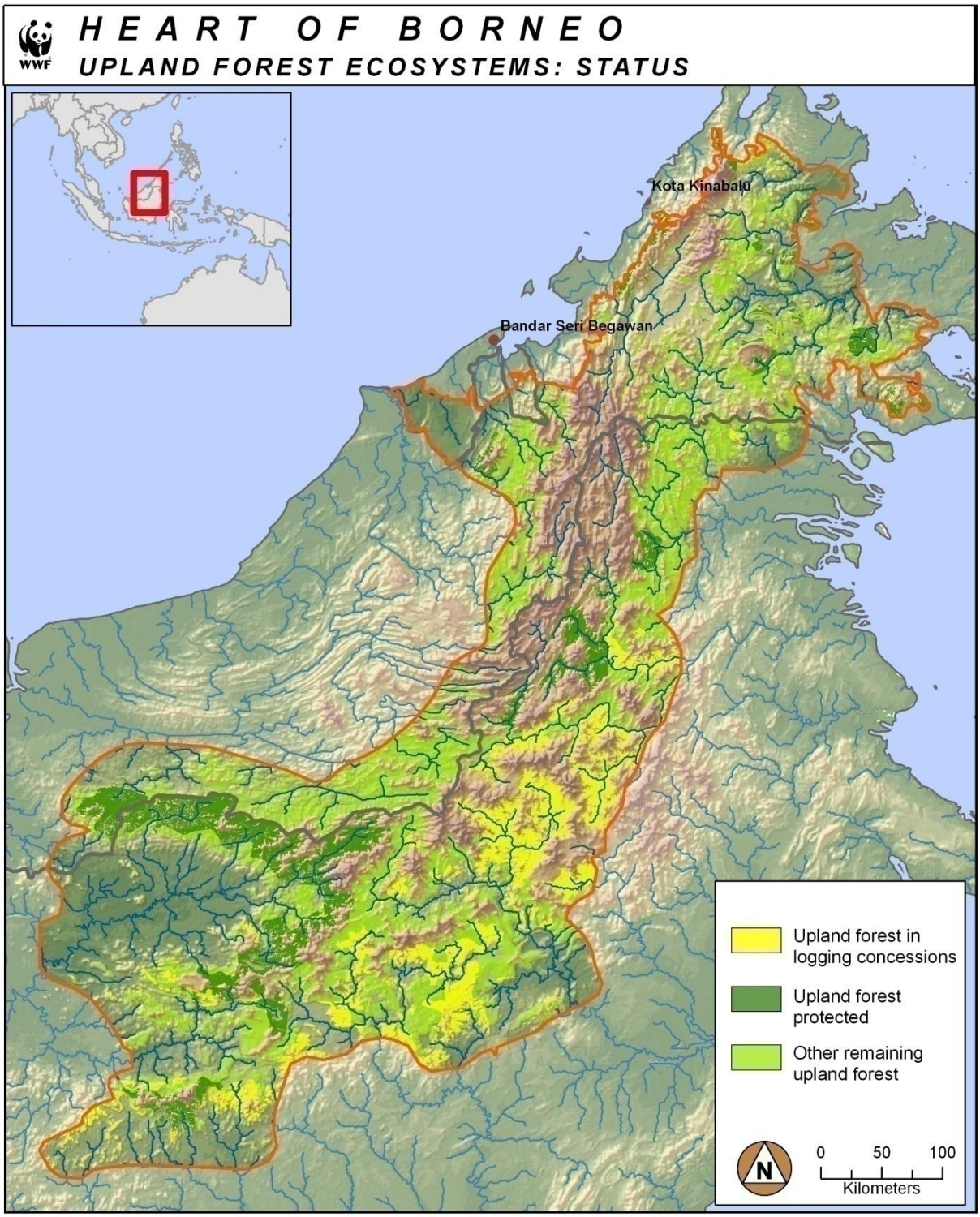
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Protected area coverage- Upland Forest in existing protected areas



Target:

Protected area coverage
KEA
Extent
Indicator
Upland Forest in existing protected areas

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Social Indicators

Domain	Key Attribute	Indicators
Economic well being	Transportation access	% population who can reach markets / 'urban' centers w/in ½ day
Economic well being	Transportation means + household goods	% population who own (bycycle, motorcycle, longboat), TV, radio, generator/solar panel
Economic well being	Housing ownership	% HH who own house where living
Economic well being	Income	% population below national poverty line % population with savings or access to credits
Economic well being	Occupation (formal and informal)	% people with salaried jobs (private and gov't) % people who extract natural resources (trading, migrant workers)
Health*	Infant mortality	Infant mortality rate, children under 1 yr
Health*	Clean water	MDI - % population with access to clean water
Health	Diseases rate	% population #/1000 → TBC, Cholera, diare, malaria
Health	Access to quality health care	% population w/in subdistrict with facility + village dispensary + staff
Health	Food security	% population usually eating 3x/day
Health	Traditional medicine	% population using traditional/modern medicine
Political Empowerment	Community organization (traditional, new organization)	% villages with different types of community organization (custom, farmer, others) % population who belong to community organizations
Political Empowerment	Natural resources right (land, forest, traditional knowledge)	% population whose (land, forest) rights are recognized by government
Political Empowerment	Collaboration partnership	% of community group belong to larger organizations or federations
Political Empowerment	Women empowerment	% of women who belong to community organizations % (village, subdistrict, district, parliament) female leaders

Education	Access to education	% of school age population With government or religious schools with village Elementary school + subdistrict + junior high school
Education*	Graduation rates	% school age population graduating from: elementary, junior and senior high school
Education*	Access to education	Enrollment rate boy : girl
Education*	Access to education	% population aged 7-12 not enrolled in school
Education	Literacy	% population who can read (boy : girl)
Education	Girl education	% village w/ community initiated environmental projects
Culture	Integrity of cultural places	# of cultural sites protected/actively managed
Culture	Integrity of cultural knowledge	# or % villages (population centre) w/cultural and ethnic assossiations % population x age group
Demographics*	Population	Average Family size
Demographics*	Population	Population by gender, per district
Demographics*	Ethnicity	Ethnic diversity by district

In the following table, the Heart of Borneo Measures Team provides an interpretation of the data for each of the Economic Well-Being indicators.

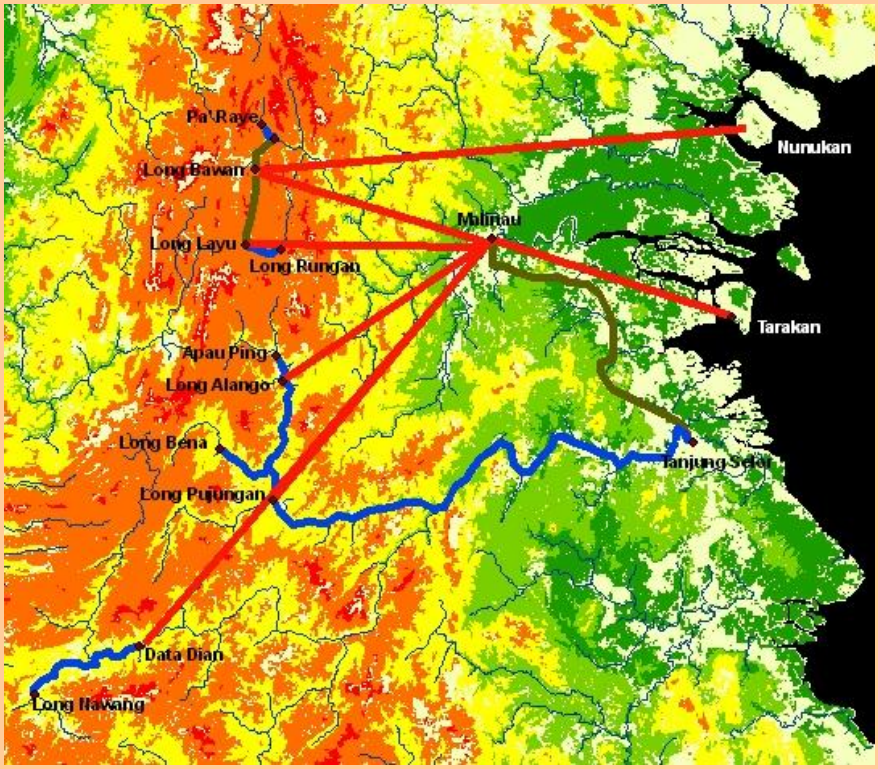
Maps and tables for each individual indicator are displayed on the pages directly following this table.

ECONOMIC WELL-BEING	
INDICATOR	**DESCRIPTION**
1. Transportation access	
% population who can reach markets/"urban" centers within ½ day	There is a direct and positive correlation between distance and remoteness, and difficulty of access. In districts like Kutai Barat, Malinau, and Kapuas Hulu, local people have to rely on a combination of means of transportation to get to the market centers/town including: small planes, motor boats, and 4WD/bus, and walking. This can constitute an additional economic burden for families needing to travel to town. **On average, people need 1 full day to get to the district capital.** (See map on transportation access in KMNP; and on travel time see Table A.5.1.a for Malinau and Table A.5.1.b. for Nunukan) Access to market and roads is one need that both local governments and people stress for future development. Alternatives like airstrips are still regarded as too expensive by local governments therefore budget is sought through government projects and logging/oil palm plantation for road development in the HoB area.
2. Transportation means + household goods % population who own bicycle /motorcycle/long boat/TV/radio/generator/solar panel	**Statistical presentation across districts is not consistent, and mostly urban biased.** For Kapuas Hulu District, for instance, government *data shows existence of some facilities (TV, radio, internet shop) by village, and not indicating number/units* of the facilities. Research by CIFOR **in Kutai Barat district** of East Kalimantan shows that almost **86% of respondents owns** transportation goods (**motorcycle or boat**), and **73% owns either parabola or refrigerator**. Another research by CIFOR in 2004 in Malinau district shows ownership of household goods from community in 14 villages (see Table A.5.2.a.). The research sheds light on properties that particularly of higher "economic value" as perceived by the local community, e.g., livestock (chicken, pigs), and boat. The data in addition reveals that more than 60% of respondents brought television and CD player into household goods after the year 2000.

3. Income	
% population below nat'l poverty line	The data show that all 8 districts fall within **"poor" category** and live **below the national poverty line (between 1-2US$/day)**. However we need to consider the "politicization" of data on poverty: governments wanting to cover up the real level of poverty suffered by people and/or local governments modifiying statistical data to show higher levels of poverty so that to get more aid from the central government. Another aspect to be considered is that "income level" is a not a sufficient indicator of economic well-being especially in areas like the HoB where people are highly dependent on natural resources for their livelihoods (see Table A.5.5.a. and graph on NTFP). *Additional indicators like: size of land cultivated and harvest data for consumption and sale (partial data from West Kalimantan); use and trade (and income%) of NTFP (partial data for East Kalimantan, CIFOR); ownership of household goods and means of transportation (partial data from CIFOR); frequency of travel (long distance) to distrcit capital for private matters; livestock; sales of agricultural and NTFP products; seem to better describe well-being conditions and quality of livelihood than simply income level.* *Complete data would require additional field surveys and primary data collection. Data available are samples from only* *some of the villages and the source is a CIFOR research.*
INDICATOR	**DESCRIPTION**
% population w/ savings or access to credit	**Credit Union** data from East Kalimantan shows an average of over IDR 4 million (= USD450) in savings per member. This is another way to measure individual "wealth." Overall the assets owned by each CU are also considerably high, ranging between IDR 2 Million (district of Kutai Barat) and IDR 76 Million (Samarinda). Data from West Kalimantan also indicate high level of partcipation in CU schemes. Moreover, specific data from the WWF work site (BKNP) shows other community-based groups engaged in revolving funds in support of economic and conservation activities - refer to CBO-BKNP graph.
4. Occupation (formal & informal)	

% people w/ salaried jobs	Data from government across eight districts consistently places **"farming"** or the agricultural sector as being major occupation (**over 70%**), and low percentage of **salaried job (below 10%)**, which is mainly as "civil servant" (see sample 'occupation' graph).
% people who engage as migrant workers	No official statistics of number of HoB residents working as migrants in Malaysia are available. For West Kalimantan province, there are records of migrants workers entering Sarawak through official check-point however data do not show the origin of the workers. In the rest of the HoB (Kalimantan area), local residents have on average all worked (abled men and some women) in Malaysia for at lest two years in their adult lives, however no record are available because there is no official checkpoint and most local residents cross the border illegally (no passport). Over the last few years, the number of local residents going to Sarawak to work has drastically diminished as the economy (employent opportunities through governmnet projects) on the Indonesian side has improved.
% people who extract natural resources for livelihood	So far a research covering 14 villages in Malinau district indicates extraction of NTFPs by villagers i.e., *gaharu* ***(34.2%)*****, plants for handicrafts (21.7%), wildlife hunting (15.8%), fishing (6.6%), and rattan (0.7%)** for family incomes (see graph NTFP). Indicators towards this information however need to be (further) generated through specific researches or participatory mapping for WWF work locations. Please refer to description of "poverty" above.

Transportation access from sub-district to district towns - Kayan Mentarang NP sample**



Legend:

river access (small boat *ketinting*)

airplane route

land

road

** Adapted from map by WWF-Indonesia, Program KMNP, 2008

(Part of) Table A.5.1.a Access from Villages to Sub-District and District Capitals - Malinau sample*

Village	Travel time and Means of Transportation	
	Sub-District Capital	District Capital: Malinau Kota
Sub-District Pujungan	Capital: Long Pujungan	
Long Pujungan (sub-district capital)	--	- by *ketinting* boat to Sub-District capital, - continue with either aircraft to Malinau Kota, - or by longboat to Tanjung Selor (Bulungan Sub-District), continue with car to Malinau Kota ± 8 hours**
Long Aran	By *ketinting* boat ± ½ hour	- by *ketinting* boat to Sub-District capital, - continue with either aircraft to Malinau Kota, - or by longboat to Tanjung Selor (Bulungan Sub-District), continue with car to Malinau Kota ± 8 hours**
Long Jelet	By *ketinting* boat ± 3 hours	- by *ketinting* boat to Sub-District capital, - continue with either aircraft to Malinau Kota, - or by longboat to Tanjung Selor (Bulungan Sub-District), continue with car to Malinau Kota ± 8 hours**
Long Ketaman	Walk ± 1½ day or by *ketinting* boat 1½ hours	- by *ketinting* boat to Sub-District capital, - continue with either aircraft to Malinau Kota, - or by longboat to Tanjung Selor (Bulungan Sub-District), continue with car to Malinau Kota ± 8 hours**
Long Bena	By *ketinting* boat ± 4 hours	- by *ketinting* boat to Sub-District capital, - continue with either aircraft to Malinau Kota, - or by longboat to Tanjung Selor (Bulungan Sub-District), continue with car to Malinau Kota ± 8 hours**

****As the road from Tanjung Selor to Malinau is in very poor conditions, most people have to go by speed-boat from Tanjung Selor to Tarakan and from Tarakan to Malianu by speed-boat (3 hours)**

Sub-District Kayan Hilir	Capital: Data Dian	District Capital: Malinau Kota
Data Dian	--	By aircraft (MAF), available once a week; or Trigana Air
Sai Anai	By *ketinting* boat 30 minutes	By *ketinting* to Sub-District capital, then with MAF once a week or Trigana Air
Long Metun II	By *ketinting* boat 30 minutes	Aircraft (MAF) twice a week
Long Metun	By *ketinting* boat 30 minutes	Aircraft (MAF) twice a week
Long Pipa/Sule	By aircraft MAF (charter)	By chartering MAF aircraft to the Sub-District capital, continue with aircraft MAF, operating once a week

Source: WWF-Indonesia, Program Taman Nasional Kayan Mentarang, Malinau 2008.

*** Partial data from Table A.5.1.a Access from Villages to Sub-District and District Capitals in the areas within KMNP**

Table A.5.1.b Access to Sub-District and District Capital from villages inside Kayan Mentarang National park (as part of) Nunukan District

Village	Travel time	Means of Transportation	
	to Sub-District capital Long Bawan	to Sub-District capital	to District Capital NUNUKAN
Long Umung	± 30 minutes	motorcycle/car	aircraft MAF from Long Bawan, available 3-4 times/week
Bungayan	± 10 hours, plus ± 30 minutes	- walk, plus - motorcycle	aircraft DAS/MAF, available once a week
Long Pua'	3 hours	walk plus motorcycle from Pa Padi	aircraft DAS/MAF, available once a week
Lembudud	1 hour	motorcycle	aircraft DAS/MAF, available once a week

Village	to Sub-District capital Long Layu	to Sub-District capital	to District Capital NUNUKAN
Long Layu	6 hours (when road conditions allow) 10 hours to **Long Bawan**	- aircraft (MAF) - motorcycle/car - walk	By aircraft MAF, 2 times/week
Binuang	- 6-8 hours	by ketinting/river and walk	By aircraft MAF, 2 times/week
Long Padi	5-6 hours	by ketinting/river and walk	by river to Binuang and then by plane; or by chartered MAF plane
Long Rungan	- 4 hours	by ketinting/river and walk	by river to Long Layu or Binuang and then by MAF plane
Tang Laan	2 hours	by ketinting/river	by river to Long Layu and then by MAF plane 2times/week

Flight routes (by MAF private and non-commercial airline):
-MAF: Tarakan-Nunukan-Long Layu or Binaung (round-trip, 2 times/week)
- MAF: Tarakan-Long Bawan-Long Layu/Tang Laan/Long Rungan/Long Padi

Source: WWF-Indonesia, Program Taman Nasional Kayan Mentarang, Malinau 2008.

Table A.5.2.a. Ownership of Household Properties in 14 villages of Malinau District*

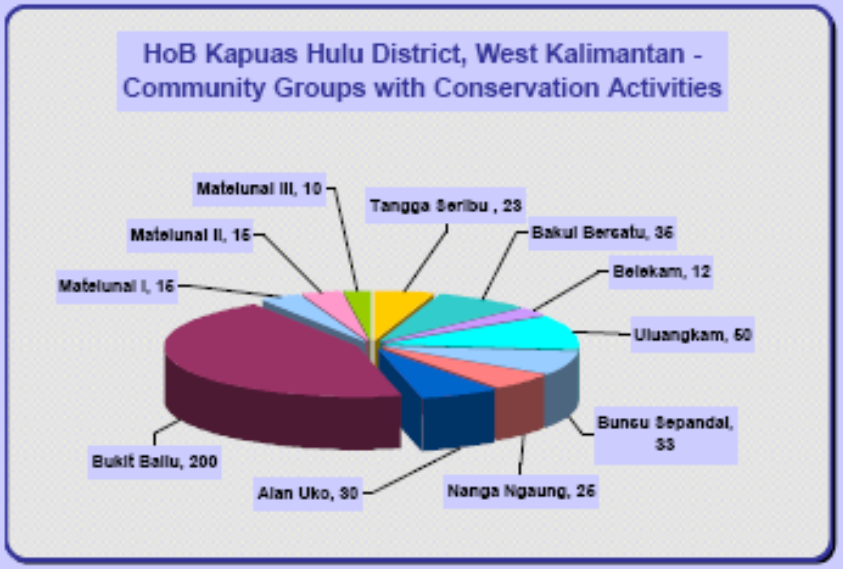
Type of Household Goods	% of Household owning the assets	% of assets bought after the year 2000
Chicken	**63.2**	27.1
***Ketinting* (boat)**	**50.0**	50.0
Pigs	**34.9**	52.8
Television	**31.6**	**64.6**
Radio	**30.9**	55.3
Chainsaw	**29.6**	40.0
CD Player	**21.1**	**78.1**
Antiques	**20.4**	22.6
Bicycle	9.2	50.0
Parabola (TV antenna)	9.2	64.3
Generator	5.3	37.5
Ponds	3.9	100.0
Refrigerator	2.6	75.0
Rice mill	0.7	0.0
Stove	0.7	100.0

*total respondents: 152 persons

(Adapted from) Source: Profil Desa-Desa di Kabupaten Malinau (Kondisi Sosial Ekonomi Desa-Desa), 2004. Kerjasama CIFOR, BMZ & Pemkab. Malinau

Community groups with conservation and economic activities - BKNP sample

No.	Group	Member (household)
1	Tangga Seribu	23
2	Bakul Bersatu	35
3	Belekam	12
4	Uluangkam	50
5	Bunsu Sepandai	33
6	Nanga Ngaung	25
7	Alan Uko	30
8	Bukit Baliu	200
9	Matelunai I	15
10	Matelunai II	15
11	Matelunai III	10
Total members (11 groups)		448

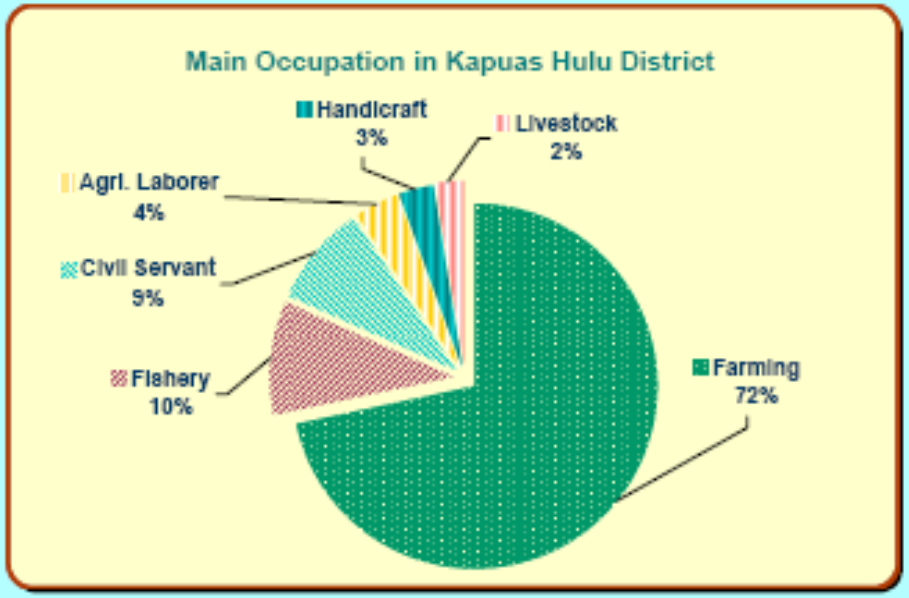


Salaried job - sample

Kapuas Hulu District - Main occupation

Type of occupation	%
Farming	70.74%
Fishery	10.04%
Civil Servant	8.75%
Agri. Laborer	3.74%
Handicraft	3.08%
Livestock	2.41%
Mechanic	0.21%
Doctor	0.04%

Total work force: 111,207
Total Population: 209,015



- % people who extract natural resources for livelihood

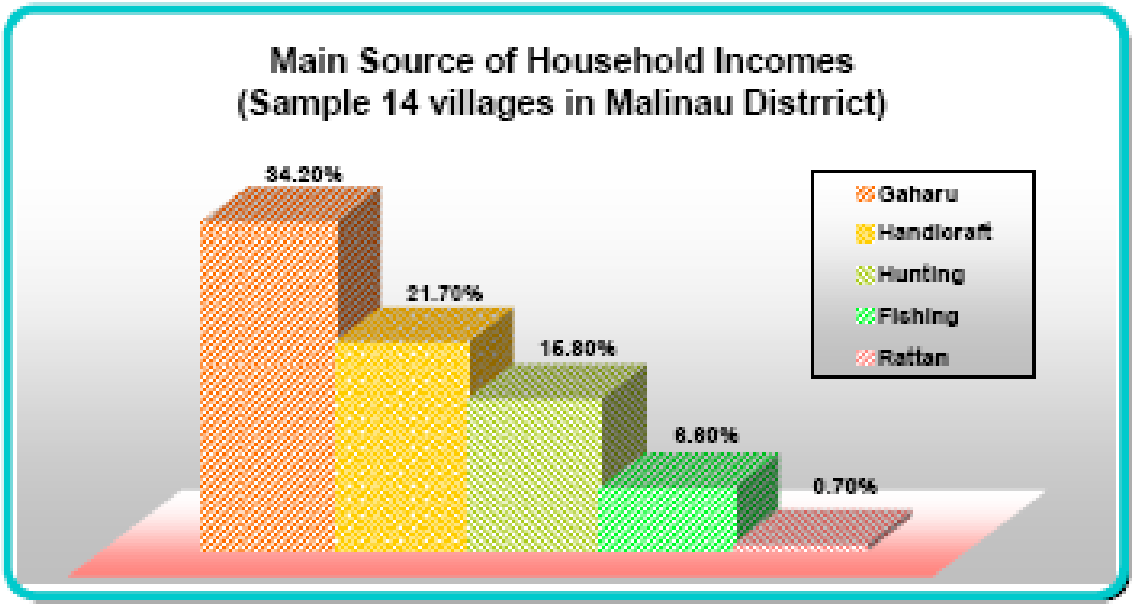


Table A.5.5.a Main Source of Household Incomes in the villages of Malinau District

Source of Income	% of respondents
Gaharu	34.20%
Handicraft	21.70%
Hunting	15.80%
Fishing	6.60%
Rattan	0.70%

** (152 respondents from 14 villages)

Source: Profil Desa-Desa di Kabupaten Malinau (Kondisi Sosial Ekonomi Desa-Desa), 2004. Kerjasama CIFOR, BMZ & Pemkab. Malinau

In the following table, the Heart of Borneo Measures Team provides an interpretation of the data for each of the Health indicators.

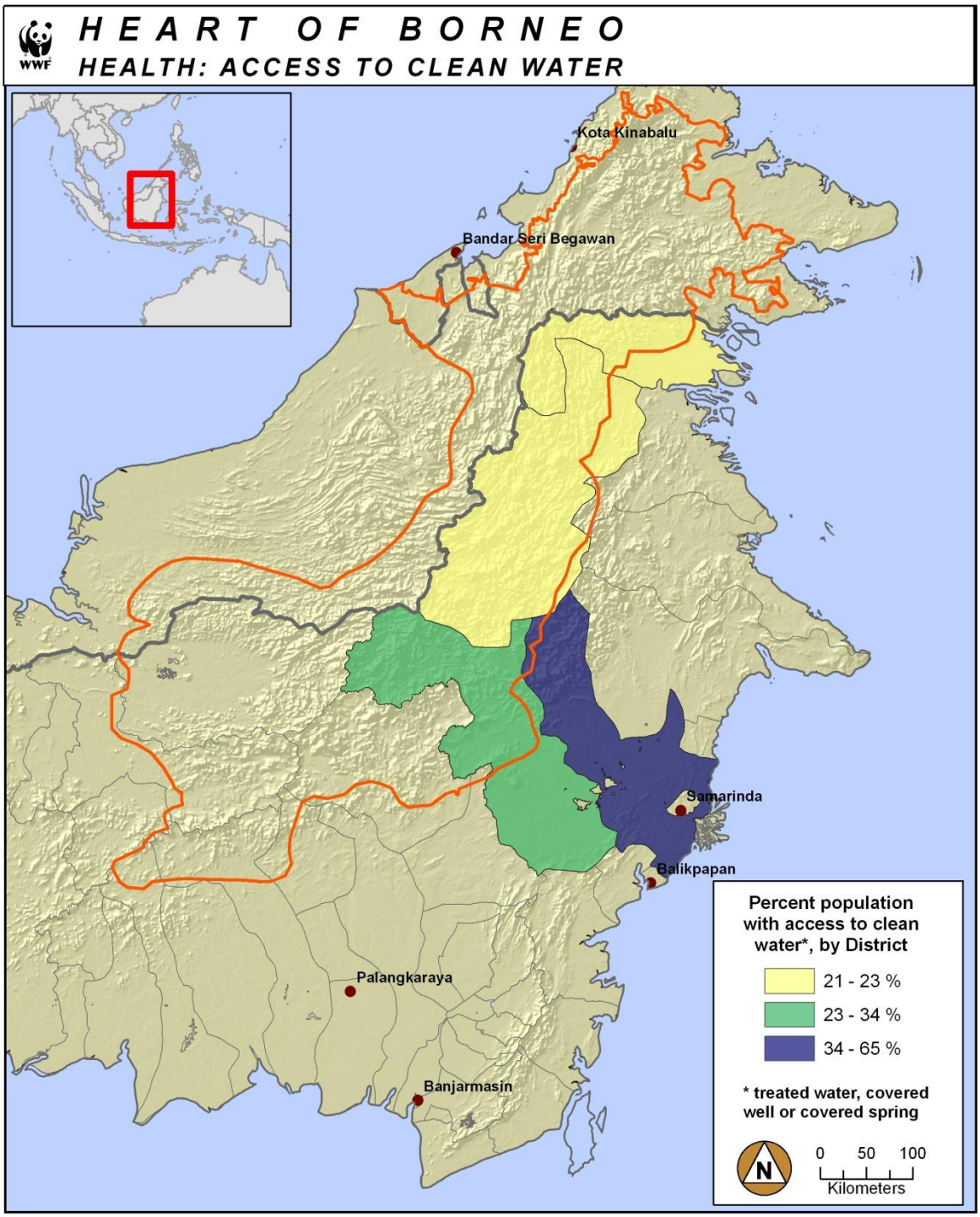
Maps, graphs and tables for each individual indicator are displayed on the pages directly following this table.

I. Health

INDICATOR	DESCRIPTION
1. Clean Water % population with (sustainable) access to improved water source (MDI)	**Approximately 20% on average** (on data from 7 districts). The data shows that in the province of East Kalimantan access to treated water (served by PDAM - state owned water company at the district towns and several subdistrict capitals) is still low in most districts, and limited to urban centers. In the districts of Malinau and Kutai Barat, almost 50% of the population depends on untreated river water for their daily needs. In the sub-district of Kutai Kertanegara, the percentage of people with access to treated water is higher than the national target. This is due to higher population density residing closer or urban areas. Only in the district of Nunukan, a high number of people depend on rain water which makes them particularly vulnerable to climatic changes and changes in weather patterns. Otherwise, population in both provinces have access to relatively safe water, however well, river, springs represent the main source of supply. Inclusion of non-PDAM water sources (covered spring and covered well) entails great difference in the graphs of access to clean water (see graph 3. for East kalimantan sample). In remote areas and the uppertreams, water quality is still excellent and no major changes in water debt/quality have been experienced (CIFOR research). Data on sources of water in the villages came from the government publications which though are consistent in details across district locations, but for West Kalimantan was only available for one district: Kapuas Hulu. Data from the water company, aside from mainly limited to urban centers, it refers more to number of paying customers, only part of which are residential houses, which is true for instance for data of Landak district (see Graph 1).

2. Disease rate % population → TBC, cholera, diarrhea, malaria	**Diarhea and malaria** are in the top five highest incidence of hospitalization records in both provinces of East and West Kalimantan (**approx. 30%**); while **the highest is Upper respiratory tract infection**, for both infants and adults. Incidence of **Tuberculosis** is low in hospitalization records, but appear more in the **outpatient consultation** visits. In all four diseases, the statistics for West Kalimantan tend to be higher than those for East kalimantan.
INDICATOR	**DESCRIPTION**
3. Access to quality health care % population w/in subdistrict with facility + village dispensary + staff	**Almost 100% accessibility**. One Public Health Clinic exists in each sub-district capital with a number of health personnel (mostly nurses, midwives, and paramedics); and a hospital in the district capital.
4. Food security % population usually eating 3x/day	**Data non-exists at the district level.** Related **provincial statistics shows** an average portion of **61.35% of incomes spent for foods consumption** by local households from different levels of expenditures (see Table A.3.4.a). A research conducted by CIFOR indicates the frequency of "protein-source" intakes by people in several villages in Malinau district (see Table A.3.4.b.). Food security is also relevant indication for the "economic well-being" of local community, for this please refer to description in the economic well-being section: paragraph 2 on "% of population below the poverty line".
5. Traditional medicines % population using traditional/modern medicines	**Old data on types of medicinal herbs.** A number of thesis researches by graduate students from local universities as well as from WWF projects were identified on this issue, but most current data was from the year 2000. Updates (as part of baselining) in few WWF work sites are on-going, but it would require more indepth analysis on the medicinal use of these plants by local communities. (See also description on "culture").
6. Child/infant mortality children aged < 1 and < 5 death	Higher level of infant mortality rate in HoB, i.e., **East Kalimantan: 15**; **West Kalimantan: 50** as compared to the **national figure**, which is **32.** (Refer to IMR graphs.)

Health- % population with access to clean water



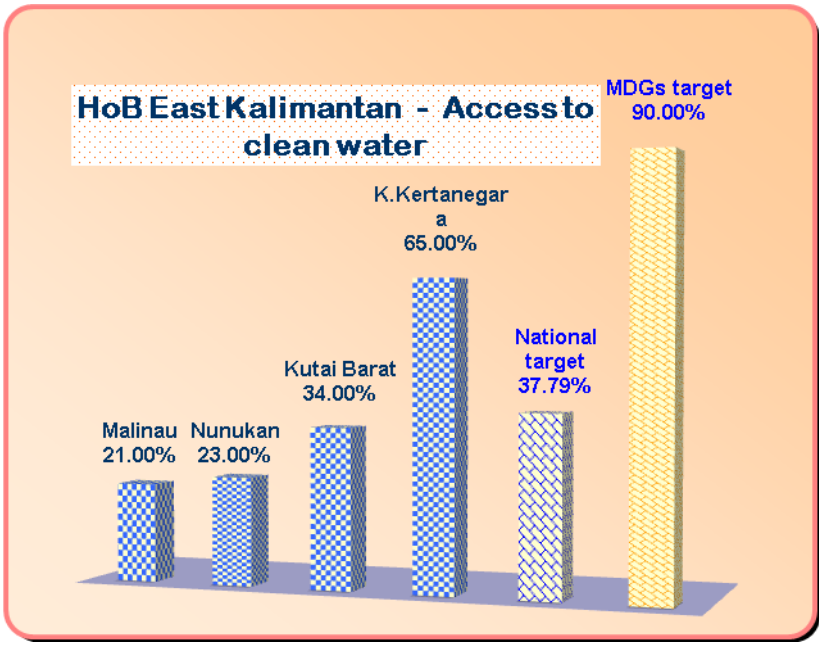
Target:

Health

KEA
Clean water

Indicator
% population with access to clean water

Justification for Indicator:
A source of clean water is an ecosystem service that is a foundation for sustainable access to water for human populations.



Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

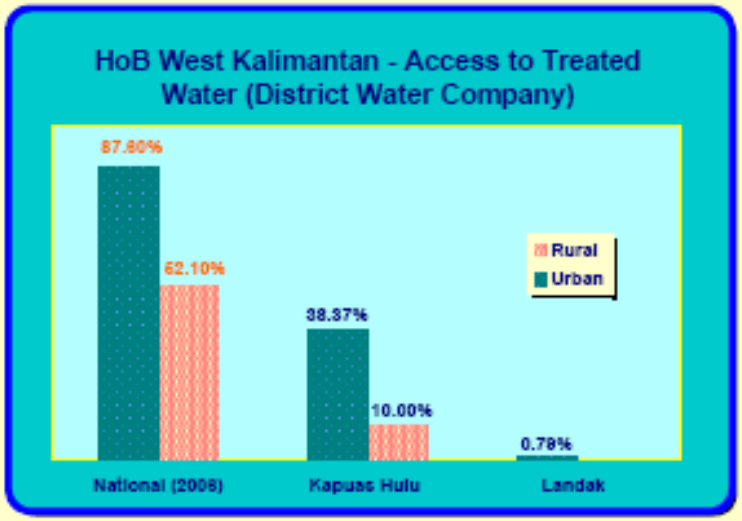
Notes:

Working Group Members:

References:

I. 1. ACCESS TO CLEAN WATER

Graph 1.



W.Kalimantan (Graph 1.)

	Rural	Urban
Landak		0.79%
Kapuas Hulu	10.00%	38.37%
National (2006)	52.10%	87.60%

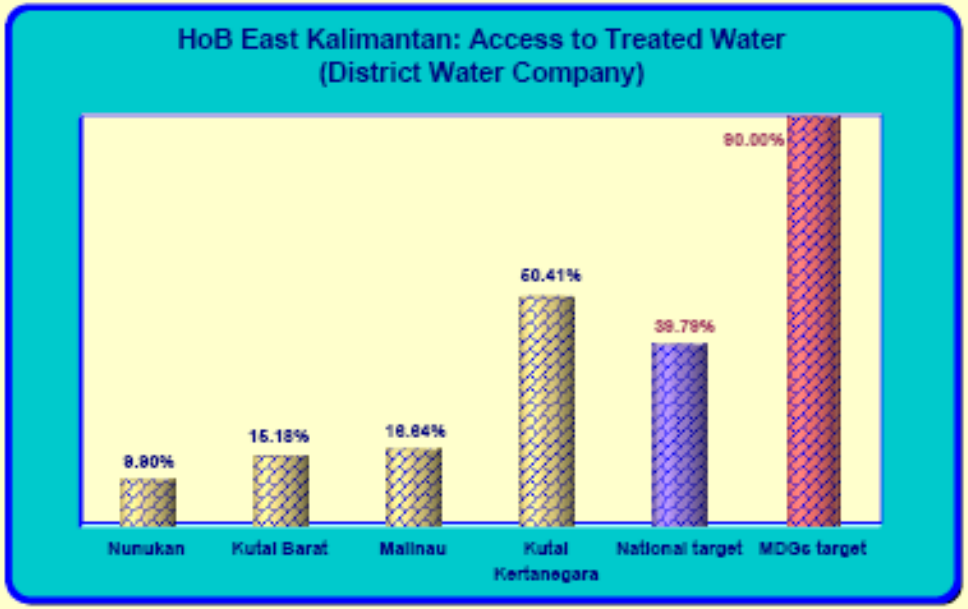
Data source

K.Hulu urban	Table A.3.6.a →	Residencial House / total households in Putussibau (from Table 1.e. - Population)
K.Hulu rural	Table A.3.6.a (1):	average value, excluding Putussibau
Landak urban	Table A.3.6.c →	Household / # household in Landak District (from Table 1.f. - Population)

National achievement (2006) added

→ No calculation could be made for Melawi (data on household non-exists); and for Sarawak (no comparable population data for location)

Graph 2



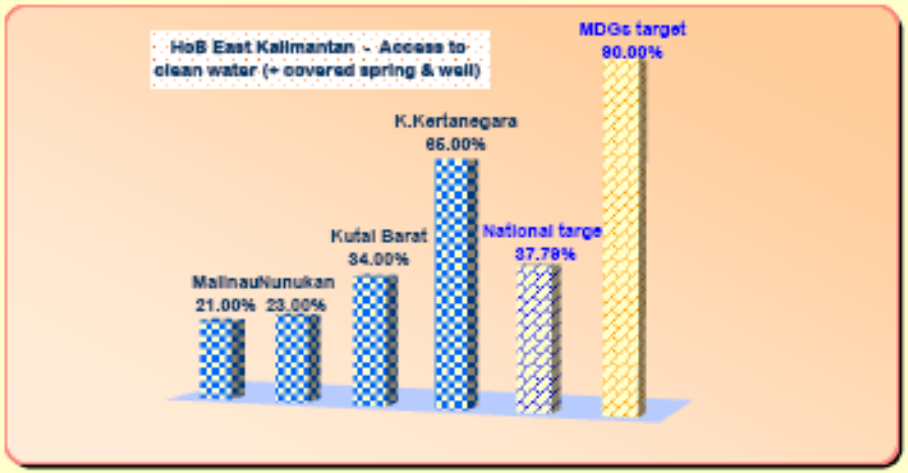
E. Kalimantan (Graph 2.)

District	Treated water
Nunukan	9.90%
Kutai Barat	15.18%
Malinau	16.64%
Kutai Kertanegara	60.41%
National target	39.79%
MDGs target	90.00%

Data source

Table A.3.6. → column "treated water"
National & MDGs targets (2015) added

Graph 3



East Kalimantan (Graph 3.) - combined data on covered well and covered spring

District	treated water + covered well + covered spring
Malinau	21.00%
Nunukan	23.00%
Kutai Barat	34.00%
K.Kertanegara	65.00%
National target	37.79%
MDGs target	90.00%

Food Security

Table A.3.4.a Average Percentage Per Capita Consumption by Monthly Expenses Grouping (East kalimantan Province, 2004-2006)

Range of Per Capita Monthly Expenses (IDR '000)	Foods			Non-foods		
	2004	2005	2006	2004	2005	2006
40.00 - 59.99	58.03	85.18	no data	41.97	14.82	no data
60.00 - 79.99	61.71	68.53	75.13	38.29	31.47	24.87
80.00 - 99.99	64.59	67.63	67.38	35.41	32.37	32.62
100.00 - 149.99	65.47	65.24	64.78	34.53	34.76	35.22
150.00 - 199.99	64.06	62.92	63.10	35.94	37.08	36.9
200.00 - 299.99	60.91	59.61	59.42	39.09	40.39	40.58
300.00 - 499.99	57.18	54.18	54.76	42.82	45.82	45.24
> 500.00	42.77	42.19	44.88	57.23	57.81	55.12
Average	**52.09**	**52.54**	**61.35**	**35.41**	**34.96**	**38.65**

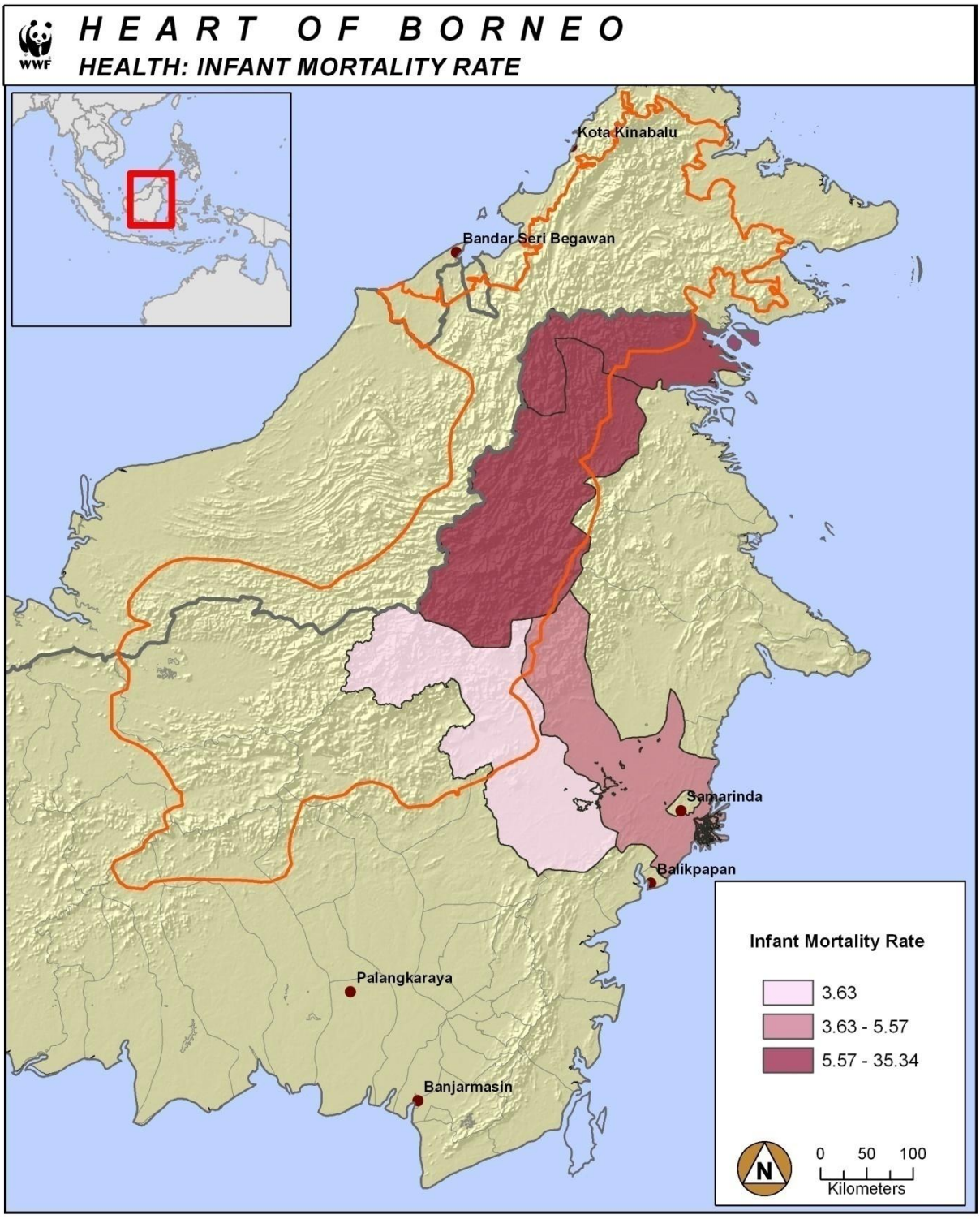
Source: Indikator Kesejahteraan Rakyat KALTIM Tahun 2006, hal. 31

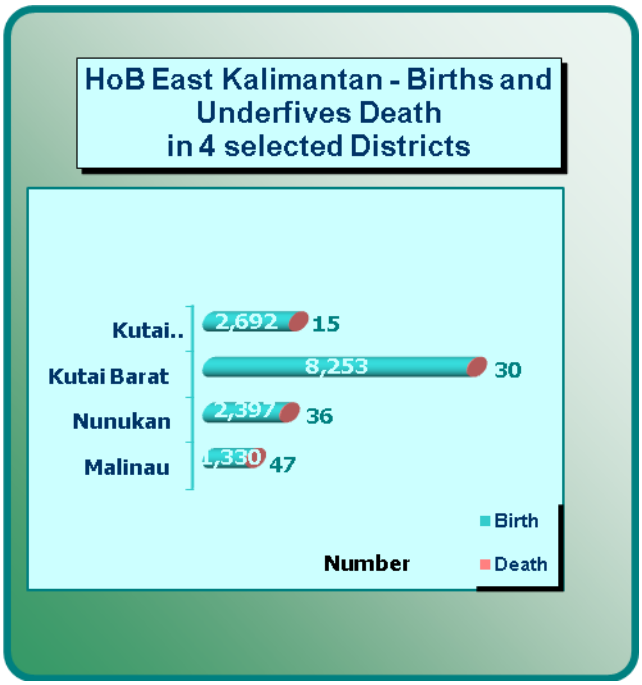
Table A.3.4.b Protein source and frequency of consumption by households in 14 villages of Malinau District*)

Frequency	Protein source		
	Meat	Egg	Fish
Never	0.7	41.4	0.7
Once per month	39.5	32.4	26.3
Once per week	32.2	16.4	36.2
2 - 3 times a day	25.0	6.6	27.6
Everyday	2.6	1.3	7.2

* : Total 152 respondents
Source: Profil Desa-Desa di Kabupaten Malinau (Kondisi Sosial Ekonomi Desa-Desa), 2004. Kerjasama CIFOR, BMZ & Pemkab. Malinau

Health- Infant mortality rate (per 1,000 live births)





Target:

Health

KEA
Mortality

Indicator
Infant mortality rate (per 1,000 live births)

Justification for Indicator:
Infant mortality rates serve as a useful proxy for overall poverty levels because they are highly correlated with many poverty-related metrics such as income, education levels and health status.

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

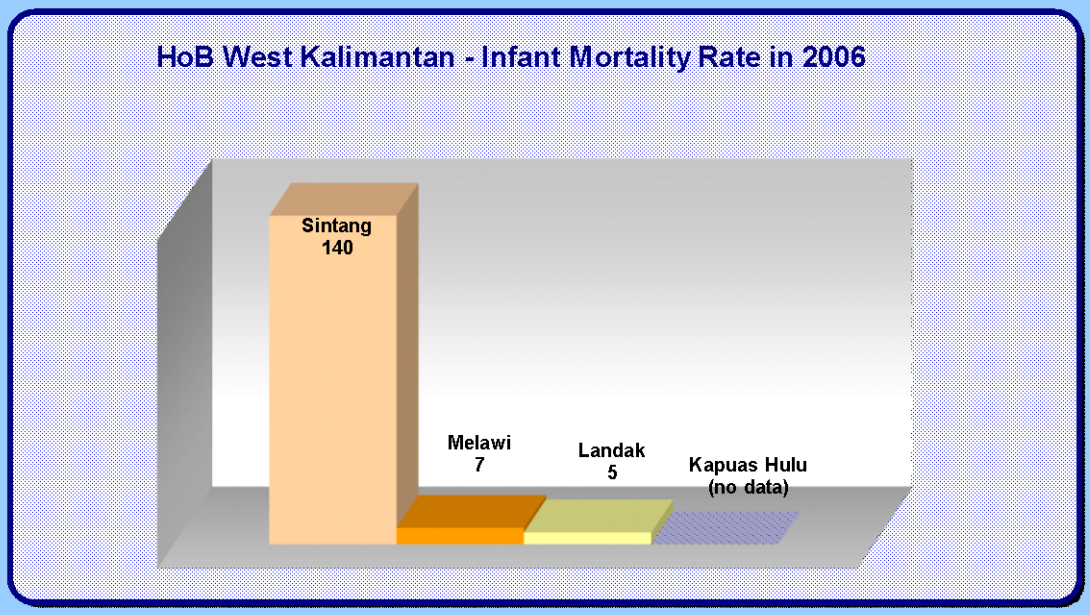
Notes:

Working Group Members:

References:

East Kalimantan Infant Mortality Rate (IMR) in 2006	
District	**Mortality Rate**
Malinau	35.34
Nunukan	15.02
Kutai Barat	3.64
Kutai Kartanegara	5.57
Average IMR	**14.89**
National IMR	**32.00**

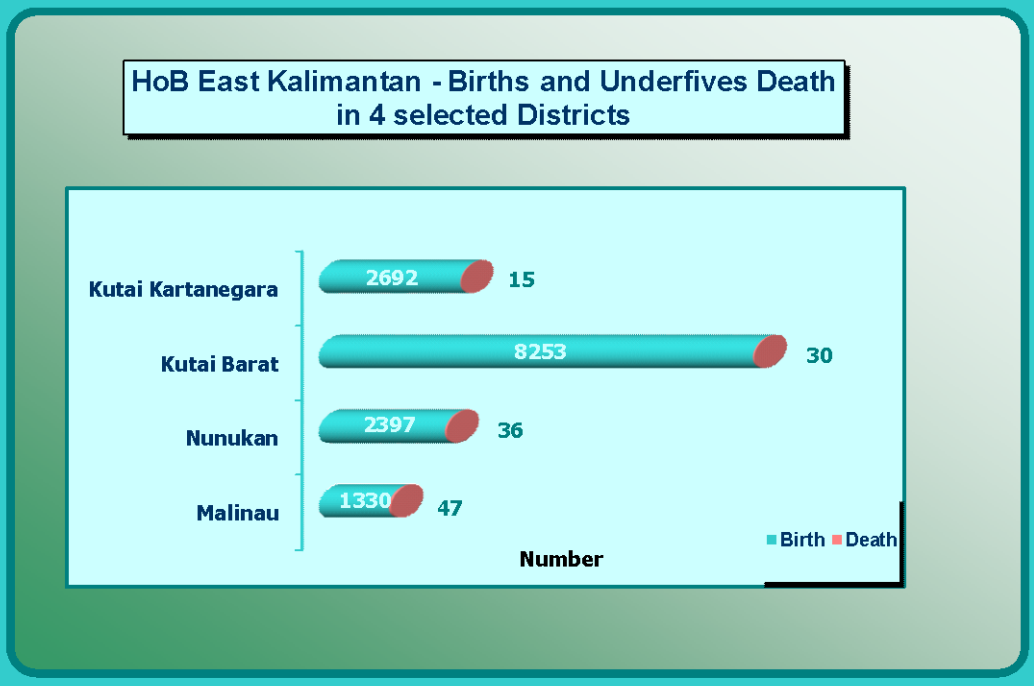
INFANT MORTALITY RATE - West Kalimantan



West Kalimantan

District	IMR
Kapuas Hulu	no data
Sintang	140
Melawi	7
Landak	5
Average mortality rate	50.67

Infant Mortality Rate - East Kalimantan



Infant Mortality Rate (IMR) in 2006	
District	**Mortality Rate**
Malinau	35.34
Nunukan	15.02
Kutai Barat	3.64
Kutai Kartanegara	5.57
Average IMR	**14.89**

East Kalimantan

District	# of Birth	# of Death Case	% Death	IMR
Malinau	1,330	47	3.53	35.34
Nunukan	2,397	36	1.50	15.02
Kutai Barat	8,253	30	0.36	3.64
Kutai Kartanegara	2,692	15	0.56	5.57

Average infant mortality rate for East Kalimantan	14.89
Average infant mortality rate for West Kalimantan	50.67
National IMR	32.00

In the following table, the Heart of Borneo Measures Team provides an interpretation of the data for each of the Political Empowerment indicators.

Graphs and tables for some indicators are displayed on the pages directly following this table.

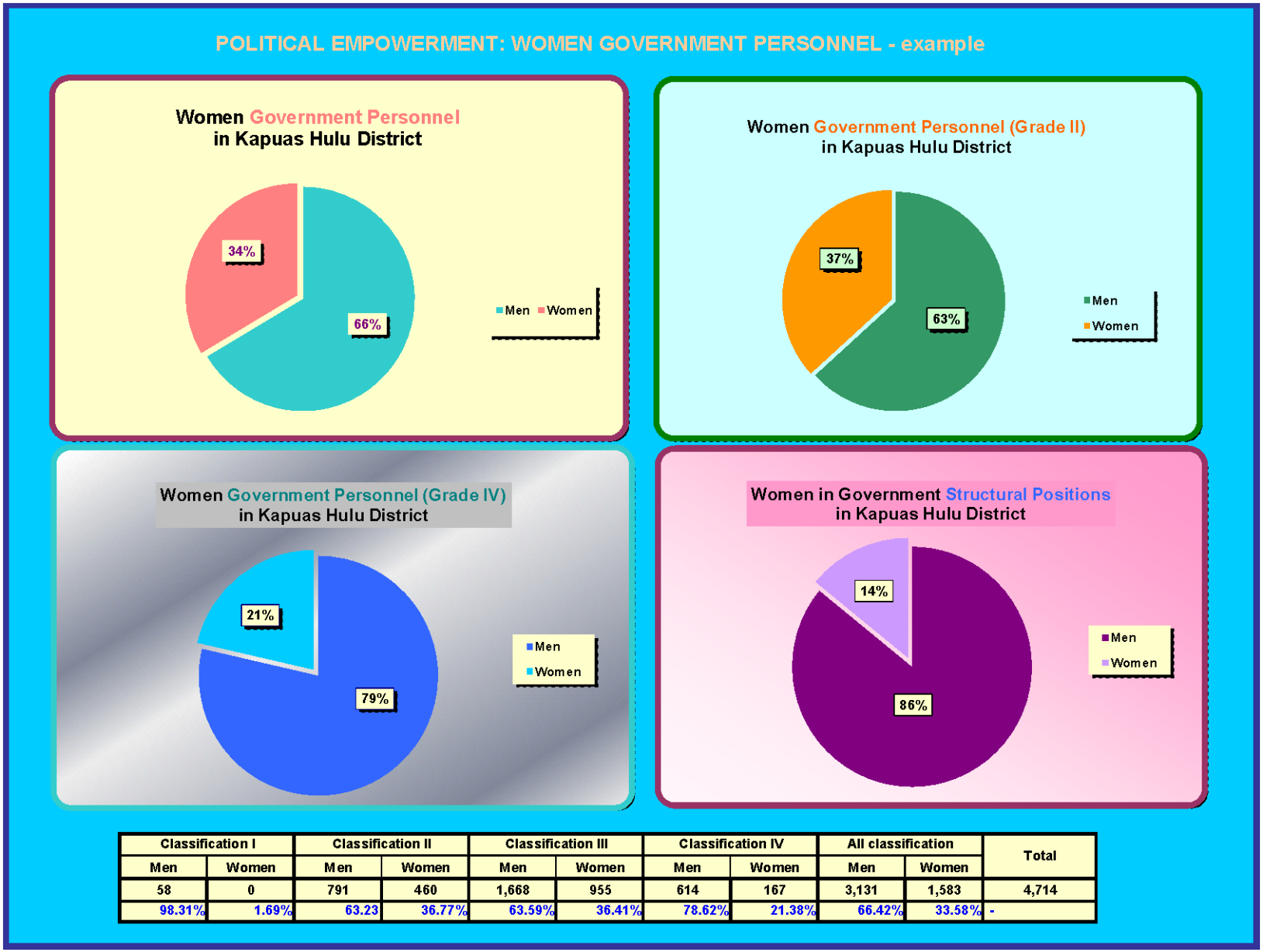
III. POLITICAL EMPOWERMENT	
INDICATOR	**DESCRIPTION**
1. Community organization (traditional, new organization) % villages with different types of community organizations (custom, farmer, & others)	**Almost 100%** for the youth and adults. All the mandatory "structures" and "village organizations" are present in all villages. *Notes: See description on % population who belong to community organization*
% population who belong to community organizations	**Almost 100%** for the youth and adults (in assignment to different village-based formal organizations). In order to be able to interpet data on village organizations in Kalimantan, it is important to realize the high level of "mandatory" participation in government-based organizations that filters down to all levels including: farmers groups; youth organizations; women; village cooperatives; etc. In terms of social organizations, church/religion (East Kalimantan) comes second in importance and level of participation and affiliation. In East Kalimantan, ethnic organizations rae very important force of social membership and affiliation, which also constitute an importnat political constituency. However, there is an important element of "government" control in ethnic organizations whereby the Head is usually the highest ranking government official of that ethnic group. *We regard data on CU membership more relevnat indicator for economic well-being rather than village/community organization*

2. Natural resources right (land, forest, traditional knowledge) % population whose land/forest/intellectual property rights are recognized by the government	Local government's decrees to legally recognize **protection status of several community-owned natural resources** are found in Kapuas Hulu districts. It **represents protection of lakes in 12 village locations** home to variety of local fish species, especially the Arowana fish (Osteoglosum sp). Management of the protected area by indigenous ethnic group, based on customary laws is currently effective, e.g., in Danau Nanga Empangau - protection status from 2001; and Danau Sadong - protection status from 2004. (See Table A.4.1.)
3. Collaboration partnership % community groups that belong to alliances / networks / federations	Data is not available from government statistics. Qualitative data on traditional / cultural groups however indicates that **the network among the Dayak ethnic groups** significantly function for both cultural and political purposes.
4. Women empowerment % village / subdistrict/ district/ government or civil servants who are female	The data show that **at least 1/3 of government employee are women**. If we look at level/grade of government position/category, it is interesting to note that percentage of women is higher at lower positions/grade and is diminishing at the higher-up rank/decision making positions. See sample graphs on women civil servant.
% local legislative members who are female	Overall, percentage of women in local parliament is **below 10%**. This is lower than the national target. In parliamentary elections 2009, parties are expected to have 30% of elected legislators women (as required quota by the Election Committee for all parties).
% of women who belong to community organizations	There is only one women NGO in Kutai Barat (membership of 400) focusing on women empowerment. **Women** however **are involved in all village/government and ethnic associations (women's section)**. Wives of civil servants belong to an association (PKK) which deals with family welfare issues. PKK is present in all villages and all government levels. Very interesting data on women "economic" involvement can be drawn from data on **CU membership** where **40% on average are women** in both provinces.

Table A.4.1 Protected (Lake) Areas in Kapuas Hulu area with formal recognition by the District Government being managed by Local community

No.	Name of area	Location		Decree for Protection Status
		Village	Sub-District	
1	Danau Pauh	Teluk Saka sub-village, Jongkong Kiri Hulu village	Jongkong	Decree of Kapuas Hulu District Head No. 288 Tahun 2007, 10 October 2007
2	Danau Selogan	Ujung Said village	Jongkong	Decree of Kapuas Hulu District Head No. 193 Tahun 2007, 29 June 2007
3	Danau Pengumpang	Ujung Jambu village	Jongkong	Decree of Kapuas Hulu District Head No. Tahun 2008, January 2008
4	Danau Basau Darat	Ujung Jambu village	Jongkong	Decree of Kapuas Hulu District Head No. 60 Tahun 2008, 12 March 2008
5	Danau Basau Darat Nelayan	Bungkuk sub-village, Ujung Jambu village	Jongkong	Decree of Kapuas Hulu District Head No. 210 Tahun 2007, 16 July 2007
6	Danau Tanjung Petak	Jongkong Kiri Hulu sub-village, Bhakti Karya village	Jongkong	Decree of Kapuas Hulu District Head No. 232 Tahun 2007, 27 July 2007
7	Danau Pauh	Teluk Saka sub-village, Jongkong Kiri Hulu village	Jongkong	Decree of Kapuas Hulu District Head Nomor __ Tahun 2007
8	Danau Sabu	Dilaga sub-village, Bunut Hilir village	Bunut Hilir	Decree of Kapuas Hulu District Head No. 287 Tahun 2007, 10 October 2007
9	Danau Penemur Bersatu	Nanga Tuan village	Bunut Hilir	Decree of Kapuas Hulu District Head No. 176 Tahun 2007, 28 June 2007
10	Danau Nanga Empangau	Empangau sub-village, Teluk Aur village	Bunut Hilir	Decree of Kapuas Hulu District Head No. 6 Tahun 2001, 31 January 2001
11	Danau Pengelang	Juang I and Juang II sub-villages, Teluk Aur village	Bunut Hilir	Decree of Kapuas Hulu District Head No. 314 Tahun 2007, 22 November 2007
12	Danau Sadong	Tanjung Karang sub-village, Padua Mendalam village	Putussibau	Decree of Kapuas Hulu District Head No. 77 Tahun 2004, 26 May 2004

Source: Dinas Lingkungan Hidup,Energi dan Sumber Daya Mineral Kabupaten Kapuas Hulu, 2007



Classification I		Classification II		Classification III		Classification IV		All classification		Total
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
58	0	791	460	1,668	955	614	167	3,131	1,583	4,714
98.31%	1.69%	63.23	36.77%	63.59%	36.41%	78.62%	21.38%	66.42%	33.58%	-

In the following table, the Heart of Borneo Measures Team provides an interpretation of the data for each of the Education indicators.

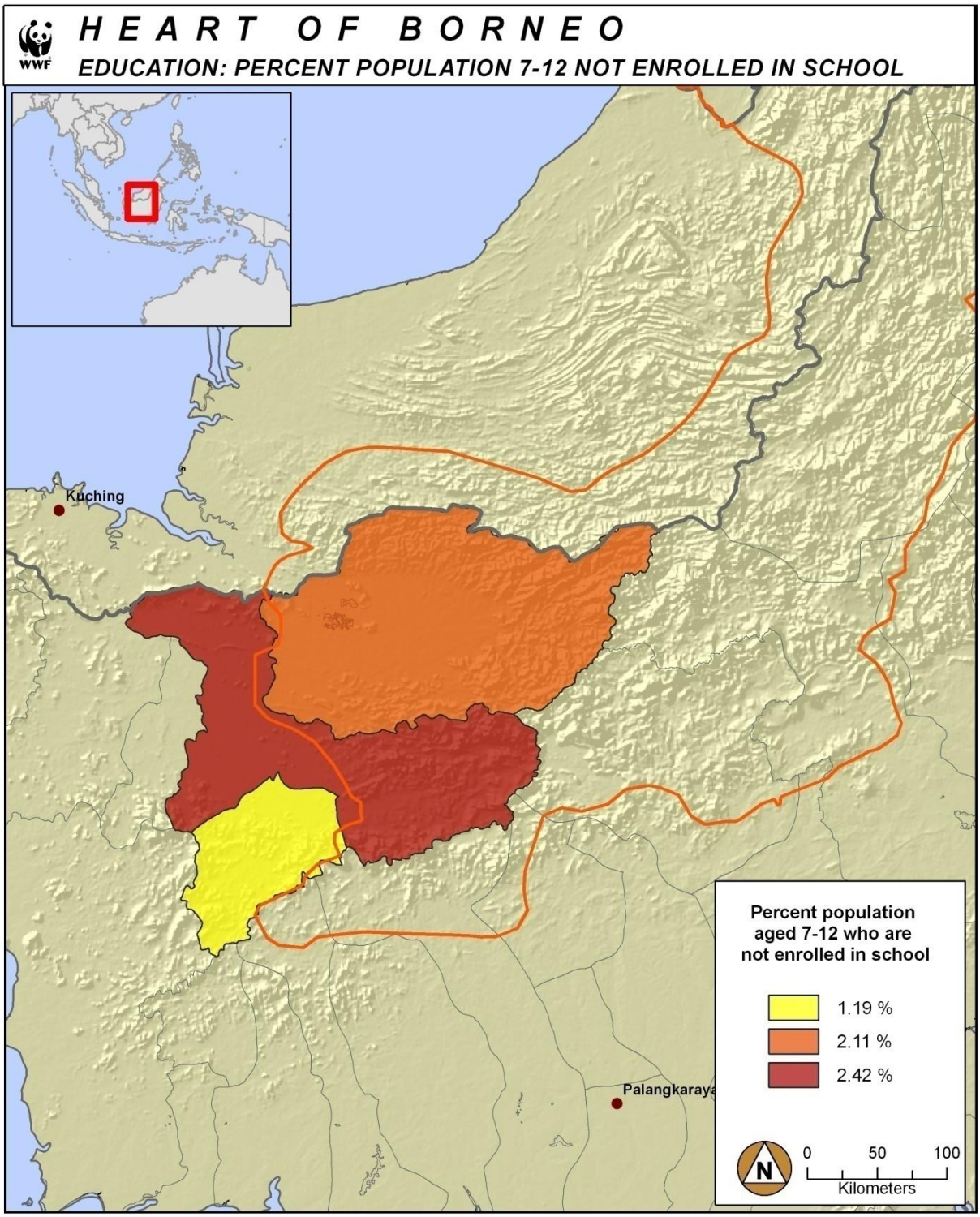
Maps, graphs and tables for some individual indicators are displayed on the pages directly following this table.

II. EDUCATION

INDICATOR	DESCRIPTION
	General *- The MDGs parameters are not measuring quality of education; difficult to analyze challenges faced by village school kids in terms of transportation, distance, family conditions, etc., with the aggregate data from district level.* *- Possible additional indicator(s) are the available learning facilities, level of regular teaching classes and attendance hours by the children, as well as timely execution of final examinaton for the graduating classes.*
1. Access to education % of villages with elementary schools and % of districts with junior high and high schools in the subdistrict	**100%.** All villages have elementary schools, and each sub-district capital has junior high schools, as mandated by government policy. The only exception is sub-districts recently established on the basis of government re-definition of administrative areas. With regard to high schools, some of the most populous sub-districts have government schools and/or private schools (=some are religious schools, other are schools started by private efforts or foundations which will then seek recognition by the government).
Erollment % girls enrolled in school % boys enrolled in school	The data on school enrollment shows similar high level of schooling participation for boys and girls, which is **higher than 95% for grade school**, and ranged from **85% to 95% for junior high school**; while enrollment level in **senior high school varies from 30% to 70%** (see graph sample for East Kalimantan). This is consistent with the low portion of kids from grade school age (7-12) who are not engage in schooling activity (refer to the graph sample for West Kalimantan). The highest participation in senior high school for West Kalimantan is in Melawi district (66% for boys and 73% for girls) and the lowest is Sintang district (about 30% for each gender).

2. Graduation rates % school age population graduating from elementary/junior high/high school	Overall graduation rates are very high: **over 95% on average in all districts**, which is almost in line with the MDGs target of 100% by 2015, and above the provincial achievement as of 2007 (UNDP, 2007). In the districts of East Kalimantan 100% graduation rates appear frequently for both primary and secondary schools. However, the data do not show the quality and continuity of educational services. For example, teachers take very long leaves of absence from teachning duties in remote areas and isolated villages. School books are not always delivered to schools so the pupils lack basic references for learning. School buildings are often in poor conditions and depend on (limited) government funds for maintenance and repairs. Underqualified teachers or teachers from elementary and junior high school are often asked to teach higher grades or tasked with responsibility for teaching curriculum at high school level. Often, high school children from remote villages choose to move to town to attend high schools (which are usually of better quality). They leave with family/kin and/or leave with traders/business families and work in shops in return for accommodations and foods. For Malinau and Nunukan: Higher education is not very high in the agenda of local people, except in families who live in towns. If children from the interior have a chance to go to University, the majority opts for theological studies and, more recently, for technical/applied educational programs supported by the government (scholarships)
boy:girl graduation ratio	Overall data shows very **high graduation rate for both girls and boys**, or not very significant difference based on gender.

Education- Percent population aged 7-12 not enrolled in school



Education- % girls & boys enrolled in school

West Kalimantan: School Enrollment

District / Province / National	7-12		13-15		16-18		19-24	
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
Landak	98.26%	96.36%	85.65%	85.03%	46.86%	46.05%	8.30%	5.40%
Sintang	96.75%	97.33%	78.39%	85.38%	30.83%	31.67%	1.24%	2.62%
Kapuas Hulu	96.81%	97.14%	84.58%	77.56%	35.17%	32.65%	9.59%	6.94%
Melawi	98.12%	97.03%	94.02%	97.86%	66.07%	72.64%	8.70%	10.05%
West Kalimantan	*95.95%*	*97.14%*	*84.05%*	*82.86*	*47.43%*	*49.74%*	*9.48%*	*9.13%*
MDGs/National target	100%	100%	100%	100%				

Target:

Education

KEA
School enrollment

Indicator
% girls & boys enrolled in school

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

Target:

Education

KEA
School enrollment

Indicator
Percent population aged 7-12 not enrolled in school

Justification for Indicator:

Long-term Viability Goal:

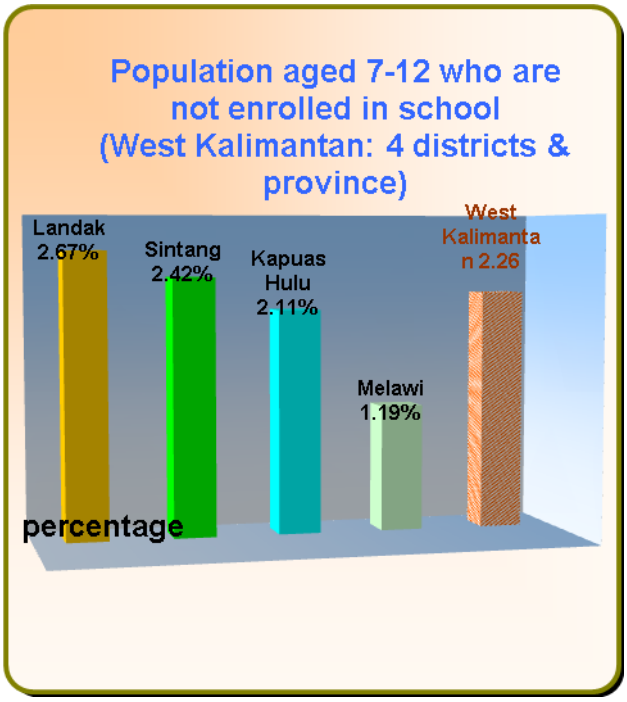
Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:



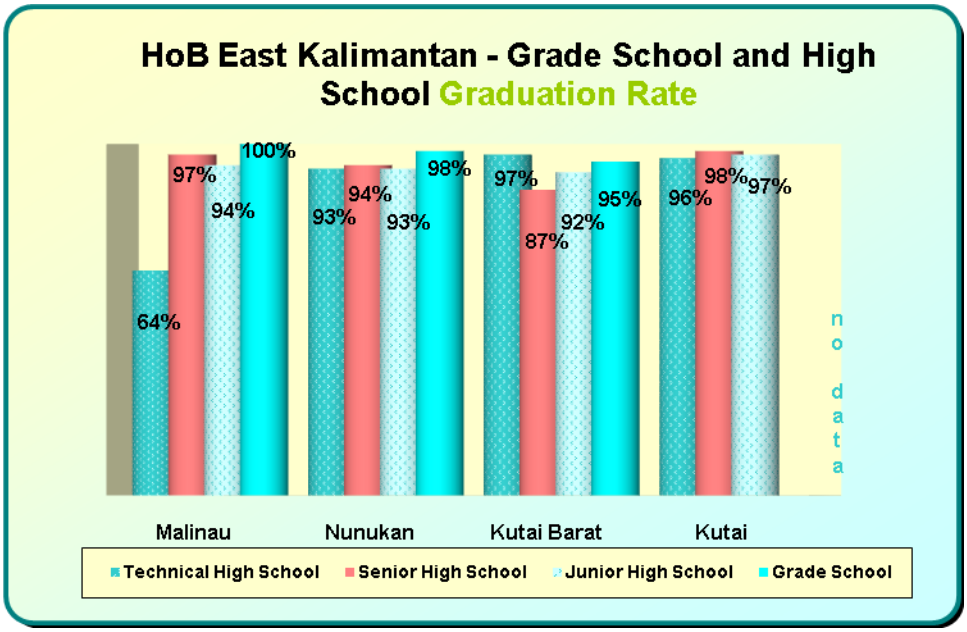
Education- % school age population graduating from grade school, junior high, and high school

Target:

Education

KEA
Graduation Rates

Indicator
% school age population graduating from grade school, junior high and high school



Justification for Indicator:
General indicator of education status - proxy for capacity

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

Working Group Members:

References:

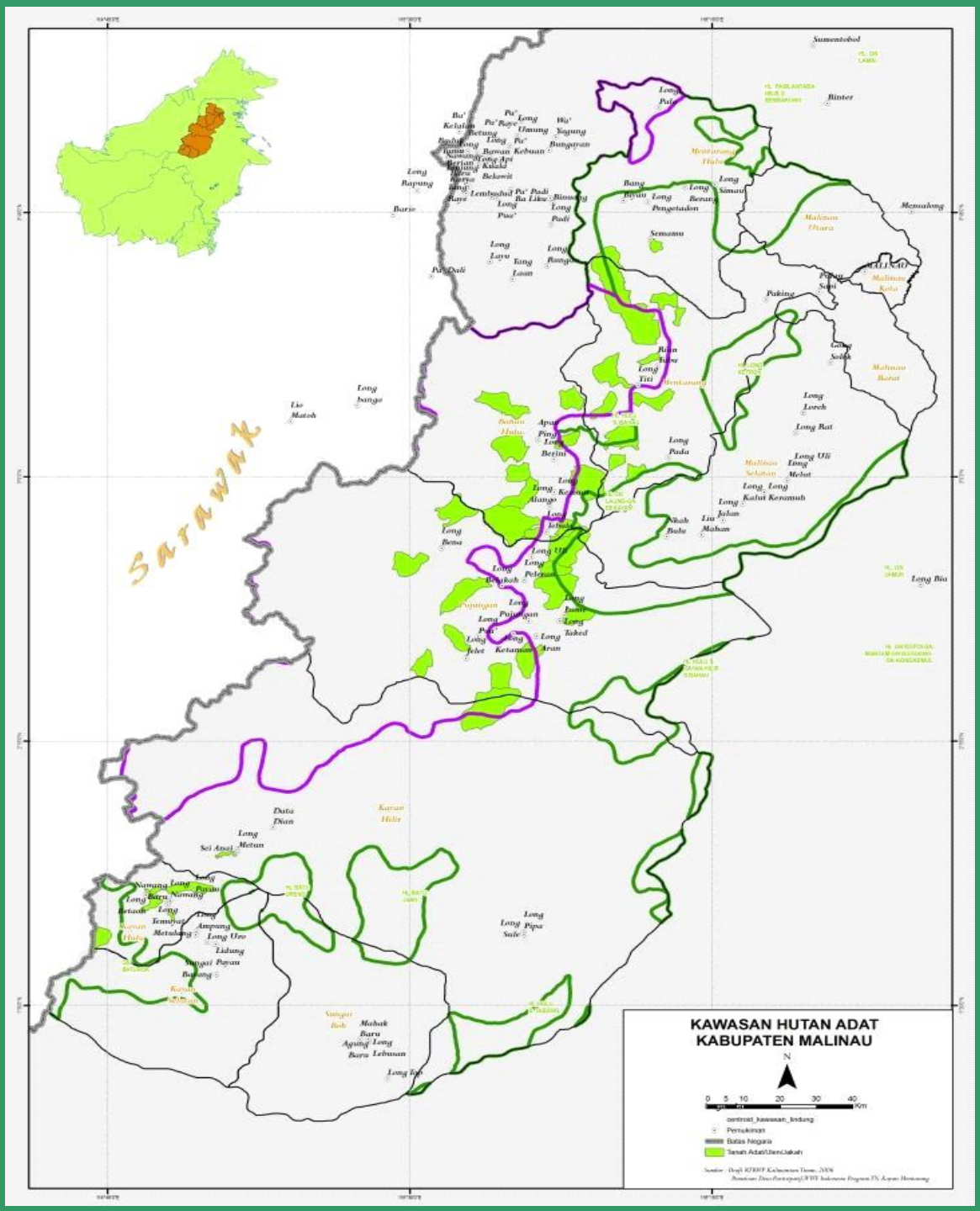
In the following table, the Heart of Borneo Measures Team provides an interpretation of the data for each of the Culture indicators.

Maps and tables for some individual indicators are displayed on the pages directly following this table.

INDICATOR	DESCRIPTION
1. Integrity of cultural places # of cultural sites protected/actively managed	Several customary lands (*Tana Ulen*) and cultural places in East Kalimantan are situated in Malinau and Nunukan districts (see customary map). There are **at least 6 locations** known as being managed and protected by the ethnic communities **in Kayan Mentarang NP area** as their customary lands (see Table A.4.1). Legal recognition of these traditional / customary rights are not yet in place. **A number of forests blocks** in three trans-boundary districts **in West Kalimantan** are indicated as being **managed and protected on the basis of local customary laws**. Reasons for protection vary from considering locations as being customary forests (*Hutan Tembawang*), source of freswater and food plants, to cultural and future reserve functions (see Table A.4.2. - W.Kalimantan). Official statistics from Government lists the **management/ownership of about 69%** out of total 2 million hectares forests area in Kapuas Hulu by the **local community,** 30% by state government, and 1% by the state-owned concessionnaire Perhutani (see Table A.4.3.)
2.Integrity of cultural knowledge	**General** Difficult to quantify the aspects of "knowledge" like traditional agricultural practices. Use of local plants for medicinal use and ceremonies is a very important aspect however would require primary data collection and field surveys conducted in sample areas of HoB (limited data exists from research conducted around 2000 and in a limited number of villages).
# /% villages with cultural/ethnic associations	**100%.** All villages in Malinau district each listed a "customary organization" - see description about village/community organizations.

# of cultural events & Examples traditional knowledge	**East Kalimantan** Big displays of traditional dances and music are occurring every time the Ethnic associations in East Kalimantan hold their regular meetings, which can be annually or by-annually. For Dayak groups, cultural display and cultural revival are very much part of their ethnic pride and process of political ascendancy. At village level, for example in Malinau District, performance of traditional dances take place at harvest festivals (held generally between end of March and June, every year), and festivities to mark Christmas and the New Year. Cultural-related events that are regularly organized by, and widely being acknowledged as attached to the Dayak ethnic groups in East Kalimantan are listed in Table A.4.4.- E.Kalimantan). **West Kalimantan** The Dayak ethnic groups in the interior areas of Kapuas Hulu maintain their traditional values in daily live (social relations, clothing, foods and beverages preparation), but especially in organizing ceremonies for significant events in human's life cycle like birth, wedding, and death. Customary regulations are likewise applied in human relations to the environment, including natural resources management and use, where customary sanctions are exercised for inobedience, and some of these customary sanctions are applied by the local government. The "long house," locally called Betang is the traditional house of Dayaks extended family. While it is basically being private residence of the Dayak extended family, several Betang houses in Kapuas Hulu are open for tourism exposures, and only occasionally restricted to any outsiders for cultural reasons, e.g., during family mourning period. For samples of customary traditions / values existing among the different Dayak ethnic groups, and their culturally protected places in five watershed areas in the bufferzones of Betung Kerihun National Park, see Table A.4.5.a.

Locations of Customary Lands "Tana Ulen" in Malinau District



Source: Program Taman Nasional Kayan Mentarang, Malinau, 2007

CULTURAL PLACES

Table A.4.1. Traditional/customary Land areas being managed by Local Communities in Kayan Mentarang NP area

No.	Customary Area	Location	Size (ha)	Management
1	Tana Ulen Long Pujungan	Malinau	68,670	Customary institution Lembaga Adat Long Pujungan (Kenyah)" in Pujungan Sub-District
2	Tana Ulen Hulu Bahau	Malinau	51,429	Management Body of Tana Ulen: *Badan Pengelola Tana Ulen (BPTU)* in Long Alango village in Bahau Hulu Sub-District
3	Tana Ulen Apau Kayan	Malinau	7,814	Manage by the customary institution from each customary land area in several villages within the Kayan Hulu, Kayan Selatan dan Kayan Hilir Sub-Districts
4	Tana Jakah Tubu	Malinau	43,252	Manage by customary institution *Lembaga Adat Puna Tubu* from several villages within Mentarang Sub-District
5	Tana Adat Lumbis	Nunukan	219,573	Manage by the customary institutions *Lembaga Adat Okolod, Tahol/Tagel* and *Agabag* in Lumbis Sub-District
6	Tana' Tepun Krayan Hulu	Nunukan	1,818	Customary institution *Lembaga Adat Krayan Hulu (Lundayeh)* in Krayan Selatan Sub-District

Source:
WWF-Indonesia, Program Taman Nasional Kayan Mentarang, Malinau 2008.

Table A.4.2 Forests Blocks being protected by Customary community in the boundary areas of West Kalimantan Province

No.	Name & Location	Sub-District	Size (Ha)
	Kapuas Hulu District		
1	*Hutan Pemanfaatan* - Sei Utik village	Embaloh Hulu	2,680.29
2	*Hutan Labian* - Ukit-ukit village	Batang Lupar	30,000
3	Hutan Lindung/*Tembawang Seriang* - Tangit II village	Badau	2,850
4	*Hutan Lindung adat Empaik* - Kekurak village in Pulau Majang	Nanga Kantuk	(no data)
5	*Hutan Lindung Adat Bukit Prapau, Serawi & Bakung*, Kayu Baung & Marakai Jaya sub-villages, Martanjung village	Puring Kencana	400
	Sintang District		
6	*Hutan Bukit Batu Kran* - Jelumuk sub-village, Panding Jaya village	Ketungau Tengah	(no data)
7	Forests area in Mangerat and Sebara sub-villages, Tanjung Sari village	Ketungau Tengah	(no data)
8	*Hutan Munggu Payan & Hutan Munggu Gelombang* - Nanga Seran village	Ketungau Tengah	(no data)
	Landak District		
9	*Hutan Lindung Terinting* - Engkangin village	Air Besar	(no data)
10	*Hutan Melanggar* - Engkangin village	Air Besar	(no data)
11	*Hutan Taroh*	(no information)	3,667.20
12	*Hutan Galau*	(no information)	1,510.70
13	*Hutan Ndor Kerja*	(no information)	1,596.06

Source: "Dari Beranda Belakang Menuju ke Serambi Depan", WWF-Indonesia, 2005

Table A.4.3. Size (hectares) and Ownership of Forests in the Sub-Districts of Kapuas Hulu District

Sub-District	Ownership			Total
	State	Customary Community	**Perhutani**(State-owned forests concession company)	
Selimbau	5,120.00	9,625.00	10,210.00	24,955.00
Seberuang	0.00	4,531.00	75.00	4,606.00
Boyan Tanjung	209,456.00	51,718.00	100.00	261,273.30
Kalis	200.00	320,407.00	0.00	320,607.00
Embaloh Hilir	3,295.00	425.00	0.00	3,720.00
Suhaid	3,170.00	8,780.00	0.00	11,950.00
Embaloh Hulu	0.00	52,627.00	2,200.00	54,827.00
Jongkong	500.00	315,245.00	540.00	316,285.00
Putussibau Utara	1.15	35,227.50	18.50	35,247.15
Putussibau Selatan	0.00	15,220.00	10.00	15,230.00
Empanang	50.00	23.00	0.00	73.00
Hulu Gurung	12,935.00	2,288.00	550.00	15,773.00
Pengkadan	1,587.00	12,463.00	0.00	14,050.00
Bunut Hulu	0.00	128.00	0.00	128.00
Bunut Hilir	2,020.00	5,006.00	300.00	326.00
Puring Kencana	0.00	0.00	0.00	0.00
Silat Hilir	12,000.00	396,928.00	5,800.00	414,728.00
Mentebah	10,618.00	10,096.00	100.00	20,814.00
Semitau Hulu	30,000.00	0.00	0.00	30,000.00
Batang Lupar	0.00	4,159.00	0.00	4,159.00
Badau	0.00	50.00	0.00	50.00
Bika	7,710.00	4,315.00	1,375.00	13,400.00
Silat Hulu	309,461.00	154,761.00	0.00	464,222.00
Total	**608,123.15**	**1,404,022.50**	**21,278.50**	**2,026,423.45**
%	30.01%	69.29%	1.05%	

Source: Kantor Pemberdayaan Masyarakat Desa Pemerintah Kab.Kapuas Hulu, 2007

Table A.4.2 Cultural events in four districts of East Kalimantan

Cultural Events	Activitiy	Significance	Location	Date of event
Malinau				
Irau Intimung	- Traditional dances and music - Cultural contests - Big Fair with local products from handicrafts to honey, from herbal medicines to shields and ceremonial knives.	Traditional ceremonies by Dayak Lun Dayeh, Kenyah, Abai, Punan	Malinau	- End of October or Early November annually; - Irau Besar bi-annually
Kutai Barat				
Cultural Ceremony **Hudoq**	Traditional Dances, craft festival	Thanking God for good harvest; and for warding off misfortunes from the newly planted rice seeds	Lirung Uting Village, Long Sub-District	**
Cultural Ceremony **Lalii Luqaal**	- Traditional performance by Bahau Saq ethnic group, traditional sport games, traditional craft exhibition - Series of ceremonies usually last for 27 days	Ceremonial thanks to the Paddy Gods and asking for better harvest	Tering Lama village, Tering Sub-District	**
Cultural Ceremony **Mengosang**	Traditional dance and art performance by Aoheng ethnic group, traditional sports competition	- pre-land-clearing ceremony; flaming first fire for land clearing	Naha Buaan Village, Long Apari Sub-District	**
Cultural Ceremony **Alaq Ta'u**	Art performance by Kenyah Umaaq Timai ethnic group, foods and crafts festives, sports game	Ricefield pre-planting ceremony for the Kenyah Umaaq Timai communities	Batu Majang Village, Long Bagun Sub-District	**
Cultural Ceremony **Nemlaai**	Series of traditional dance performance by Bahau Long Glaad and Bahau Busang ethnic groups, tree planting and construction of Belawing, sports competition, craft exhibition	Ceremonies for celebrating triumph, heroism.	Long Tu Yog Village, Long Pahangai Sub-District	**

Cultural Events	Activitiy	Significance	Location	Date of event
Nunukan				
Irau Fengeh Ranih	- Traditional dances and dresses, Traditional music, culinary traditions - Awards for farmers (biggest rice harvest; number of water buffaloes; etc)	Thanksgiving and Harvest Festival Participation from Lun Dayeh from Malaysia	Krayan Sub-District	End of March or beginning of April, Annually
Cultural Party **Jepen**	Traditional art and cultural performance	-	Krayan Sub-District	**
Bamboo Music Festival	Music performance by using the traitional bamboo music instruments	-	Krayan Sub-District	**
Kutai Kertanegara				
Customary Ceremony **Erau**	- cultural ceremonies and traditional dances, sports competitions	- customary tradition performance by communities from the interior.	Tenggarong city	September, annual
Cultural Ceremony **Uman Undit**	-	village anniversary for Dayak Kenyah ethnic group	-	**
Pesta Laut Samboja	-	thanksgiving by fishermen community	Semboja	June, annual
Ngungu Tahun	-	- Thanksgiving for agricultural harvests	Mulia Harapan Sebulu	August, annual

** These ceremonies exist but might not be held annually on a regular basis

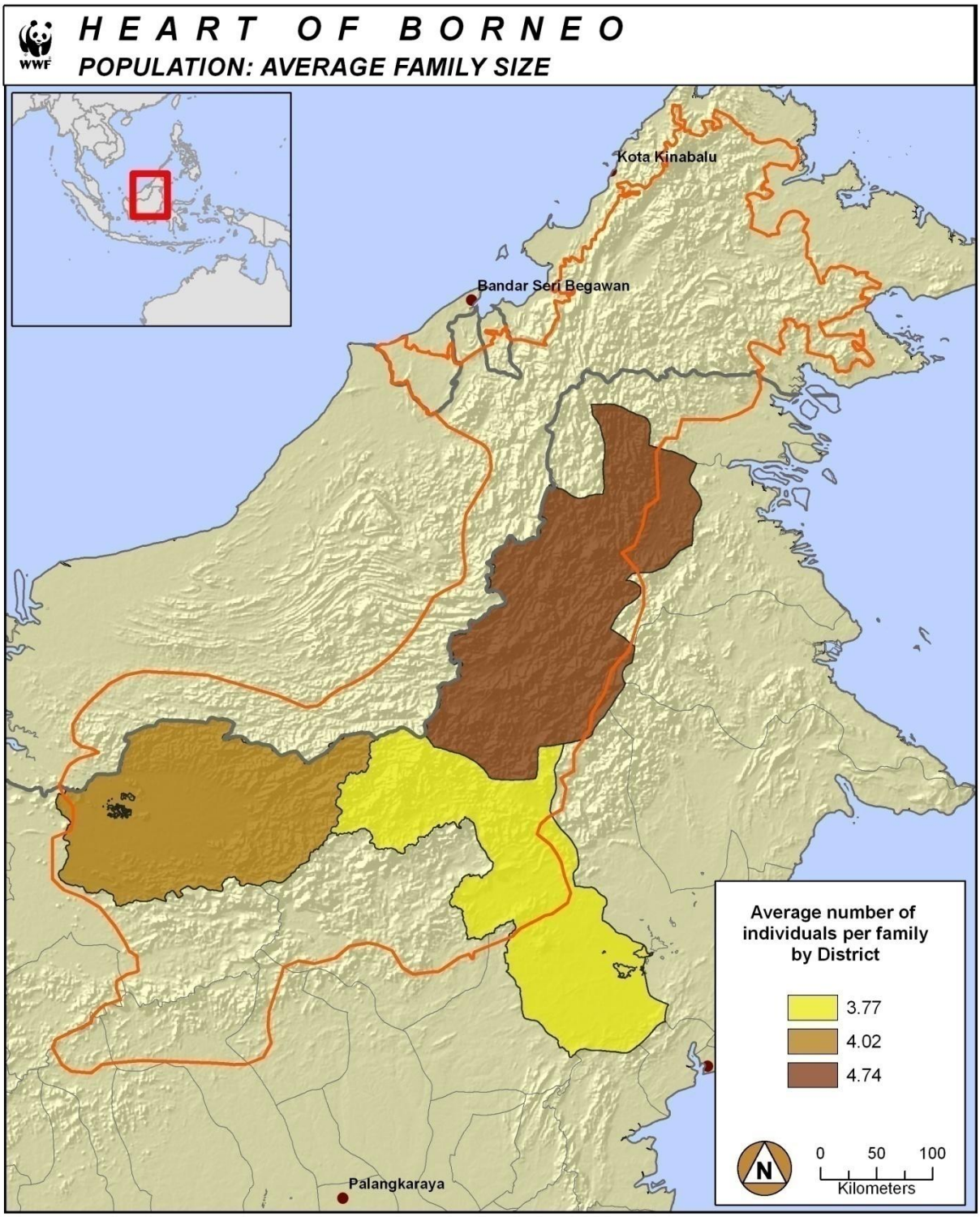
Table A.4.5.a Cultural traditions preserved by the different Dayak Ethnic Groups in Kapuas Hulu District

No.	Tradition / Knowledge	Description
1	*Ladang Gulir Balik:* ** Dryland Farming - with rotational system	- as being main activity of the community, farming takes the period of 6 - 8 months annually. Farm land ownership is hereditary, and farm locations as well as forest blocks for future reserve are regulated based on the traditional sustainability and conservation values. Periodical rotation is part of the system, and rotation is regulated on areas that were previously farmed. - The "*Tata' Doom*" ceremony identifies first opening of farm land - arranged during full moon with leadership by Dayaks "royal" family. No lights allowed in the "long house *Betang*" during the ceremony, and all *Betang* house members pray together, hitting the mat they're sitting on so as to chase evils away from the farm. The ceremony is still common among the Dayak Taman group, in Mendalam watershed area, but is gradually decreasing. For the Kayan ethnic group, it is substituted with blessing of paddy seeds in the Church, and watch that planting is not taking place during mourning times.
2	(Rice farming) Harvest and Planting Ceremonies	- The customary traditions for "planting" and "harvest" seasons, which may appear as merely ceremonials to outsiders, are maintained by the Dayaks more for its common values of alerting on times for "collective/group work", the obligation of selecting good seeds and hence conserving the local genetics. The 'Sare Pare" ceremony among the Bukat ethnic group (in Kapuas Watershed) is an event to "close the old" and "start a new" farm location, but it ties with sufficient preparation of the required farming equipments and materials.
3	*Hutan lindung/Toan Kapulungan*: Protected Forests area	Reserve forests for hunting, collecting rattan and food spices. These are forests locations that are not for commercial exdploitation. The "*hutan lindung masyarakat*" along the river Potan (in Sibau Watersheds) and "*danau lindung*" Sadong (in Mendalam Watersheds) are samples of this criterion, where the locals agreed to its protection, and hunting, fishing are allowed only for own consumption by using traditional practices/techniques.
4	*Hutan Buah/Temawang*: Fruits Forests	- People are not allowed to cut the trees in the "*tembawang* forests" - violation to which is subject to customary sanctions. Many of *tembawang* forests are found along the river side in Ulu Palin watersheds.
5	*Bukit Tendek* (Tendek Hill)	- Bukit Tendek is located in Nanga Nyabau village. All trees/plants and biodiversity inside and surrounding the Tendek hill are protected by the local ethnic community from any kind of exploitation.
6	*Daerah Keramat*: Sacred place	These are forbidden areas, violence to which are believed as turning in disasters. One sample is River Amek in Tanjung Lokang (Kapuas watersheds) area. Restrictions include killing of certain animals and collection of specific tree species; and these are effectively function among the local people.
7	Traditional practices / equipments	The Dayak people are self sufficiently producing most of their household and farming/fishing equipments from natural materials in the wild or planted in their farms. These include the "*Bubo*" (traditional fish trap) made of bamboo or rattan, mattress and sun hat made of palm leaves or weeds species, as well as basketries. Natural dye stuff from various plants are produced and widely used for woven materials and handicrafts.
8	Traditional Ceremony *Nike' Benih* (Dayak Iban ethnic group), *Pamole' Beo'* (Dayak Tamambaloh ethnic group)	Harvest Festive - harvest thanksgiving ceremony, which is taking place every year on June 1st, and is celebrated coinciding the traditional "*Gawai Dayak*" festival by Dayak community in Sarawak, Malaysia.

** the system exists and is applied by all farming communities (Dayaks) in all five watershed areas / bufferzone of Betung Kerihun National Park.

Source: WWF-Indonesia, Program Taman Nasional Betung Kerihun, Putussibau, 2008

Demographics - Family size



Target:

Demographics

KEA
Population

Indicator
Average Family size

Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

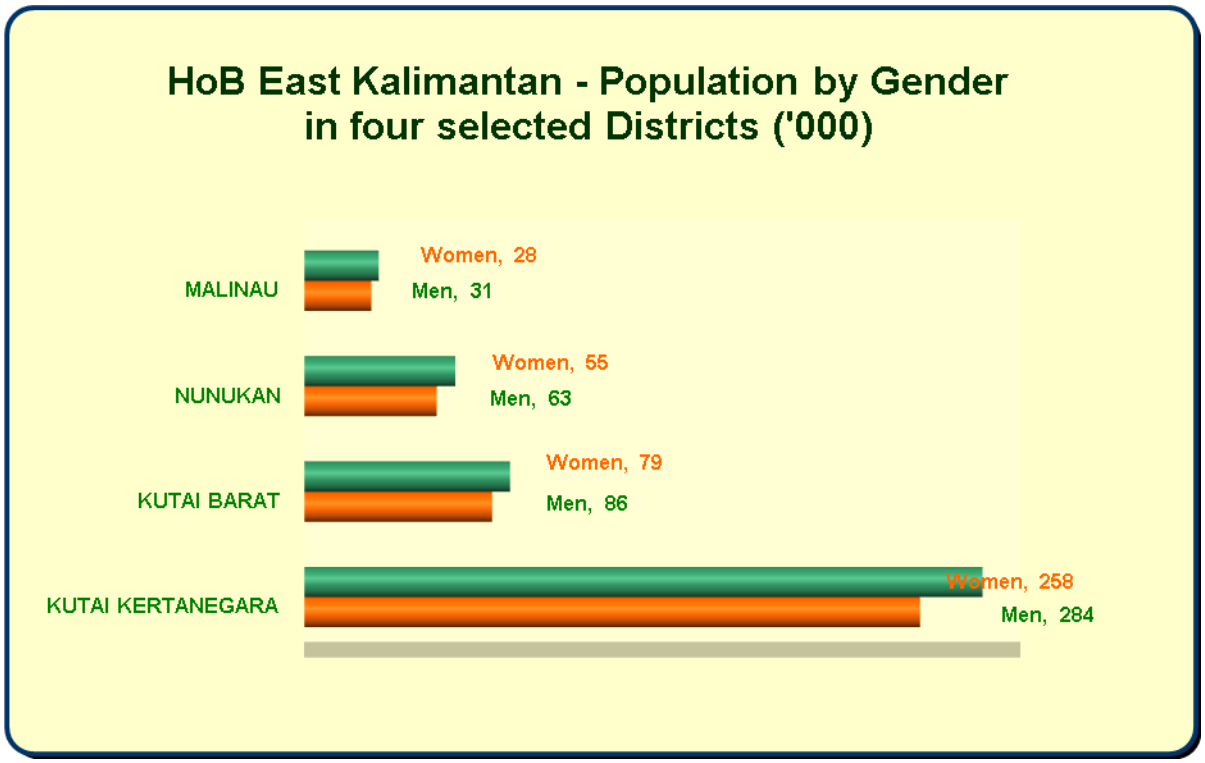
Future Indicator Development Required:

Notes:

Working Group Members:

References

Demographics - Population by gender, per district



Target:

Demographics

KEA
Population

Indicator
Population by gender, per district

Justification for Indicator:

Long-term Viability Goal:

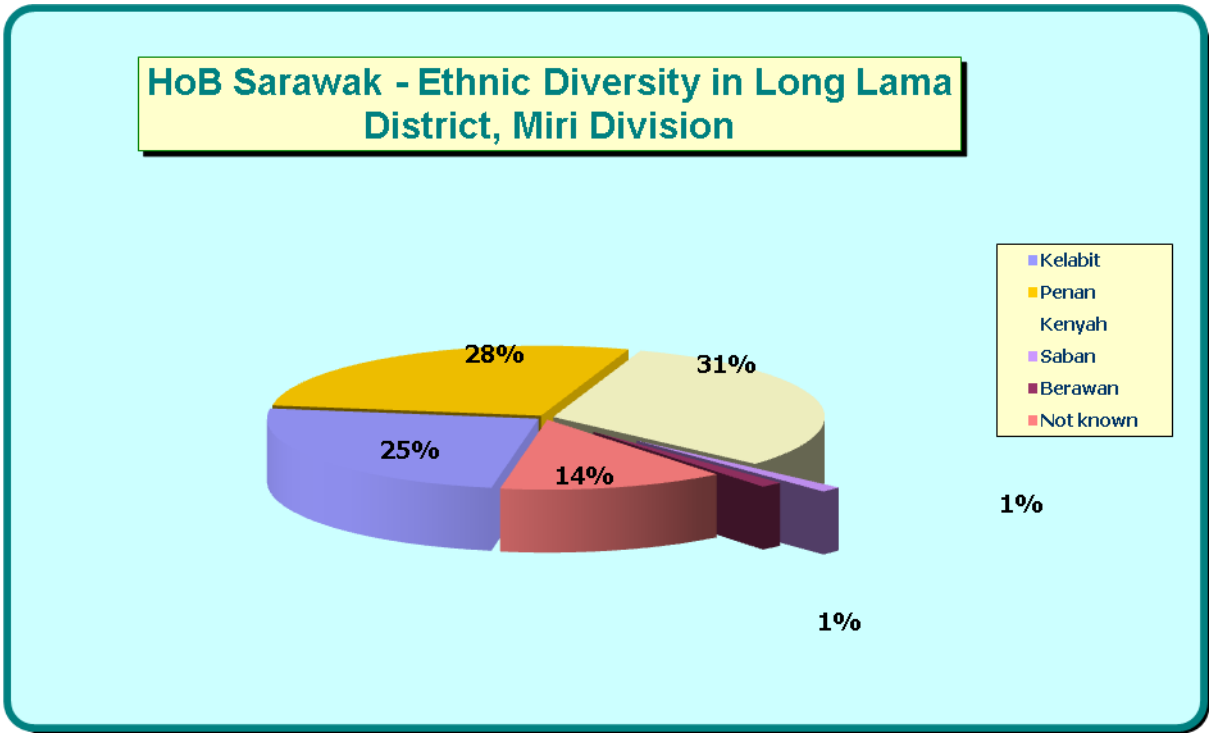
Monitoring Approach:

Future Indicator Development Required:
Notes:
Working Group Members:
References:

Total population by gender in four selected districts of East Kalimantan, 2006

District	Men	Women	Ratio	Total
MALINAU	31,171	28,041	111	59,212
NUNUKAN	63,267	55,440	114	118,707
KUTAI BARAT	86,220	78,694	110	164,914
KUTAI KERTANEGARA	284,243	257,990	110	542,233
Total	464,901	420,165		885,066

Demographics- Ethnic diversity by district



Target:
Demographics

KEA
Ethnicity

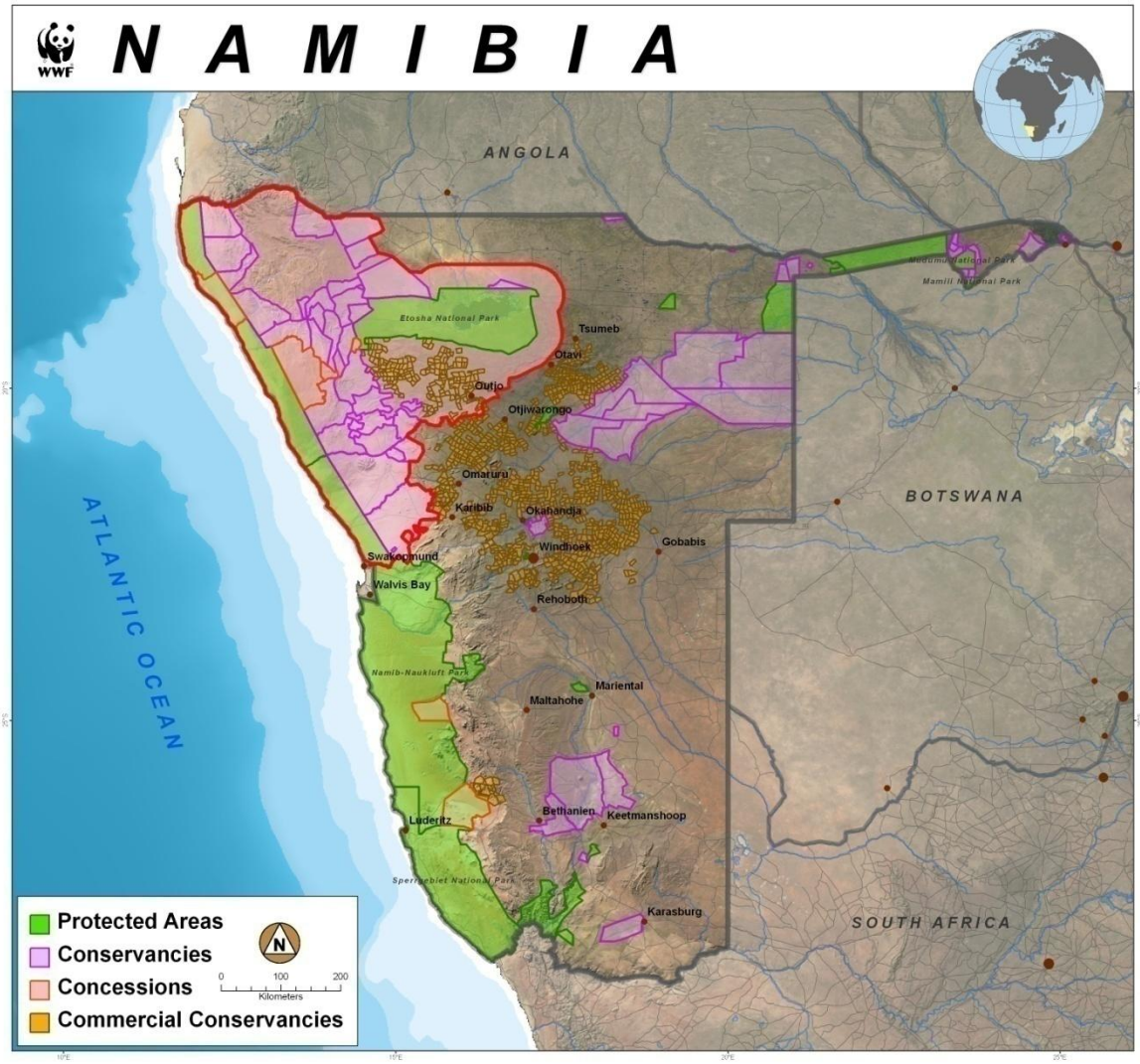
Indicator
Ethnic diversity by district

Justification for Indicator:

Long-term Viability Goal:
Monitoring Approach:
Future Indicator Development Required:
Notes:
Working Group Members:
References:

APPENDIX 5

NAMIBIA



The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to

characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

Credits:

The data presented in the following pages is the product of over a decade of work by a broad collaboration of hundreds of community game guards, resource monitors, conservancy committee members, conservancy managers and community members. They were supported by WWF in Namibia, the USAID funded LIFE Programme, the Namibian Association of Conservancy Support Organizations (NASCO), and the Namibian Ministry of Environment and Tourism (MET), where Jo Tagg played a leading role in developing Namibia's GIS from scratch. Significant baseline data also came from the Atlas of Namibia created byJohn Meldelsohn, Alice Jarvis, Carole Robertson and Tony Robertson.

A WWF team compiled this data for the Conservation Measures pilot project. The team members include: Chris Weaver, WWF-Namibia Project Office; Greg Stuart-Hill, WWF-Namibia Project Office, Barry Boonzaier, GIS Consultant; Aurelie Shapiro, WWF-US; and Robin Naidoo, WWF-US. Other persons who, whilst not part of the WWF Measures Team, indirectly contributed to this output through their work over the past decade and particular acknowledgement needs to go to Andee Davidson, WWF in Namibia, Flip Stander, formerly with the MET, and Anna Davis, editor of the series of state of conservancy program publications ('Namibia's Communal Conservancies: a Review of Progress and Challenges, 2004-2007).

Technical Progress Report

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a.

b. PART 1: GENERAL NARRATIVE REPORT

c.

Project/ Programme Title:	
International Project Number(s):	
Reporting Period:	
Name (writer(s) of this report):	Greg Stuart-Hill
Position/ Title:	Natural Resource Advisor
Organisation:	WWF in Namibia
Date:	30th September 2008

i.

15) **Global Programme Framework.**

This Project is predominantly focused in a landscape in the north western parts of Namibia, including both communal and protected areas. This landscape comprises a portion of the Namibia/Karoo Ecoregion that contains a large number of communal conservancies that interface closely with the Etosha and Skeleton Coast National Parks. The landscape also comprises freehold land, as well as government land leased under concessions to private sector tourism operators.

16) **Project Successes:**

The project was able to identify the boundaries of the landscape and this was done through consultation with stakeholders. It was able to mobilize key persons who then went about aggregating data for the landscape into a directory structure. Much of this data aggregation process involved extracting data out of much larger national databases, as well as physically locating and capturing data from reports and files. The Miradi model was completed for the landscape. Apart from identifying threats, targets and contributing factors, it also included

establishing indicators and populating these with measures indicating the current status. Considerable effort was put into developing a series of maps and charts that captured the status and trend of a fairly comprehensive set of indicators. It should be noted that much of the data used to populate the Measures Project was acquired as a result of more than 12 years of systematic collection and storage of conservancy monitoring information that was amalgamated through WWF-LIFE Project support to the Ministry of Environment and Tourism.

17) **Progress on Activities and related financial issues.**

The following project activities were achieved:

i) Following a participatory process, the boundaries of the landscape (study area) were agreed and a shapefile generated. The criteria used for inclusion into the landscape were all those lands that linked the Altantic seaboard and the Skeleton Coast National Park to Etosha. This resulted in the inclusion of state protected areas, communal conservancies, freehold farms, concession areas run by the private sector, and communal lands that were not under conservancy management.

ii) Using MIRADI software, threats, targets and contributing factors were identified for the landscape.

iii) Various indicators for the landscape were identified and these were populated with data capturing the current status.

iv) Where data was available, a number of maps, charts and trend graphs were developed for a host of indicators.

v) All the data were captured into a directory structure and copies have been made and distributed.

b. Quantify and explain any financial consequences related to activities (e.g. any major deviations in budget or expenditure).

18) **Problems and Constraints.**

It was not possible to obtain comprehensive spatial coverage for a large number of indicators in the landscape. The reason for this is that freehold farms, national parks and privately managed concession areas cover significant parts of the landscape. Most of the data that is available is from the communal conservancies, where the WWF/LIFE programme has over the past decade, been developing a number of community run local level monitoring systems. Some new data were acquired for the above gaps, but either there is no monitoring systems operating in these areas and/or obtaining these data is an extremely time-consuming process, which would have involved costly high search efforts and often-protracted negotiations.

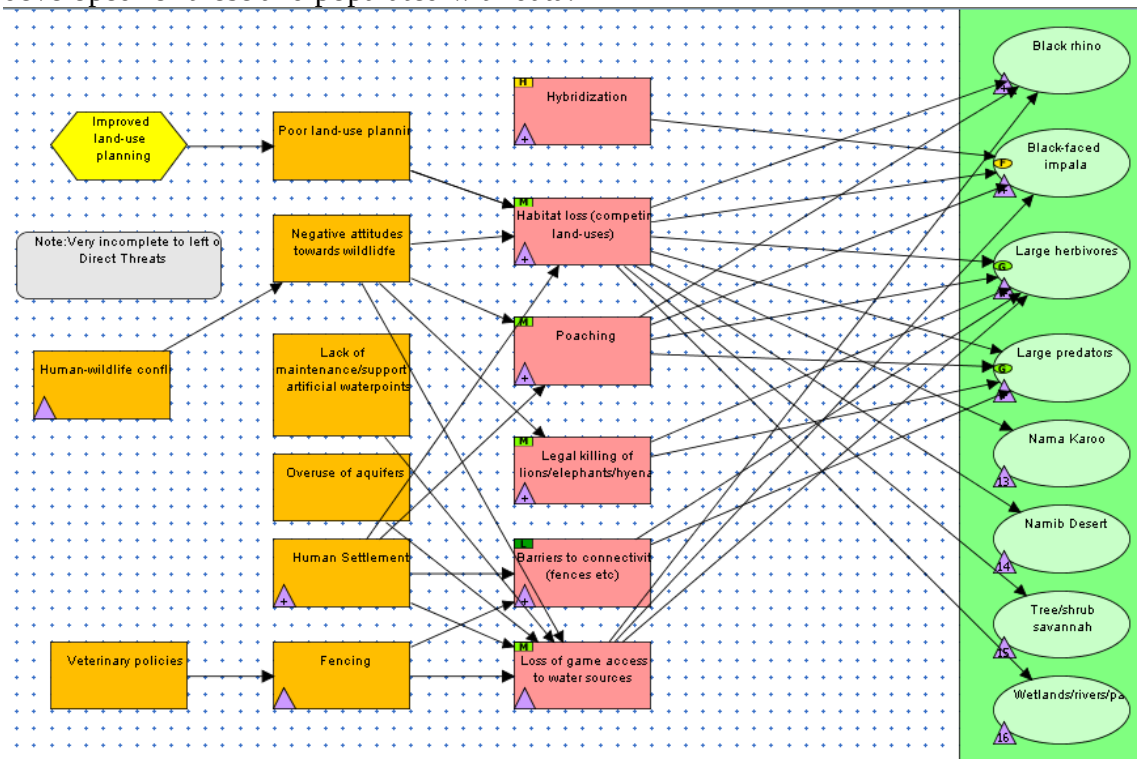
The development of a full comprehensive spatial picture of the landscape will entail a high degree of commitment and funding, and will take some time to establish as it will involve having to develop new local level monitoring systems. Without making this commitment, the measures 'gaps' in the landscape will persist.

19) **Unexpected effects.**

No unexpected consequences as a result of the project were noted.

20) **Learning and Sharing.**

a. Provide a brief summary of the results of the analysis of the Biological, Threat, Conservation Management and Social Condition status of the North-West Namibian landscape. Following a decade of devastating conservation impacts in the 1980's as a result of the turmoil leading up to and immediately following Namibia's independence from South Africa, wildlife has subsequently recovered greatly as a result of a community based conservation management programme. This approach use wildlife as a legitimate form of land-use. Specifically wildlife adds value to peoples' livelihoods through various forms of consumptive and non-consumptive use and in some cases the benefits thus derived can even outcompete agriculture and pastoralism. Using Miradi software a conceptual model of the landscape was built (see below) and monitoring indicators developed for each of the targets and threats. When populating each of these indicators with measures data, a very positive conservation picture of the landscape emerged to the extent that it was agreed that population numbers (of most species) is a non-linear conservation measure – a notion not commonly appreciated by the wider conservation community. The conservation model for the north-west however, fell short in the area of socio-economic benefits. This was probably because the methodology is primarily threat-based whereas WWF's conservation programme in Namibia is opportunity focused – specifically using wildlife to promote improved land use and generate socio-economic benefits. Thus whilst the model does not cater for socio-economic targets indicators were developed for these and populated with data.



b. Please comment on the following elements of the program:

i. **Human Capacity**: What capacity was employed to accomplish the objectives (staff, technical expertise, etc.)? Was this sufficient? If not, please comment on the gaps.

The measures project in Namibia was added to the core CBNRM support programme activities, which are the prime mandate of the WWF in Namibia office. As such, it was difficult to dedicate the necessary amount of staff time. Consequently, an external GIS specialist was commissioned to aggregate data and generate the various map and graph outputs. This consultant worked with both the Director of the Namibian WWF office, as well as the Natural Resource Advisor, both of whom are extremely experienced in both the landscape and in performance monitoring systems – indicating that a high degree of skills is required in such an initiative.

ii. **Methods:** Please evaluate the Conservation Measures methodology. What were its strengths and weaknesses? Please comment specifically on issues of data availability, analysis, & issues associated with scale. From the Namibian perspective, one of the strengths was that the Conservation Measures methodology allowed us to test and evaluate our existing conservation paradigm. One of the biggest weaknesses of the methodology (Miradi) is that it is completely threat focused and does not encourage creative thinking in terms of identifying and capitalizing on opportunities – both conservation and socio-economic. When the Namibian programme was subjected to the methodology major components of the most successful aspects of the programme did not emerge. This apparent shortcoming was raised with the USA based team through an exchange of emails but was not ultimately resolved. Another weaknesses of the Conservation Measures methodology was that, in an attempt to standardize outputs and data structures, the project had a tendency to be top down. This approach had two adverse: (i) local Namibian partners were antagonistic because they felt that the data were for 'WWF- US' ("they want our data"); and (ii) the measures data structures resulted in largely duplicated data-sets (i.e. the Measures data plus the National Namibian Information System) which is not best practice. These weaknesses might not be problematic at other Measures sites that may not be as advanced as Namibia in terms of Conservation monitoring and information systems, where the Measures project might actually stimulate these. Allaying fears of 'data mining' by outsiders required the Namibian Measures team to use long-term personal relationships and credibility with local partners to allay concerns. The problem with the duplicated data set remains.

iii. **Resources:** Were there sufficient financial resources to accomplish the project objectives? If not, what would have been required? Most importantly, this project benefited hugely by capitalizing on a decade's worth of monitoring support and comprehensive inventory surveys from a number of independent projects. This project drew heavily on data and information generated by an extremely widespread and comprehensive local-level monitoring programme referred to as the 'Event Book System', as well as the Namibian atlas, and a number of specialist researchers' databases. Without this prior investment this project would probably only have been able to generate approximately 10-15% of the achieved results. The difference in the amount of data available for the communal lands versus that for the freehold and parks is a tangible illustration of the key role that previous monitoring efforts in the landscape have played. In short, it is critical to understand that the outputs generated

by this project would not have been achieved with the same of investment made by the current 'measures project.

iv. **Time:** How much staff time was dedicated to this project? Was this sufficient to accomplish the objectives? In addition to the GIS consultant who spent 47 days, the Natural resource advisor spent 45 days; the Director of WWF in Namibia spent approximately 7 days, and direct support from the Washington measures team was approximately ….days. In addition, a student captured data (approx 6 days) and the WWF natural resource technician used approximately 65 days in the field collating and capturing data from different conservancies and supporting conservancies in the monitoring programmes. Most importantly this number of days should not be used as any indication of what it would take to replicate this in another landscape. In Namibia the measures project was fortunate in being able to capitalize on almost a decade of investment into local level, as well as national-level monitoring systems.

v. **Alignment:** How did the Measures work fit with the portfolio of activities in North-West Namibia. Conceptually, the Measures project fits extremely closely with the activities of WWF in Namibia, and in particular, the north-west landscape in relation to monitoring the impact of the CBNRM programme. However, the spatial scope of the measures project did not align well with previous data collection methodologies, as the Measures activities were confined to the landscape – a subset of the national CBNRM monitoring information system. Consequently, a considerable amount of time and project resources were spent on extracting data for the landscape from the national data sets, with the additional complication of having to create a separate data set and directory structure that was specified for the international measures programme. This is not ideal, as it now means that in future we have to update two data sets (the national one and the measures one) in order to keep both current. This duplication is not best practice and the correct way forward would be to rather build a query system into the national information system that can generate measures reports from a subset (namely the landscape) of the national data set.

A positive aspect of the measures work was that it highlighted spatial gaps in the landscape where there is no data available. As mentioned previously this was as a result of WWF's activities over the past decade having being focused on CBNRM. Filling these gaps will be no easy feat. Firstly, WWF in Namibia has neither programmes nor any funding for work in National parks and freehold farms - although we try to work closely with these land managers on issues of common concern with conservancies. Secondly, even if these areas were fully included into WWF programmes, it would take years of effort to initiate and develop the necessary local

level monitoring programmes which are the critical building blocks for a measures programme. Nonetheless, will be important for planning at a landscape level to rectify these shortcomings.

Towards this, and for a variety of other reasons, WWF in Namibia sees that the establishment of 'Conservation Complexes', consisting of an aggregation of freehold farms, communal conservancy lands and state protected areas, all working together on issues of common concern to be an important strategic objective towards achieving the conservation targets in Namibia.

vi. **Organizational Structure:** To the extent applicable, please comment on any opportunities or challenges that emerged from the overall structure of the Conservation Measures Program (i.e. Washington core team and place-based team) and the structure of the program in your place (i.e. working across trans-national boundaries, etc.). The Namibian measures programme received invaluable support from staff from Washington. This was particularly needed as WWF staff were overcommitted and struggling to maintain core business during a difficult transition period from USAID funding support to WWF family core support. As a result, assistance from the contracted GIS expert was invaluable. Of concern is the challenge of sustaining the measure initiative. Unless it becomes mainstreamed into Namibia national monitoring and evaluation system, it will be extremely difficult to keep updated in the future. In that sense, the measures programme has, whilst adding value in many ways, had the disadvantage of diverting effort away from consolidating and improving the national system.

vii. **Conservation Findings:** Did the analysis of the indicators result in any new insights about North-West Namibia. No new insights regarding the landscape emerged during this process. However, the process highlighted a fundamental flaw in the basic assumption of many conservation indicators. There is often a naïve and automatic assumption that there is a linear relationship between the indicator measure and the desired situation. For example: an on-going increase in a particular wildlife species does not necessarily indicate an improving situation. On-going population growth of a particular species can, in fact, have severe negative conservation impacts in terms of habitat degradation and/or outcompeting and perhaps even driving down the populations of other more vulnerable species. Also, as in the case of black rhino in the landscape, increasing numbers of animals in a given area is not always desirable, as it may result in slowing of breeding rates and in these situations the appropriate indicator is breeding rate not population number or trend.

21) **Adaptive Management.** Based on your analysis of the situation and the project's progress, which project objectives and activities have been changed, or will need to be changed? Please attach latest versions of your action plan (e.g. logframe) and monitoring plan, if changes have been made.

Because this was a short-term project done under pressure, there was no opportunity to reflect and adapt the design. However, there are adaptations that need to be made. Firstly, it is critical that the measures programme in Namibia be seen as a Namibian programme, not a WWF-US based information system about Namibia. This means that data need to be stored in data structures that are appropriate to Namibia (not Washington). Compiling the measures data into the directory structure provided by the measures team was in the end counter-productive and the effort should rather have been put into upgrading the Namibian CONINFO data structure, and in building queries that would generate landscape reports out of the national information system.

22) **Communications/ Stories.** Highlight any actions or successes meriting communications attention e.g. positive media coverage, success stories, contacts made (such as with government), major events. It is too early to involve any specific communication activity or develop stories around this activity. Significant co-operation between NGO's and the Government was necessary in order to obtain many of these data. It is envisaged that once the spatial gaps have been filled the products of this project could be used to publish a book that might provide 'a profile of the north west landscape of Namibia'.

23) **Future Issues/ Challenges.** Highlight the 3 most significant issues/ challenges ahead for the project, focusing on the next 12 months, and explain how they will be addressed. (Concentrate on barriers to delivery that could lead to major changes to objectives or plans). The biggest technical challenge is to fill the spatial gaps in the landscape – i.e. where we still need to get data. These are the areas where WWF has not worked in the past and obtaining such data in many cases will involve a fairly long process (3 to four years) of developing, through partnerships with land managers, local-level monitoring systems. These are the essential building blocks for a landscape level monitoring system. The other challenge is the extreme shortage in technical staff in Namibia who would have the capacity and time to work on the Measures project. The other challenge, which has to some degree been addressed but still remains a great threat, is the issue of ownership of these data. Most of the data belongs to the communities living in the area, as it has been generated through local-level monitoring systems where ownership of the data and monitoring process has been totally involved. The Namibian partners in both the government and the NGO sector's feel very strongly that the data belongs to Namibia and are extremely uncomfortable with anything that creates the perception that the data is being 'mined' by foreigners or foreign entities. WWF needs to be very careful in this regard, particularly with its scientific and promotional materials. Finally, the next critical step is to take a strategic step backwards. Rather than continue to build the Measures data-set as an independent entity, it is necessary to return to the task of further developing the national conservation data-set (CONINFO), but this time effort should be focussed on building in query systems that enable information to be extracted for any particular area (a landscape, a province, a district, etc).

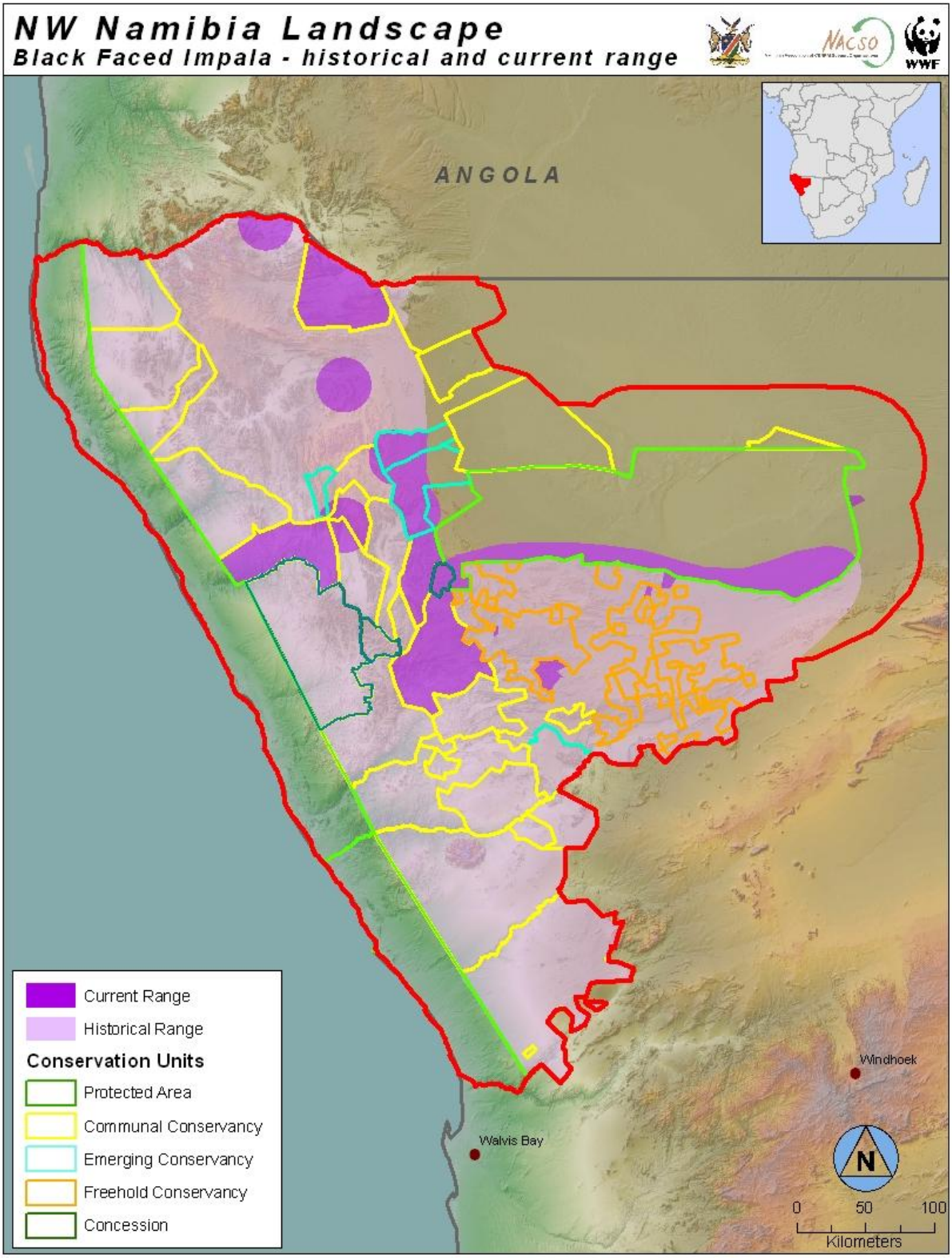
24) **Overall Assessment of progress.** Assess whether the project has made the expected progress against the action plan, and whether planned the objectives will be achieved (In the early stages of a project, this will be a somewhat subjective judgement. As the project progresses, this should be based on an assessment of progress against goals and objectives and the associated indicators). It would appear that the Namibian component of the measures project

has largely achieved its objectives. Aside from the spatial gaps, where there are currently no data (or even monitoring systems), most of the existing data for the landscape has been captured. This has been captured and presented within the Measures guidelines and the Conservation model developed with the aid of the Miradi software. The next step is to fill the spatial gaps and to mainstream the data structures back into CONINFO so that periodic updating of data will occur thereby ensuring sustainability.

Biological Targets

Target	Key Attribute	Indicators
1. Black-faced impala	population size	number of individuals
1. Black-faced impala	population size	% historic range occupied
2.Black rhino	population size	relative abundance
2.Black rhino	structuring of vegetation	% of historic rhino range now occupied
3. Large herbivores	presence/absence	% of historic complement of large herbivore spp. now present
3. Large herbivores	structuring of vegetation	% of historic elephant range now occupied
3. Large herbivores	ecological connectivity	map of contiguous habitat patch, and contiguity index
4.Large predators	predator-prey dynamics	% of historic complement of predator spp. now present
4.Large predators	lion abundance	# lions
4.Large predators	lion abundance	% original range occupied
4.Large predators	cheetah abundance	cheetah observations/100 km transect
5. Namib desert	extent and condition	% in good condition
6. Nama Karoo	extent and condition	% in good condition
7. Salt pans	extent and condition	% in good condition
8. Tree-shrub savannah	extent and condition	% in good condition
9. Riparian/watercourses	extent and condition	% water points/springs intact (no human settlement, etc.)

Black-faced impala - % historic range occupied



Target:
Black-faced impala
KEA/Indicator:
% historic range occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

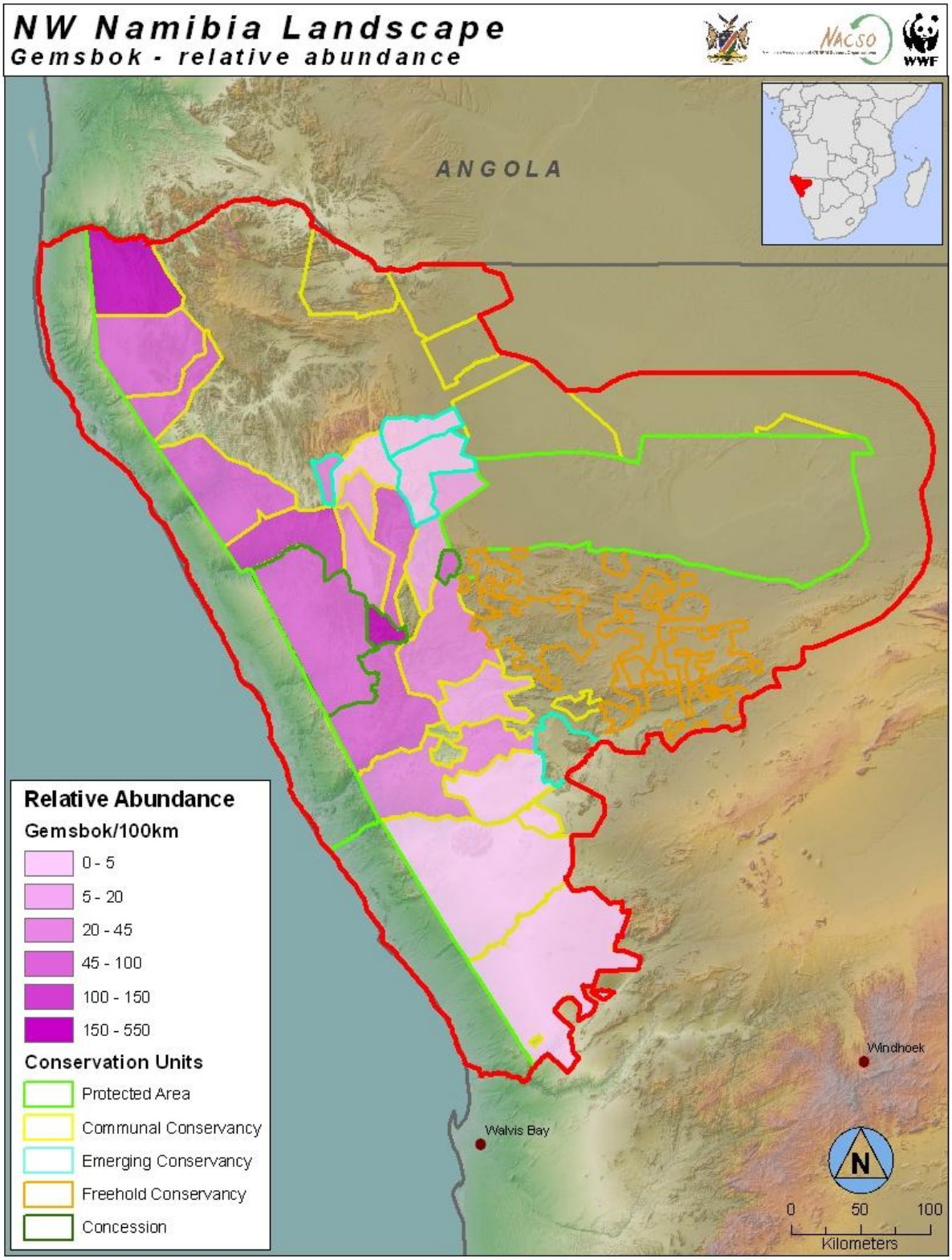
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - gemsbok abundance



Target:
Large herbivores
KEA/Indicator:
Gemsbok / gemsbok abundance
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

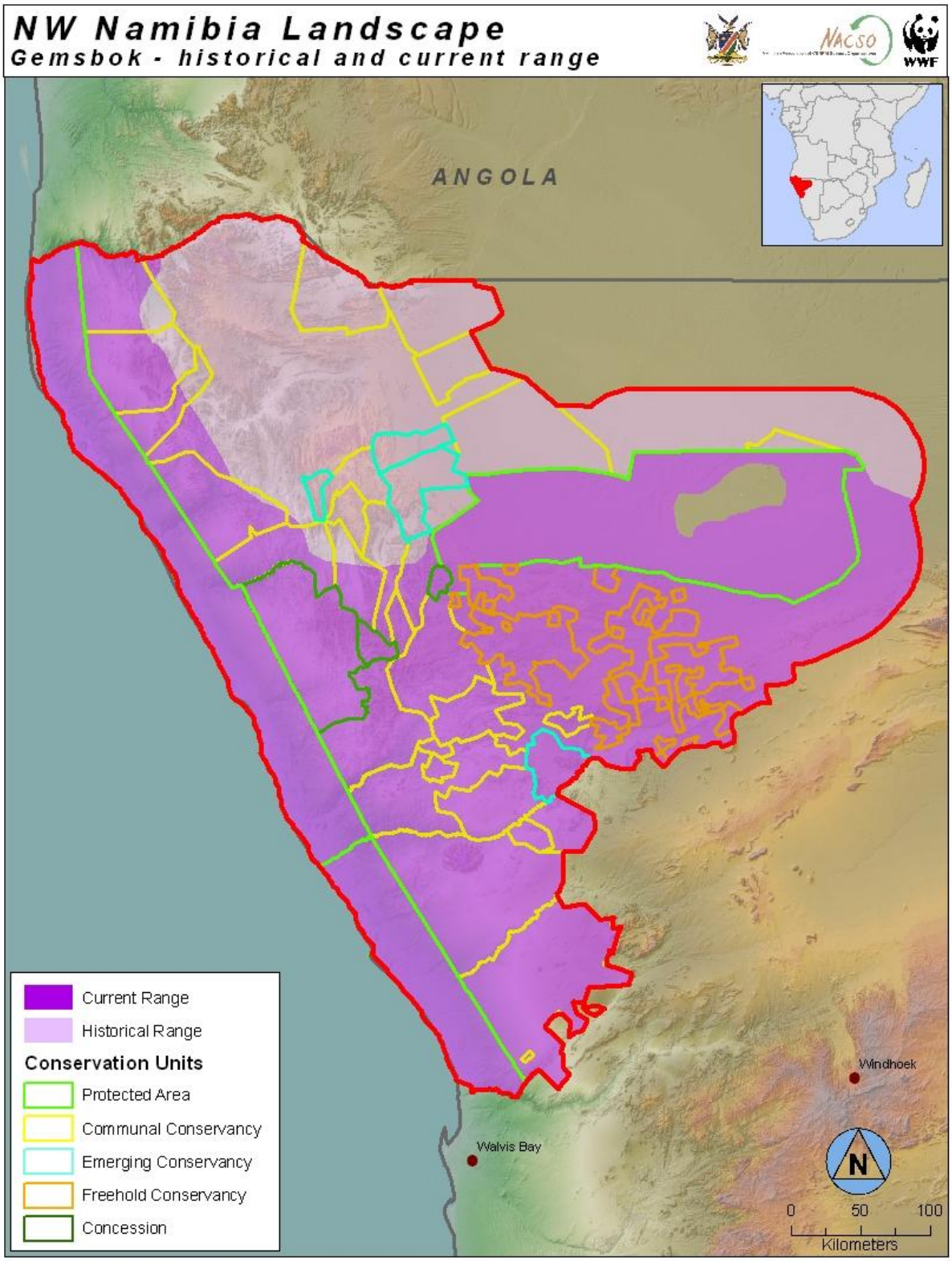
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - % of historic gemsbok range now occupied



Target:
Large herbivores
KEA/Indicator:
Gemsbok / % of historic gemsbok range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

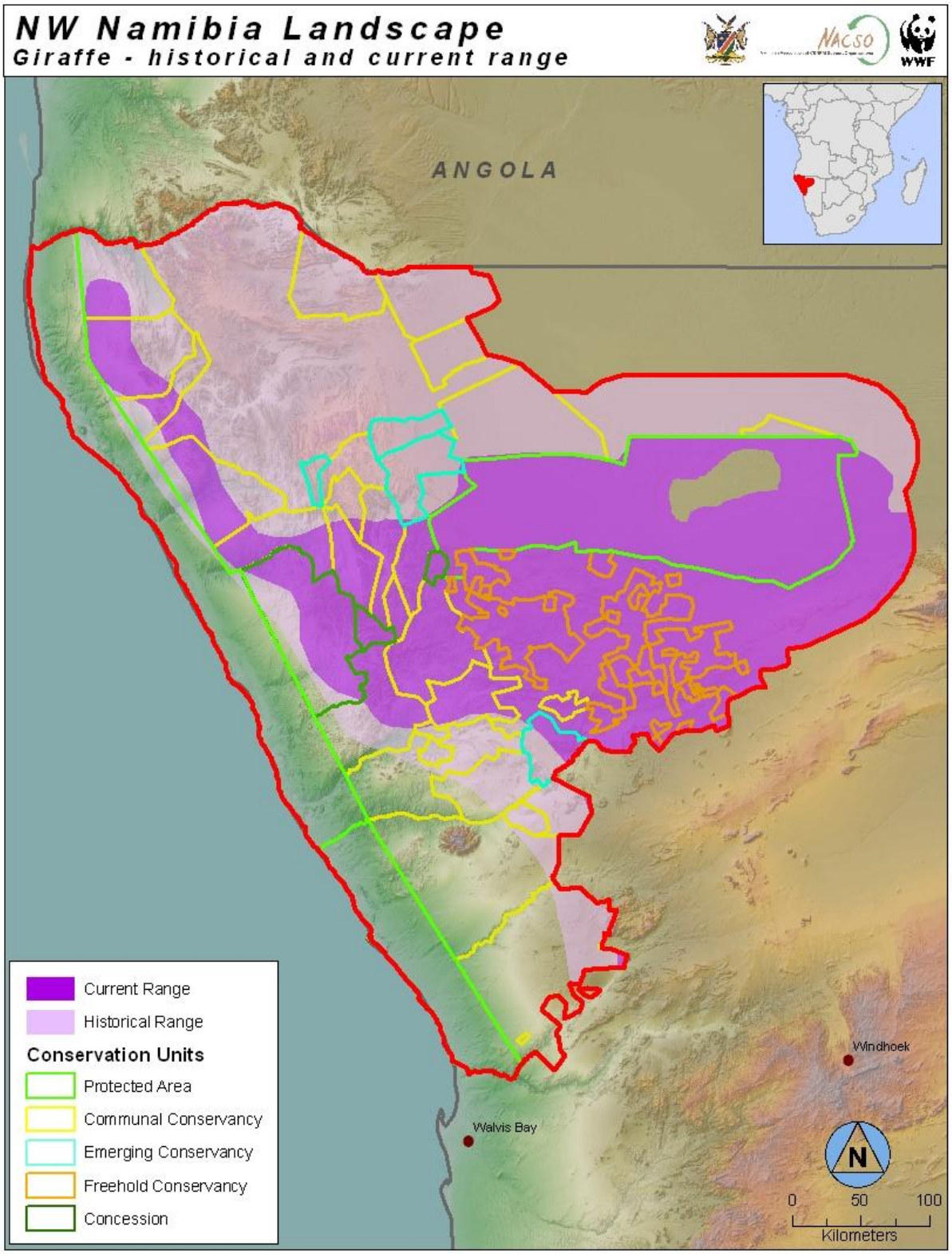
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - % of historic giraffe range now occupied



Target:
Large herbivores
KEA/Indicator:
Giraffe / % of historic giraffe range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

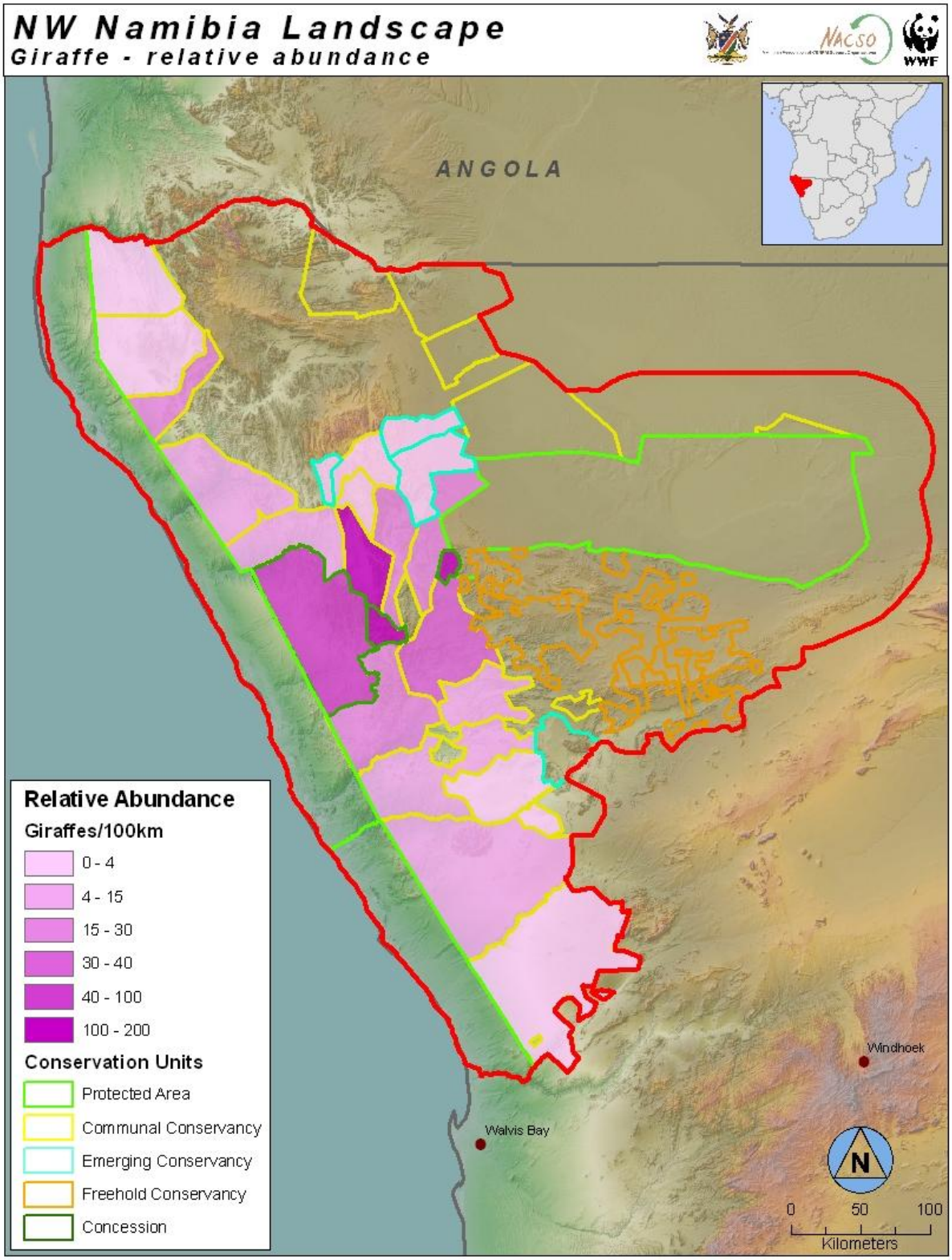
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - Giraffe abundance



Target:
Large herbivores
KEA/Indicator:
Giraffe / Giraffe abundance
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

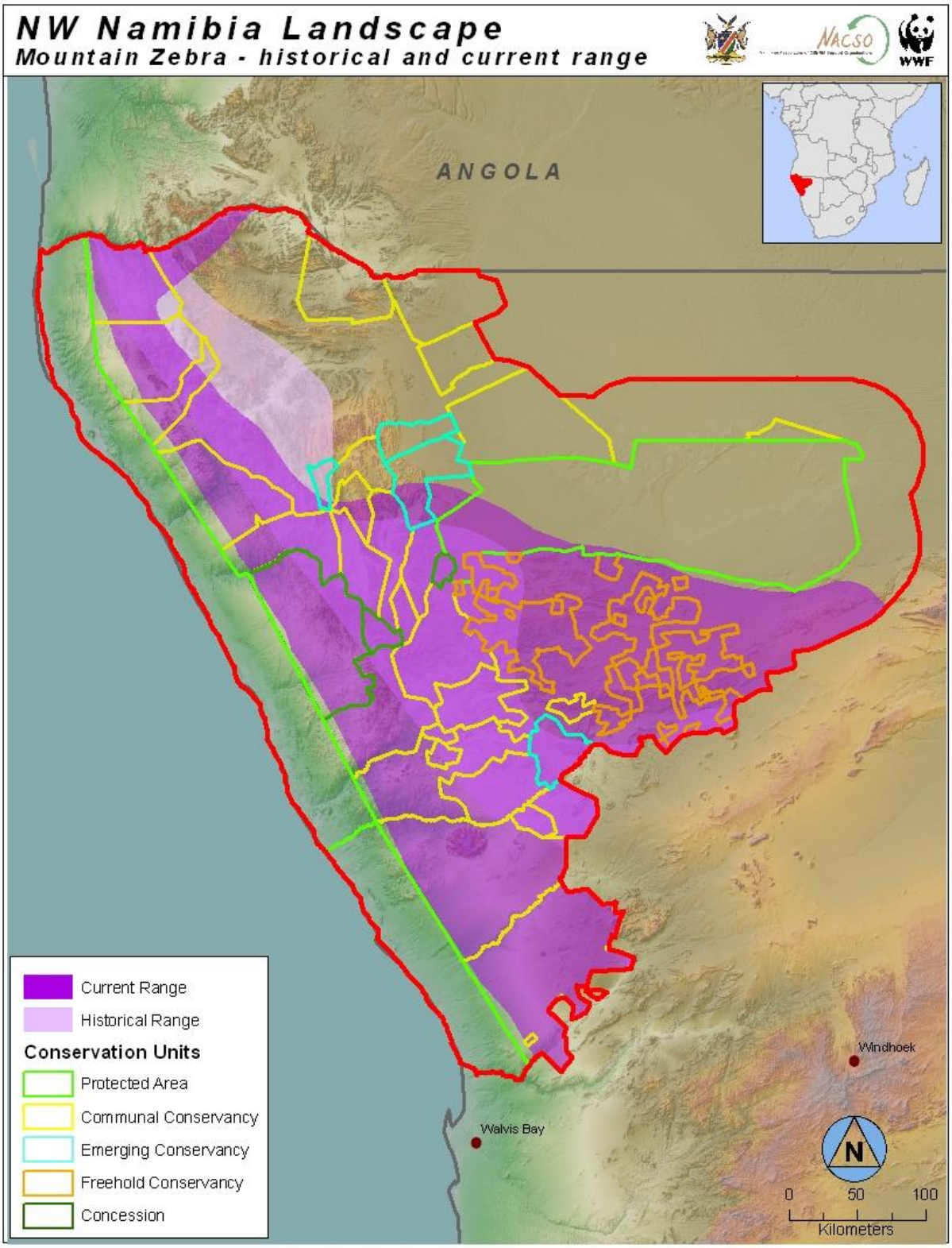
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - % of historic Zebra range now occupied



Target:
Large herbivores
KEA/Indicator:
Mountain Zebra / % of historic Zebra range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

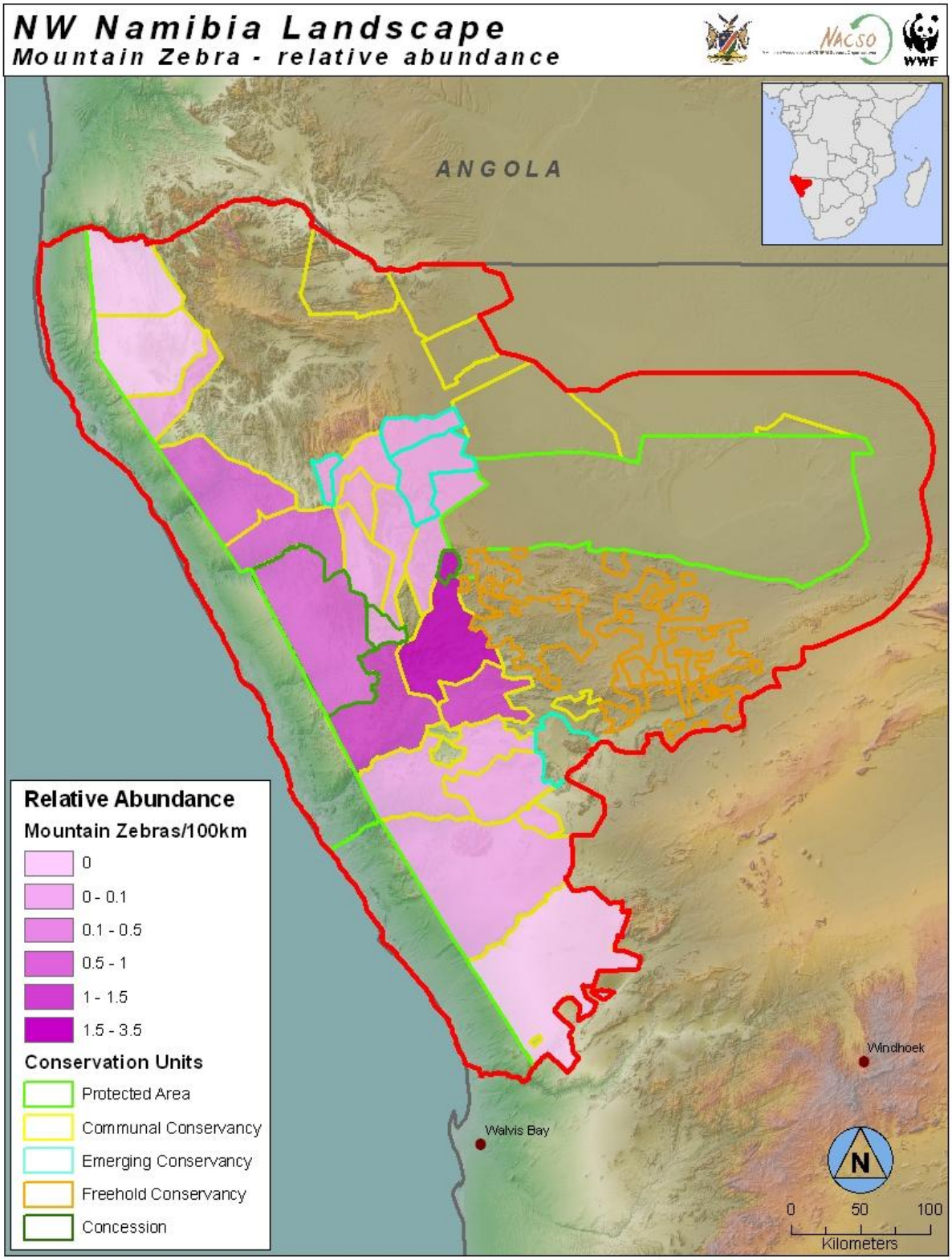
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - Zebra abundance



Target:
Large herbivores
KEA/Indicator:
Mountain Zebra / Zebra abundance
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

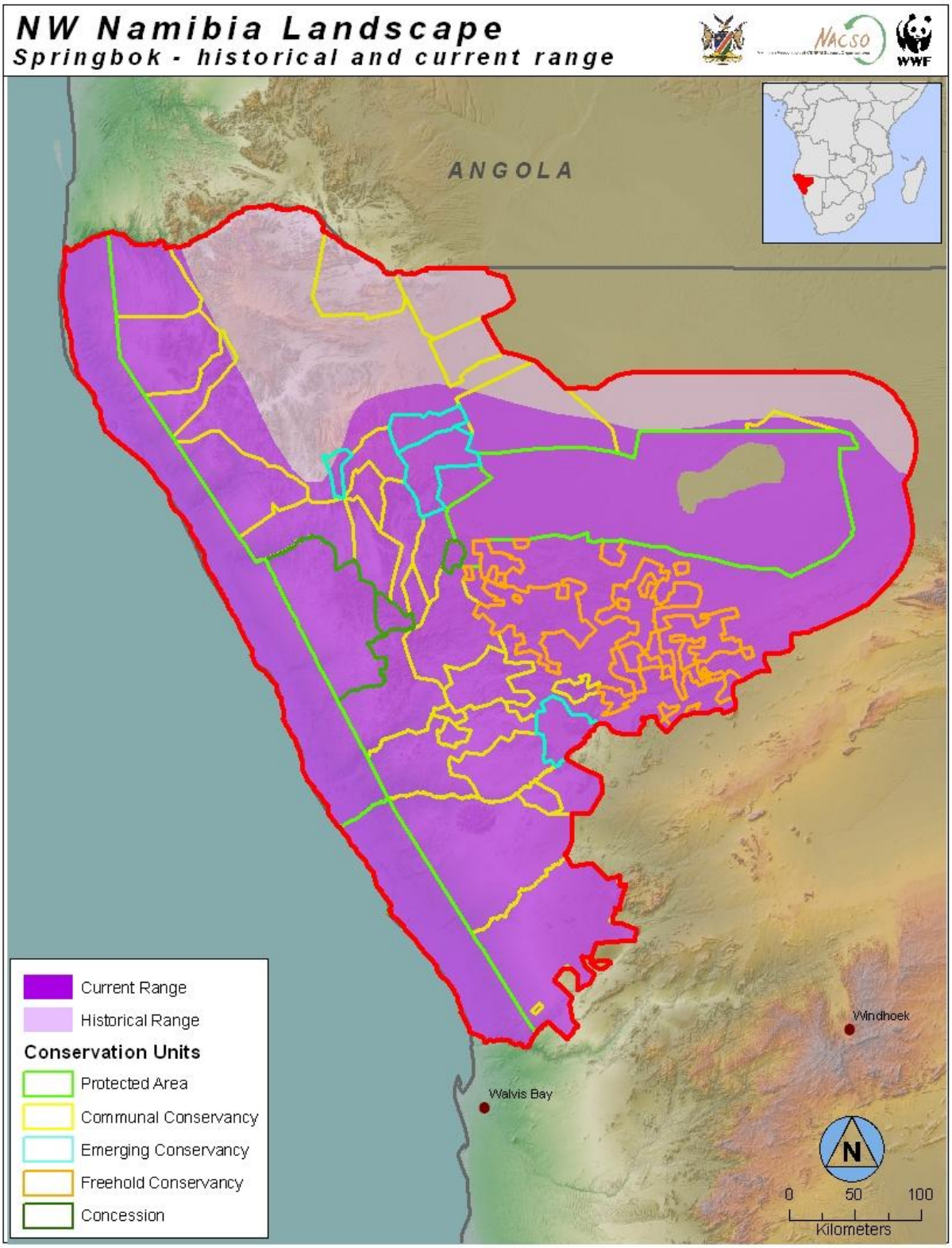
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - % of historic Springbok range now occupied



Target:
Large herbivores
KEA/Indicator:
Springbok / % of historic Springbok range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

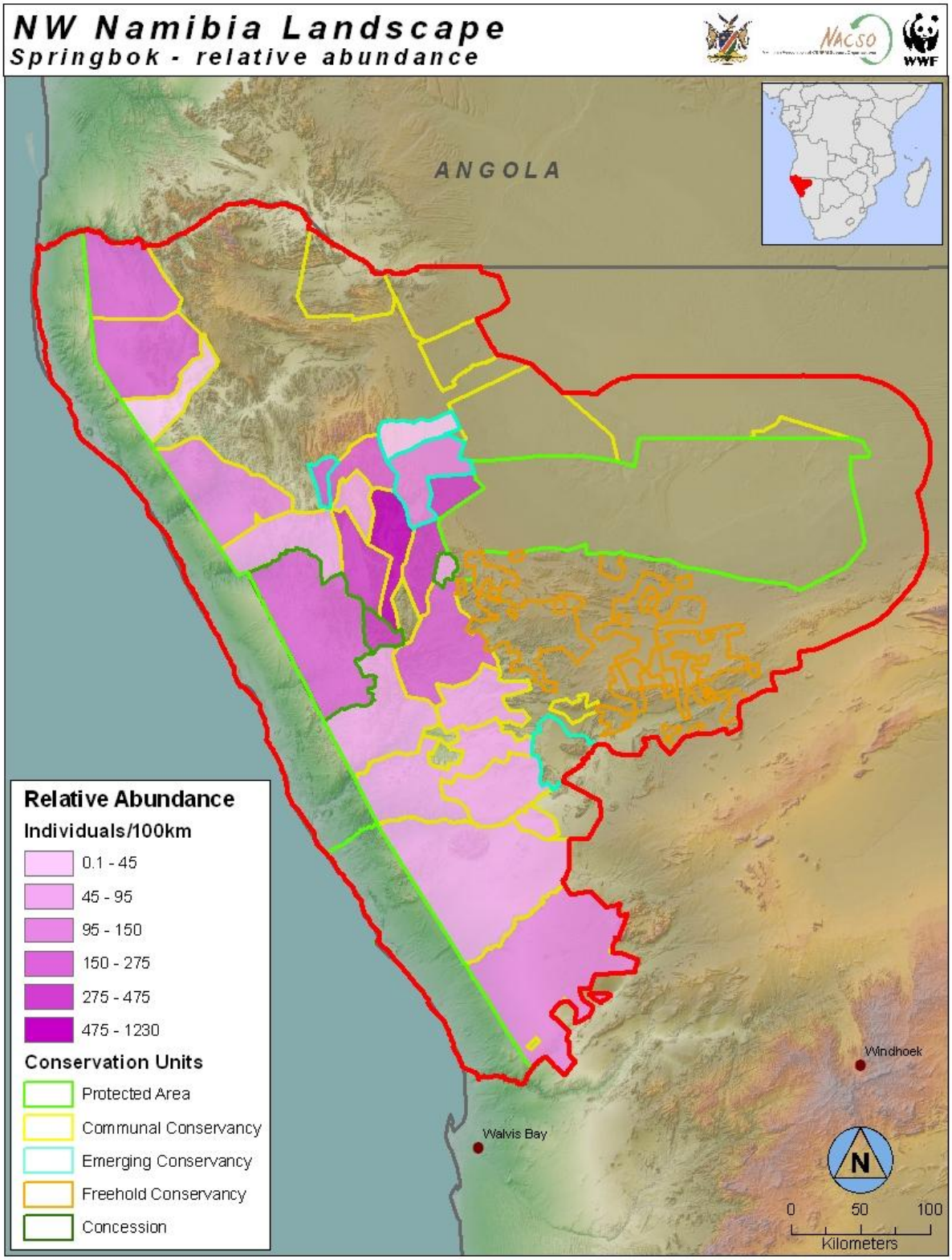
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - Springbok abundance



Target:
Large herbivores
KEA/Indicator:
Springbok / Springbok abundance
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

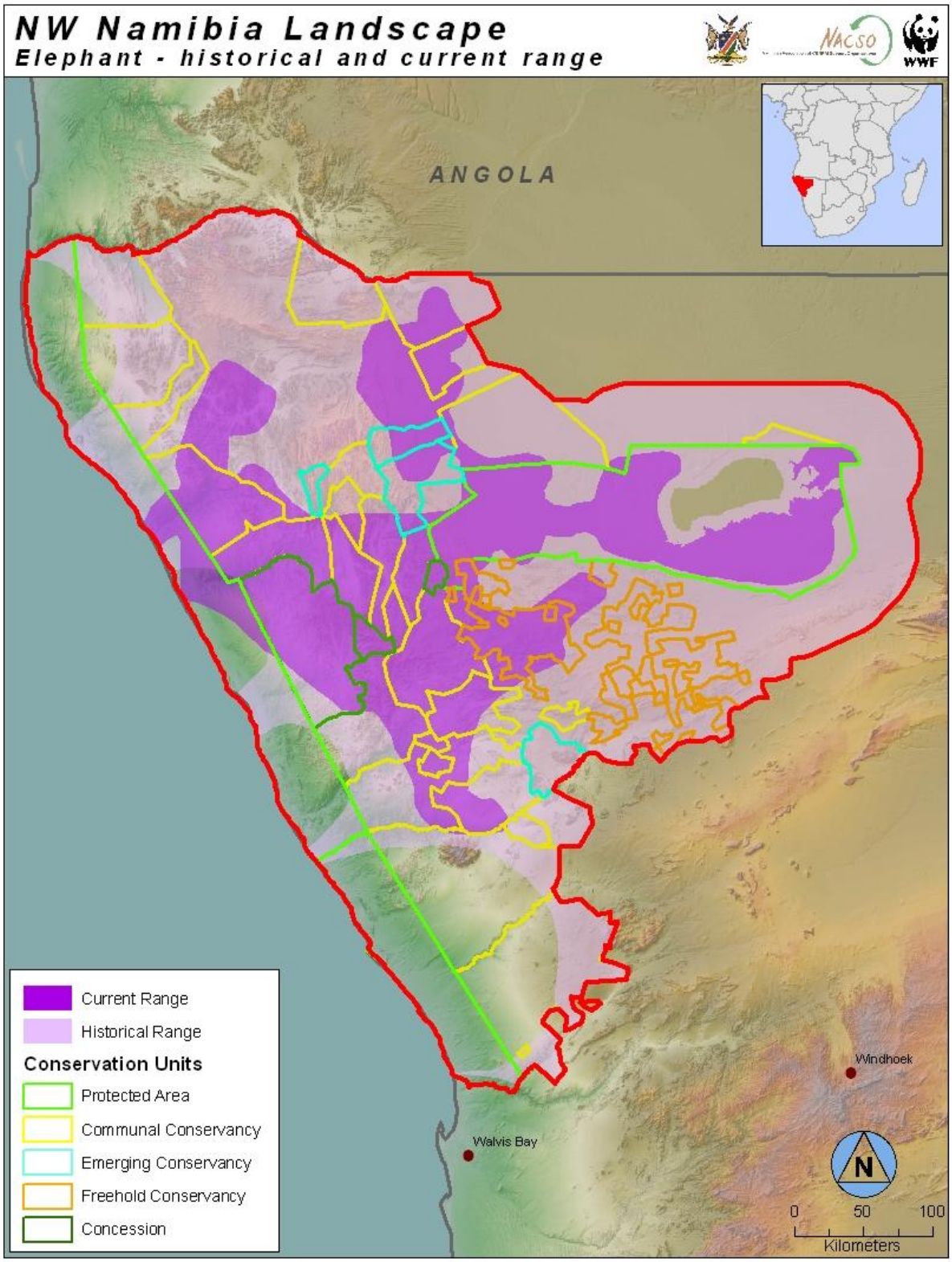
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large herbivores - % of historic elephant range now occupied



Target:
Large herbivores
KEA/Indicator:
structuring of vegetation / % of historic elephant range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

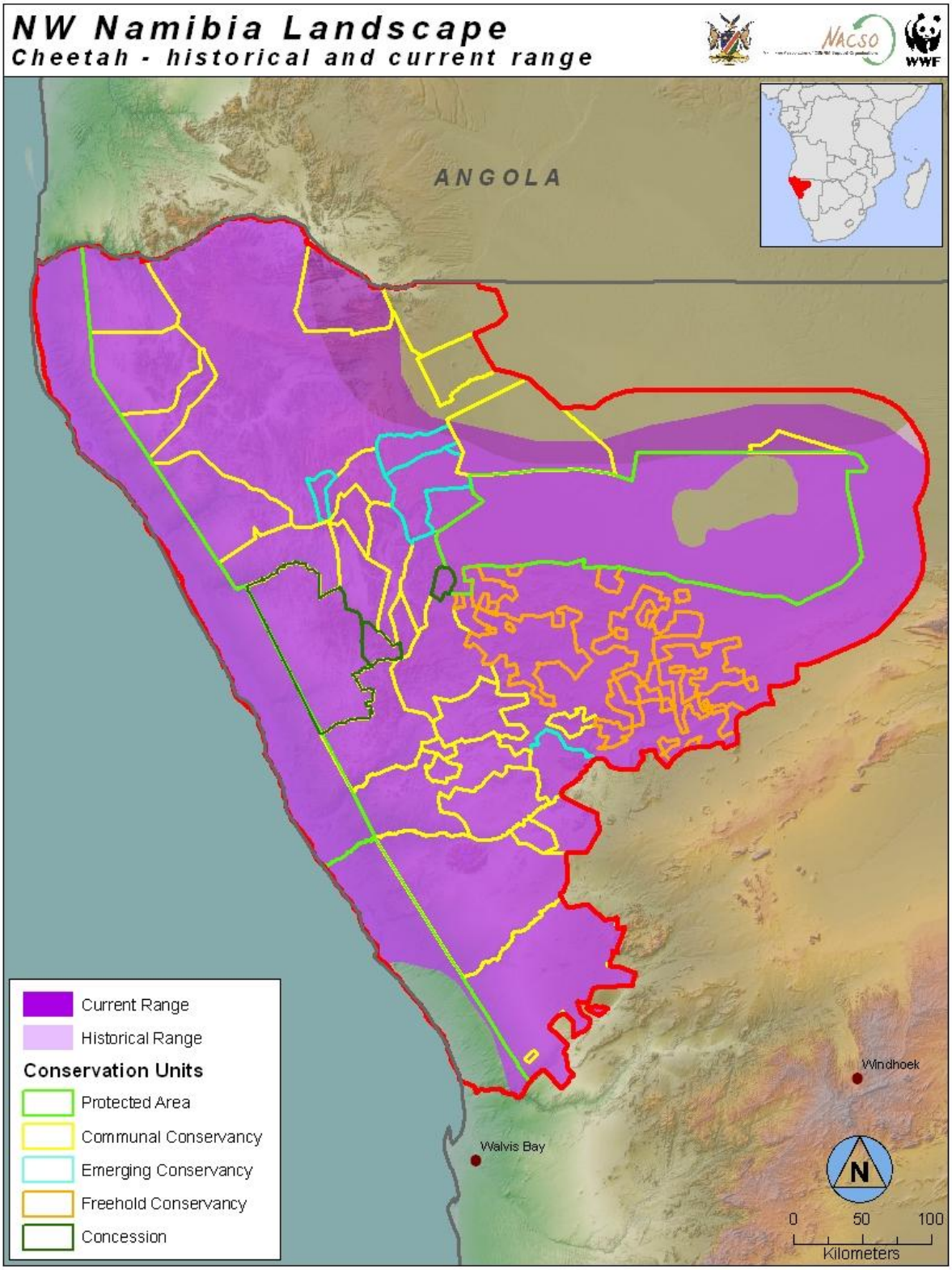
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large predators - % original range occupied - Cheetah



Target:
Large predators
KEA/Indicator:
cheetah abundance / % original range occupied - Cheetah
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

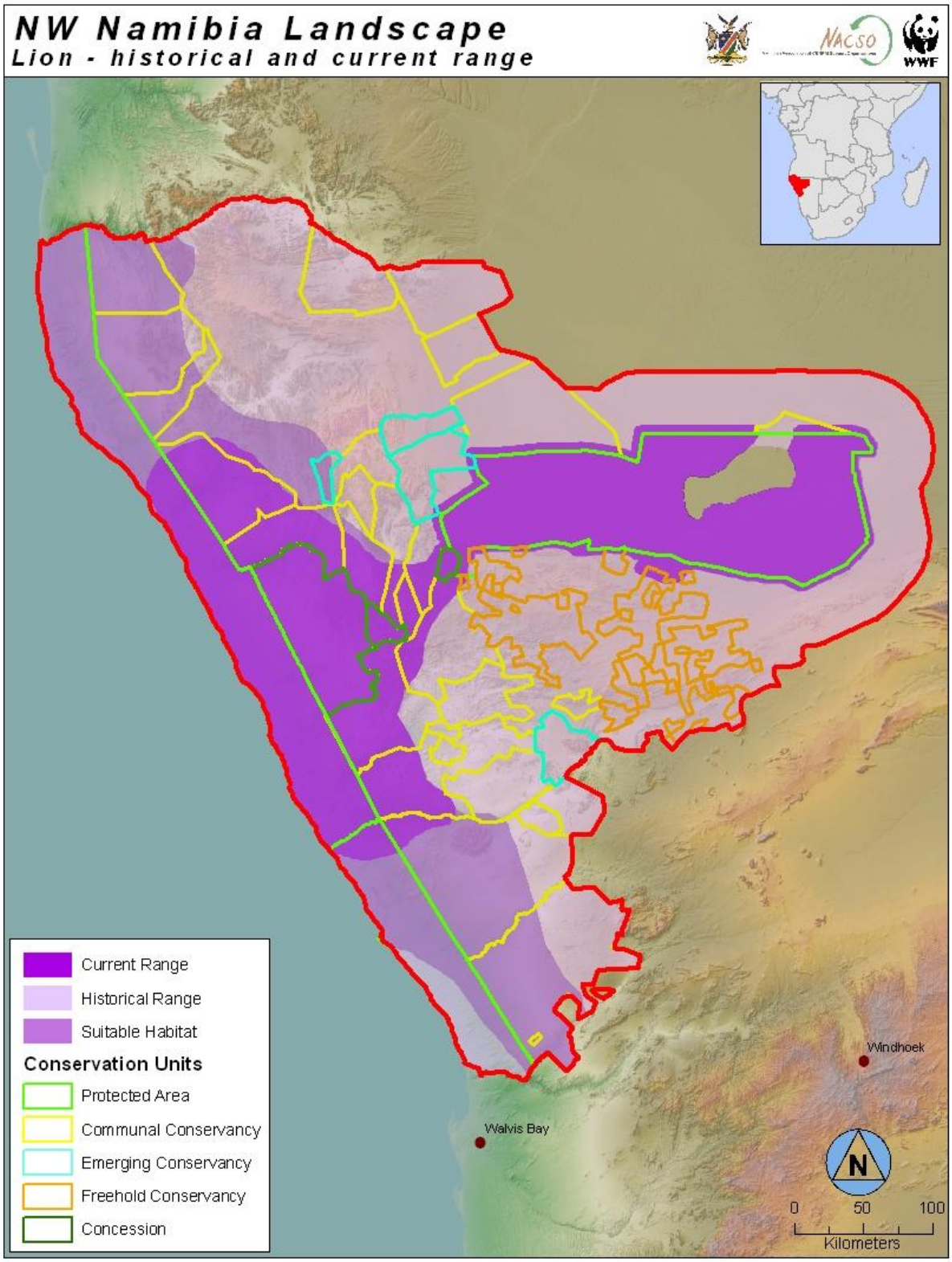
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Large predators - % original range occupied - Lion



Target:
Large predators
KEA/Indicator:
lion abundance / % original range occupied - Lion
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

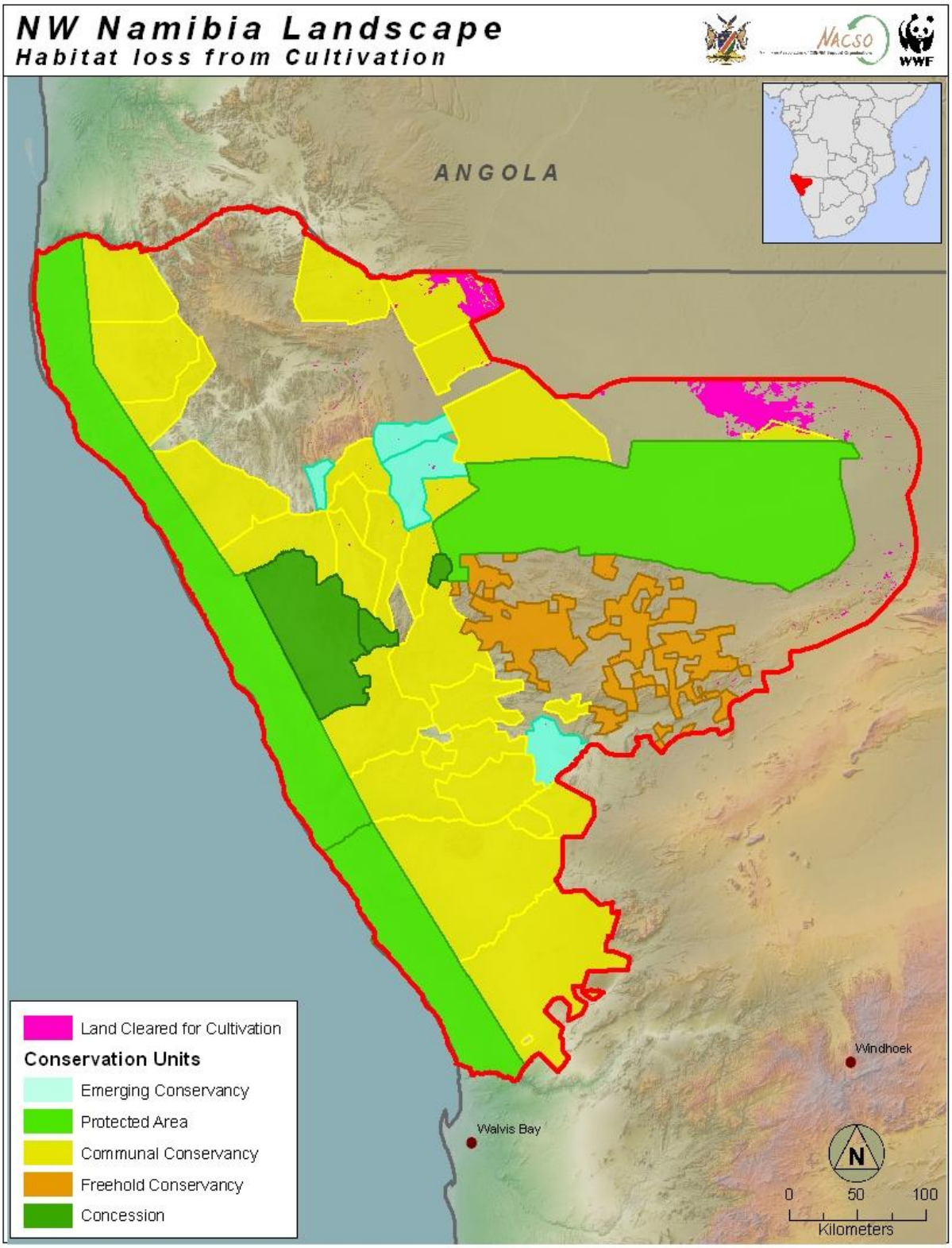
Working Group Members:

References:

Threat Indicators

Target	Key Attribute	Indicators
Habitat loss*		% riverbanks occupied by human settlement
Habitat loss*		% riverbanks occupied by human settlement
Poaching*		% or # of protected & specially protected spp. killed/yr
Killing of "pest" animals		relative abundance of pest animals (jackals, vultures, raptors)
Barriers to connectivity*	Fencing	km of fences
Hybridization*		Proximity of Common Impala Farms to Black Faced Impala range
Habitat loss*		Livestock densities
Killing of "pest" animals*		relative abundance of pest animals (jackals, vultures, raptors)

1. Habitat loss - % riverbanks occupied by human settlement



Target:
1. Habitat loss
KEA/Indicator:
/ % riverbanks occupied by human settlement
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

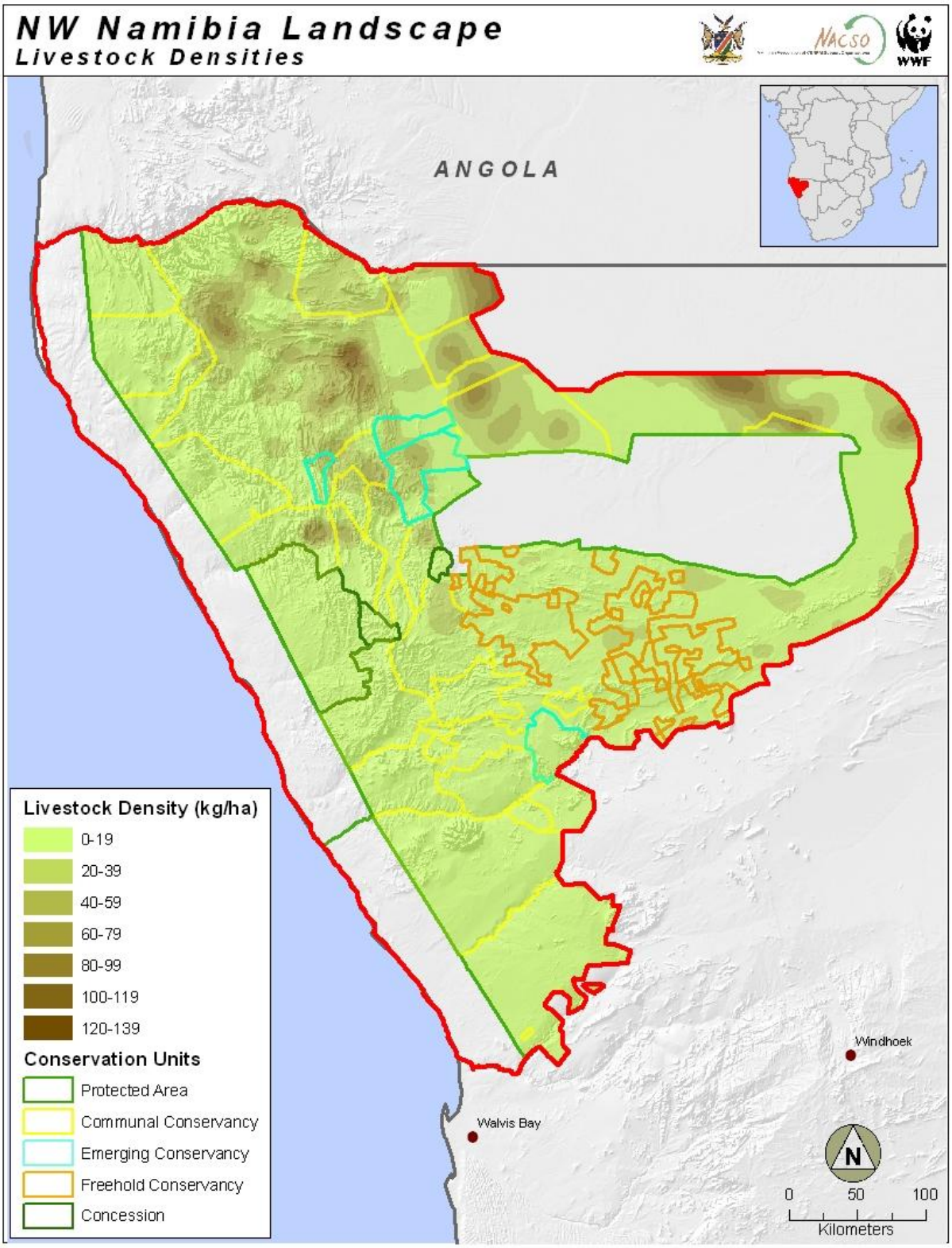
Future Indicator Development Required:

Notes:

Working Group Members:

References:

1. Habitat loss - Livestock densities



Target:
1. Habitat loss
KEA/Indicator:
/ Livestock densities
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

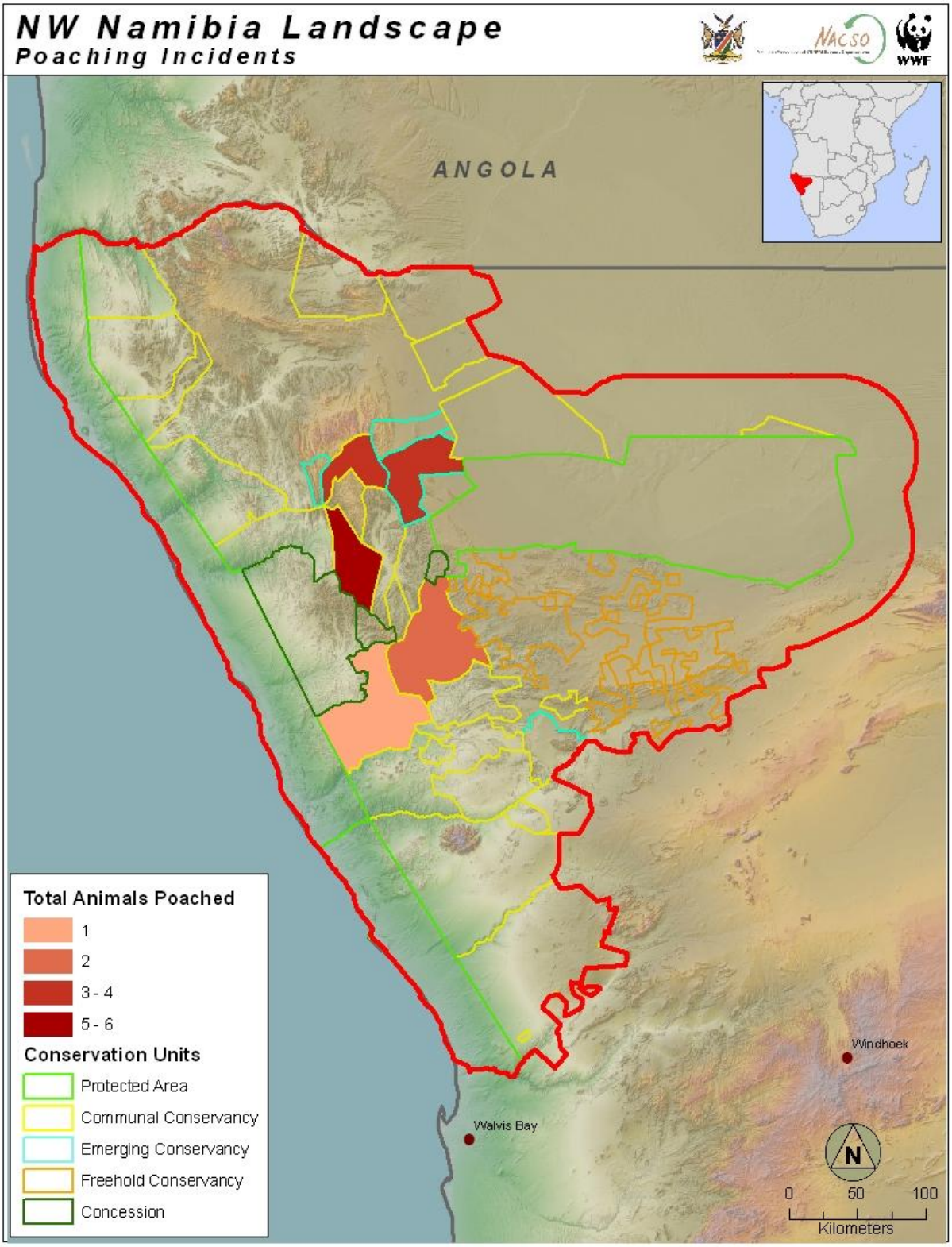
Future Indicator Development Required:

Notes:

Working Group Members:

References:

2. Poaching - % or # of protected & specially protected spp. killed/yr



Target:
2. Poaching
KEA/Indicator:
/ % or # of protected & specially protected spp. killed/yr
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

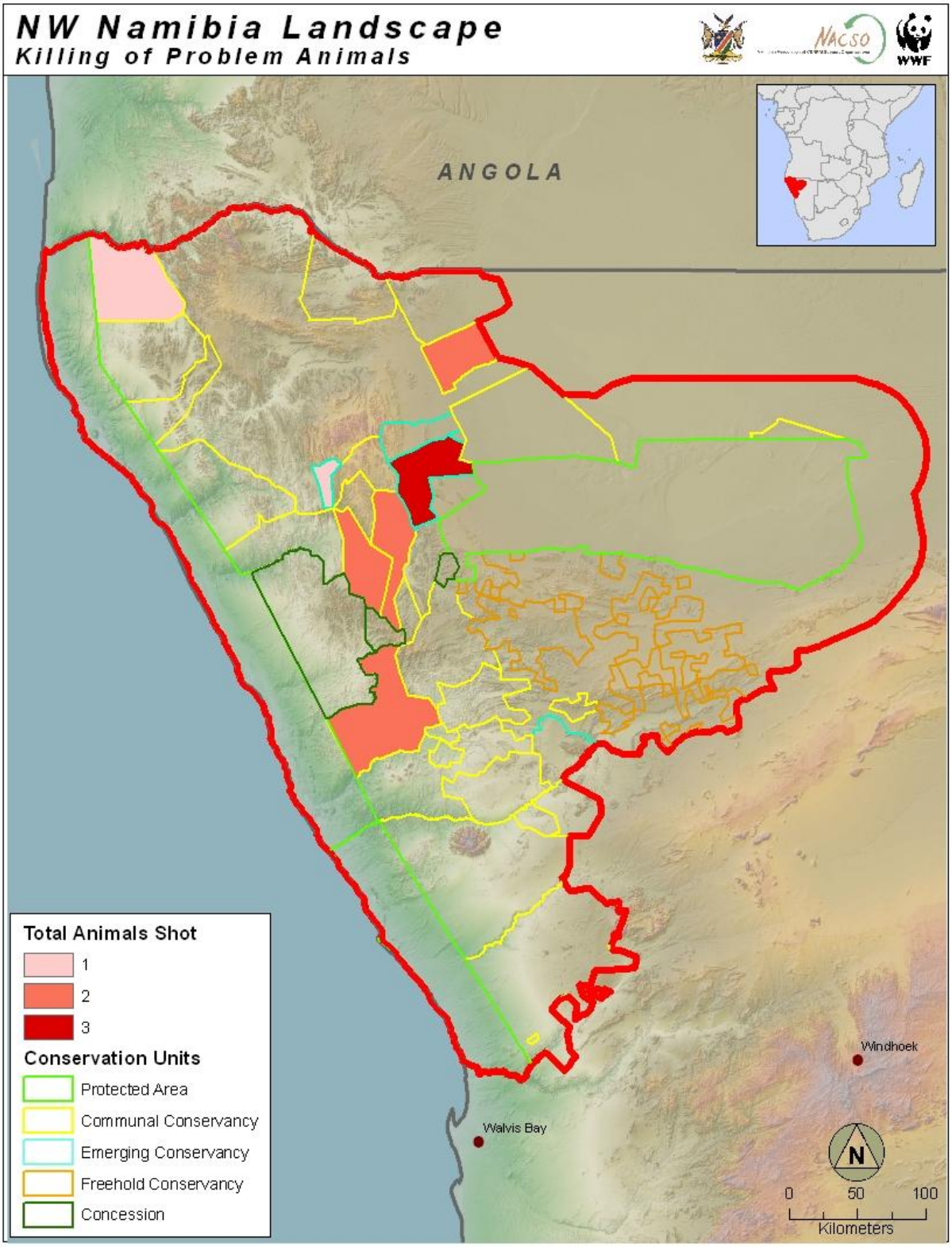
Future Indicator Development Required:

Notes:

Working Group Members:

References:

3. Killing of "pest" animals - relative abundance of pest animals (jackals, vultures, raptors)



Target:
3. Killing of "pest" animals
KEA/Indicator:
/ relative abundance of pest animals (jackals, vultures, raptors)
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

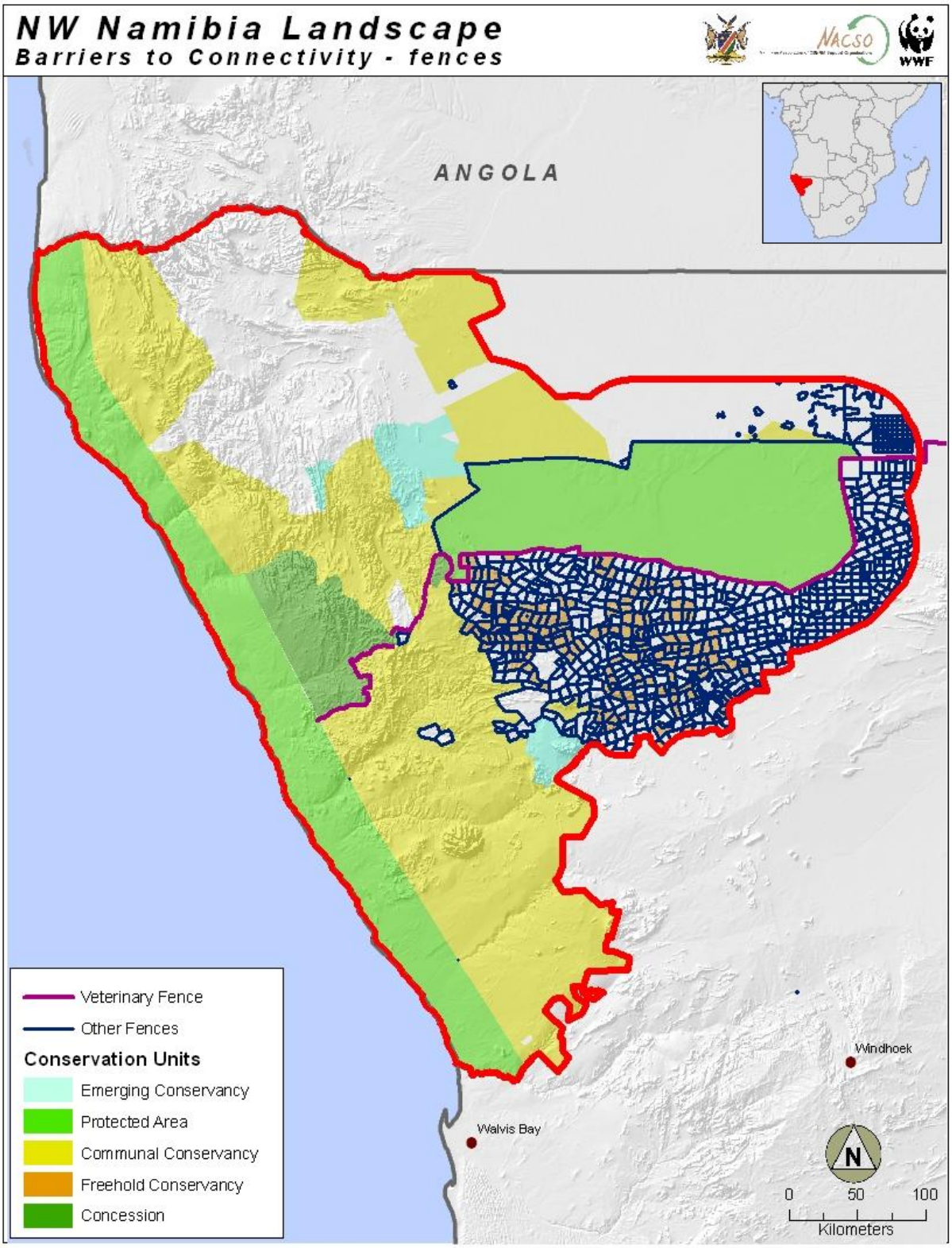
Future Indicator Development Required:

Notes:

Working Group Members:

References:

4. Barriers to connectivity - km of fences



Target:
4. Barriers to connectivity
KEA/Indicator:
Fencing / km of fences
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

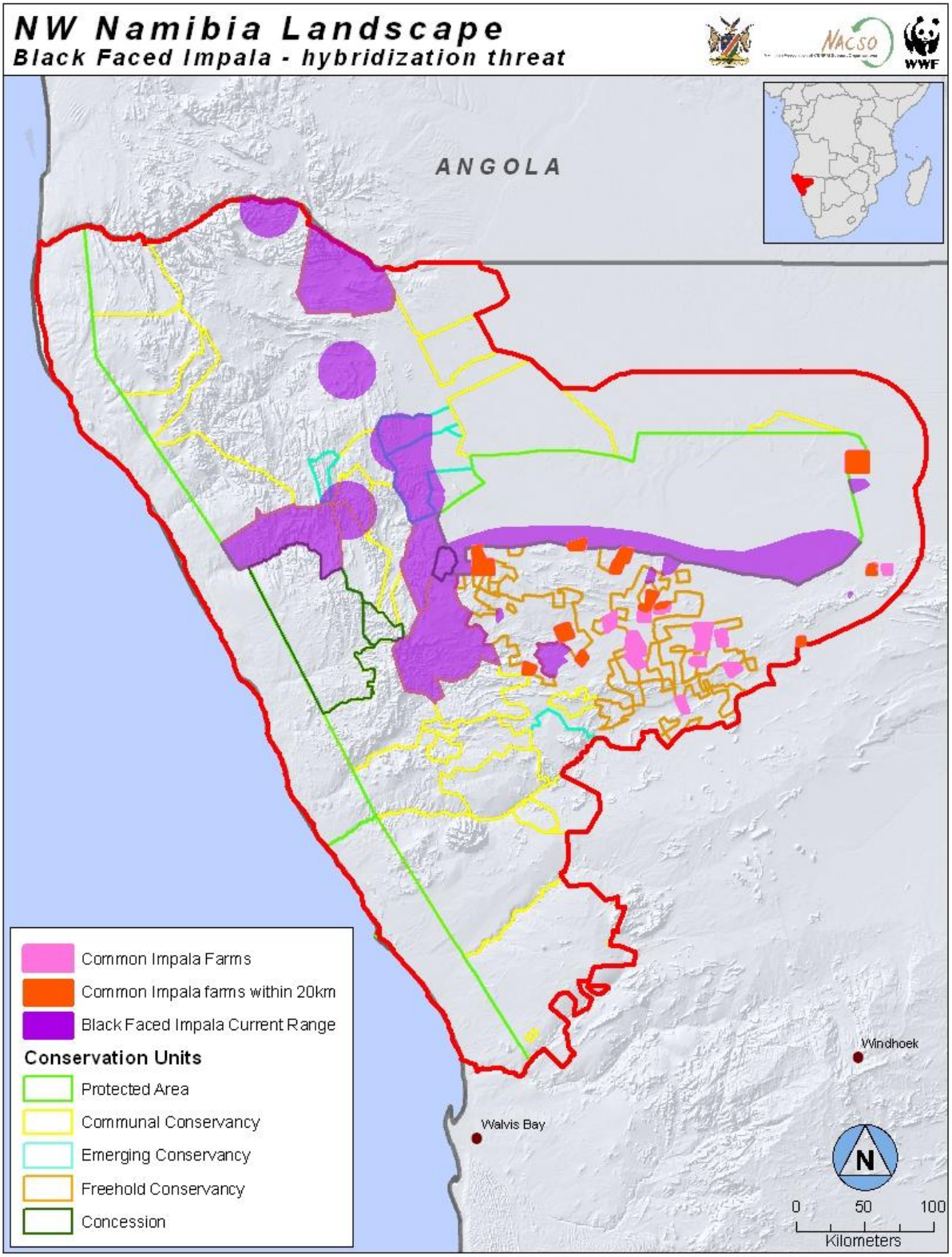
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Hybridization - proximity of Common Impala Farms to Black Faced Impala range



Target:
Hybridization
KEA/Indicator:
/ proximity of Common Impala Farms to Black Faced Impala range
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

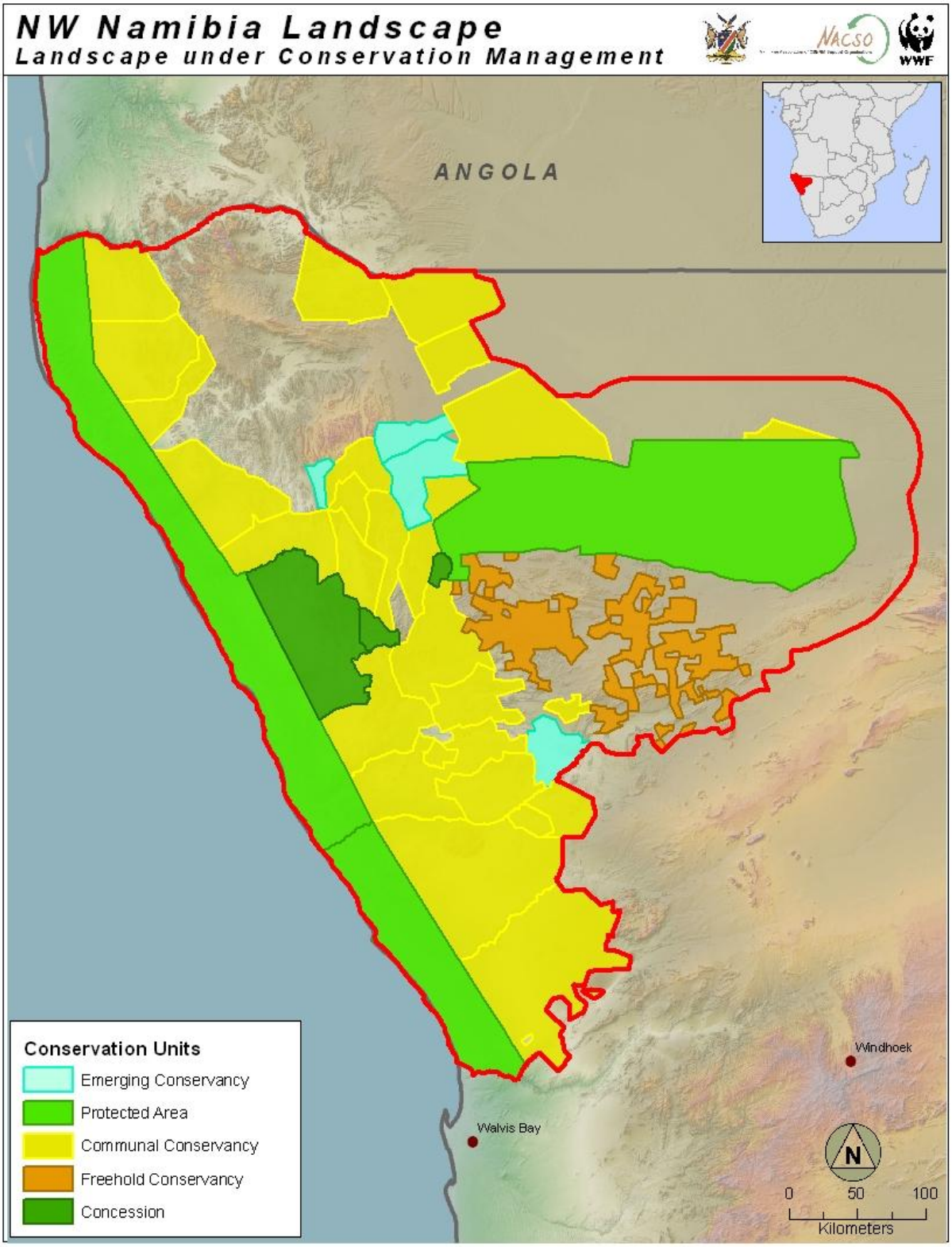
Working Group Members:

References:

Conservation Management Indicators

Target	Key Attribute	Indicators
Ecoregion conservation*		% area covered by co-management institutions
Management capacity	Management plans	% conservation mgmt units w/comprehensive mgmt plans
Management capacity*	Management plans	#/% of management units implementing management plans effectively
Management capacity*	Patrols	# game guards/ 5000 ha
Namib desert*		% biome under cons. Mgmt
Nama Karoo*		% biome under cons. Mgmt
Salt pans*		% biome under cons. Mgmt
Tree-shrub savannah*		% biome under cons. Mgmt
Protected area representation*		% priority areas for terrestrial diversity under protection
Protected area representation		% priority areas for terrestrial endemism under protection
Riparian habitat*		% linear watercourse under protection (cons, PA, freehold,etc)
Terrestrial habitat*		% total area under conserv. Mgmt. (conservancy, park, concessions)
"green" enterprises		% Namibian conservation enterprises eco-certified
Self-financing*	sustainable finance	% of conservation management units fully covering own costs/yr

Ecoregion conservation - % area covered by co-management institutions



Target:
Ecoregion conservation
KEA/Indicator:
/ % area covered by co-management institutions
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

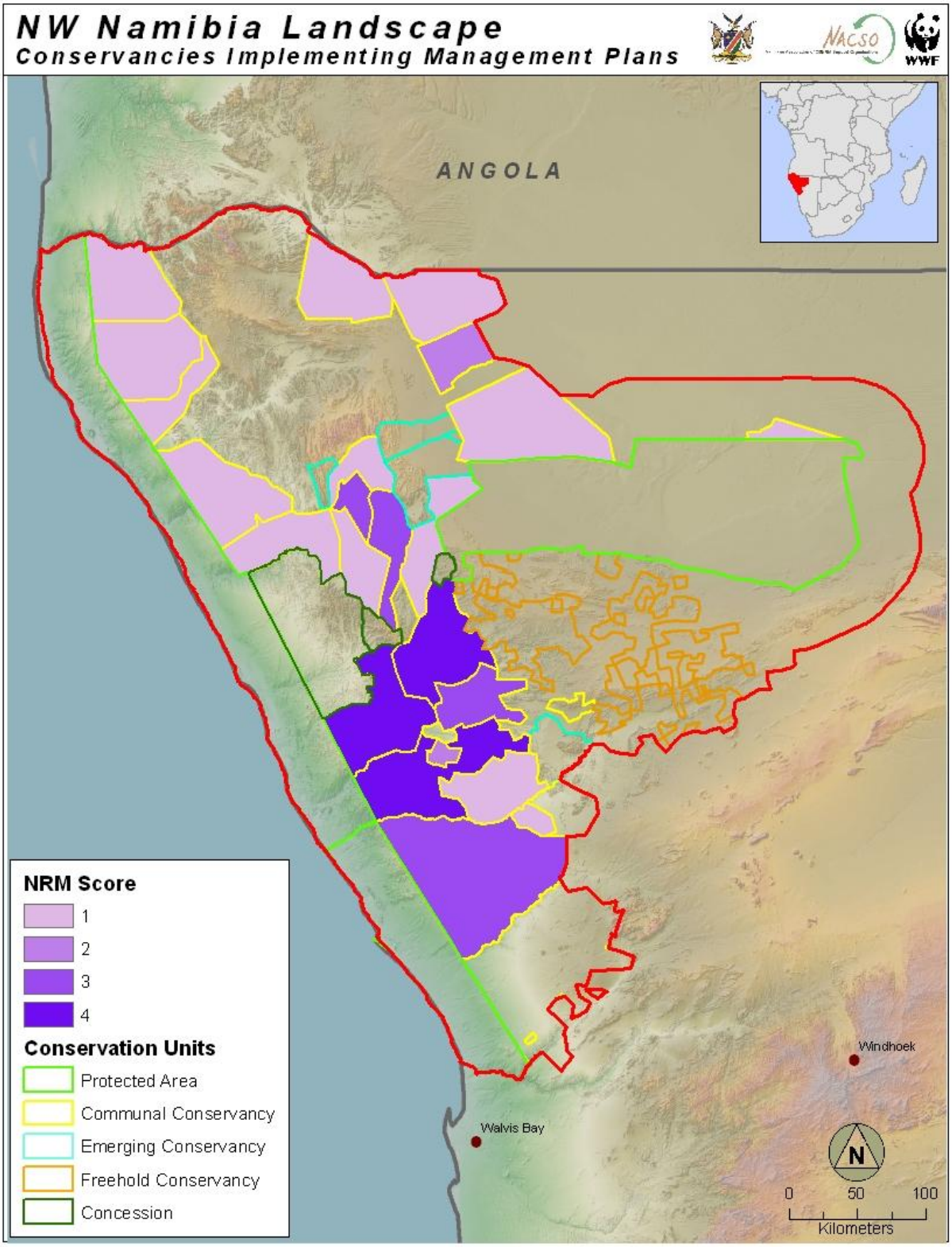
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Management capacity - #/% of management units implementing management plans effectively



Target:
Management capacity
KEA/Indicator:
Management plans / #/% of management units implementing management plans effectively
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

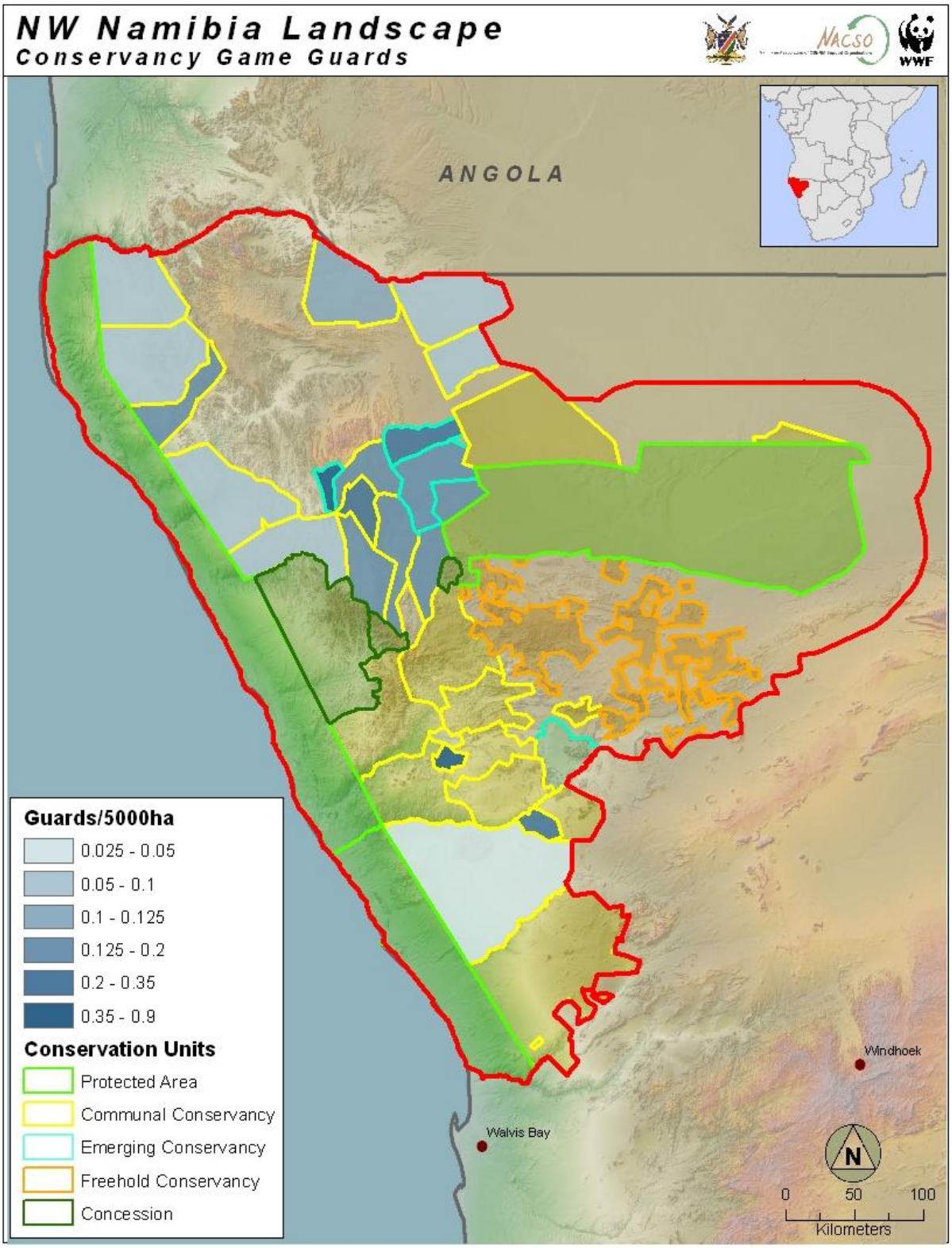
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Management capacity - # game guards/management unit



Target:
Management capacity
KEA/Indicator:
Patrols / # game guards/management unit
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

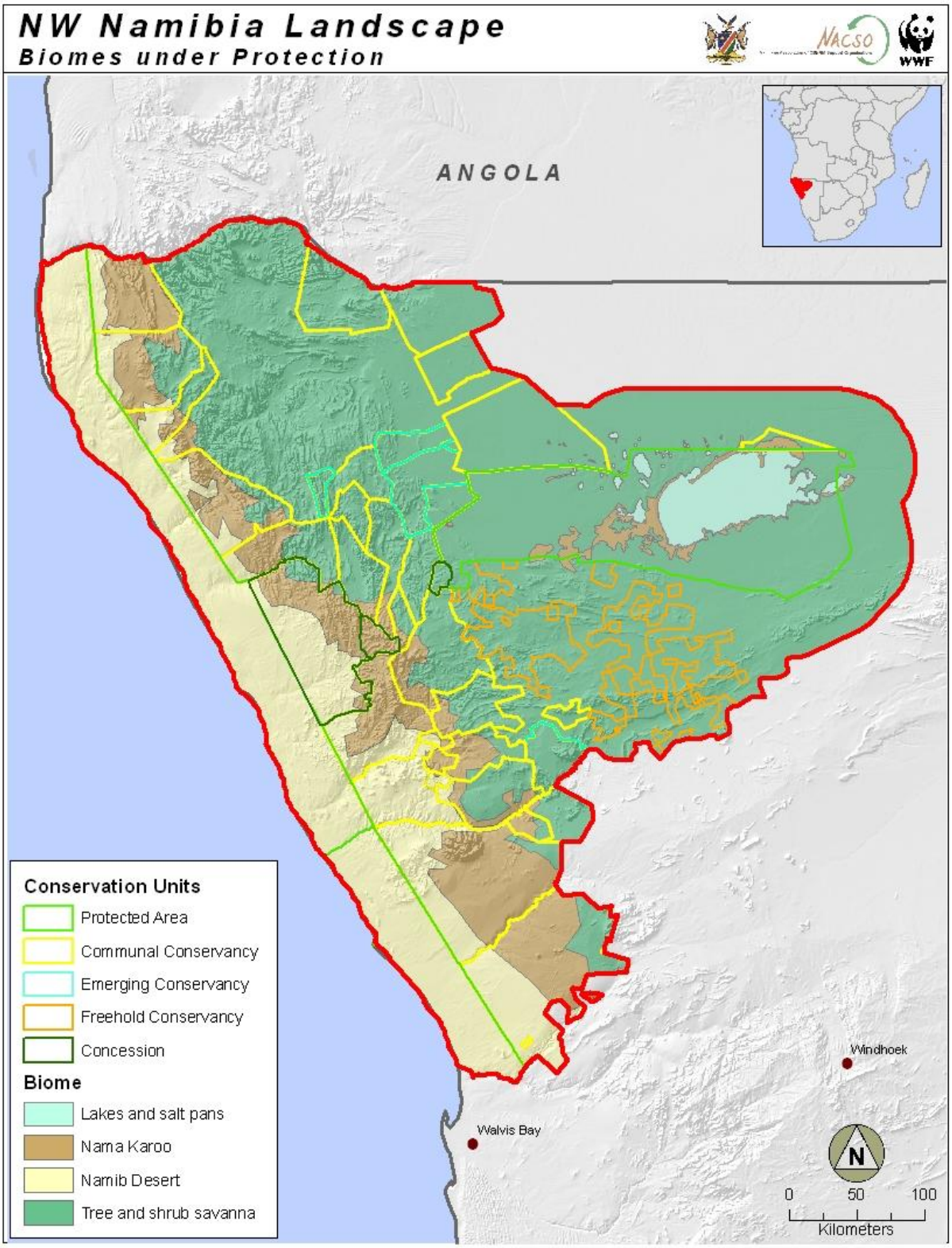
Future Indicator Development Required:

Notes:

Working Group Members:

References:

% biomes under cons. Mgmt



Target:
Namib Desert/Nama Karoo/Salt pans/Tree-shrub savannah
KEA/Indicator:
% biome under cons. Mgmt
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

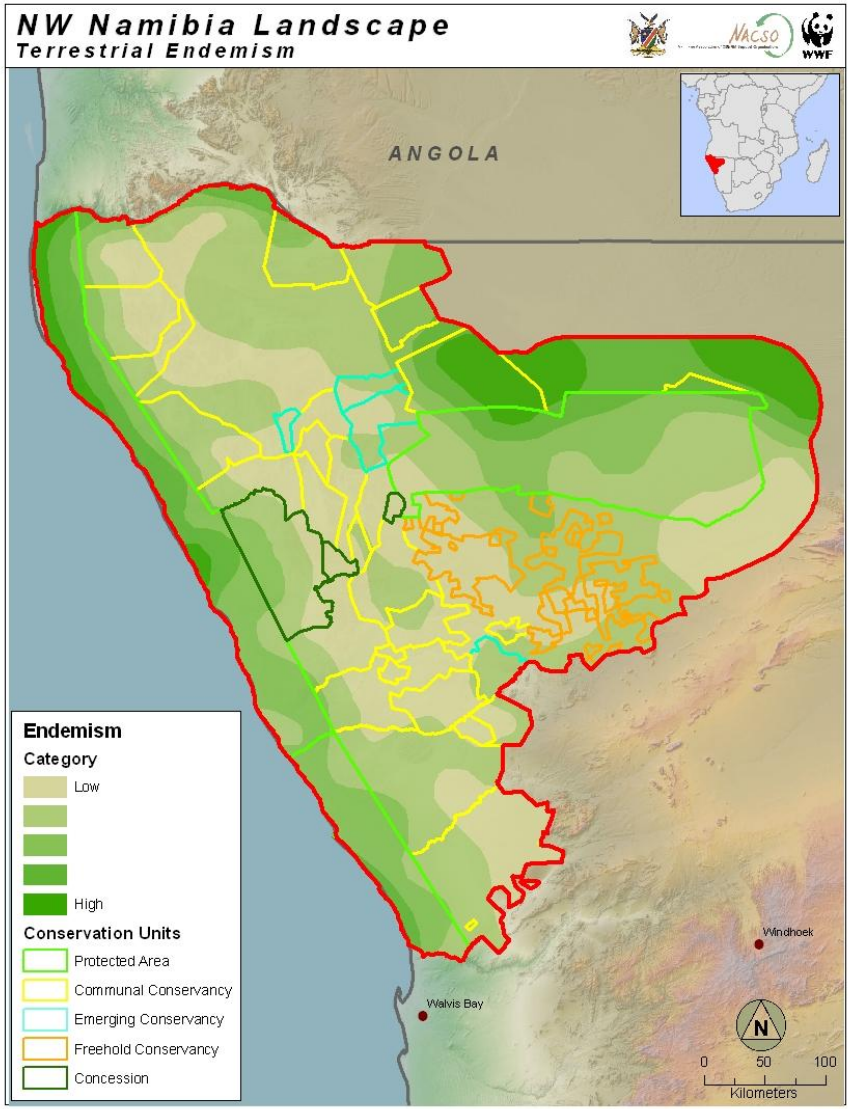
Future Indicator Development Required:

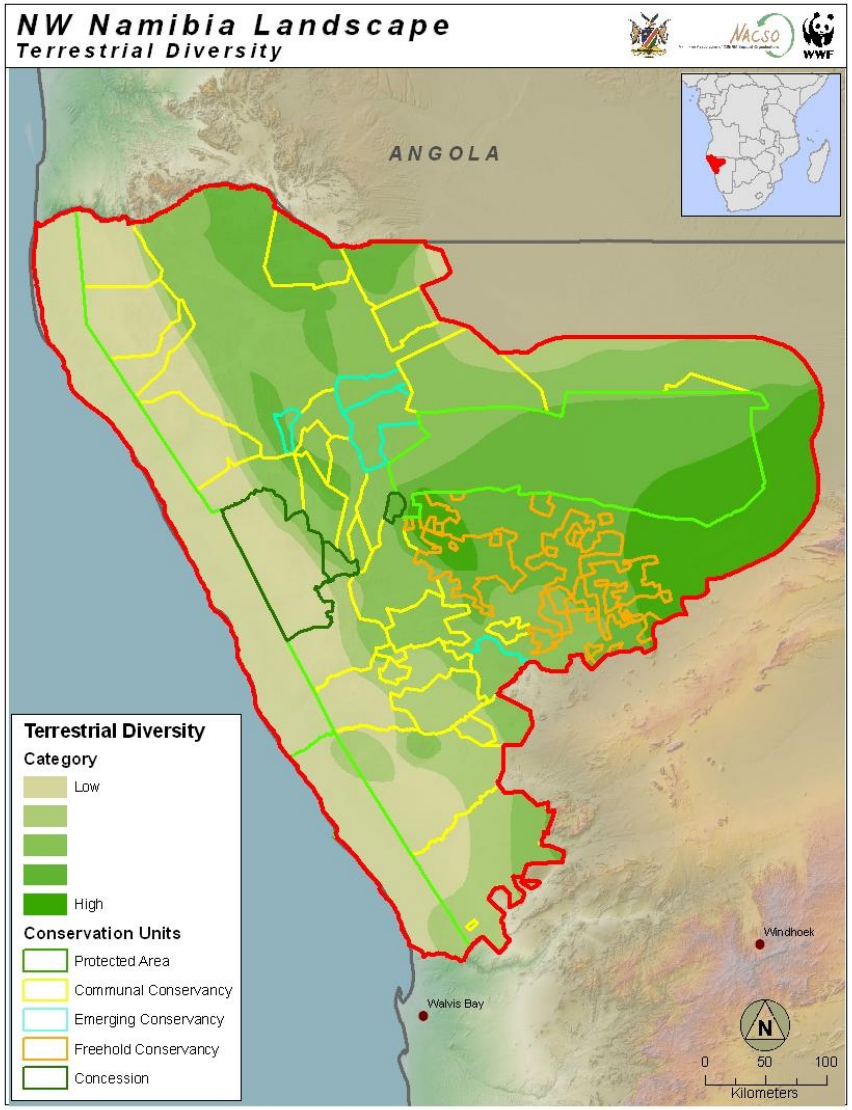
Notes:

Working Group Members:

References:

Protected area representation - % high priority conservation areas under protection (endemism, diversity)





Target:
Protected area representation
KEA/Indicator:
% high priority conservation areas under protection (endemism, diversity)
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

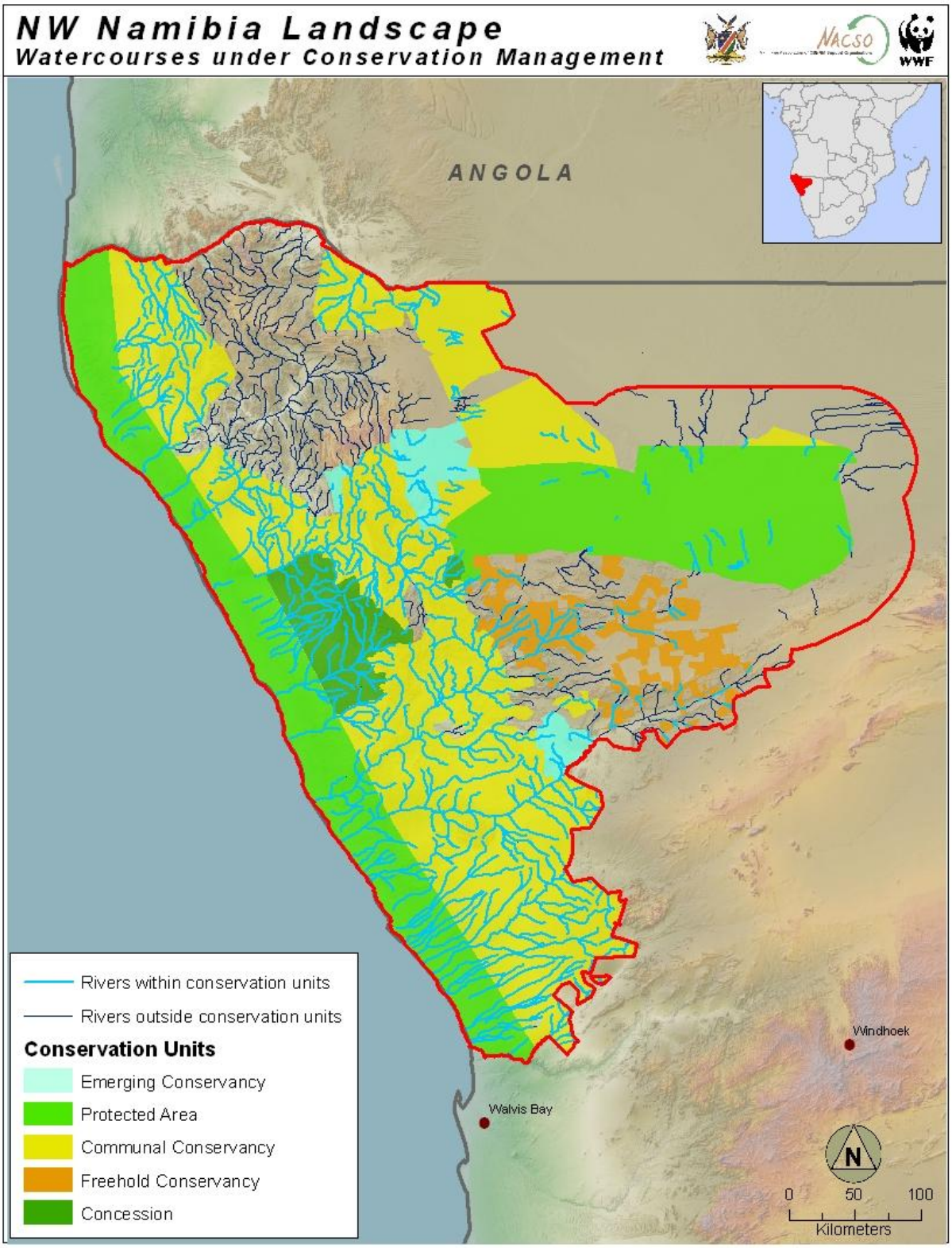
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Riparian habitat - % linear watercourse under protection



Target:
Riparian habitat
KEA/Indicator:
/ % linear watercourse under protection
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

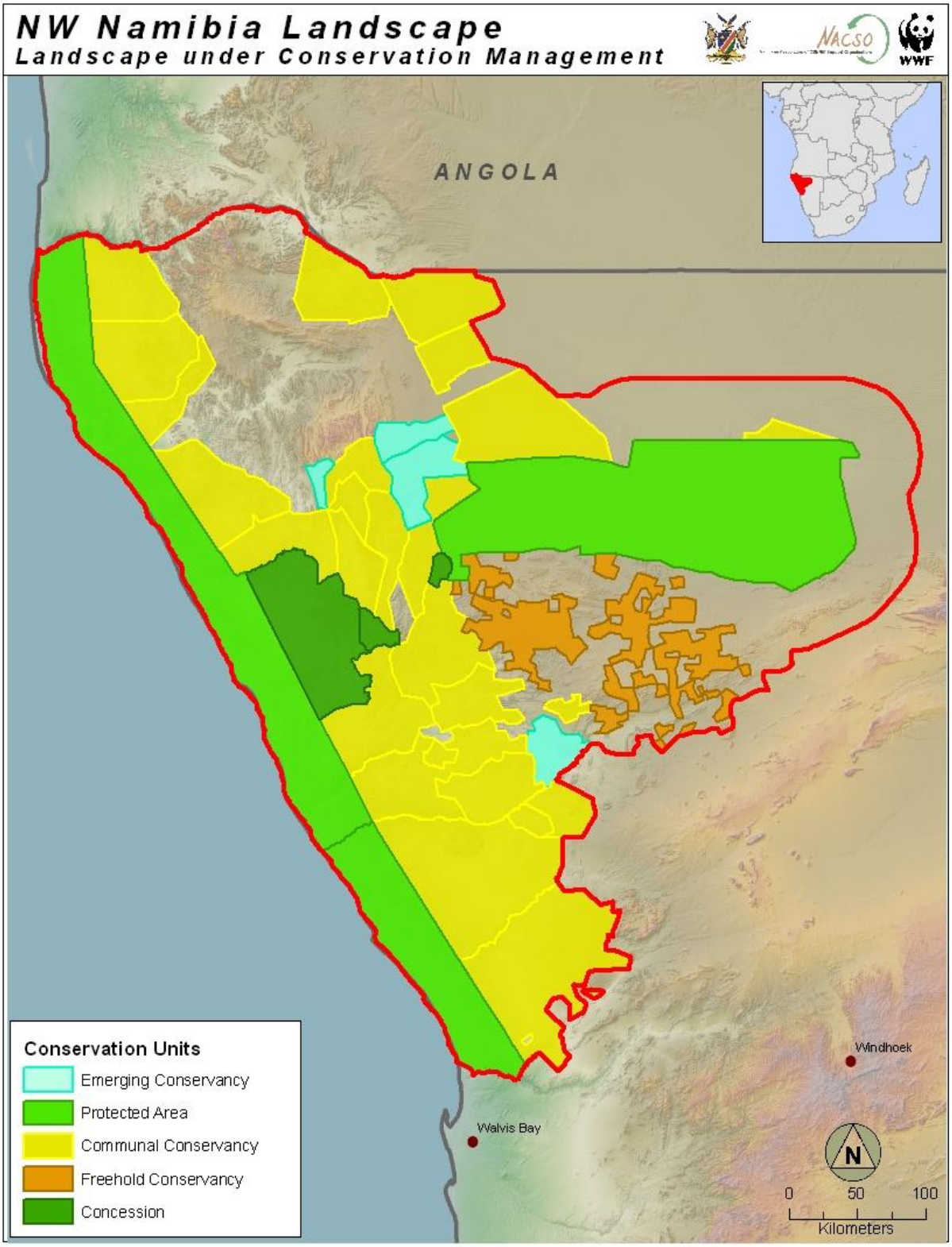
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Terrestrial habitat - % total area under conserv. Mgmt. (conservancy, park, concessions)



Target:
Terrestrial habitat
KEA/Indicator:
/ % total area under conserv. Mgmt. (conservancy, park, concessions)
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

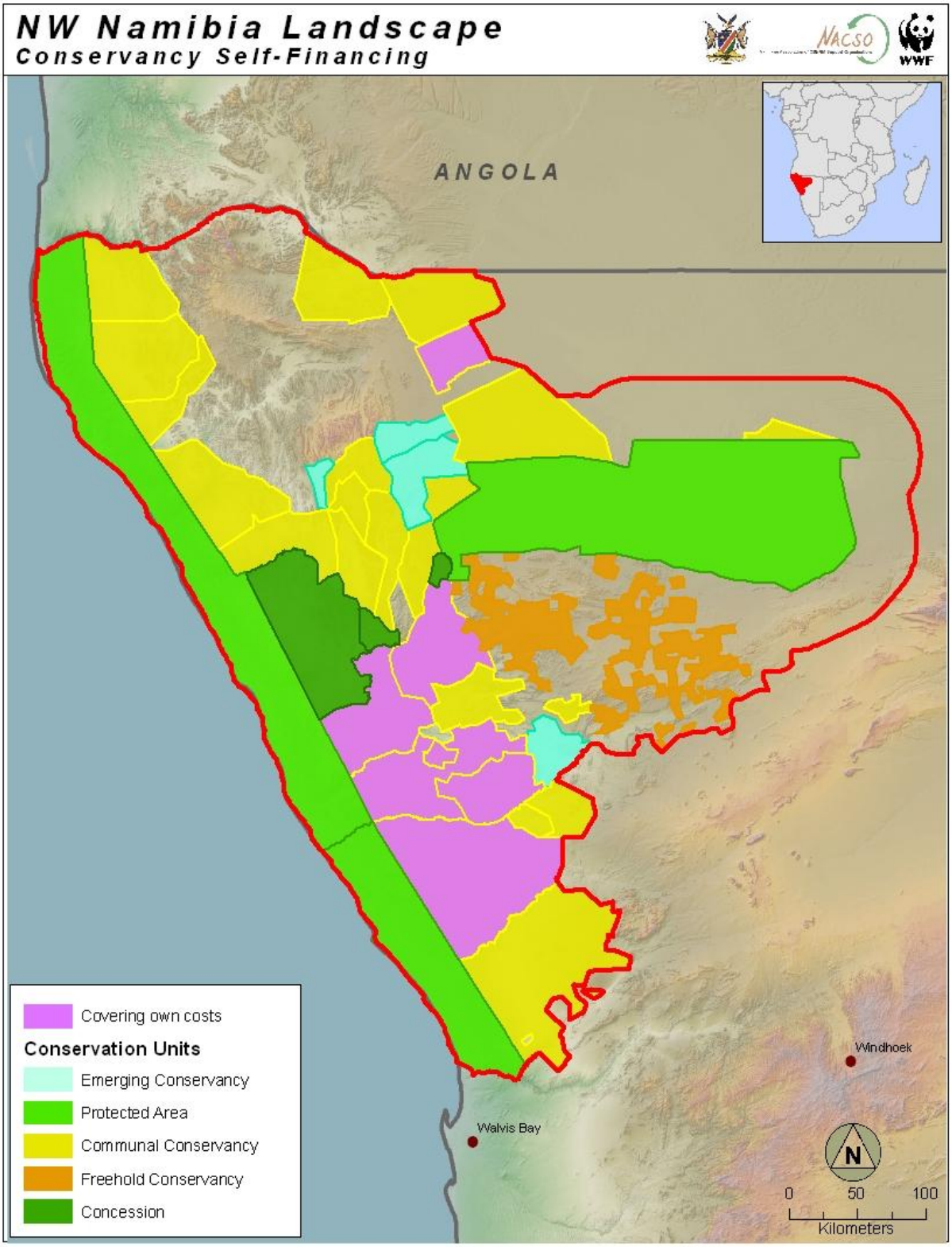
Future Indicator Development Required:

Notes:

Working Group Members:

References:

Self-financing - % of conservation management units fully covering own costs/yr



Target:
Self-financing
KEA/Indicator:
sustainable finance / % of conservation management units fully covering own costs/yr
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

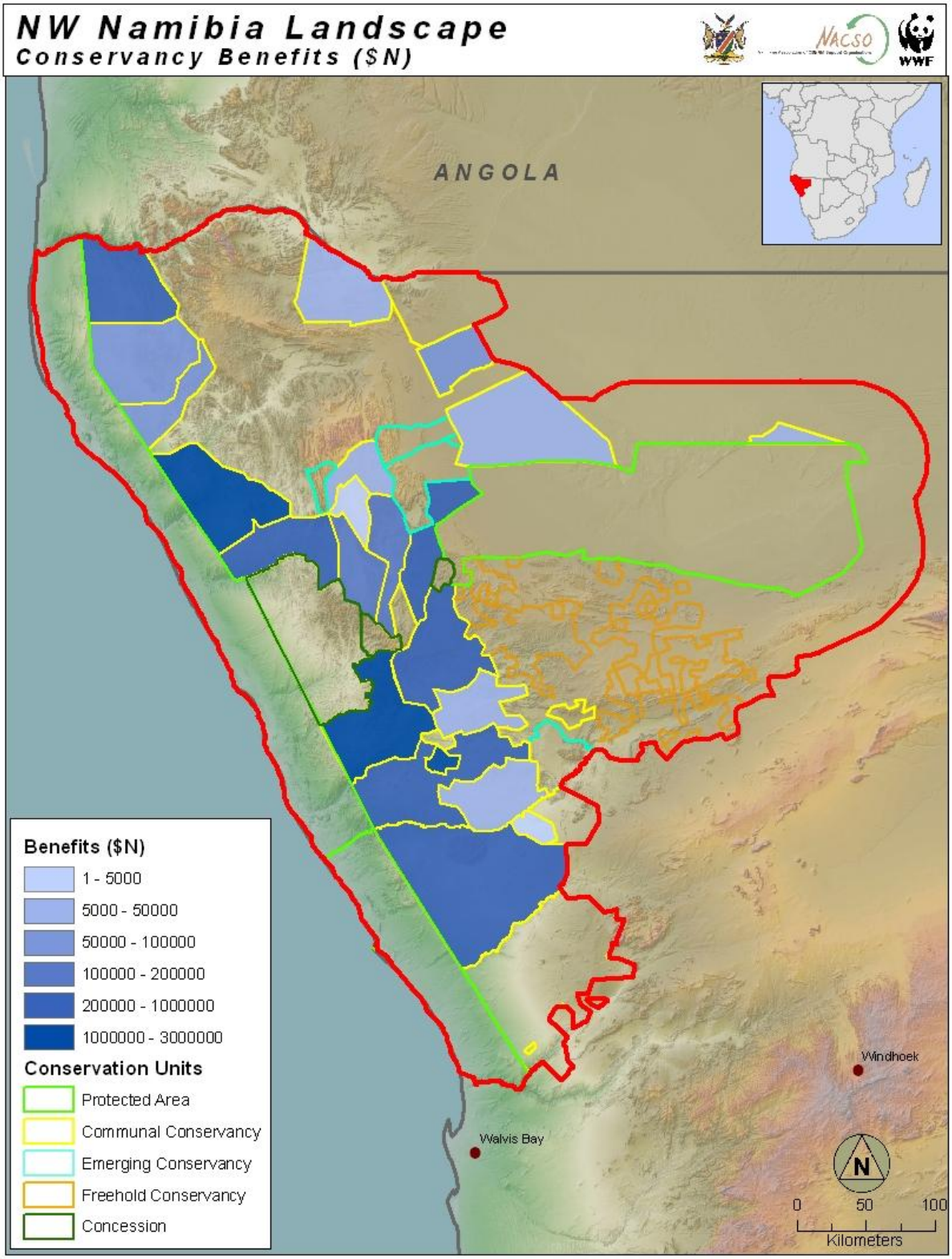
Working Group Members:

References:

Social Indicators

Domain	Key Attribute	Indicators
economic well-being	Natural assets	monetary value of wildlife populations in landscape
	Conservation revenues*	total revenue from conservation-based economic activity
	Employment*	total jobs generated by conservation-based economic activity
	Employment	% jobs generated by conservation-based economic activity held by women
health	risk of injury or death	% pop or # individuals attacked by wildlife/yr
health	food security	% livestock killed by wildlife/yr
health	food security	# or % fields raided by wildlife/yr
health	Disease prevalence	% population HIV+
health	Disease prevalence	% population w/malaria/yr
	Nutrition*	kg / game meat distributed /capita / yr
	access to health care	% population w/"ready access" to health clinic
political empowerment	resource rights	% of conservancy population who are registered members
	resource rights*	% population who reside in conservancies
	female empowerment*	% conservancy mgmt members who are female
	security of land tenure	(unsure how to measure)
education	access to education	% population (children) w/"ready access" to a primary school
	environmental awareness*	level of conservancy commitment to conservation demonstrated through NRM staff levels
	environmental awareness*	level of conservancy commitment to conservation demonstrated through investment of own funds into NRM
culture	traditional ceremonies	% conservancies w/game meat available for traditional ceremonies
	local ecological knowledge	% landscape mapped through participatory mapping of local knowledge
	local ecological knowledge	# or % local trackers demonstrating wildlife expertise/tracking skill

economic well-being - total revenue from conservation-based economic activity



Target:
economic well-being
KEA/Indicator:
Conservation revenues / total revenue from conservation-based economic activity
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

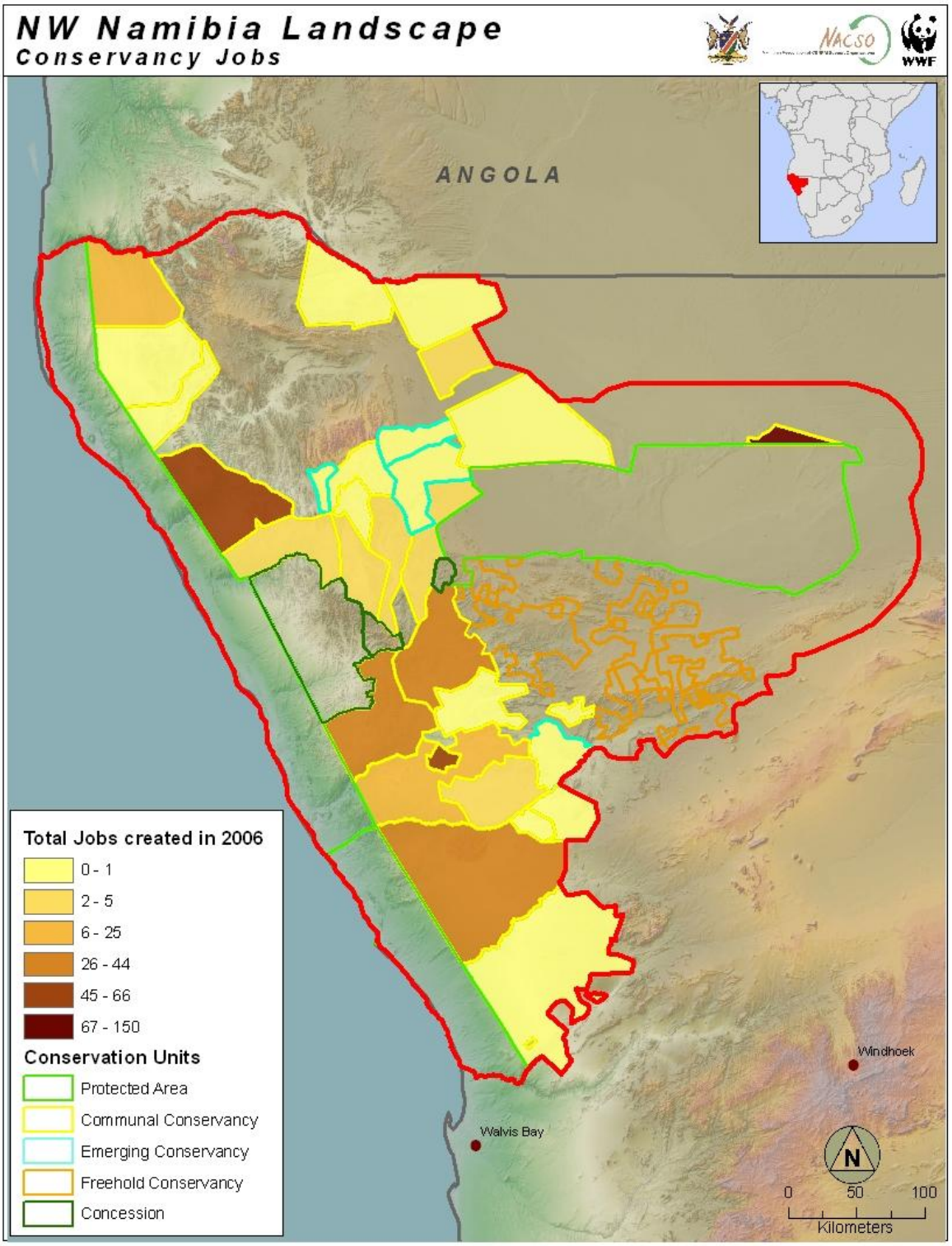
Future Indicator Development Required:

Notes:

Working Group Members:

References:

economic well-being - total jobs generated by conservation-based economic activity



Target:
economic well-being
KEA/Indicator:
Employment / total jobs generated by conservation-based economic activity
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

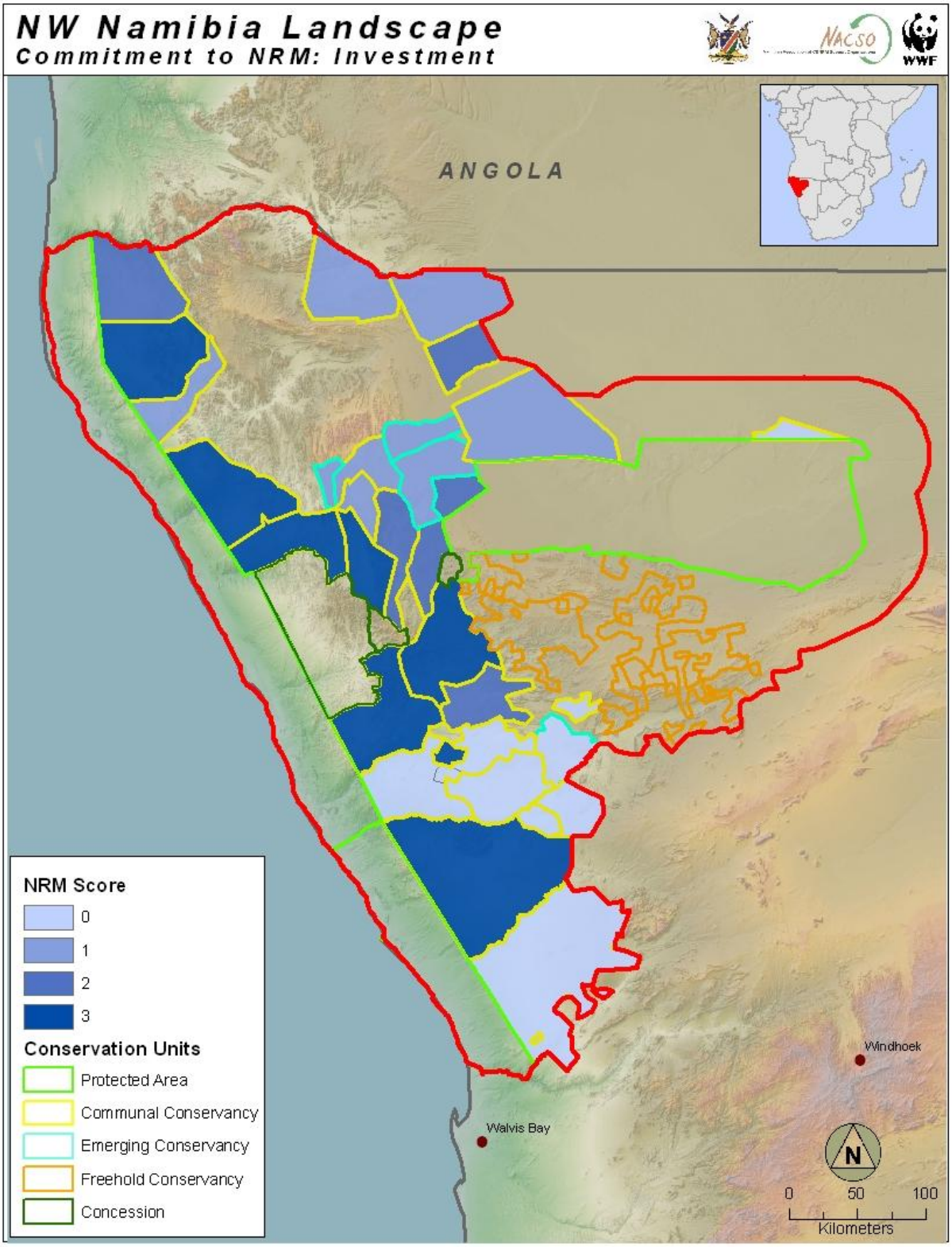
Future Indicator Development Required:

Notes:

Working Group Members:

References:

education - level of conservancy commitment to conservation demonstrated through investment of own funds into NRM



Target:
education
KEA/Indicator:
environmental awareness / level of conservancy commitment to conservation demonstrated through investment of own funds into NRM
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

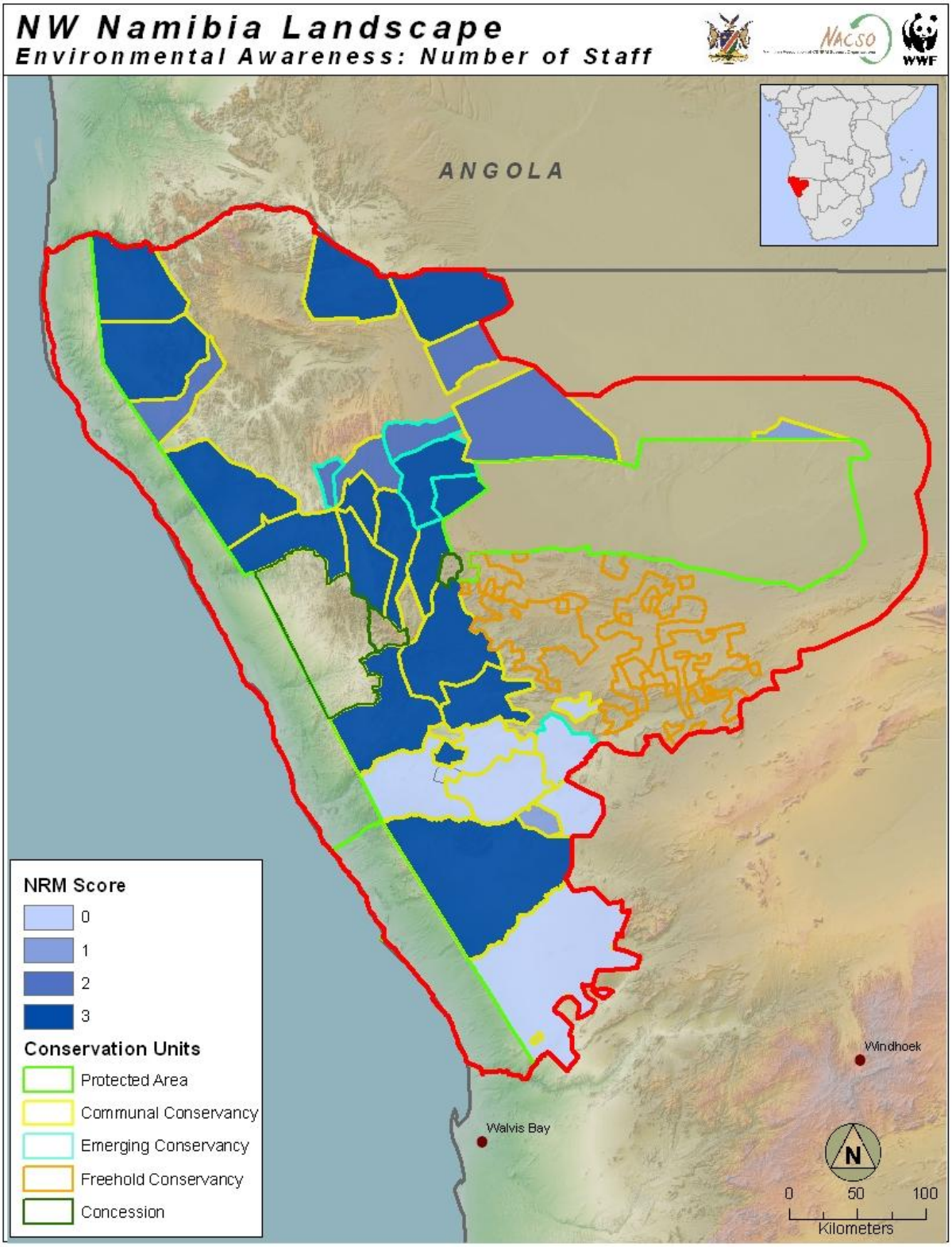
Future Indicator Development Required:

Notes:

Working Group Members:

References:

education - level of conservancy commitment to conservation demonstrated through NRM staff levels



Target:
education
KEA/Indicator:
environmental awareness / level of conservancy commitment to conservation demonstrated through NRM staff levels
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

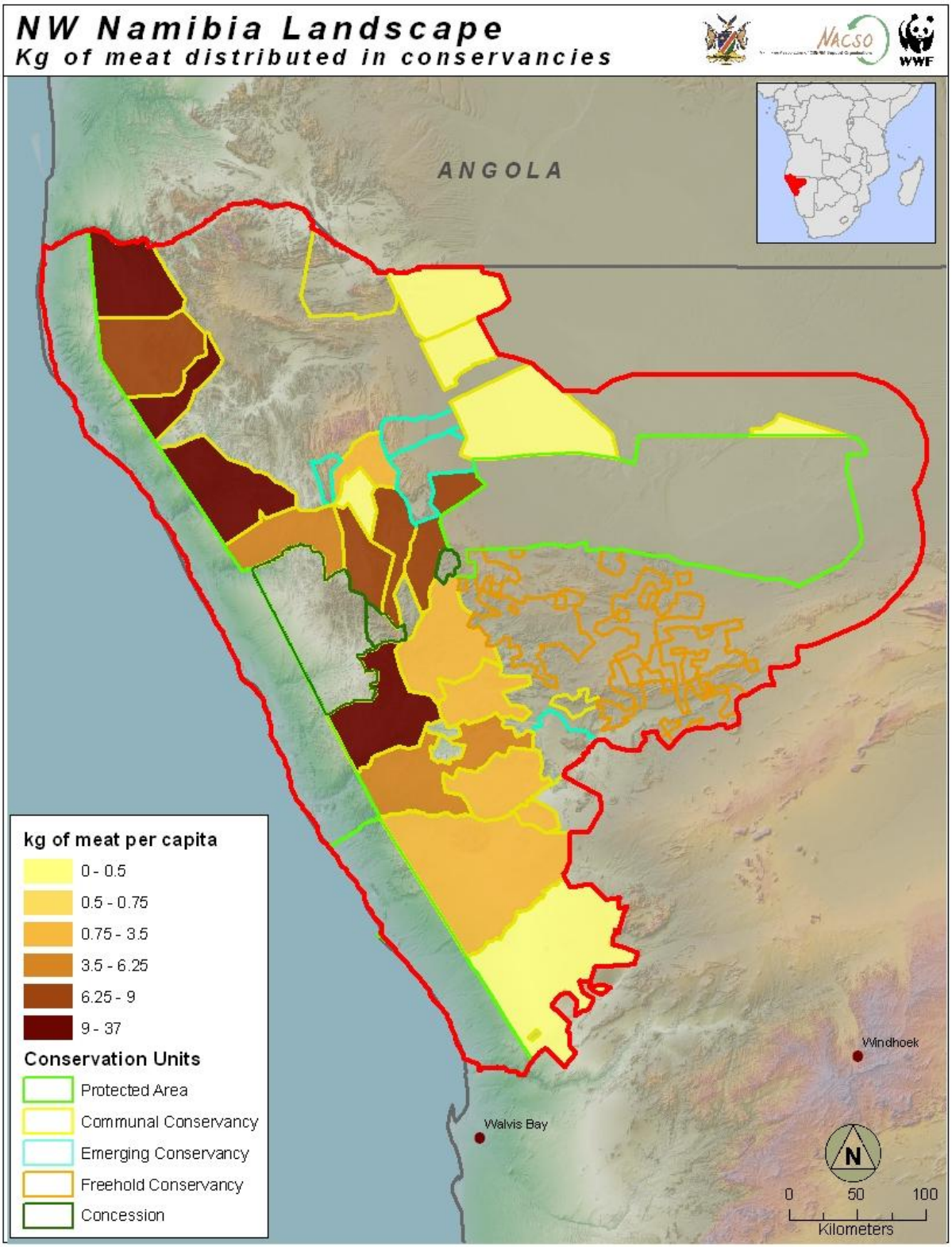
Future Indicator Development Required:

Notes:

Working Group Members:

References:

health - kg/conservancy HH game meat consumed annually



Target:
health
KEA/Indicator:
nutrition / kg/conservancy HH game meat consumed annually
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

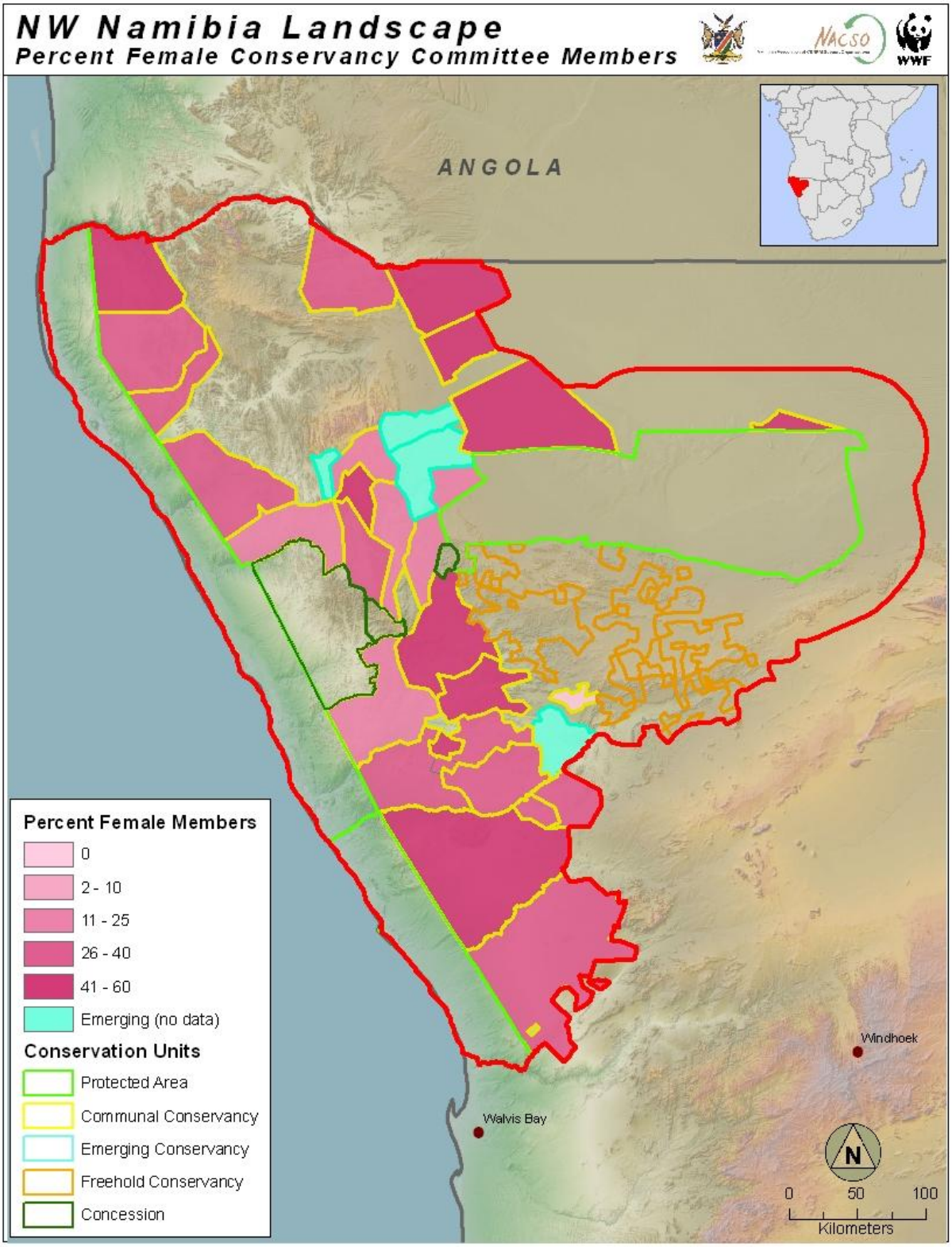
Future Indicator Development Required:

Notes:

Working Group Members:

References:

political empowerment - % conservancy mgmt members who are female



Target:
political empowerment
KEA/Indicator:
female empowerment / % conservancy mgmt members who are female
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

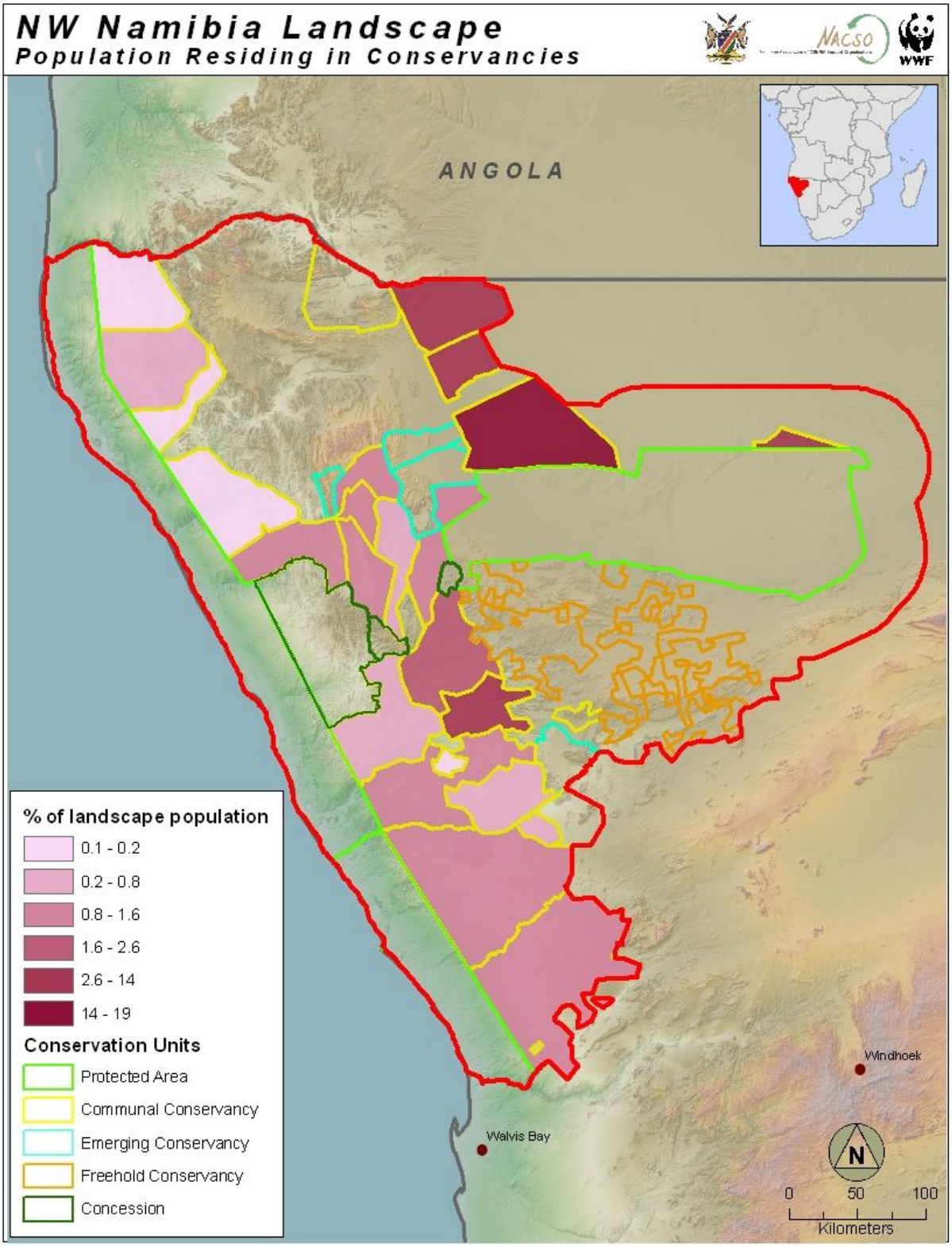
Future Indicator Development Required:

Notes:

Working Group Members:

References:

political empowerment - % population who are conservancy residents



Target:
political empowerment
KEA/Indicator:
resource rights / % population who are conservancy residents
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

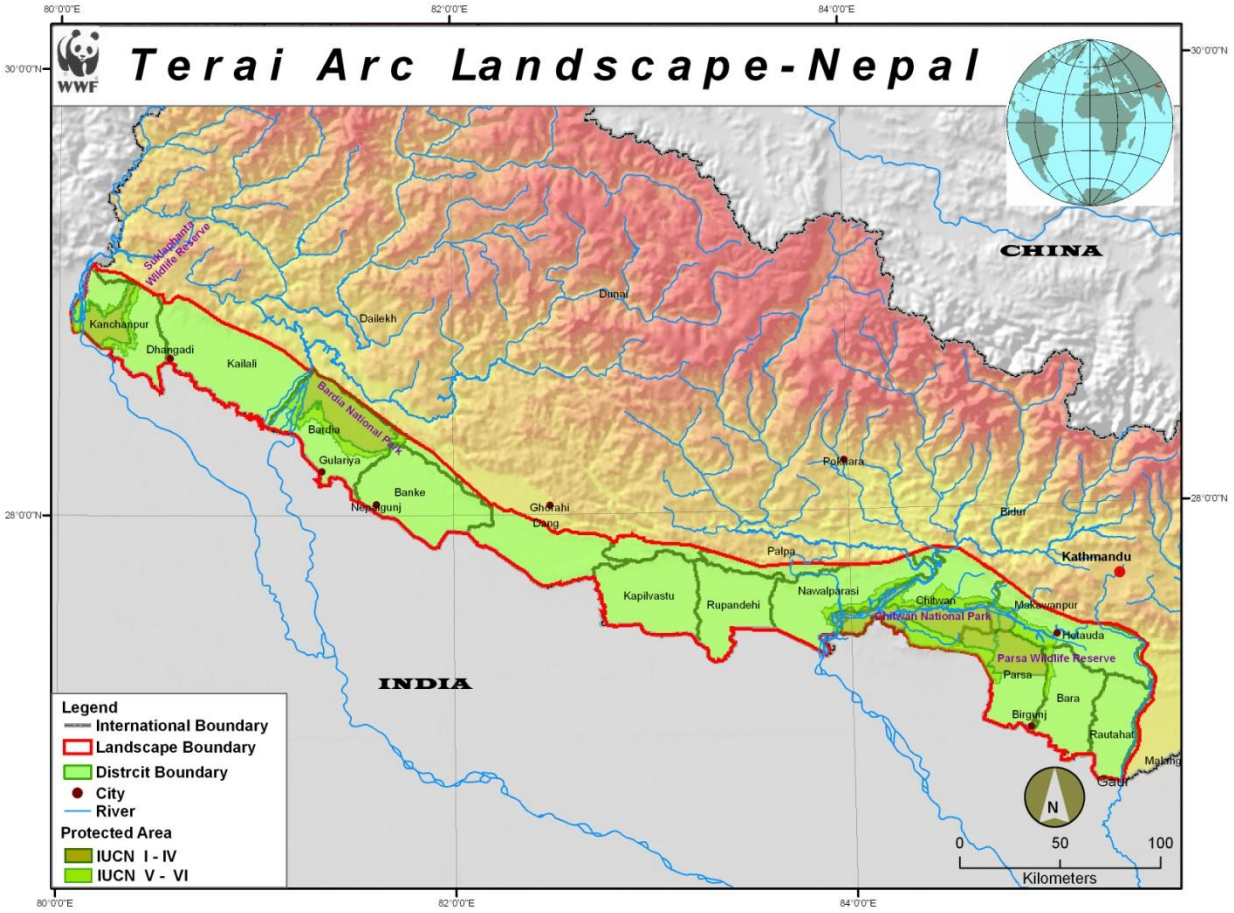
Notes:

Working Group Members:

References:

APPENDIX 6

Terai Arc Landscape - Nepal



The Conservation Measures program is a multiyear effort to measure the status of WWF priority places through a set of quantitative indicators. A four-part Conservation Measures Framework is used to characterize the conservation status of WWF's priority places. The four components are: biological targets, threats, conservation management, and social well-being. Added together, these components generate baseline information that is critical for effective conservation planning across large geographies.

The Conservation Measures approach was tested at varying scales in 6 WWF priority places, starting in late 2008 and continuing through the fall of 2009:

- Bering Sea (Marine Ecoregion)
- Coastal East Africa (two Landscapes)
- Coral Triangle (Protected Area)
- Heart of Borneo (NI)
- Namibia (Landscape)
- Nepal (Landscape)

The pilot was a collaborative effort to identify indicators in each of the four categories, and then collect, analyze and map data to depict baseline conditions in the place. Staff from WWF-US Conservation Science Program provided guidance and technical assistance to program staff in each of the six test sites. However, the real work was done by Measures Officer placed in each site. These individuals (or a team in some cases) scoured sources of existing data, compiled and analyzed the data and created maps to display the current status of many indicators across their geography. This appendix is one product of these efforts over the past year and a half.

Credits:
Bijan Gurung, WWF-Nepal led the Measures pilot effort. Several colleagues in the Nepal office provided technical expertise and support. They include: Tara Gnyawali, Ritesh Shrestha, Gokarna Thapa, and Kanchan Thapa. Their efforts were supported by WWF-US staff Huaqun Li and Shubash Lohani.

Technical Progress Report

25) **Learning and Sharing.** Describe key lessons learned, that are important to your project or that may be of use to others outside this project. They may relate to any of the following: successes, strategies adopted, challenges you are facing, surprise results, management processes, or technical understanding.

Due to its nature as a learning effort, the Conservation Measures program has developed the following questions to capture insights on specific components of our program. Your feedback will be incorporated into a final program report and recommendations for implementing Conservation Measures in the future.

a. Provide a brief summary of the results of the analysis of the Biological, Threat, Conservation Management and Social Condition indicators for the Terai Arc Landscape.

WWF Nepal has greater strength in biological targets, so data for the biological targets and their corresponding indicators are more than the other three domains. However, data have been filled up for the rest so as to attain a balance among the four.

The template shows the population of tiger, rhino and elephant have been maintained, but not to their historic level. Their current population distribution of these species is far from the historic level. However, restoration of critical areas slightly enhanced their distribution (% of habitat occupied). There is a drastic decline in endangered vulture species and gangetic dolphin. Poaching of focal species has been reduced as compared to yesteryears. Area under specific management has also been gradually increased.

The installation of biogas as an alternative energy is increasing each year. There is an increase in the population receiving health care (even exceeding the projected population). It is entirely due to the free cross-border mobility from India for the health care service.

b. Please comment on the following elements of the program:

i. **Human Capacity**: What capacity was employed to accomplish the objectives (staff, technical expertise, etc.)? Was this sufficient? If not, please comment on the gaps.

A full time officer (Monitoring Officer) was appointed for gathering the data. He was supported by other staff with their expertise as and when required. They are Research Officer, GIS Officer, Livelihood Specialists, Database Assistant and Conservation Biologist. WWF US also provided support for mapping (GIS) social indicators.

ii. **Methods:** Please evaluate the Conservation Measures methodology. What were its strengths and weaknesses? Please comment specifically on issues of data availability, analysis, & issues associated with scale.

The conservation measures template was developed by people from WWF Nepal with expertise in different fields. The targets and indicators for social conditions were mostly derived from MDGs/UNDP, national census data and other related publications. There were hardly any problem while defining the targets and indicators for the biological, threats and conservation management. The template shows the landscape level monitoring or time-series

data. The indicators were later thrashed out in the workshop in the middle of the project year. The discussion in the workshop ambitiously finalized more than 115 indicators. It was a daunting task even to go through each of them for the possibility of data availability.

The entire work was based on secondary data. They were mostly published data and only few were unpublished (raw) data. WWF Nepal has a great strengthen on data for biological targets. It is supported by the GIS facility. Department of National Parks and Wildlife Conservation (DNPWC), Department of Forest (DoF), IUCN-Nepal, Bird Conservation Nepal (BCN) and similar organizations were visited for the data for biological, threats and conservation management. MDGs/UNDP, national census data, health department and development-related organizations were visited for the data for social indicators.

Most of the government institutions have poor data management system, let alone the bureaucratic sluggishness, so a lot of effort was put to drain data from the departments. Raw (unpublished) data were taken and analyzed at instances. Data could not be found for each year as shown in the template e.g. national census data is taken in every ten year, forest cover, wildlife census etc. Researches are carried out at certain pocket areas of interest of the scholar. So, it was harder to interpret the dataset for the entire landscape based on the pocket areas.

It subsumes 14 districts within TAL (Nepal). However, the landscape does not incorporate the whole of the each district. It incorporates a part of some of the districts. But for simplicity especially for social indicators, all 14 districts were considered.

iii. **Resources:** Were there sufficient financial resources to accomplish the project objectives? If not, what would have been required?

The financial resource was just sufficient to accomplish the project objectives. It was neither too meagre nor too enough.

iv. **Time:** How much staff time was dedicated to this project? Was this sufficient to accomplish the objectives?

A full time staff was hired for the purpose. Other supporting staff also spent some hours to complete the data.

v. **Alignment:** How did the Measures work fit with the portfolio of activities in Terai Arc Landscape/WWF-Nepal?

The measures work fits basically with the conservation activities of the organization and its partners. The organization has been working on endangered species and habitat. The template reflects the output (annual) of the conservation activities. It complements the activities on habitat and species, e.g. work in critical areas are reflected by the data for functional corridors, activities to reduce poaching and retaliatory killings, support for biogas plant etc.

However, the measures work has very less correlation with the works carried out by WWF Nepal on livelihood issues (social indicators). The datasets for social indicators are just huge enough to count the activities of WWF Nepal.

vi. **Organizational Structure:** To the extent applicable, please comment on any opportunities or challenges that emerged from the overall structure of the Conservation Measures Program (i.e. Washington core team and place-based team) and the structure of the program in your place (i.e. working across trans-national boundaries, etc.)

The Washington core team was providing strategic guidance where as place-based team was helping with data. The project did not involve working across trans-national boundaries (India). It included TAL for Nepal.

c. **Conservation Findings:** Did the analysis of the indicators result in any new insights about the Terai Arc Landscape?

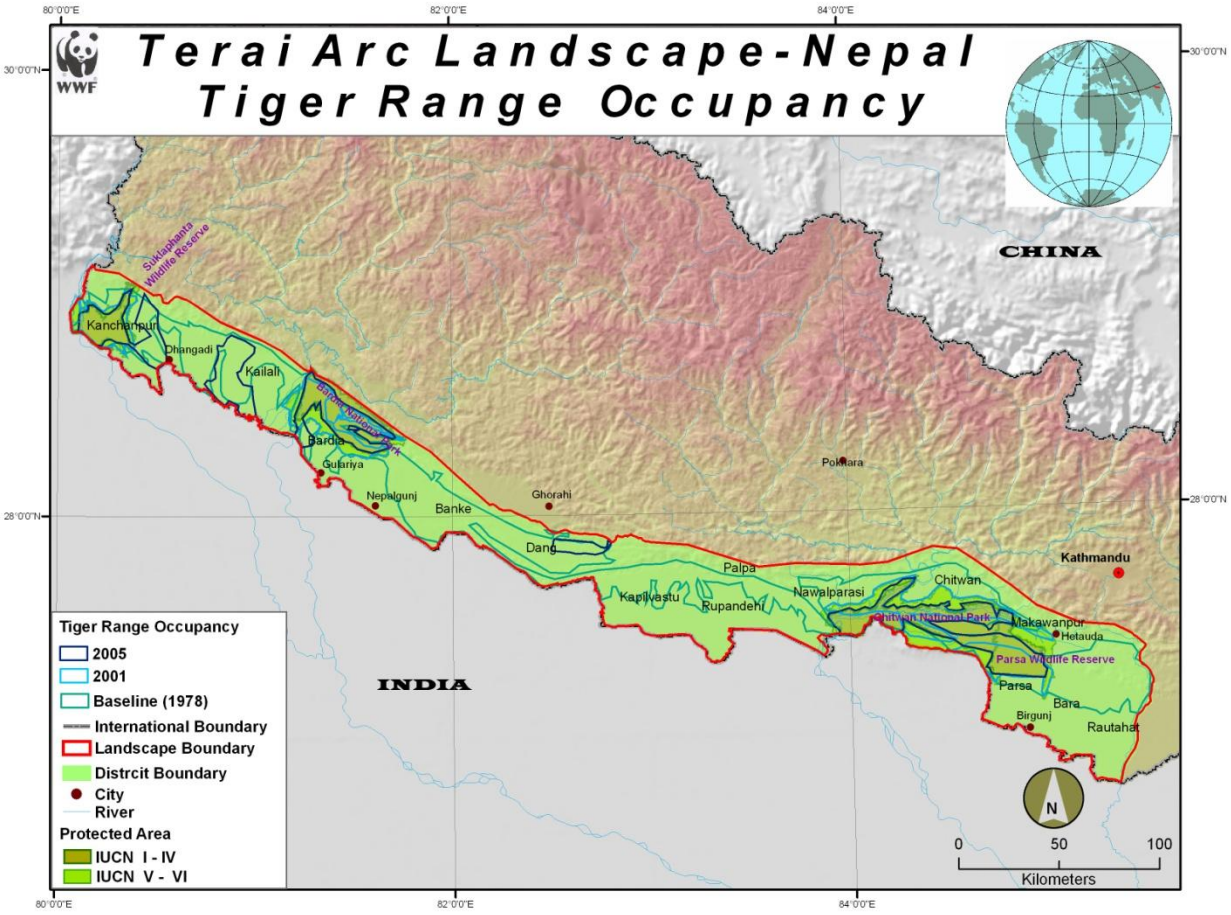
Continued efforts have to be forged to maintain the current populations of tiger, rhino and elephant have been maintained. More work is needed to curb the drastic decline of endangered vulture species and gangetic dolphin. Encroachment in forests needs effective curbing measures.

Biological Targets

Target	Key Attribute	Indicators
Target: By 2020, demographically and ecologically viable populations of focal species conserved		
Species 1a. Tiger	population size (size)	number of individuals
Species 1b. Tiger*	population distribution (area)	% historic range occupied
Species 1c, Tiger	Demographic Structure (condition)	number of breeding adults in core populations
Species 2a. Greater One-horned rhino	population size (size)	number of individuals
Species 2b. Greater One-horned rhino*	population distribution (area)	% of historic rhino range occupied (Terai area only)
Species 2c. Greater One-horned rhino	Demographic Structure (condition)	number of calves in core populations
Species 2c. Greater One-horned rhino	Demographic Structure (condition)	Calf to Female Adult (per 100)Ratio
Species 3a. Asian elephant	population size (size)	number of individuals
Species 3b. Asian elephant*	population distribution (area)	% of historic range now occupied
Species 3c. Asian elephant	Demographic Structure (condition)	number of calves in core populations
Species 4a. Swamp Deer	population size (size)	number of individuals
Species 4b. Swamp Deer*	population distribution (area)	% of historic range now occupied
Species 4c. Swamp Deer	Demographic Structure (condition)	??? (verify with Ritesh & then Eric W)
Species 5a. Slender billed Vulture	population size (size)	number of individuals
Species 5b. Slender billed Vulture	population distribution (area)	??? (verify with Eric W & BCN)
Species 5c. Slender billed Vulture	Nesting success (condition)	number of nests/sites
Species 6a. White-rumped Vulture	population size (size)	number of individuals
Species 6b. White-rumped Vulture	population distribution (area)	??? (verify with Eric W & BCN)
Species 6c. White-rumped Vulture	Nesting success (condition)	number of nests/sites
Species 8a. Gangetic Dolphin	population size (size)	number of individuals
Species 8b. Gangetic Dolphin	population distribution (area)	% of length of river
Species 9a. Gharial	population size (size)	number of individuals
Species 9b. Gharial*	population distribution (area)	% of historic range now occupied
Species 9b. Gharial	Number of Captive Population Released	Number of individuals

Target	Key Attribute	Indicators
Target: By 2020, 56 Terai wetlands under effective management for biodiversity conservation		
8a. River System (lotic)	continuity	length of undisturbed river stretch
8b. Wetlands (lentic)	number of active wetlands	Number of Wetlands under effective management
Target: By 2020, XX ha of grassland and YY ha of forests under effective management for biodiversity conservation		
Habitat 1a. Churia Forest	Area in hectares	area under conservation management and restored in PAs
Habitat 1b. Churia Forest*	Area in hectares	area under conservation management and restored outside PAs
	quality (condition)	% of non-degraded forest
Habitat 4a. Terai Forest	Area in hectares	area under conservation management and restored in PAs
Habitat 4b. Terai Forest*	Area in hectares	area under conservation management and restored outside PAs
	quality (condition)	% of non-degraded forest
Habitat 2. Riverine Forest	Area in hectares	extent
	quality (condition)	% of non-degraded forest
Habitat 5a. Saccharum-spontaneum dominated grassland	Area in hectares	area under conservation management and restored in PAs
Habitat 5b. Saccharum-spontaneum dominated grassland	Area in hectares	area under conservation management and restored outside PAs
	quality (condition)	% of non-degraded grassland
Habitat 6a. Other grasslands	Area in hectares	area under conservation management and restored in PAs
Habitat 6b. Other grasslands	Area in hectares	area under conservation management and restored outside PAs
	quality (condition)	% of non-degraded grassland
Habitat 7. Corridors	Number of corridors	Number of corridors being used by focal species

Tiger - % historic range occupied



Target:
Tiger
KEA
population distribution
Indicator
% historic range occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

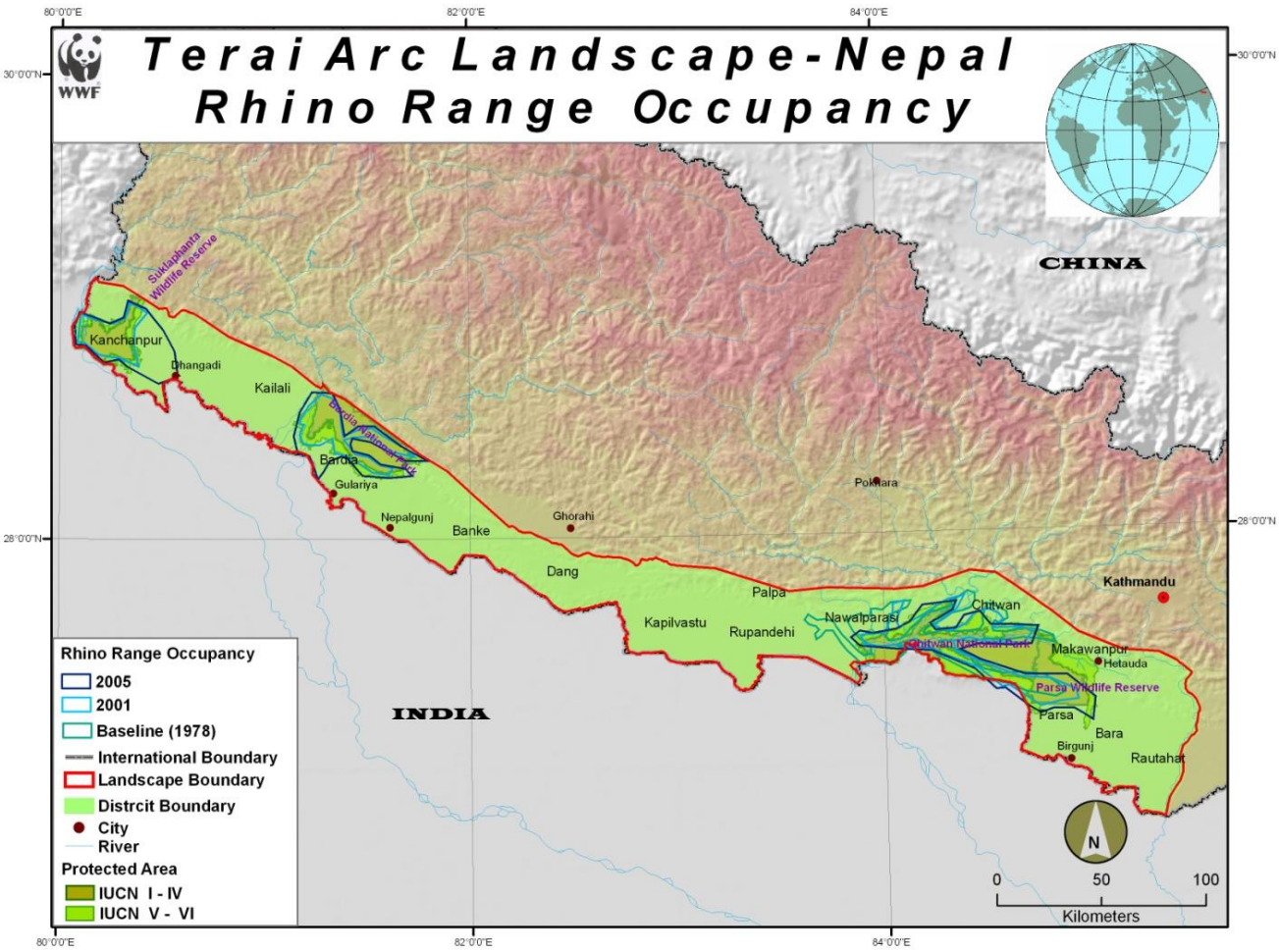
Future Indicator Development Required:

Notes:
% area of TAL occupied by tigers (of entire TAL area; 2001- only PAs <500 m; 2005- only PAs, Laljhadi, Basanta, Khata)
Historic range: 1,825,214 ha. based on 1978 habitat; excludes area above 500m; used as 100% and other years calculated as percentage of this baseline

Working Group Members:

References:
WWF

Greater One-horned rhino - % of historic rhino range occupied (terai area only)



Target:
Greater One-horned rhino
KEA
population distribution
Indicator
% of historic rhino range occupied (terai area only)
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

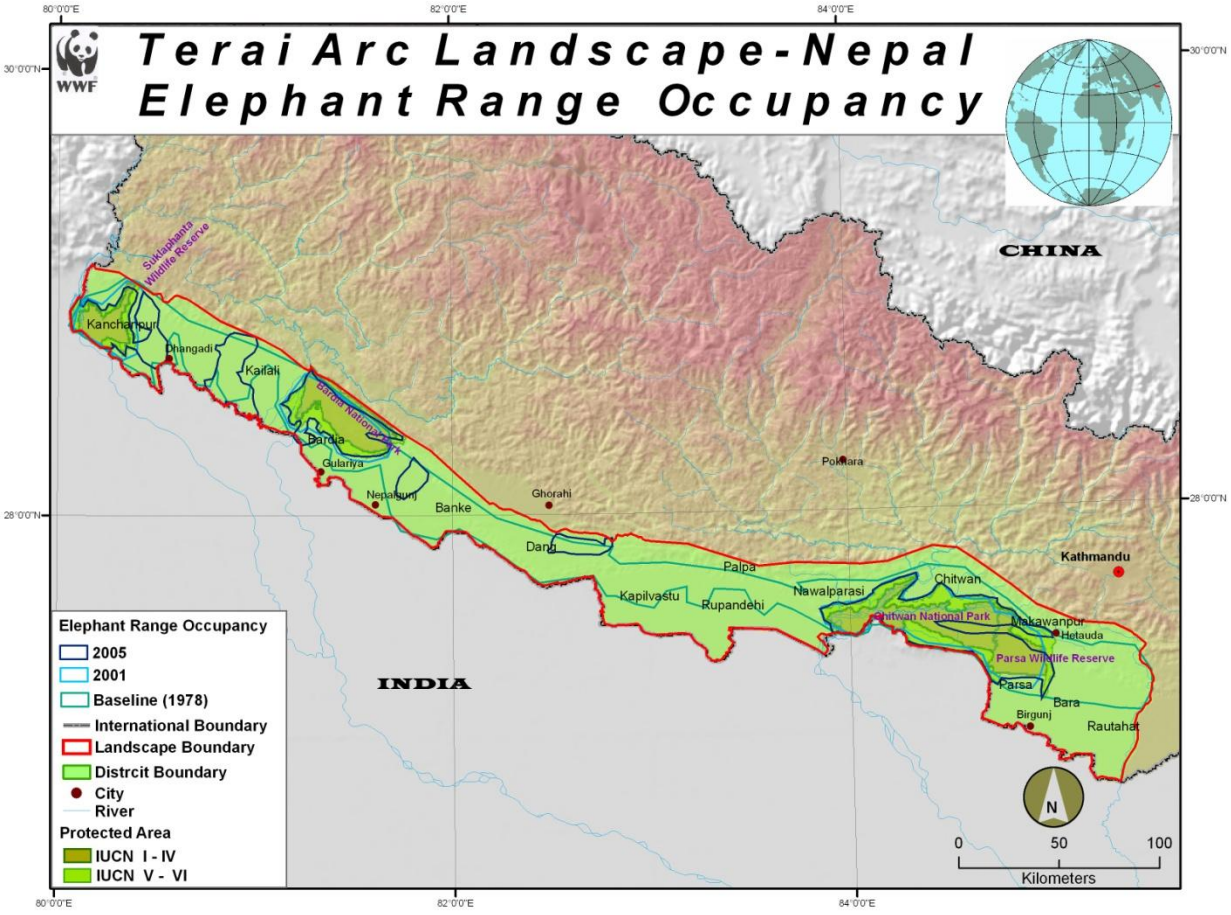
Future Indicator Development Required:

Notes:
% area of TAL used by rhinos (of entire TAL area; 2001- PA&BZ <300 m excluding Sal forest; 2005- all PAs & BZs, Laljhadi, Basanta, Khata excluding Churia)
Historic range: 977,648 ha. based on 1978 habitat; excludes churia & Sal forest; includes < 300 m used as 100% and other years calculated as percentage of this baseline

Working Group Members:

References:
WWF

Asian elephant - % of historic range now occupied



Target:
Asian elephant
KEA
population distribution
Indicator
% of historic range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

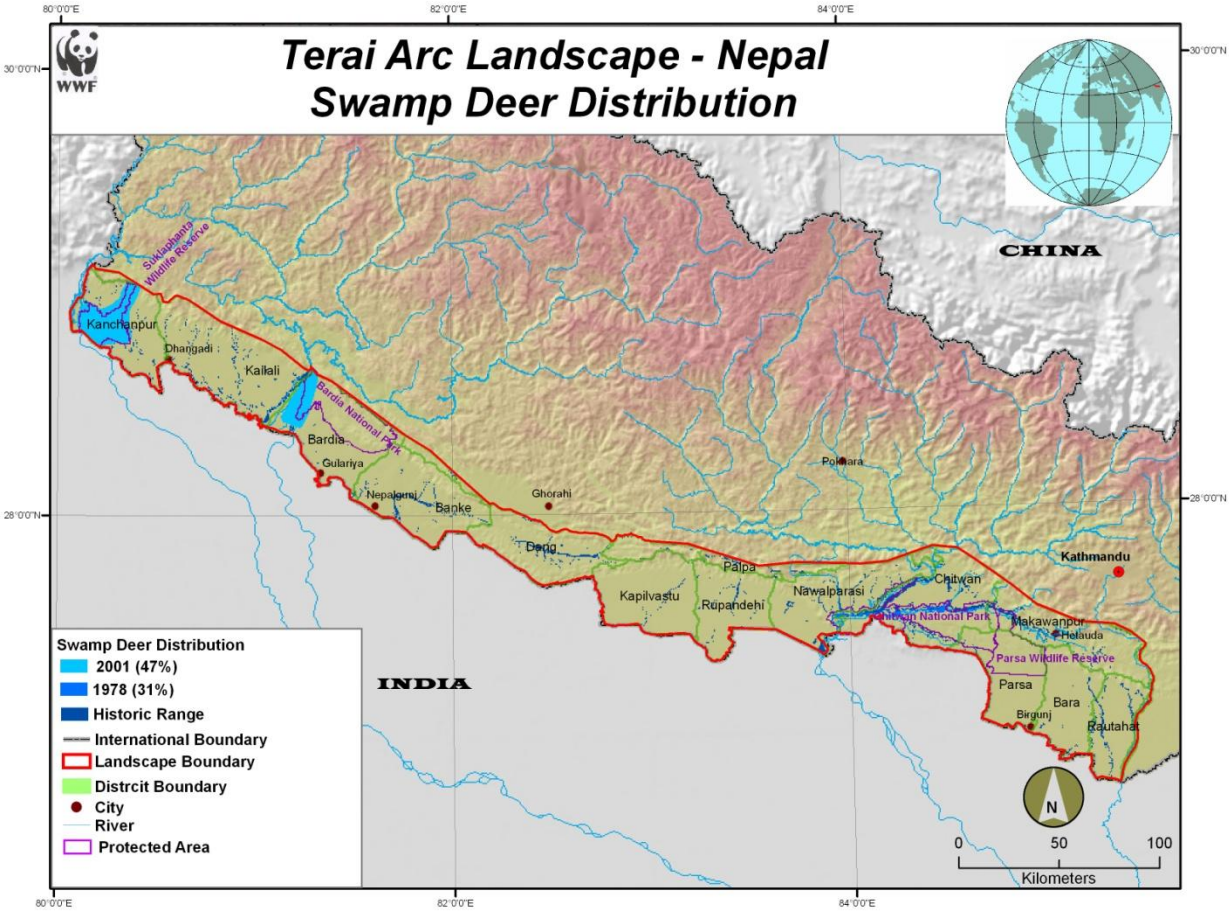
Future Indicator Development Required:

Notes:
% area of TAL used by elephants (2001- PA&BZ <500 m; 2005- PA&BZ, Laljhadi, Basanta, Khata, Mahadevpuri, Lamahi <500 m)
Historic range: 1,825,214 ha. based on 1978 habitat; entire TAL <500 m, used as 100% and other years calculated as percentage of this baseline

Working Group Members:

References:
WWF

Swamp Deer - % of historic range now occupied



Target:
Swamp Deer
KEA
population distribution
Indicator
% of historic range now occupied
Justification for Indicator:
Swamp deer is a prey species in grasslands

Long-term Viability Goal:

Monitoring Approach:

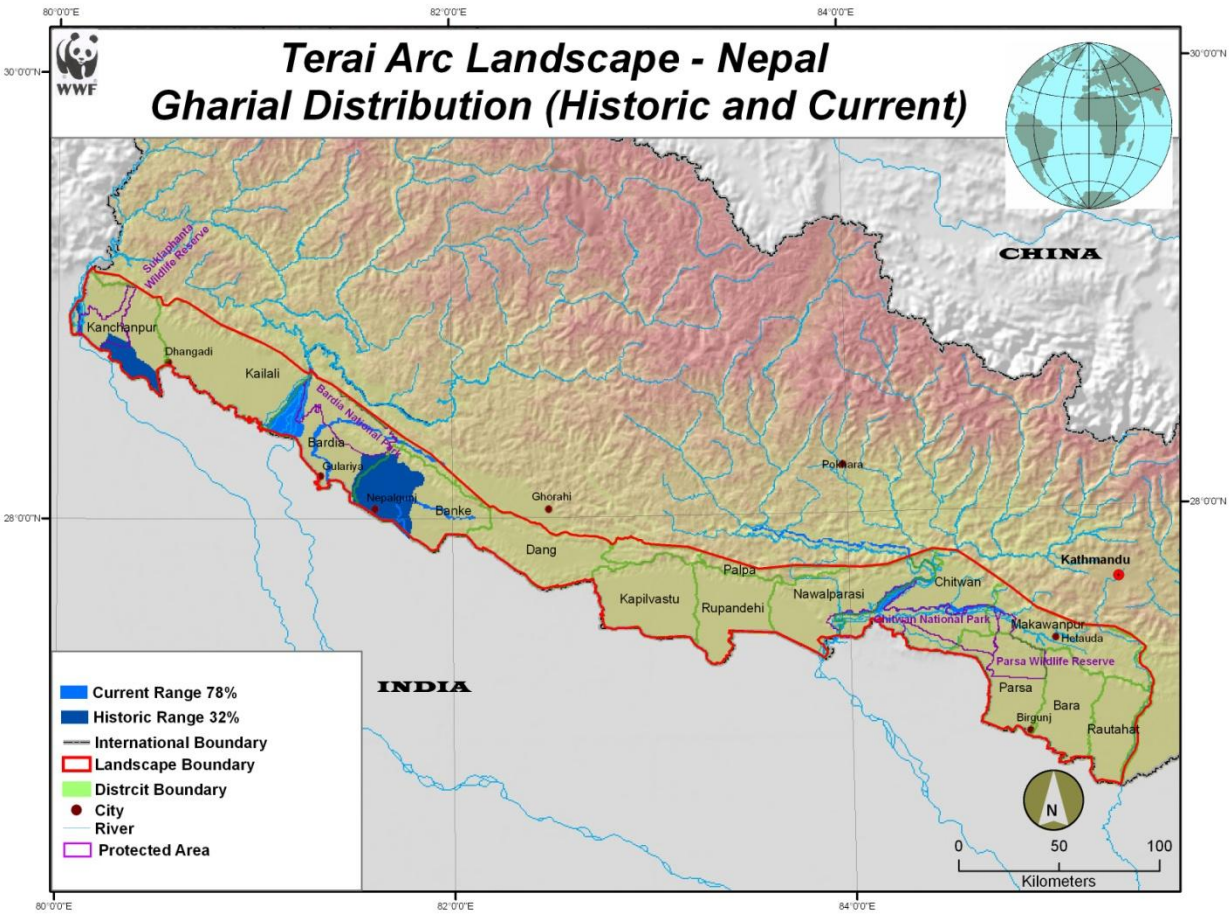
Future Indicator Development Required:

Notes:
Baseline used from Schaaf (1978)

Working Group Members:

References:
WWF

Gharial - % of historic range now occupied



Target:
Gharial
KEA
population distribution
Indicator
% of historic range now occupied
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

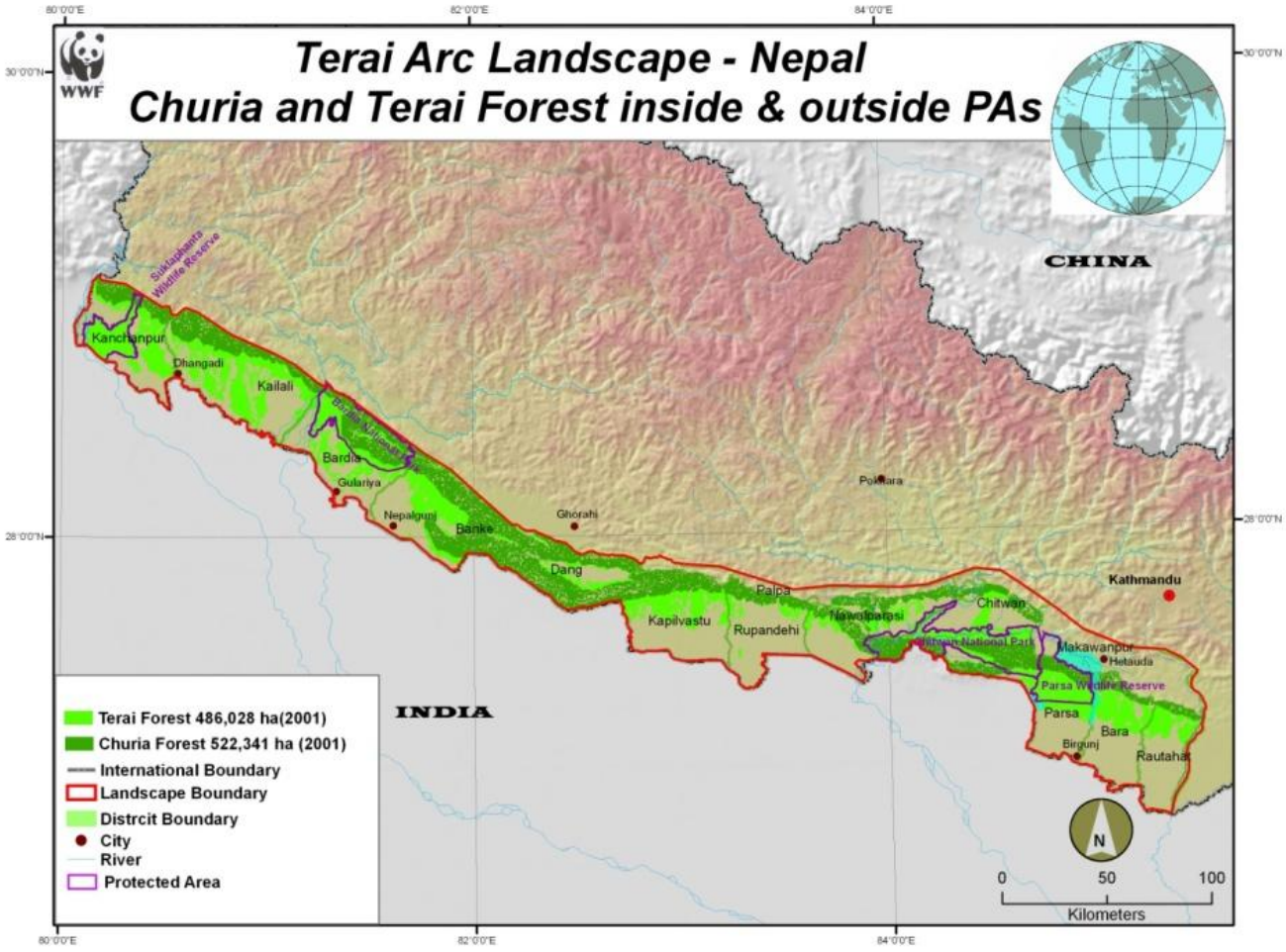
Future Indicator Development Required:

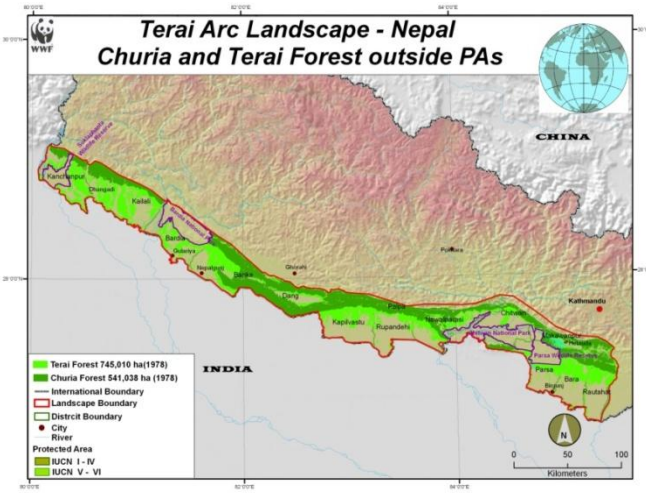
Notes:

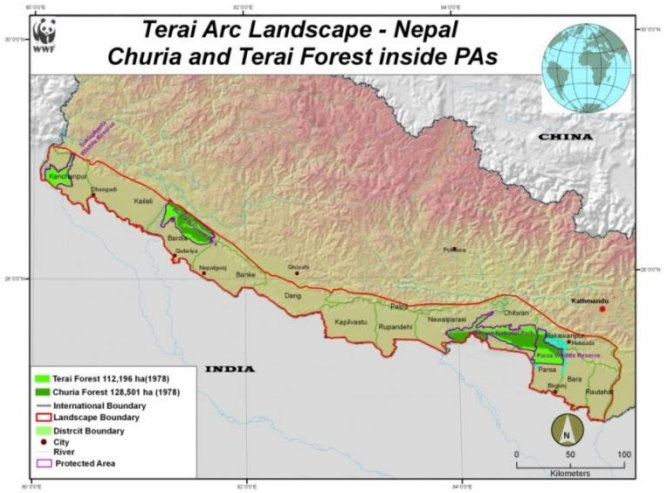
Working Group Members:

References:
Neera (?)

Churia & Terai Forest - % of non-degraded forest







Target:
Churia & Terai Forest
KEA
quality
Indicator
% of non-degraded forest
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:

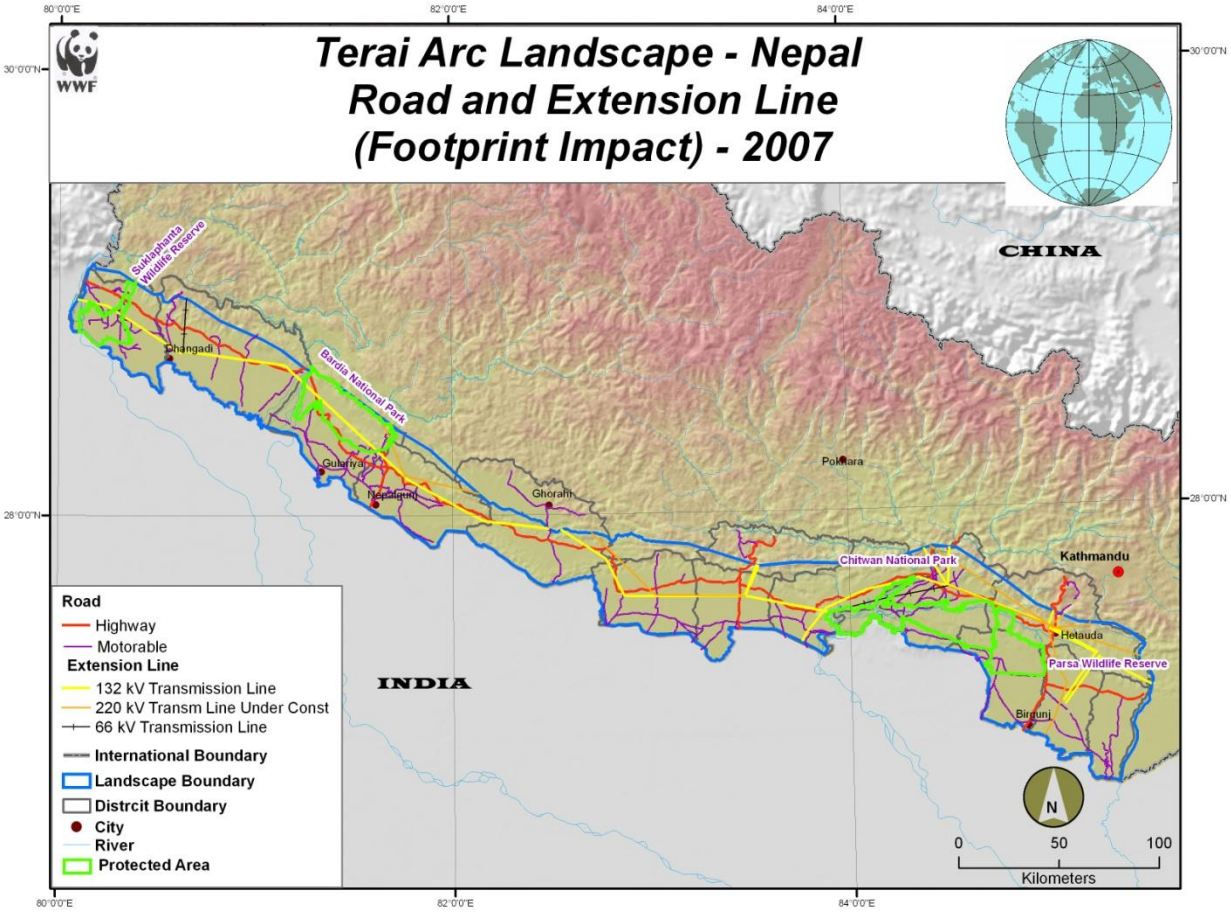
Working Group Members:

References:

Threat Indicators

Target / Theme	Key Attribute	Indicators
Habitat conversion		
1. Agriculture expansion	area	area (ha.) agriculture in PAs, BZs, corridors & bottlenecks
2. Encroachment	area	area (ha.) encroached in PAs, BZs, corridors & bottlenecks
3a. Infrastructure development	no. of sites	footprint of impact
3b. Infrastructure development*	no. of sites	Oil & gas extraction footprint of impact
3c. Infrastructure development*	length of Extension Grid	footprint of impact
4. Natural succession	extent (change in habitat)	Area of Grassland (Ha) in PAs
5. Oil & gas extraction	number	number of sites/ Blocks
Habitat degradation		
6. Watershed degradation	number	number of landslides
	condition	turbidity in major rivers
7. Unsustainable logging		No. of cases
8. Unsustainable Fuel Wood and fodder collection	tons of oil equivalent	Quantity of unsustainable collection of fuel wood
	number	number of stall-feeding
9. Overexploitation of NTFPs		
10. Forest conversion (monoculture)	extent	Conversion of forests into agriculture
11. Overgrazing	extent	LU per unit Ha
12. Chemical pollution	extent	
13. Uncontrolled forest fires	number	number of fires
14a. Invasive species*	Area	Riparian Vegetation Infested
14b. Invasive species	Area	Degraded Land Infested
15. Unregulated tourism in PAs	Percent Increase/decrease from baseline	No. of Tourists flow in PAs
Population decline		
16. Poaching of focal species	poaching incidents	number of poaching incidents in TAL per year
17. Accidental killing	extent	number of animals killed
18. Retailatory killing		number of animals killed
19. Poor fishing process		
20a. Human wildlife conflict (with focal species)	incidents of conflicts	number of conflicts (fatalities, depredations) per year in TAL
20b. Human wildlife conflict (with focal species)	impacts to local communities	Human Injuries and Fatalities

Infrastructure development - footprint of impact



Target:
Infrastructure development
KEA
length of Extension Grid
Indicator
Road and extension line
Justification for Indicator:
Indicator of the impact of infrastructure footprint
Long-term Viability Goal:

Monitoring Approach:

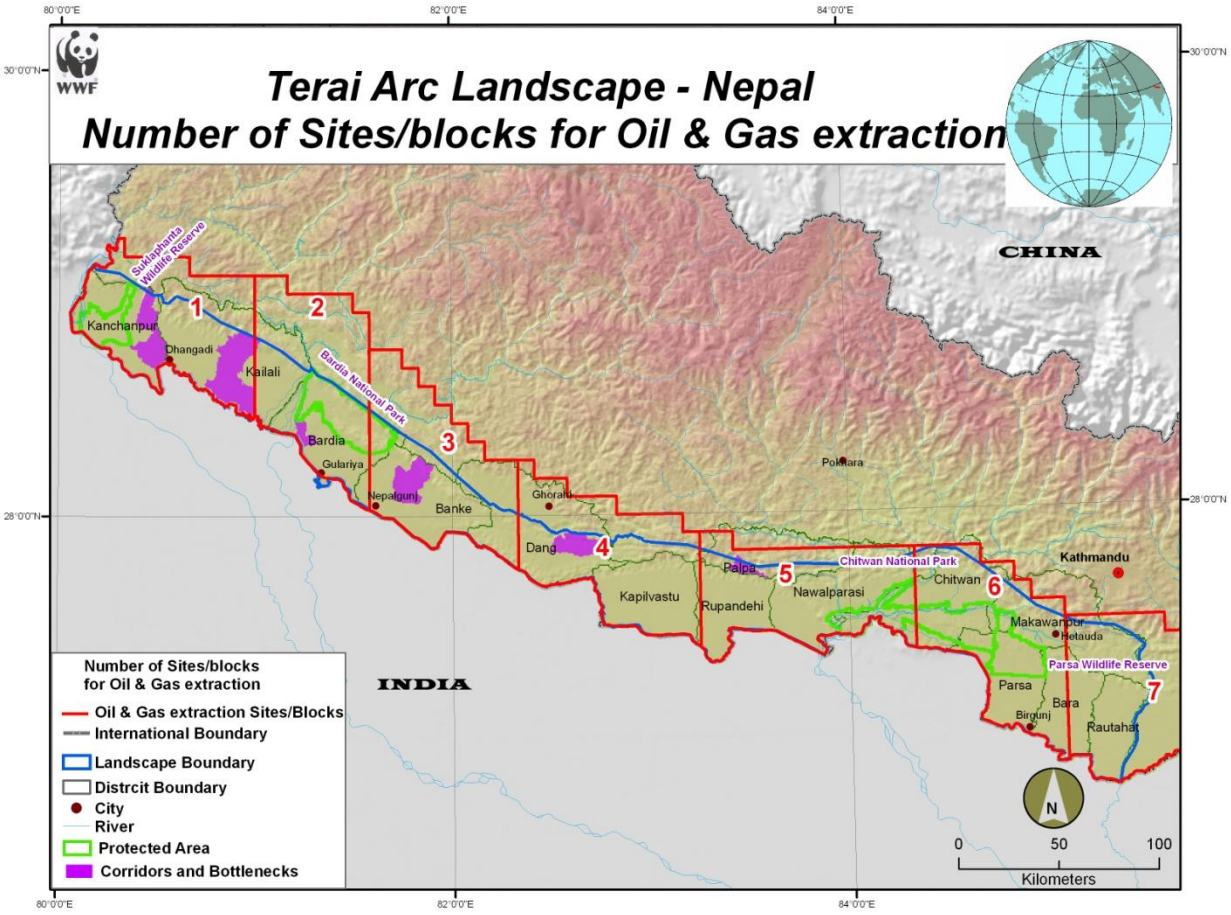
Future Indicator Development Required:

Notes:
Cumumative Data for 2007
km/road/high extension line

Working Group Members:

References:

Oil & gas extraction - number of sites/ Blocks



Target:
Oil & gas extraction
KEA
number
Indicator
number of sites/ Blocks
Justification for Indicator:
initial exploration of how to track and quantify the impact of oil and gas extractive activities
Long-term Viability Goal:

Monitoring Approach:

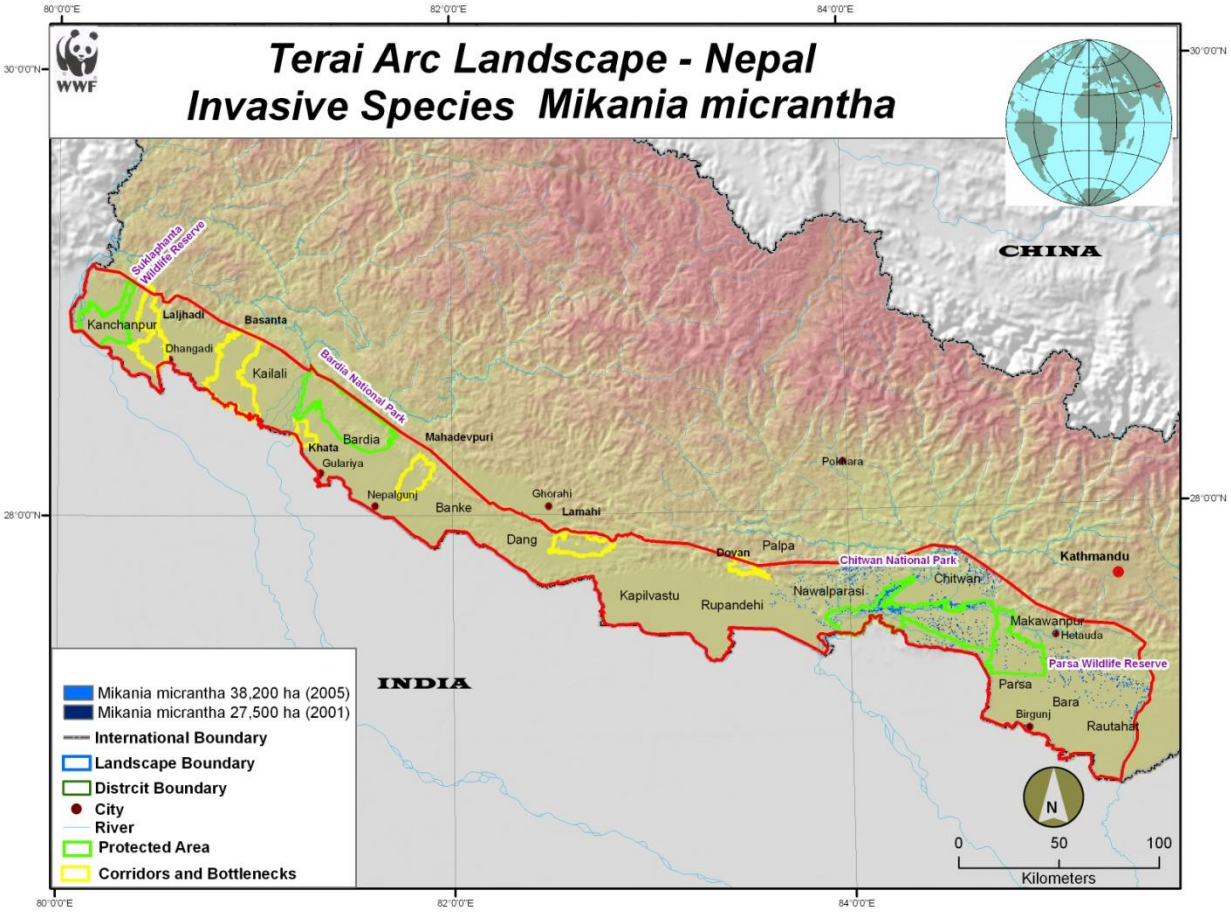
Future Indicator Development Required:

Notes:

Working Group Members:

References:
Blocks: Each 5000 sq km; Nepal Bar Association(NBA)

Extent of invasive species, Mikania micrantha



Target:
Mikania micrantha
KEA
extent
Indicator
Extent of invasive species, Mikania micrantha
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:
Study carried out in CNP only

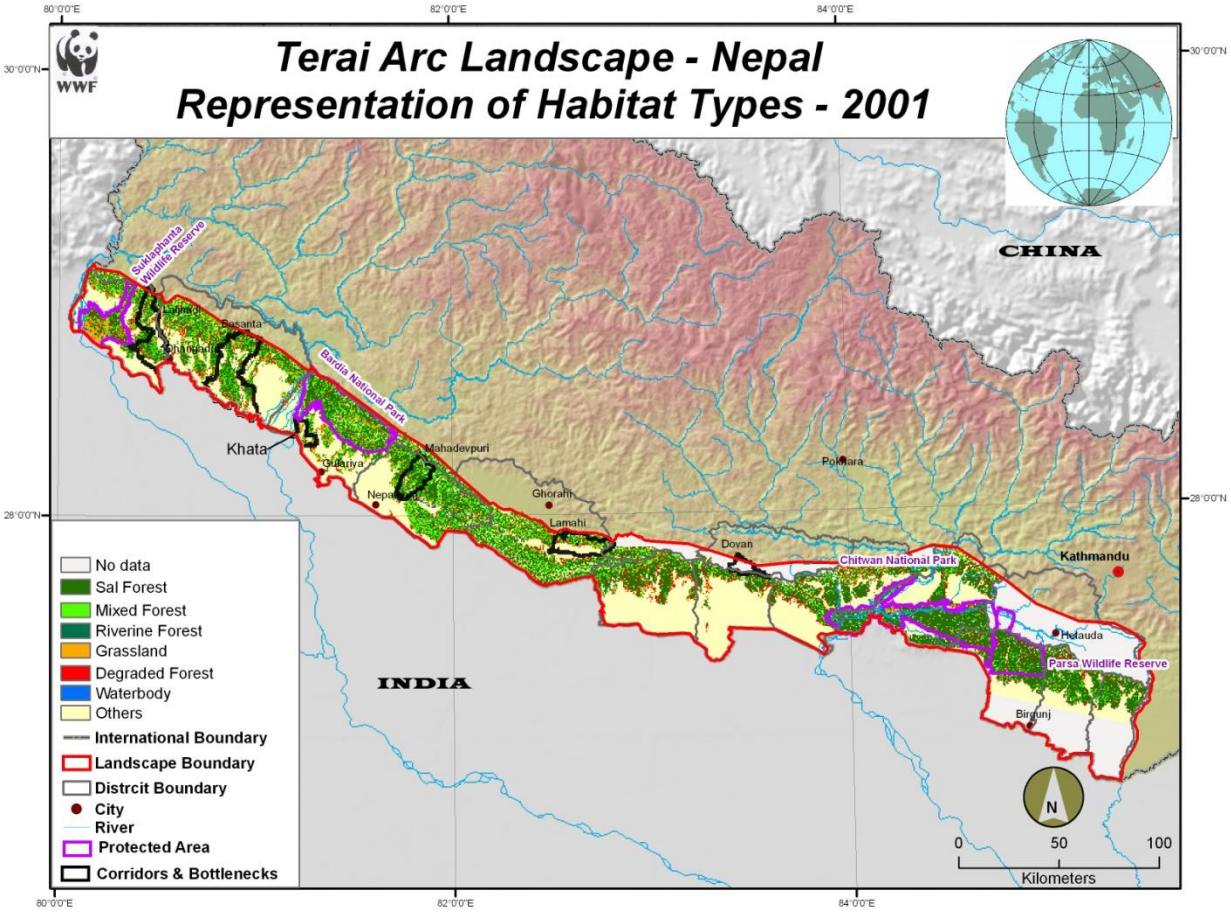
Working Group Members:

References:

Conservation Management Indicators

Target / Theme	Key Attribute	Indicators
Target: By 2020, four Protected Areas in TAL (Nepal) effectively managed		
1. Habitat representation*		Representation of habitat types by PAs
2. Management plans		Management plans for PAs & CFs
3. Specific management of some habitats*		% of landscape managed under specific management plans
4. Resource allocation to PAs		Government allocation of resources to PAs
5. Management effectiveness of four PAs	Management plans	Percent execution/implementation of management plans
6. Institutions	number	number of existing registered (formal) management institutions
7. Human resource	number	number of government staff deputed to manage biodiversity in Terai
8. Budget		annual budget allocation by government for management of biodiversity in Terai (TAL)
9. Management capacity of four PAs	Staff/Infrastructure/equipment	RAPPEM Score
10. Management budget of 4 PAs	budget	% budget available against required

Habitat representation - Representation of habitat types by Pas



Target:
Habitat representation
KEA
Indicator
Representation of habitat types by PAs
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

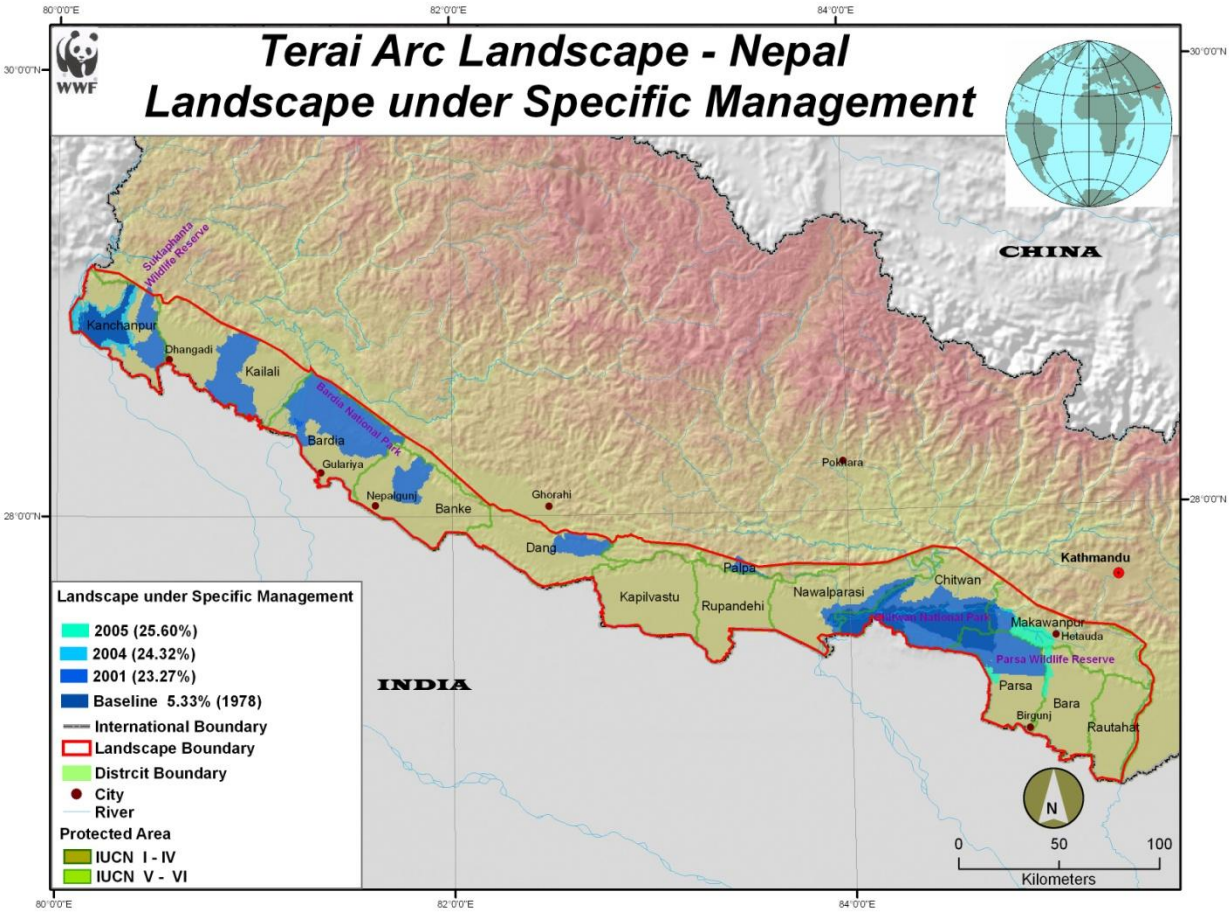
Future Indicator Development Required:

Notes:
freshwater/wetlands, forest, grasslands

Working Group Members:

References:

Specific management of some habitats - % of landscape managed under specific management plans



Target:
Specific management of some habitats
KEA
Indicator
% of landscape managed under specific management plans
Justification for Indicator:
Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:
PAs, corridors & bottlenecks

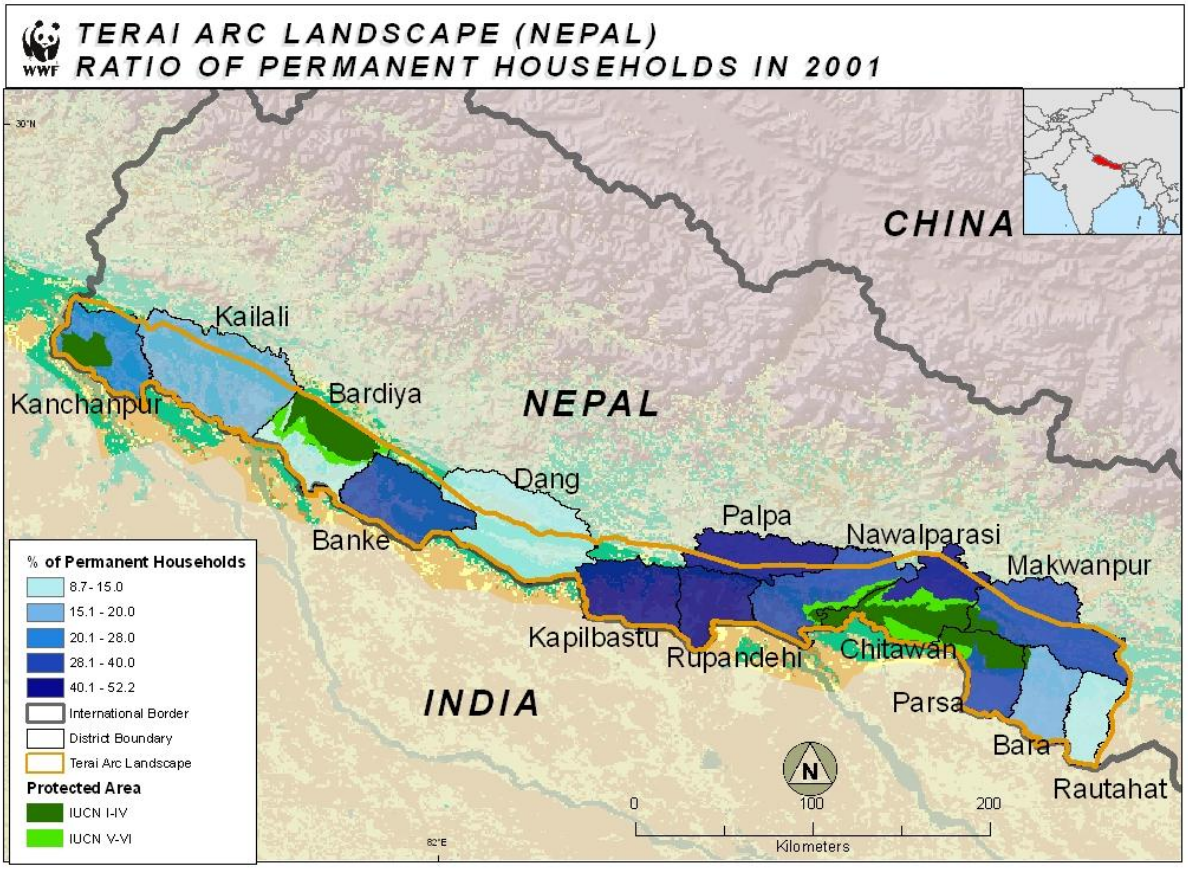
Working Group Members:

References:
WWF Nepal

Social Indicators

Target / Theme	Key Attribute	Indicators
Economic well-being	Assets	% of area under forest cover
		% of permanent households*
		Number of biogas plants*
		% of HH using Solids Fuel *
	Land	% of HHs with landholding <0.5 ha
	Access to credit	% of HHs with access to institutional credit
	Income	Total revenue from conservation-based economic activity
		% of population below $1 (PPP) per day
	Employment	Total jobs generated by conservation-based economic activity
		% of unemployment rate of people 15 - 24 age*
Health	Nutrition	% of population below minimum level of dietary energy consumption*
		Prevalence of underweight children under five years of age
	Food security	% of HHs with food sufficiency greater than 6 months
	Water security	% of population with sustainable access to an improved water source*
	Access	% population w/ "ready access" to health clinic
		% of population within half an hour walk to health facilities/outreach clinics
	Mortality	Infant mortality rate*
		No of Incidence of ARI per 1000 Children under <5 years*
		No of incidence of diarrhoea cases per 1000 Children under , years
	Population	Total population
		Net migration
	Family planning	Contraceptive prevalence rate (CPR)
Political empowerment	Resource right	% of HH with legal access to forest resouces
		number of CBOs managing natural resources
		% indegenious people (IP) in CBO executive committee
	Women's Empowerment	% Community Forest Executive Committee members who are female*
		Ratio of Literate female to literate male (15-24) Years
		% of women in non agriculture sector
		% women in key positions of CBO related to NRM- executive committee
Education	Access	Ratio of girls to boys in primary, secondary & tertiary education
	Environmental awareness	% of students who are member of eco-clubs
		Total number of schools with ecoclubs in landscape
Culture	Culture	number of ethnic groups

Economic well-being - % of permanent households



Target:
Economic well-being
KEA
assets
Indicator
% of permanent households
Justification for Indicator:
Indicator of household wealth based on tangible goods
Long-term Viability Goal:

Monitoring Approach:

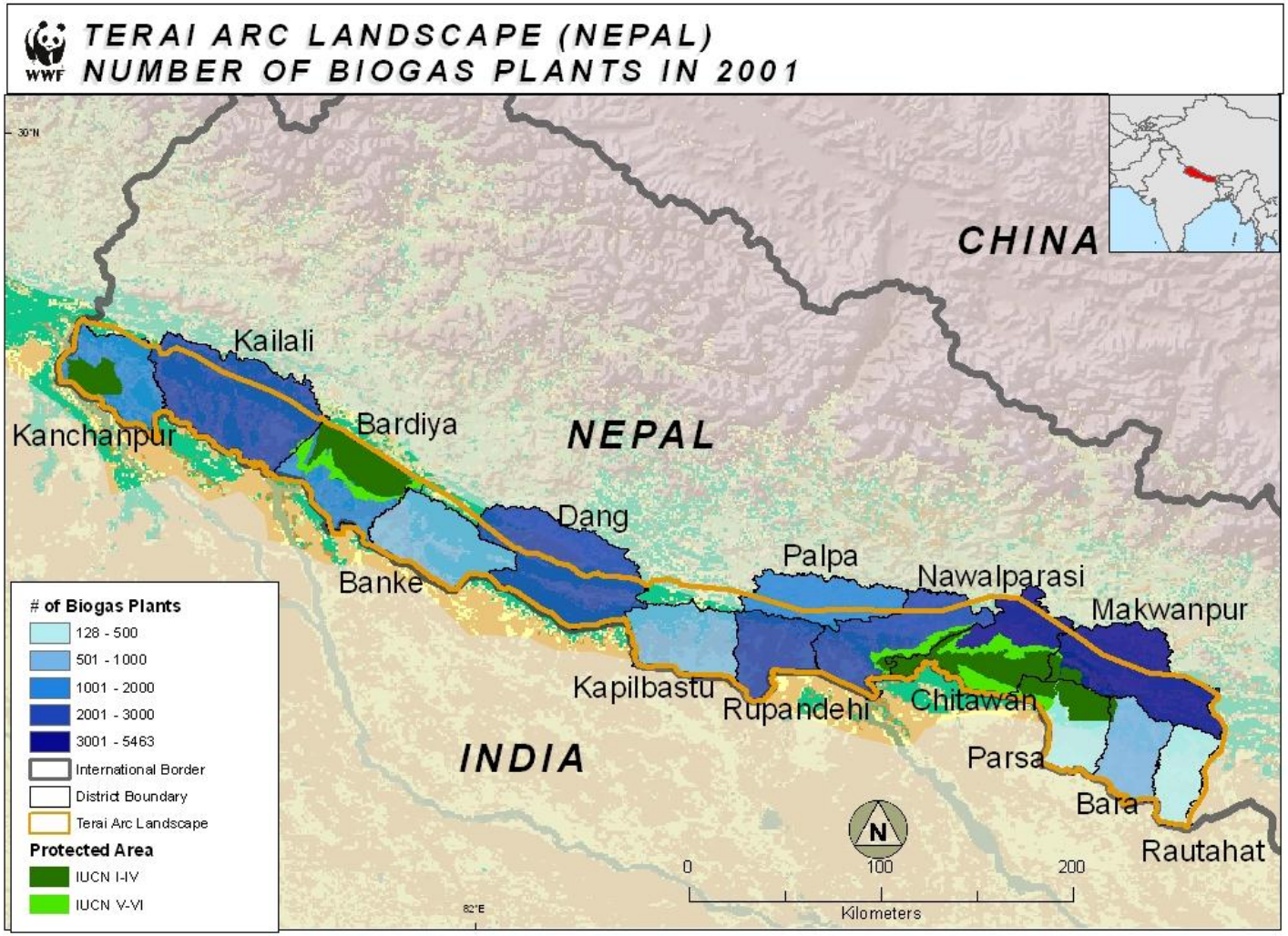
Future Indicator Development Required:

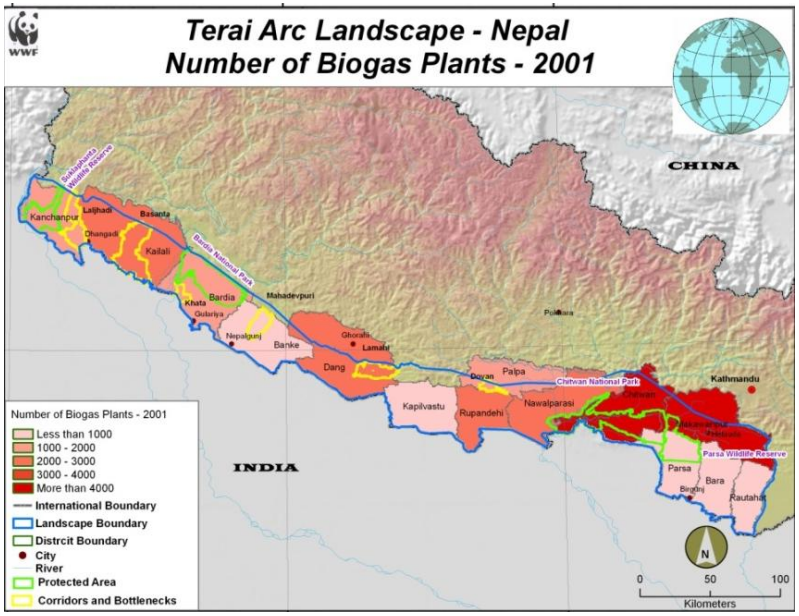
Notes:
Refers to the types of materials used to construct houses. A permanent house is constructed of cemented or concrete and has zinc or galvanized roof (MDG District Report).

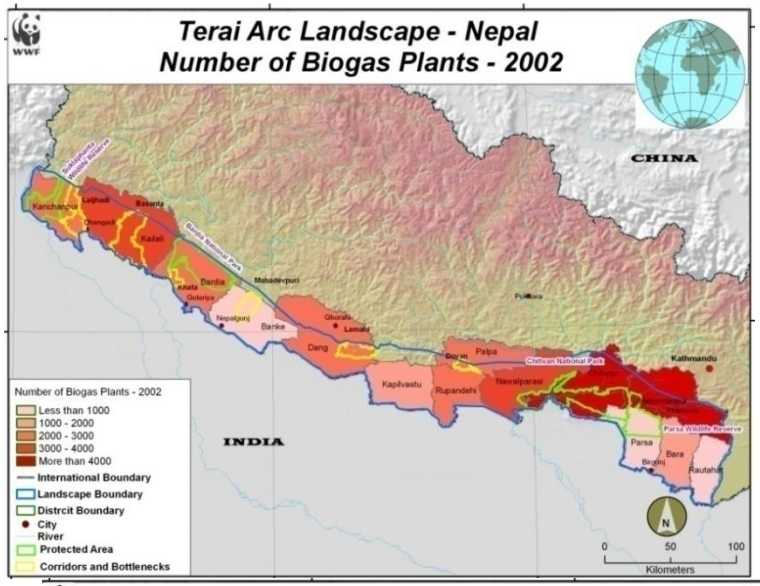
Working Group Members:

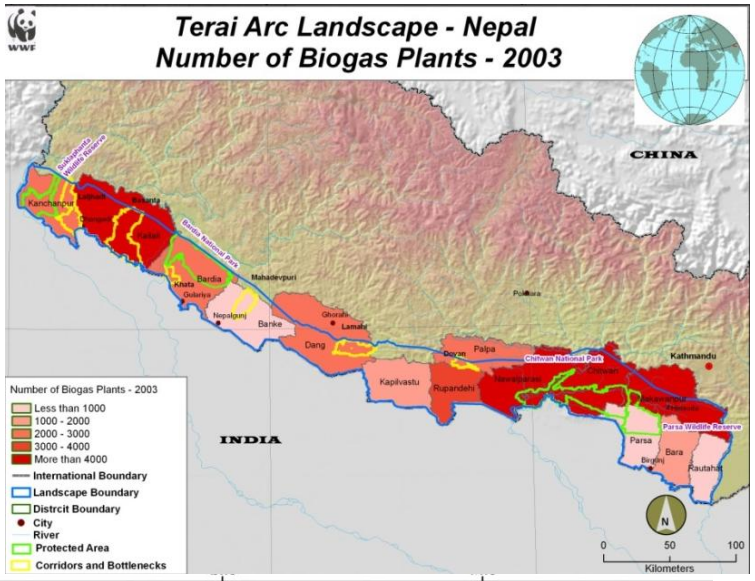
References:
CBS_CEN2001, Census 2001, Central Bureau of Statistics, National Planning Commission, HMG Nepal, 2002;

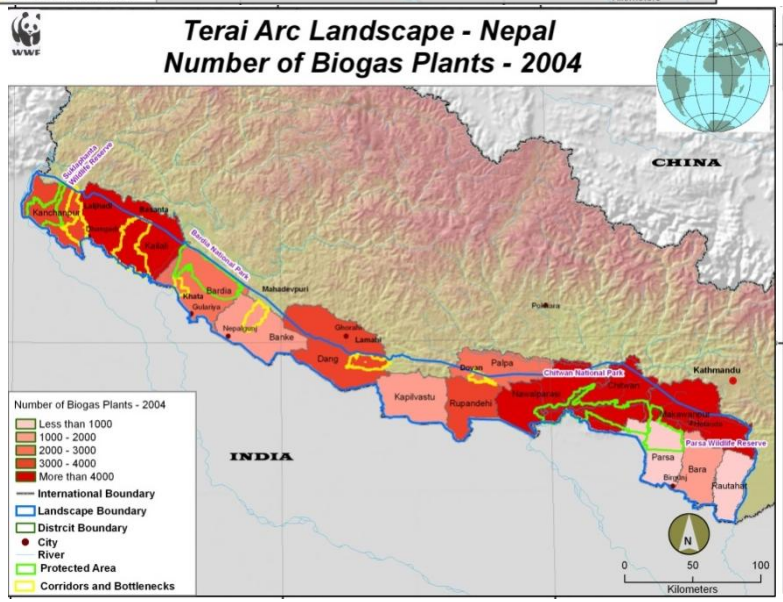
Economic well-being - Number of biogas plants

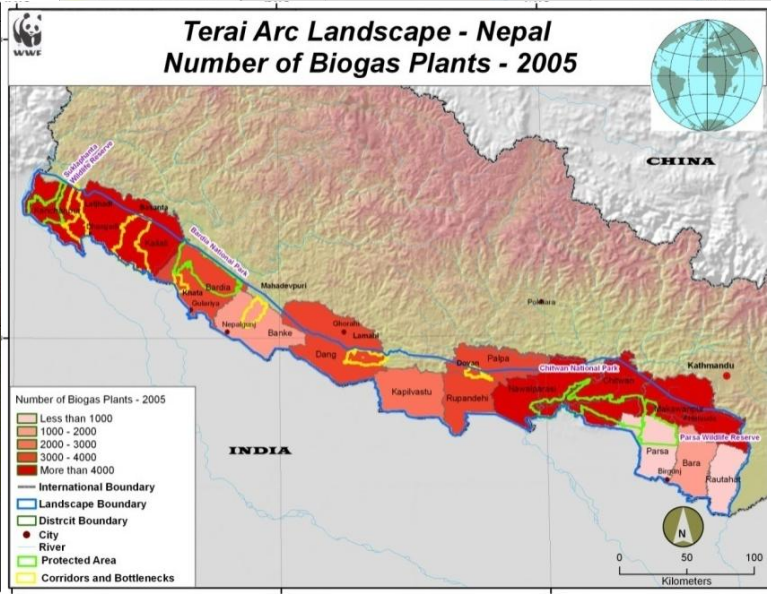


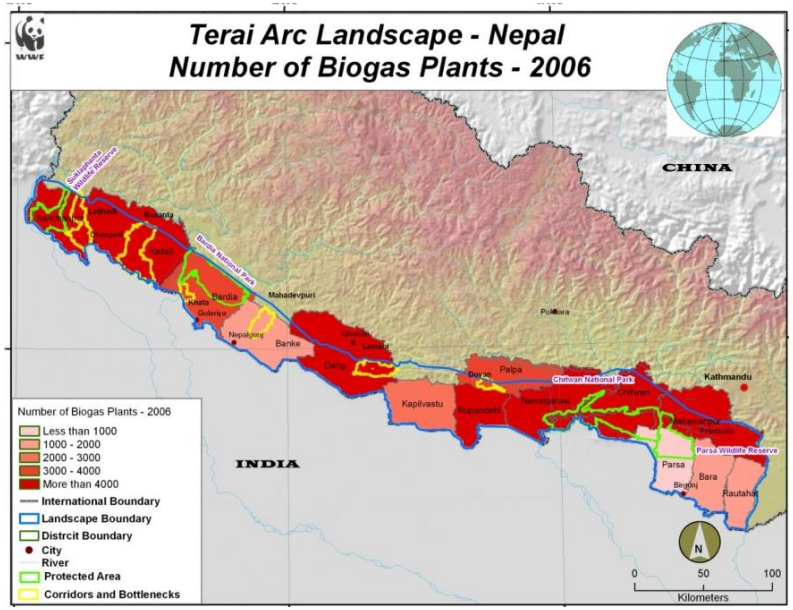

Terai Arc Landscape - Nepal
Number of Biogas Plants - 2001
WWF
CHINA
INDIA
Kanchanpur
Lalitpur
Basanta
Changadi
Kailali
Bardia National Park
Khata
Bardia
Gulariya
Mahadevpuri
Nepalgunj
Banke
Ghorahi
Lamahi
Dang
Palpa
Doran
Chitwan National Park
Chitwan
Kathmandu
Kapilvastu
Rupandehi
Nawalparasi
Parsa Wildlife Reserve
Parsa
Bara
Birgnj
Rautahat
Number of Biogas Plants - 2001
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
N
0
50
100
Kilometers

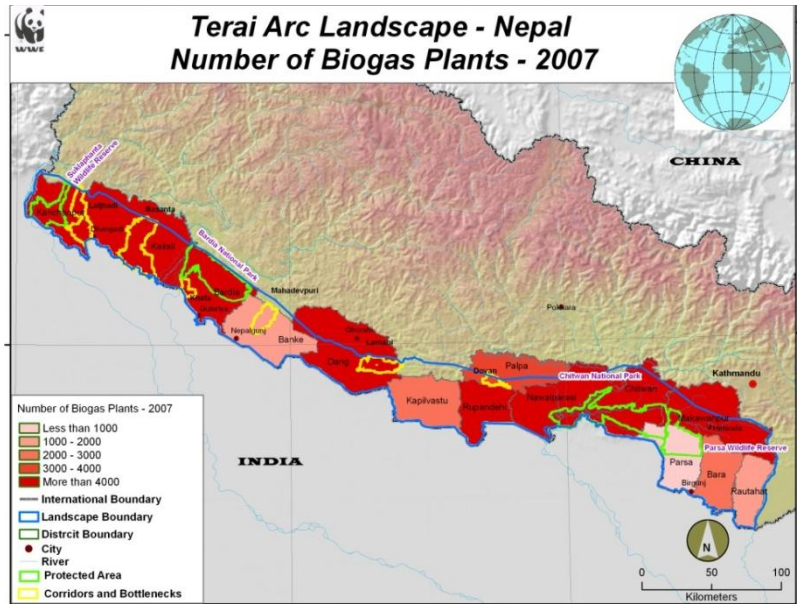

Terai Arc Landscape - Nepal
Number of Biogas Plants - 2002
CHINA
INDIA
Kathmandu
Number of Biogas Plants - 2002
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers


Terai Arc Landscape - Nepal
Number of Biogas Plants - 2003
CHINA
INDIA
Kathmandu
Number of Biogas Plants - 2003
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers


Terai Arc Landscape - Nepal
Number of Biogas Plants - 2004
CHINA
INDIA
Kathmandu
Number of Biogas Plants - 2004
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers


Terai Arc Landscape - Nepal
Number of Biogas Plants - 2005
CHINA
INDIA
Kathmandu
Number of Biogas Plants - 2005
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers


Terai Arc Landscape - Nepal
Number of Biogas Plants - 2006
CHINA
INDIA
Kathmandu
Chitwan National Park
Parsa Wildlife Reserve
Number of Biogas Plants - 2006
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers


Terai Arc Landscape - Nepal
Number of Biogas Plants - 2007
CHINA
INDIA
Kathmandu
Chitwan National Park
Parsa Wildlife Reserve
Number of Biogas Plants - 2007
Less than 1000
1000 - 2000
2000 - 3000
3000 - 4000
More than 4000
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
Corridors and Bottlenecks
0 50 100
Kilometers

Target:
Economic well-being
KEA
assets
Indicator
Number of biogas plants
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

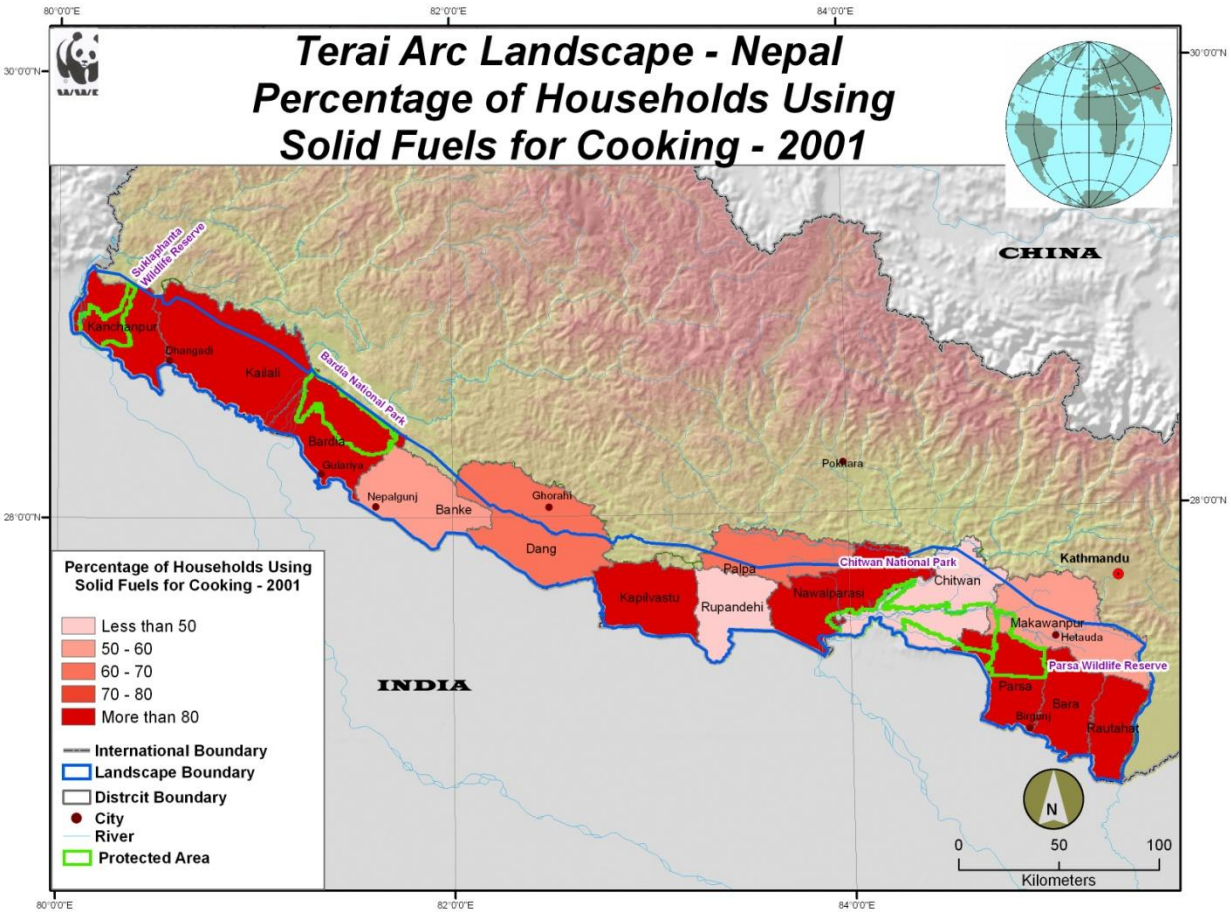
Future Indicator Development Required:

Notes:
BSP provided absolute figures for the 14 districts of TAL
The figure in each year column is absolute no. for 14 districts within TAL

Working Group Members:

References:
Biogas Support Program (BSP), Kathmandu

Economic well-being - % of HH using Solids Fuel



Target:
Economic well-being
KEA
assets
Indicator
% of HH using Solids Fuel
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

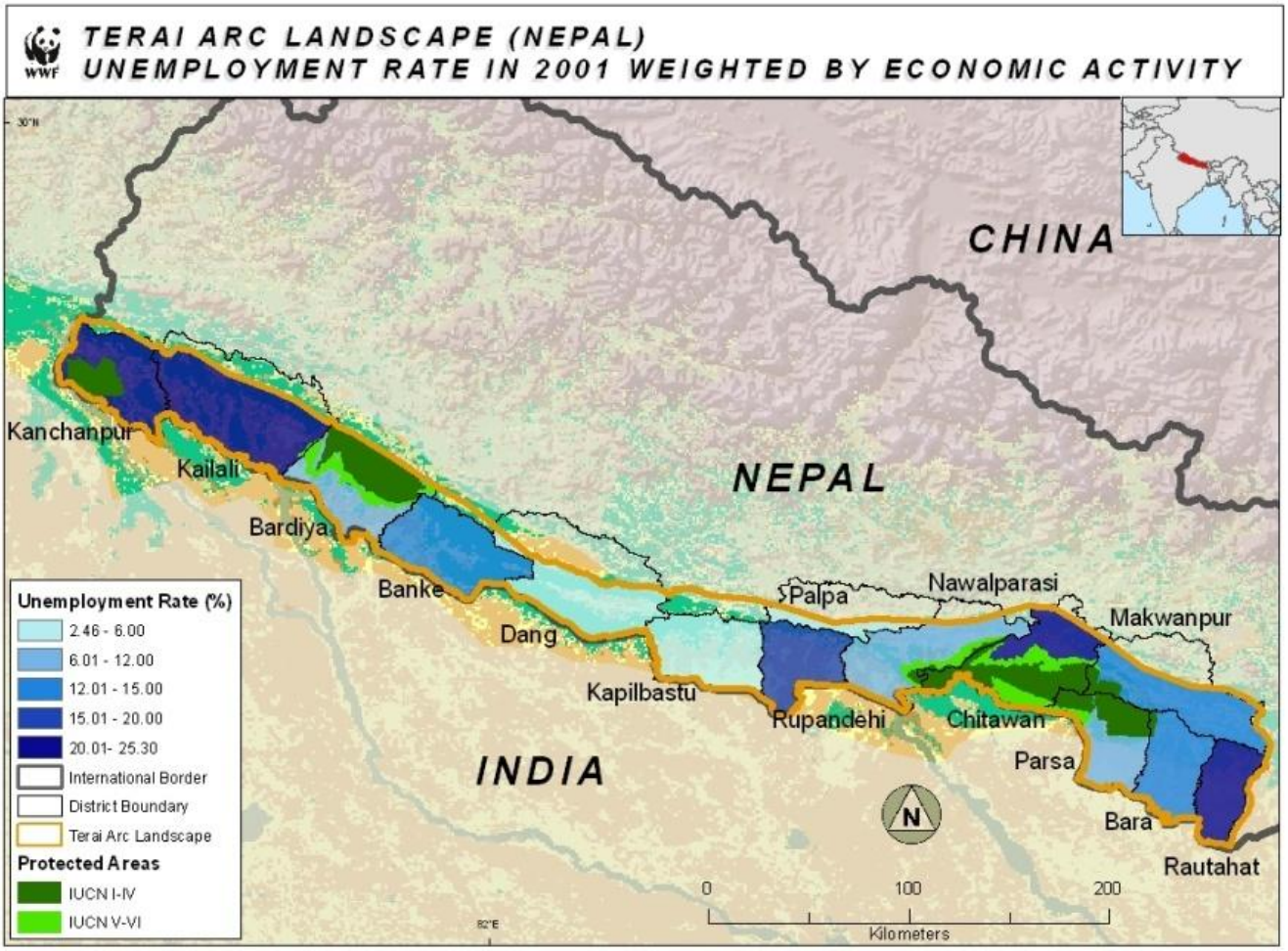
Future Indicator Development Required:

Notes:
Average of 14 TAL districts
Proportion of HH using solids fuels for cooking: Solid fuels comprised of firewoods , cowdung, leaves, straw and thatches

Working Group Members:

References:
Quoted in NLSS 2003/4: National =76.9%

Economic well-being - % of unemployment rate of people 15 - 24 age



Target:
Economic well-being
KEA
employment
Indicator
% of unemployment rate of people 15 - 24 age
Justification for Indicator:
Benchmark of general economic conditions
Long-term Viability Goal:

Monitoring Approach:

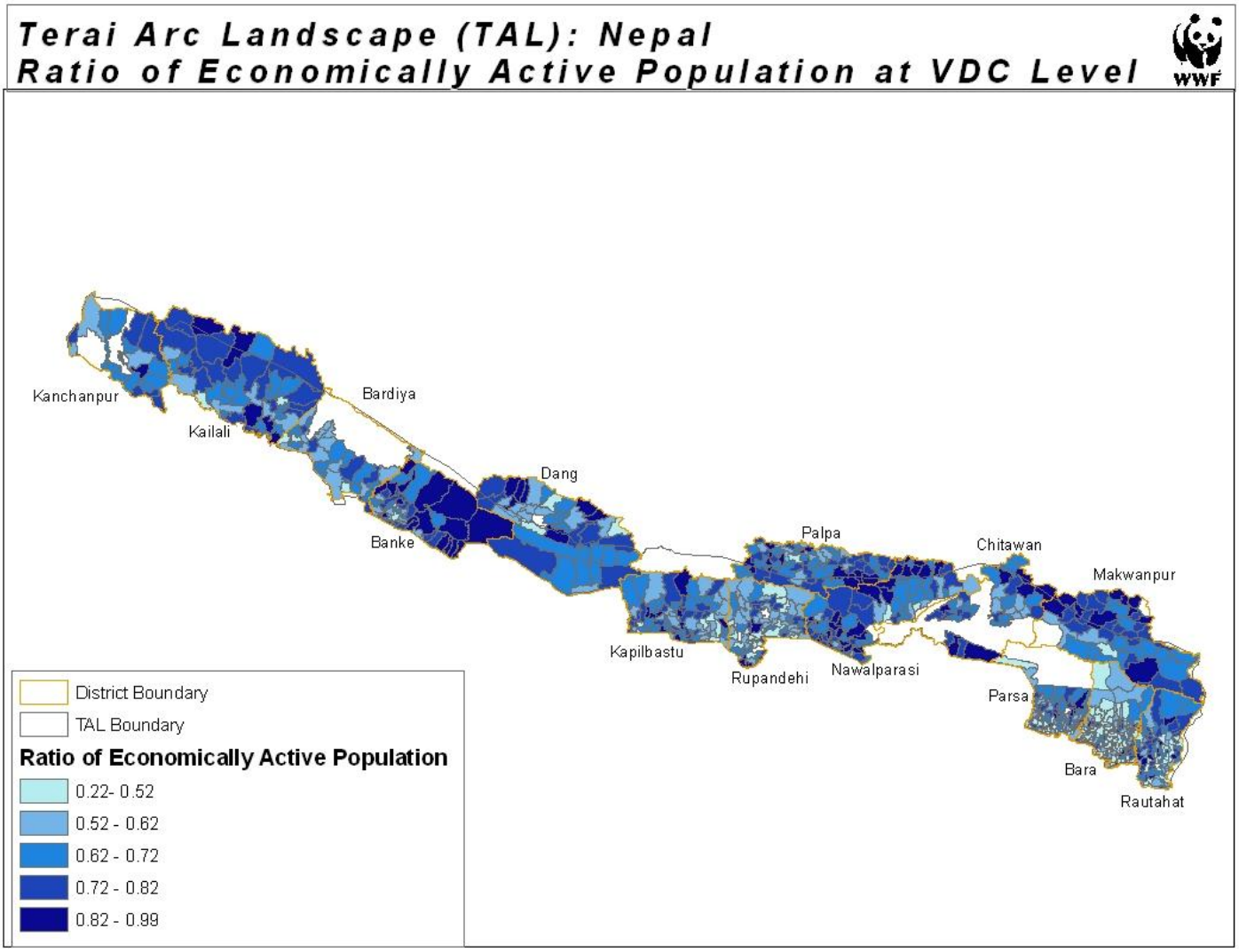
Future Indicator Development Required:

Notes:
Average of 14 TAL districts
Data was collected by CBS in the year 2001.

Working Group Members:

References:
CBS_CEN2001, Census 2001, Central Bureau of Statistics, National Planning Commission, HMG Nepal, 2002; MDG 2005 UNDP or CBS/NLSS 2003/04

Economic well-being - % of economically active population at VDC level



Target:
Economic well-being
KEA
employment
Indicator
% of economically active population at VDC level
Justification for Indicator:
Benchmark of general economic conditions
Long-term Viability Goal:

Monitoring Approach:

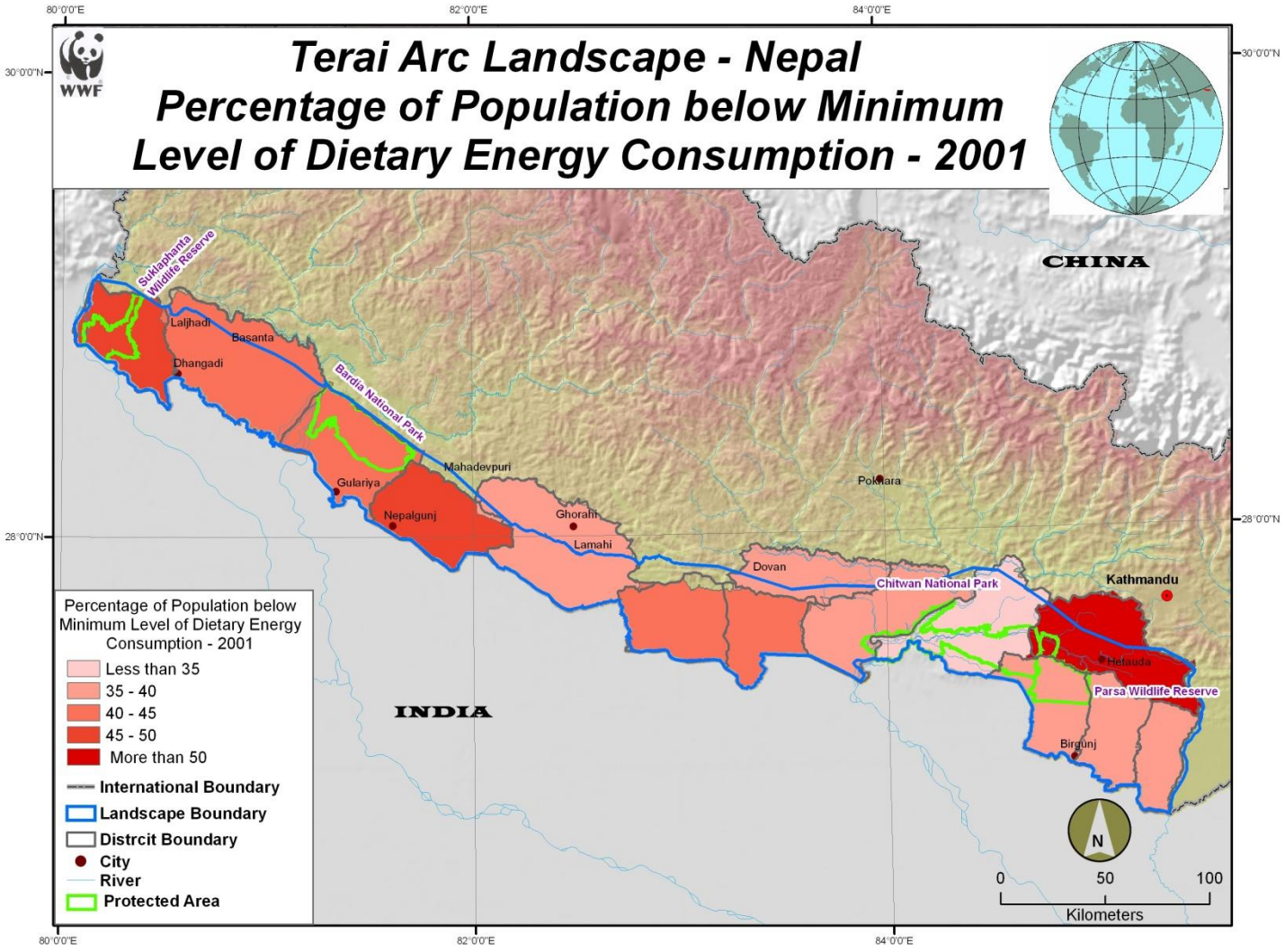
Future Indicator Development Required:

Notes:
Data correspond to % of people per VDC that were economically active over the previous year. Economically active is defined as people who are employed or who are actively seeking employment. Calculations based on CBS data from the 2001 national census.

Working Group Members:

References:
The Tibetan and Himalayan Library website: http://www.thdl.org/collections/cultgeo/nepal/census/

Health - % of population below minimum level of dietary energy consumption



Target:
Health
KEA
nutrition
Indicator
% of population below minimum level of dietary energy consumption
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

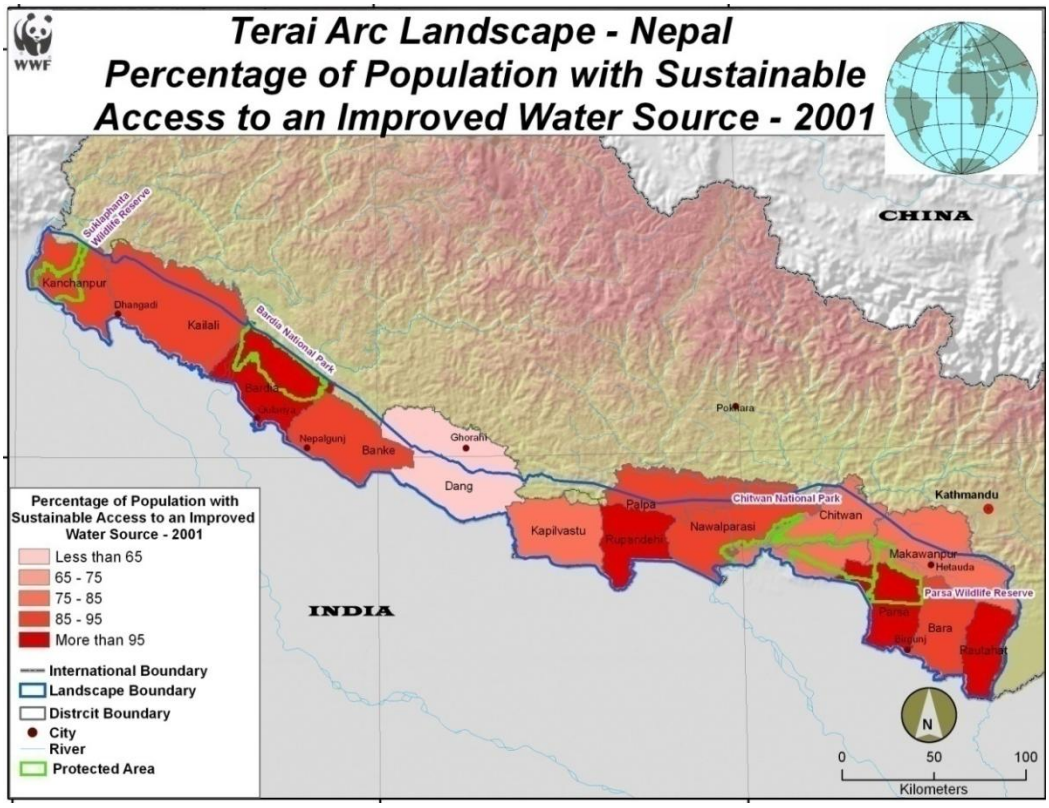
Future Indicator Development Required:

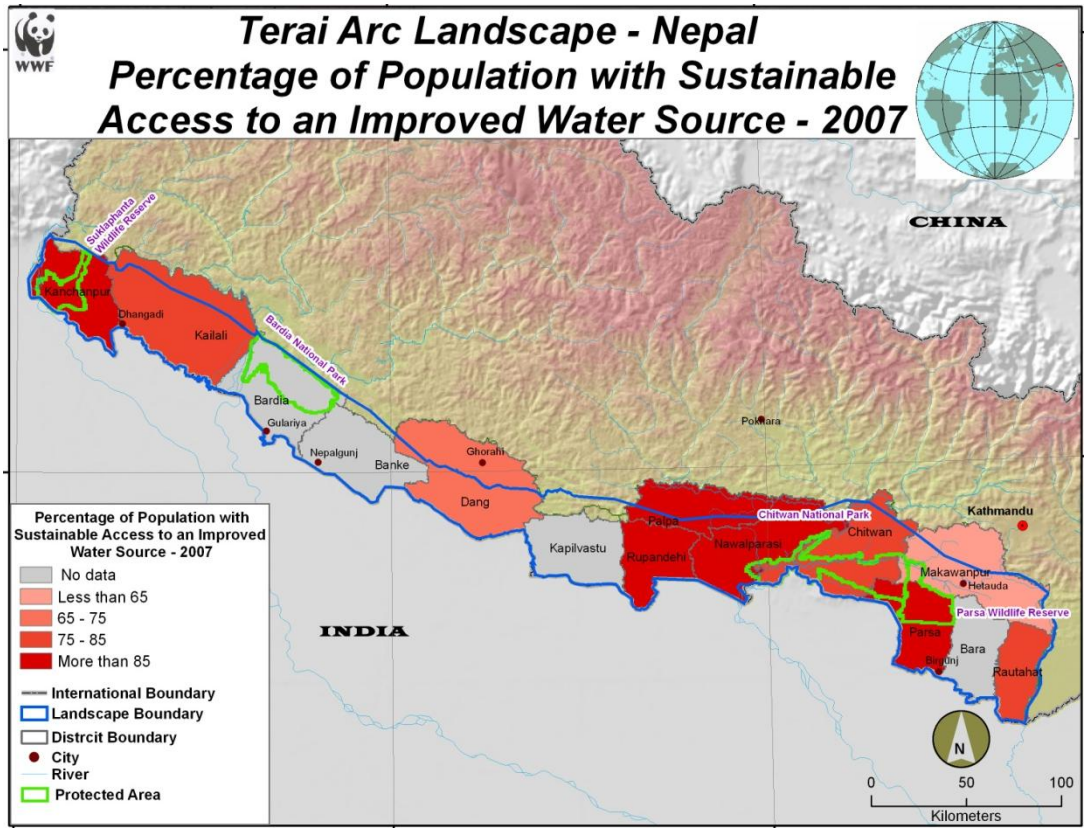
Notes:
NLSS based on % of the districts people with low dietary intake (caloric intake shortfall); 2005 data is based on SAE by WFP on caloric intake prevalence for 14 TAL districts
Majority of the TAL districts falls under the 36-45 % population intake below than required dietary energy.

Working Group Members:

References:
MDG Report 2005 UNDP; CBS/NLSS 2063 National Data; SAE of Poverty, Caloric Intake & Malnutrition in Nepal 2006, GoN/WFP/WB

Health - % population with sustainable access to improved water source





Target:
Health
KEA
water security
Indicator
% of population with sustainable access to an improved water source
Justification for Indicator:
A source of clean water is an ecosystem service that provides the foundation for providing sustainable access to water for human populations.
Long-term Viability Goal:

Monitoring Approach:

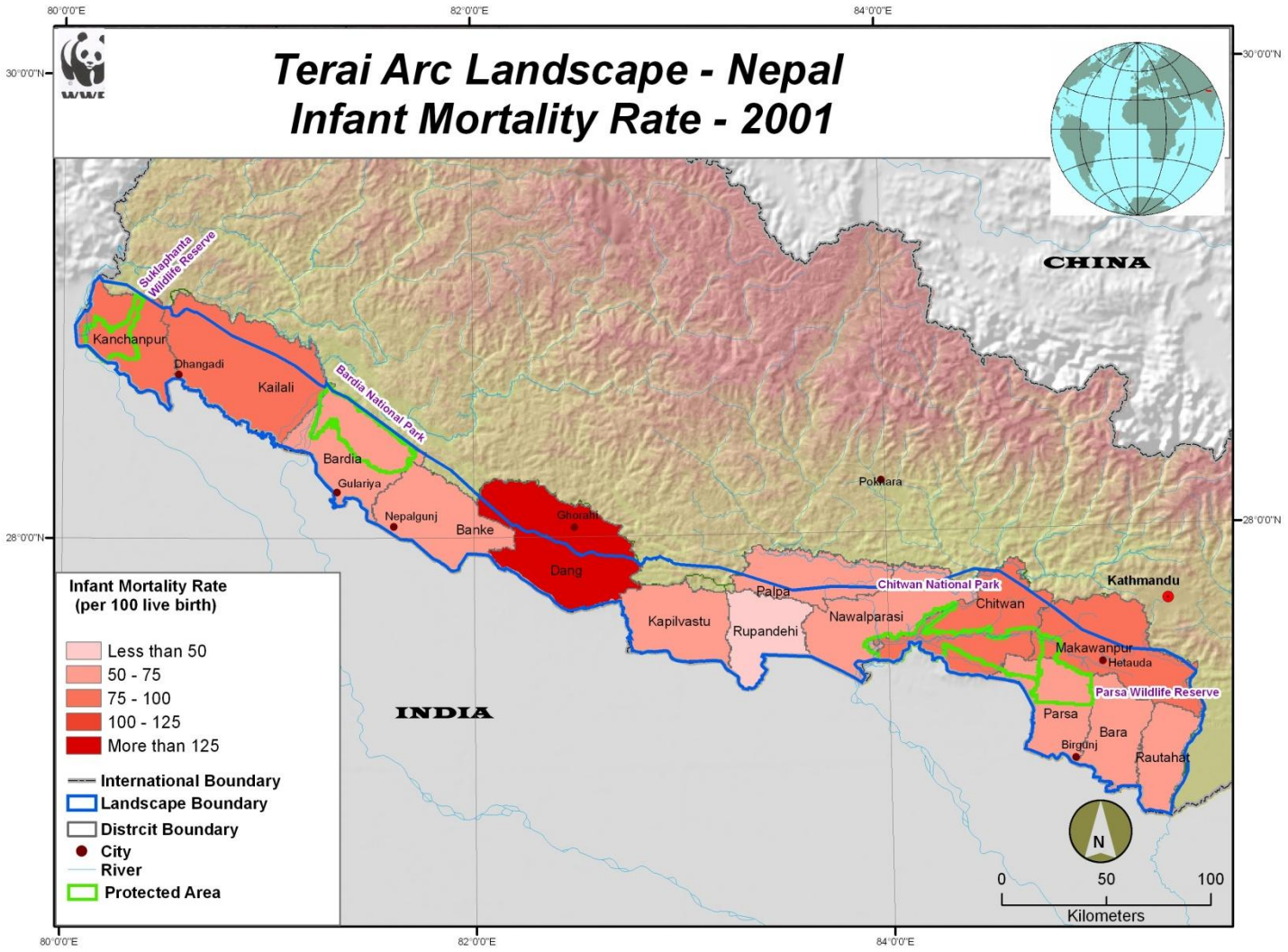
Future Indicator Development Required:

Notes:
CBS data for 2001; district-wise report at Department of Water Supply & Sewerage (DWSS) for 2007

Working Group Members:

References:
CBS_CEN2001, Census 2001, CBS/NPC, HMG Nepal, 2002; CBS/NLSS 2003/04; MDG 2005 UNDP; NDHS 2006; DWSS/ GoN progress reports for districts;

Health - Infant mortality rate



Target:
Health
KEA
Mortality
Indicator
Infant mortality rate
Justification for Indicator:
Infant mortality rates serve as a useful proxy for overall poverty levels because they are highly correlated with many poverty-related metrics such as income, education levels and health status (Dasgupta, 1993; Balk et al., 2006).
Long-term Viability Goal:

Monitoring Approach:

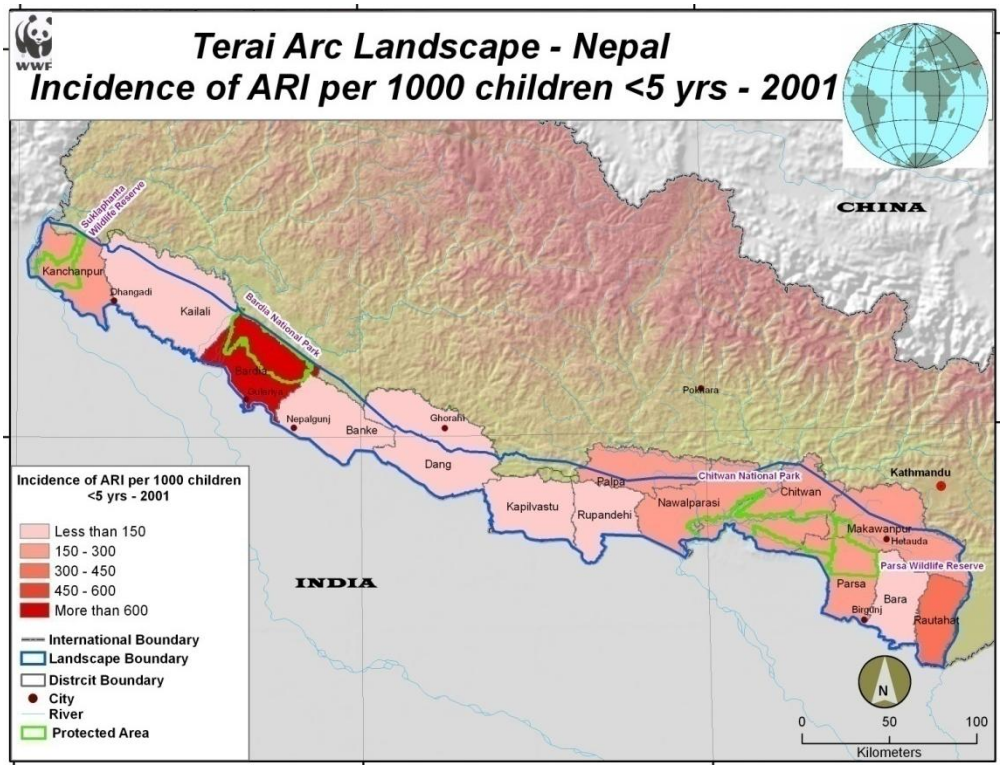
Future Indicator Development Required:

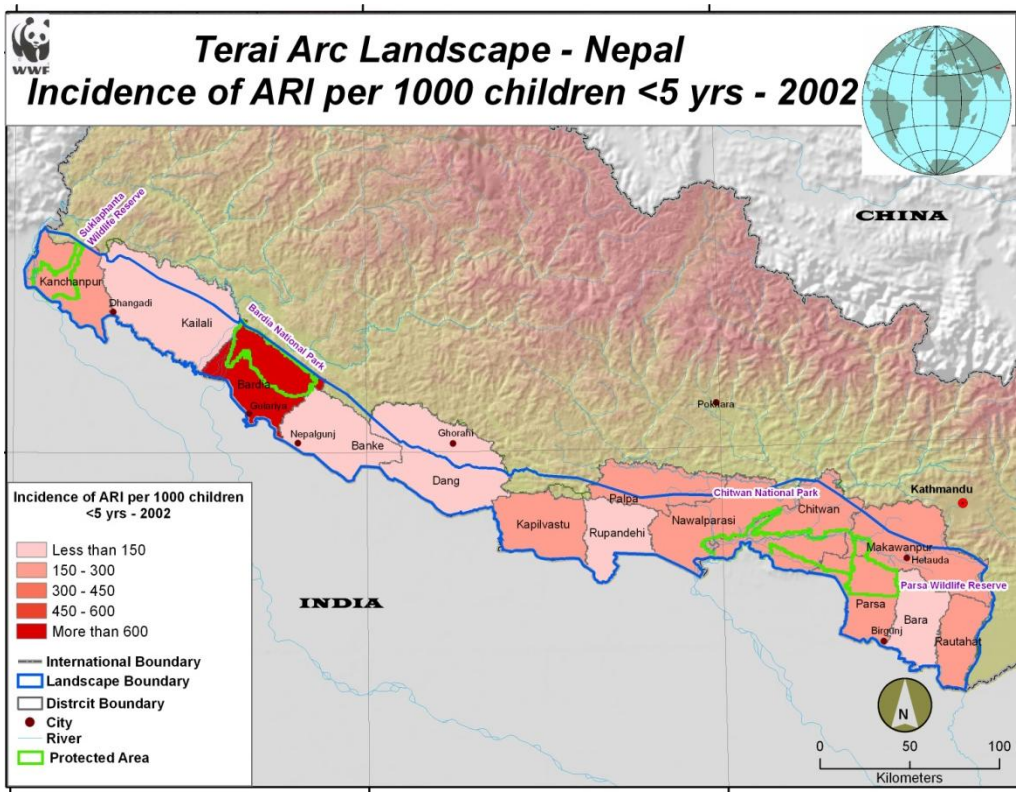
Notes:
Average of 14 TAL districts
Based on UNDP report-Social empowerment index by district, 2001

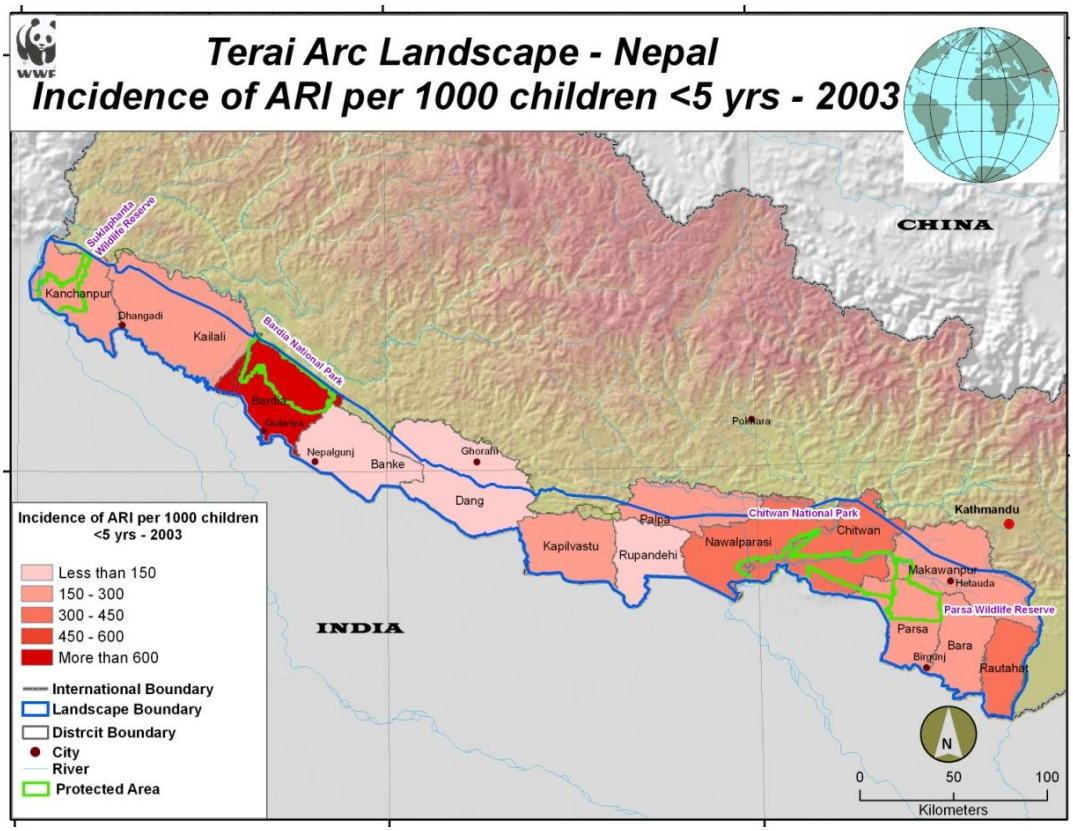
Working Group Members:

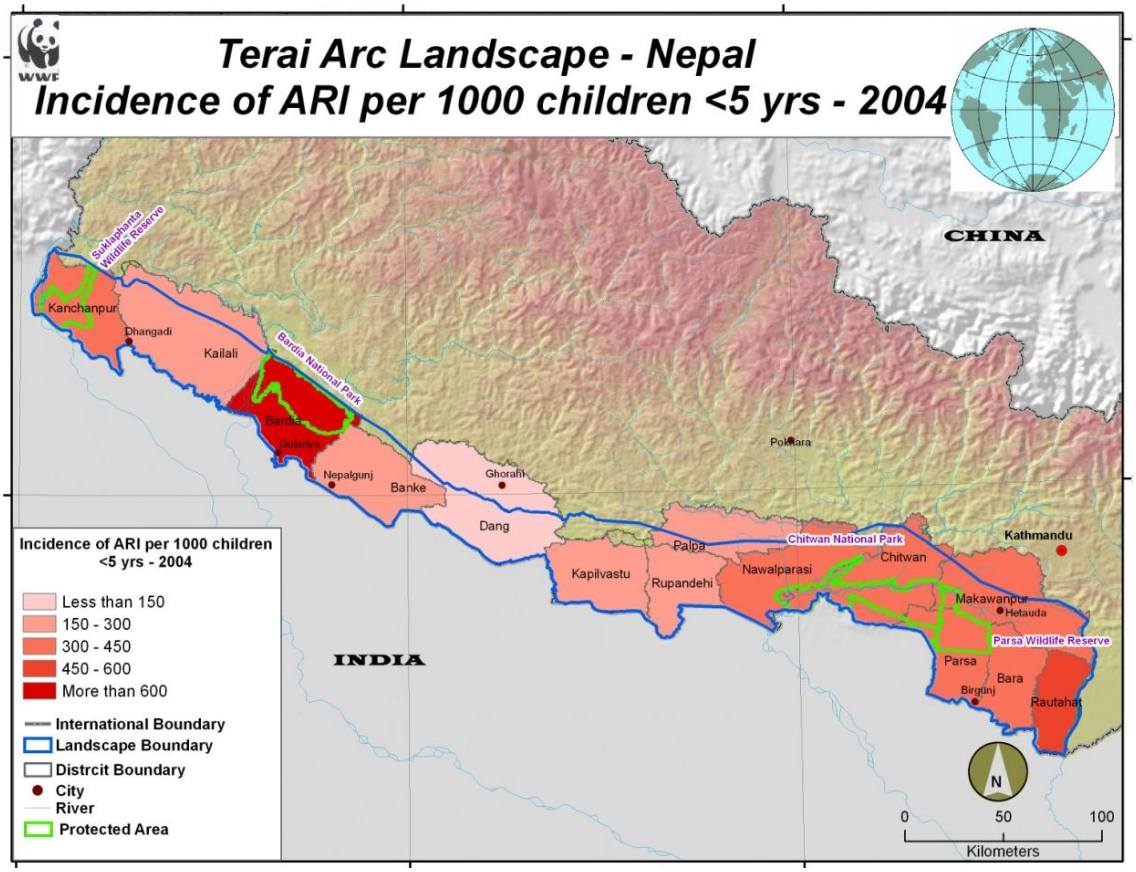
References:
Nepal Human Development Report 2004, UNDP; MDG Progress Report for districts; NDHS 2006; Nepal Population Report 2007, MHP

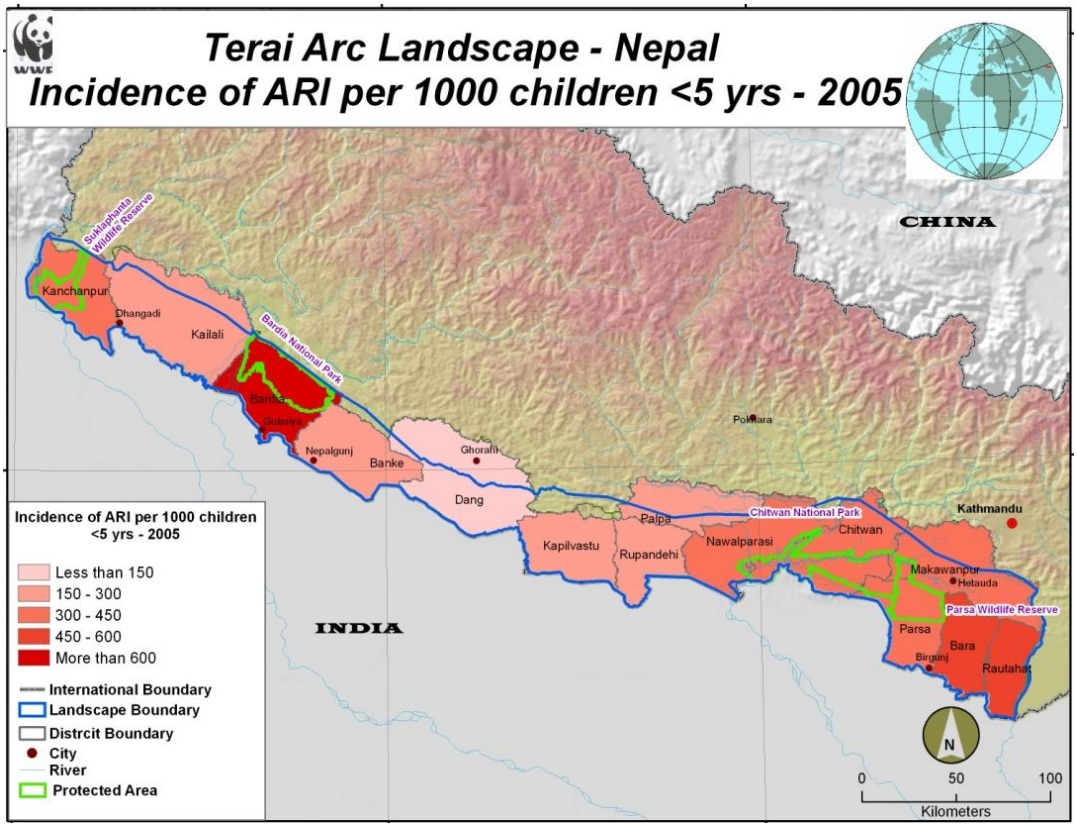
Health - No of Incidence of ARI per 1000 Children under <5 years

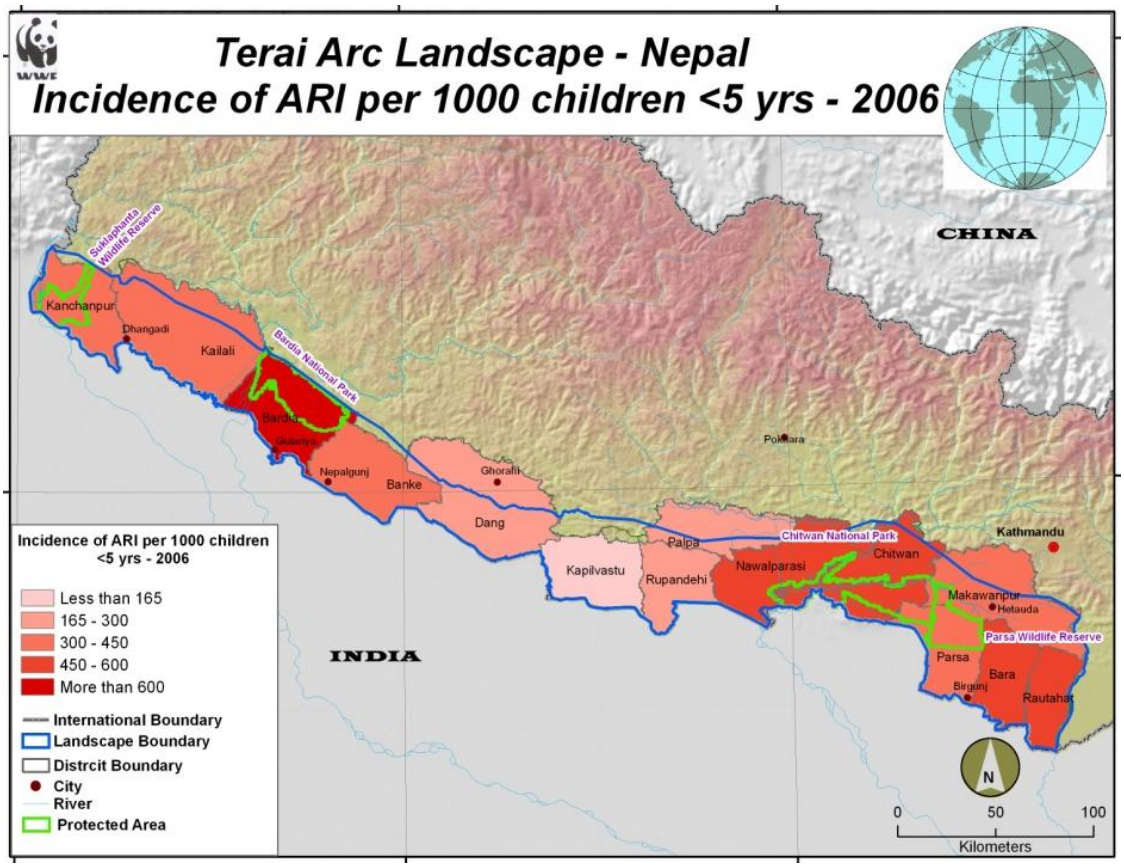


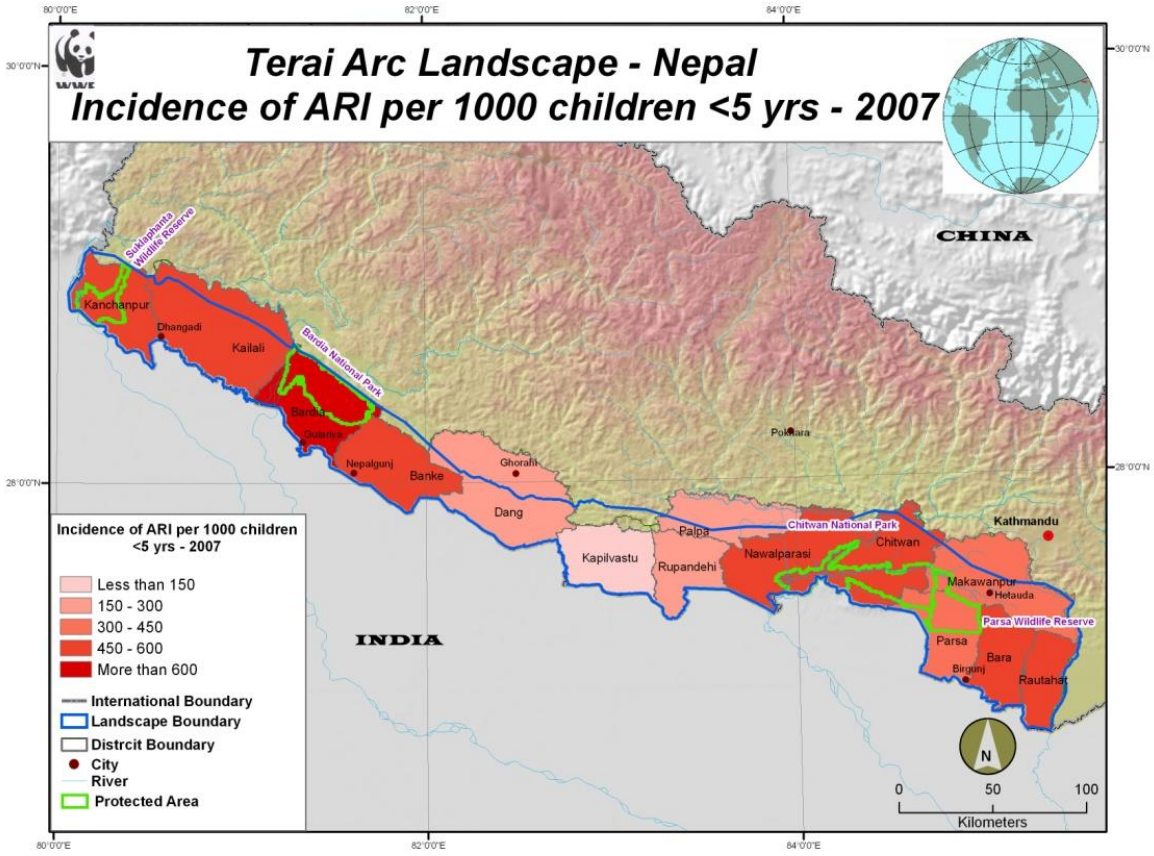



Terai Arc Landscape - Nepal
Incidence of ARI per 1000 children <5 yrs - 2003
CHINA
INDIA
Suklaphanta Wildlife Reserve
Kanchanpur
Dhangadi
Kailali
Bardia National Park
Bardia
Gulariya
Nepalgunj
Banke
Ghorahi
Dang
Pokhara
Palpa
Chitwan National Park
Chitwan
Kathmandu
Kapilvastu
Rupandehi
Nawalparasi
Makawanpur
Hetauda
Parsa Wildlife Reserve
Parsa
Bara
Birgunj
Rautahat
Incidence of ARI per 1000 children <5 yrs - 2003
Less than 150
150 - 300
300 - 450
450 - 600
More than 600
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
N
0
50
100
Kilometers


Terai Arc Landscape - Nepal
Incidence of ARI per 1000 children <5 yrs - 2004
CHINA
INDIA
Suklaphanta Wildlife Reserve
Kanchanpur
Dhangadi
Kailali
Bardia National Park
Bardia
Gulariya
Nepalgunj
Banke
Ghorahi
Dang
Pokhara
Palpa
Chitwan National Park
Chitwan
Kathmandu
Kapilvastu
Rupandehi
Nawalparasi
Makawanpur
Hetauda
Parsa Wildlife Reserve
Parsa
Bara
Birgunj
Rautahat
Incidence of ARI per 1000 children <5 yrs - 2004
Less than 150
150 - 300
300 - 450
450 - 600
More than 600
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
N
0
50
100
Kilometers


Terai Arc Landscape - Nepal
Incidence of ARI per 1000 children <5 yrs - 2005
CHINA
INDIA
Suklaphanta Wildlife Reserve
Kanchanpur
Dhangadi
Kailali
Bardia National Park
Bardia
Gulariya
Nepalgunj
Banke
Ghorahi
Dang
Pokhara
Palpa
Chitwan National Park
Chitwan
Kathmandu
Kapilvastu
Rupandehi
Nawalparasi
Makawanpur
Hetauda
Parsa Wildlife Reserve
Parsa
Bara
Birgunj
Rautahat
Incidence of ARI per 1000 children <5 yrs - 2005
Less than 150
150 - 300
300 - 450
450 - 600
More than 600
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
N
0
50
100
Kilometers


Terai Arc Landscape - Nepal
Incidence of ARI per 1000 children <5 yrs - 2006
CHINA
INDIA
Suklaphanta Wildlife Reserve
Kanchanpur
Dhangadi
Kailali
Bardia National Park
Bardia
Gulariya
Nepalgunj
Banke
Ghorahi
Dang
Pokhara
Palpa
Chitwan National Park
Chitwan
Kathmandu
Kapilvastu
Rupandehi
Nawalparasi
Makawanpur
Hetauda
Parsa Wildlife Reserve
Parsa
Bara
Birgunj
Rautahat
Incidence of ARI per 1000 children <5 yrs - 2006
Less than 165
165 - 300
300 - 450
450 - 600
More than 600
International Boundary
Landscape Boundary
Distrcit Boundary
City
River
Protected Area
N
0
50
100
Kilometers



Target:
Health
KEA
Indicator
No of Incidence of ARI per 1000 Children under <5 years
Justification for Indicator:
Average of 14 TAL districts
Long-term Viability Goal:

Monitoring Approach:

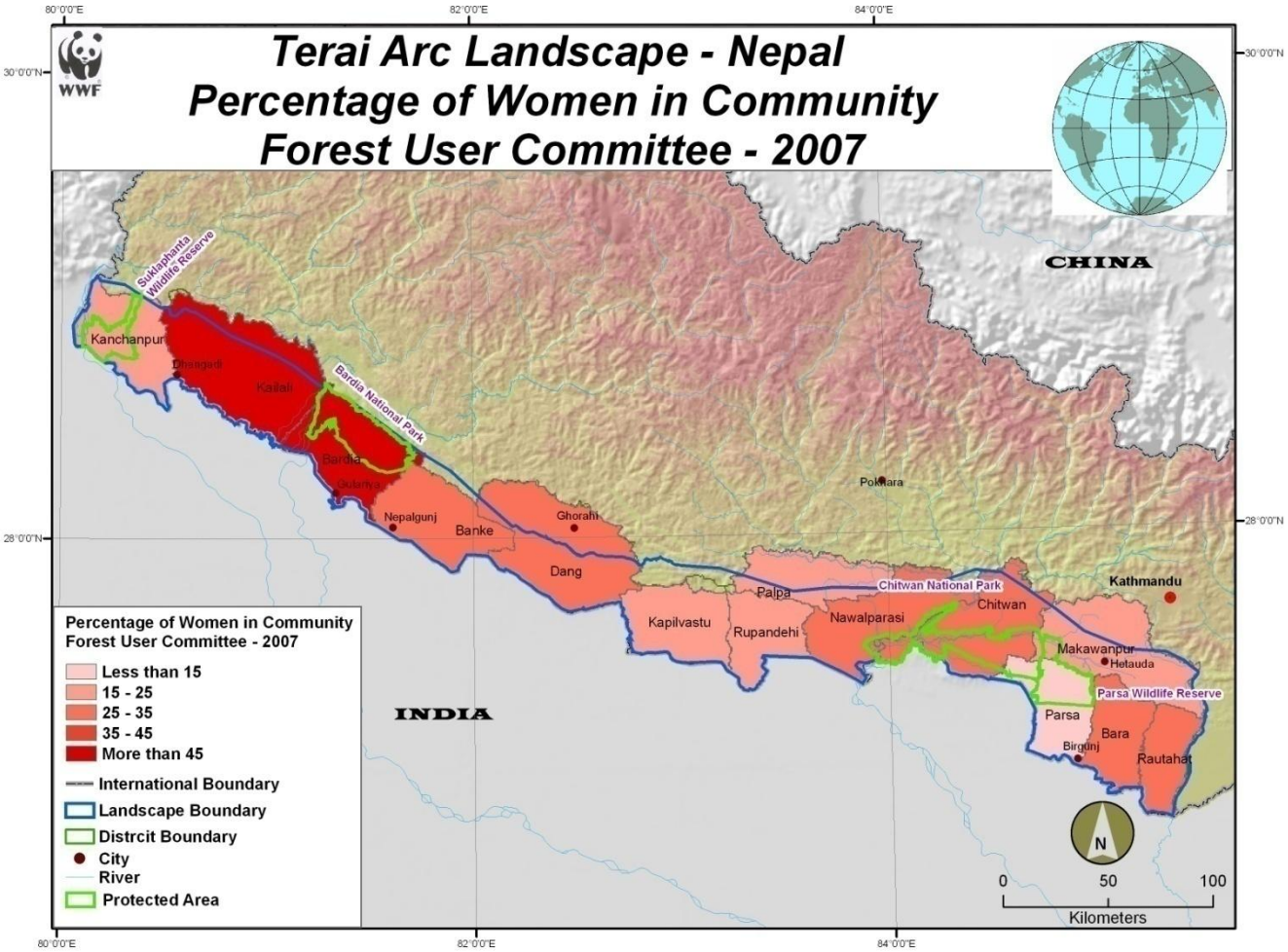
Future Indicator Development Required:

Notes:
Ministry of Health : This indicator is computed as ratio of the identified cases of acute respiratory infection to the children less than 5 years to the total estimated population of that age group expressed as per thousand children.

Working Group Members:

References:
Department of Health Sercives, Ministry of Health (MOH:2001) referred. National Value : 229

Political empowerment - % Community Forest Executive Committee members who are female



Target:
Political empowerment
KEA
female empowerment
Indicator
% Community Forest Executive Committee members who are female
Justification for Indicator:

Long-term Viability Goal:

Monitoring Approach:

Future Indicator Development Required:

Notes:
Women in committee merely, not their % in executive committee (2007 latest recorded)

Working Group Members:

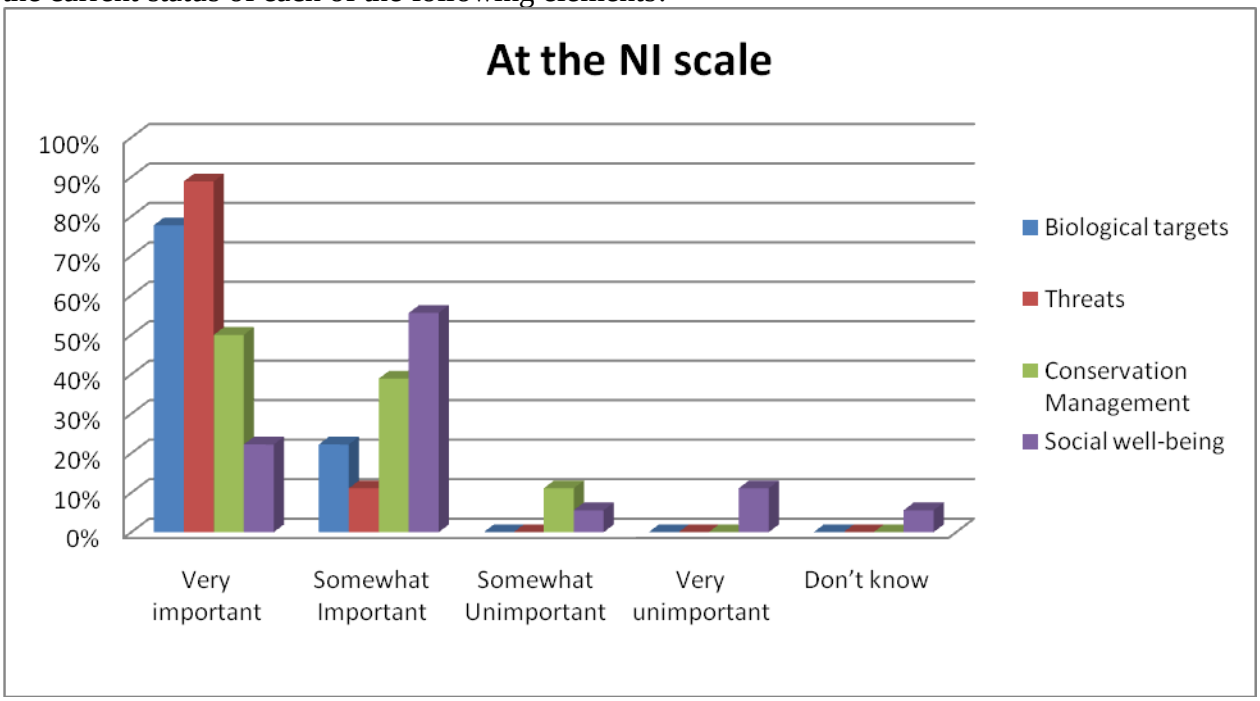
References:
1. Community forest bulletein no 11 2004. National Data; MIS DoF (CF) data till 2007 ii. According to Munni Gautam Article there (National) are 35000 women in Key position over the country at 2004. Source : 25 years of community forestry ii. Rarely more than two member in executive committe in CFUG (CFD:2004)

Conservation Measures Survey Results

Participants in the Conservation Measures Workshop and other people involved in the process were asked to complete a survey either before or during the workshop. The survey attempted to ascertain their thoughts about various aspects of the project, and to rate their importance. 18 people took the survey, including a mix of Conservation Measures Field Officers, WWF-US staff and staff from around the network.

Question 1

In order to achieve WWF program goals at the NI scale, how important is it to understand the current status of each of the following elements?



Comments:

Biological Targets -

- Central to our work, motive and objective as WWF
- Ultimately this is what WWF is trying to save. However, getting a realistic picture at such a large scale is challenging due to limited resources. Trends will most likely need to be inferred from monitoring at smaller scales within the NI
- We believe understanding biological targets is critical, but also believe that an ecosystem approach to management is critical and most times, more effective than focusing large amounts of resources on individual species
- donors don't value pure biological monitoring very much
- We have pledged to conserve places broadly, and knowing the status of biological targets tells us how the place is doing ecologically
- Without having a better understanding about the current status of the biological targets it is almost impossible to set the program goals
- population trends of key species
- This is the very basis for our actions

- Useful if linked to social well-being; species and habitats are always the main focus of WWF
- I've checked "somewhat important" and not "very" because I am defining status the way it seems the Cons. Meas. prog. has, i.e. viability (for biol. targets). While determining status would be helpful and ideal, I would not consider it very important for quality monitoring
- To measure success in conservation measures and benefits of intervention; to obtain a global overview of the status

Threats –
- affects our work, motive and objective as WWF
- If we know that the direct threats are most endangering our bio targets, then we must track whether they are increasing or decreasing. For some threats (dams, forest cover), it may be much more realistic to monitor status at this very large scale. Thus, to some extent broad reduction in threats can help corroborate trends in biodiv improvement (or vice versa).
- It is essential to understand threats if good conservation is to be achieved. However, we believe it is equally important to understand conservation opportunities, as pursuit of opportunities will often counter threats.
- should be focus of WWF's work at all scales
- We need real information to back up our impressions.
- A better understanding of the threats is crucial to design appropriate strategies
- key threats that threaten critical habitats for key species
- at this scale, the status of biological targets should indicate the status of the threats
- This provides the urgency for which to act upon
- Also opportunities
- Appreciation of causal context of threats and opportunities
- to achieve the biological targets
- we need to have an updated understanding of what the threat levels are, though in prog. effectiveness mtrg., assessing outcomes is in a sense assessing threat levels (if objectives are to reduce threats). So continued threat mtrg. may not be needed given the staff constraints in the field
- to assess level of threats impacting conservation targets
- the major threats at global level

Conservation management –
- central to our work, motive and objective as WWF
- WWF should keep an eye on how NI governance is working, because they are so new. However, don't fall into the trap of spending too much energy on this at the expense of actual conservation work.
- Conservation management has been most effectively achieved in the Namibia program by linking economic/social gain to conservation development opportunities.
- should be focus of WWF's work at all scales
- Protected areas and the resources to fund them are a cornerstone of conservation.
- Better understanding of the conservation management will enable to make right decisions for effective and efficient use of our limited resources

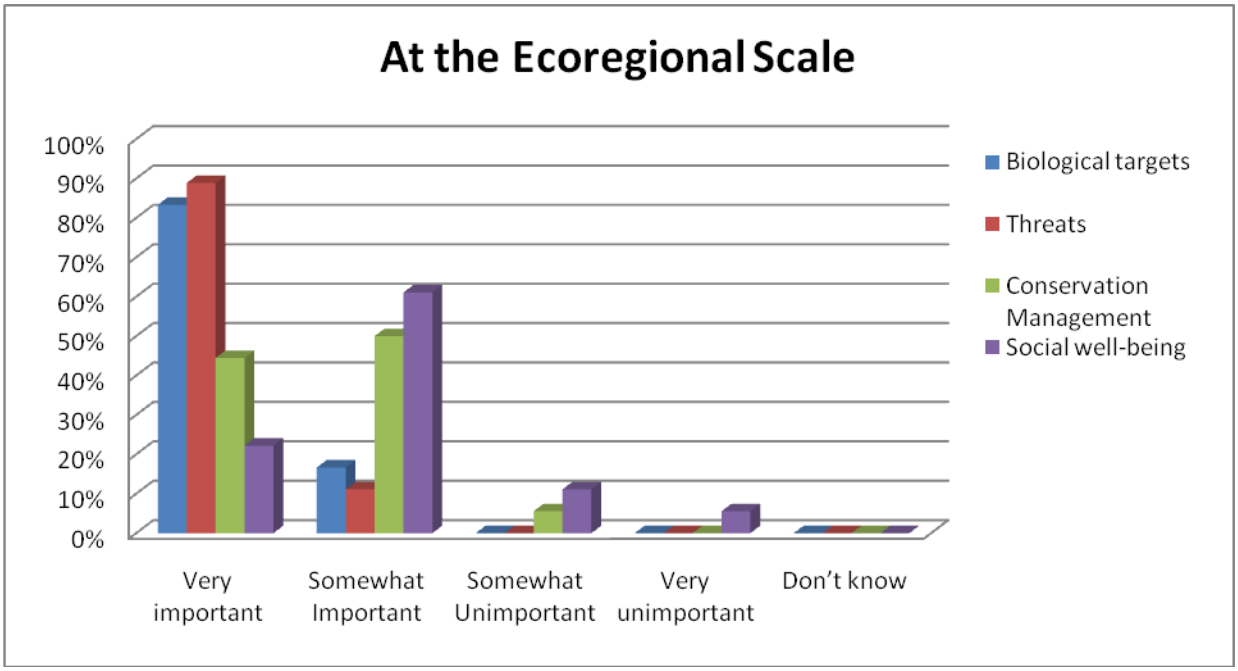
- effective management of protected areas and enforcement landscape wide
- at this scale, the status of biological targets should indicate the status of conservation management
- Important to make use of available tools for understanding all dimensions of conservation management
- needs more qualification
- Very important but needs to be linked to strategies that are actually developed. Cons. mgmt. also is too broad a category and would have to be broken down into its many parts
- To measure success of conservation management
- to know what are the conservation initiatives at global level

Social Well-being –

- Not something our field is asking for
- related to our work, motive and objective as WWF
- Overall social well being at such a large scale can probably be found from other sources. But at that scale I don't think any correlations can be made with conservation work.
- In a developing world context, it is essential to link social enhancement with conservation.
- link from social well-being to threats, mgmt not always clear
- Some baseline data is necessary to inform strategies, but this is not as critical as the other categories.
- Understanding of social well being will help us to design effective conservation strategies
- as it relates to conservation of key habitats and species
- at this scale, social well-being is unimportant since social well-being status beyond the buffer zones and corridors are beyond wwf's sphere of influence.
- Yes its important but needs to be carefully focused and realisation that not all data is useful aggregated to an NI level (poss only a few indicators are). More than quantitative though
- Linked to biological targets and opportunities
- fuzzy on it and it needs to be relooked in light of the GPF 'global drivers'
- See comments for biol. targets. Additionally, the status needs to be directly linked to the conservation issues at one level. At a higher level, SWB status is important for assessing relevance & strategy reformulation
- Social well being is relevant to ecological well being and should be monitored as well
- too much differences between countries/regions

Question 2

In order to achieve WWF program goals at the ecoregion scale, how important is it to understand the current status of each of the following elements?



Comments:

Biological Targets:

- need to know where you are to know where you are going
- As above, biological targets are central to our work. And as the scale is reduced the ability to monitor and the accuracy increases. However, these measures will likely be rolled up from smaller scales.
- if talking ecoregions, bio targets are hugely important
- We have pledged to conserve places broadly, and knowing the status of biological targets tells us how the place is doing ecologically.
- key to management success
- biological targets are very important
- to assess conservation intervention success
- to obtain a regional overview of the status

Threats:

- It may become more realistic to monitor specific threats at this scale. It's hard to say when not talking about a specific threat though.
- In Namibia's case, we identify and understand the threats, but we do not spend a large level of resources monitoring them. Instead we focus on our monitoring on progress against opportunities related to conservation management and resulting social well-being.
- should be focus of WWF's work at all scales
- We need real information to back up our impressions.
- at this scale, the status of biological targets should indicate the status of the threats
- threats are directly related to biological targets
- to assess impact and risk towards biological targets
- to analyze the threats affecting the entire region

Conservation Management:

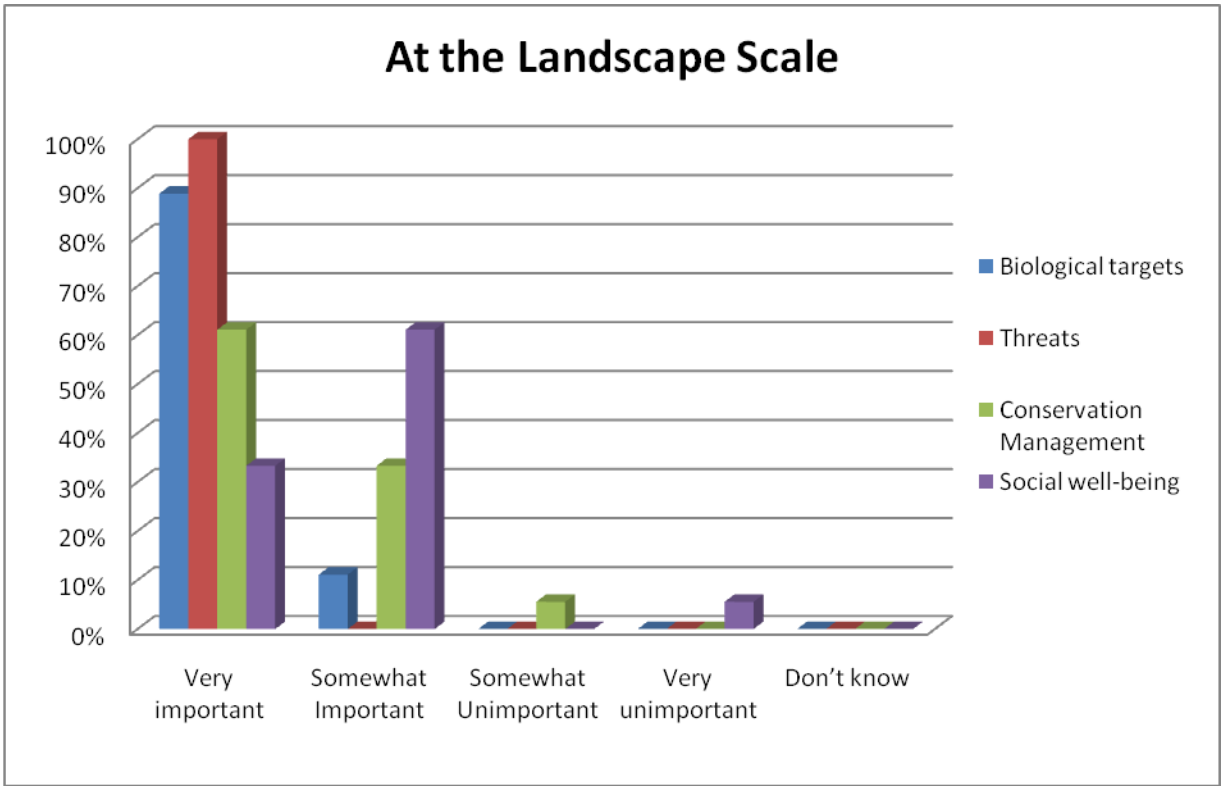
- As the scale becomes smaller, it's important to take a closer look at the quality of management. But this might still be too small of a scale.
- should be focus of WWF's work at all scales
- Protected areas and the resources to fund them are a cornerstone of conservation.
- status of biological targets and threats is the outcome of conservation management
- it needs more qualification and discussion
- to assess success of management intervention
- protected areas initiatives and functioning at ecoregional level

Social Well-Being:

- I would think that social well-being on such a broad scale would obscure community level trends that would have a more direct impact on biologica targets.l
- The monitoring of social well-being is essential to our program, as this data is then applied towards advocacy and policy development to leverage greater support towards conservation.
- link from social well-being to ecoregions not always clear
- Some baseline data is necessary to inform strategies, but this is not as critical as the other categories.
- at this scale, social well-being is unimportant since social well-being status beyond the buffer zones and corridors are beyond wwf's sphere of influence.
- there are few targets for social indicators
- to assess success in conservation intervention relevant to socio-economic well-being
- more important at this level, because more similarities and interactions

Question 3

In order to achieve WWF program goals at the landscape scale, how important is it to understand the current status of each of the following elements?



Comments:

Biological Targets

- Target status is easier to monitor at smaller scales
- This is the most likely scale at which real monitoring will occur. WWF will only realistically be able to look at landscapes where we currently work and that will have to be rolled up to the larger scales in some way. It will never be perfectly scientific, but we have to work in an imperfect world.
- I believe as the scale of intervention becomes smaller and more localized, it is essential to have a better grip on all elements of the measures (ie. biological, threats, CM, social well-being, and opportunities) as interventions need to be more specific at smaller scales.
- not sure bio targets work at this scale, except for habitats
- key to management success
- directly reflects the health of landscape
- To assess success of conservation intervention, to strategize next step
- the status of important targets at field level

Threats

- At the landscape level it's much easier to observe threats and know that trends up or down will have a direct link to biological targets.
- should be focus of WWF's work at all scales
- direct implication to biodiversity targets
- to assess new emerging threats
- semi-detailed information on all actual threats in the field

Conservation Management

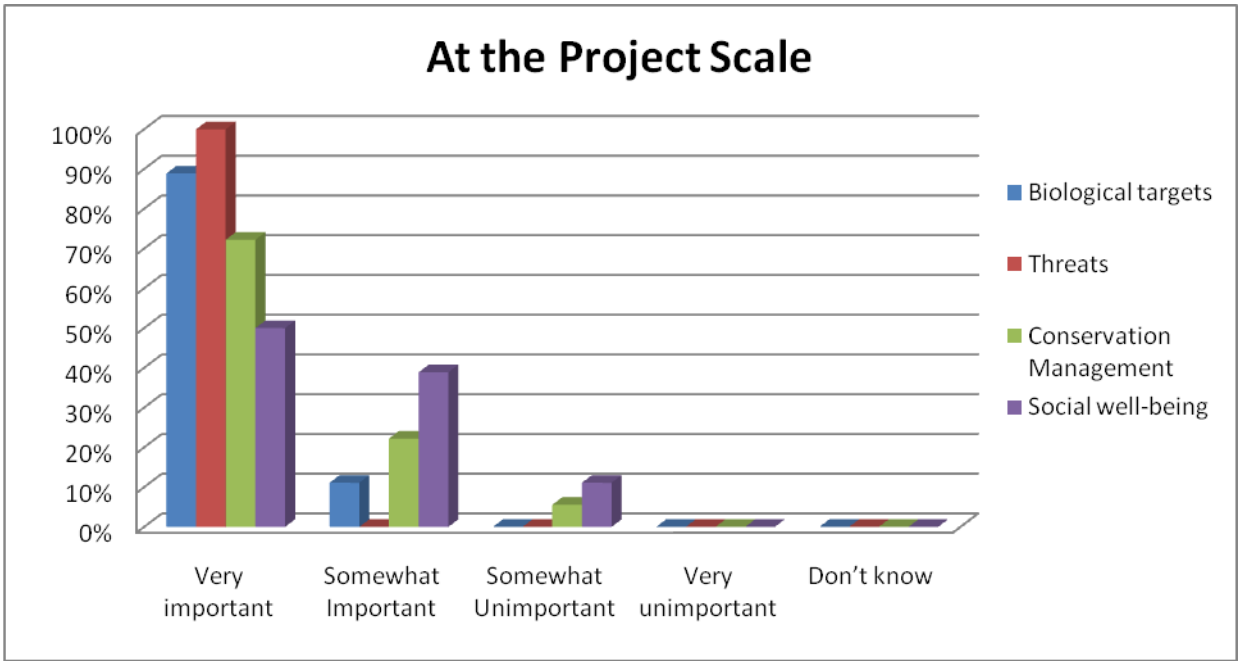
- This is the most relevant scale at which to monitor management effectiveness. Yet, although it's important, I think a "quick and dirty" means of evaluation is sufficient. Only is there seems to be a big problem and there are no good results, then a more in depth examination is required.
- should be focus of WWF's work at all scales
- status of biological targets and threats is the outcome of conservation management
- but it is still not clear (indicators)
- to assess success of conservation intervention
- (functioning of) all conservation mngt. initiatives in the field

Social Well-Being

- At this scale, it will be easier to see how the well being of communities are affecting the biological targets positively or negatively.
- link from social well-being to landscapes not always clear
- Land-use decisions are being made at this scale, and this makes social data more important.
- WWF goals and associated activities do not exactly influence at broader landscape level
- to provide information on possible change in social well being relevant to ecological indicators
- interactions communities and natural resources

Question 4

In order to achieve WWF program goals at the project scale, how important is it to understand the current status of each of the following elements?



Comments:

Biological Targets:

- As mentioned above, the more localized the intervention, then the more detailed the level of knowledge and monitoring of each of these aspects is required.
- bio targets not always meaningful at one project site
- What is the rationale for expecting different answers to this questions based on difference in scale?
- important to project works
- to strategise for the conservation target; as well as to measure success of conservation intervention
- cannot be disconnected from landscape scale, more detailed

Threats:

- should be focus of WWF's work at all scales
- important to project works
- to assess conservation success
- subset of landscape scale threats

Conservation Management:

- should be focus of WWF's work at all scales
- At the project scale, you are probably working in or around a protected area - so this information should be known.
- may have less relevance at project scale
- to assess conservation success
- connected to landscape scale cons. mngt.

Social Well-Being:

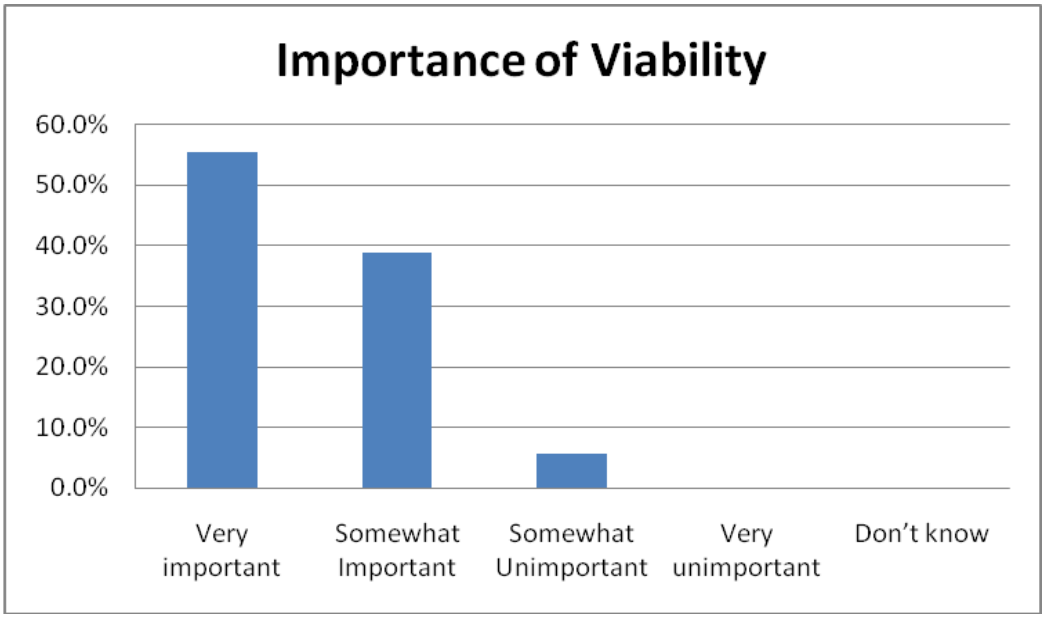
- Easier to measure at site or very local scale

- socio targets at 1 proj site may not be material
- the landscape level measures has very less relevance at project level
- to assess conservation success
- more information available than landscape scale

E.

F. Question 5

To achieve WWF program goals, how important is it to establish criteria for the likelihood that a habitat or species will persist in the long-term – in order to understand current biological target status?



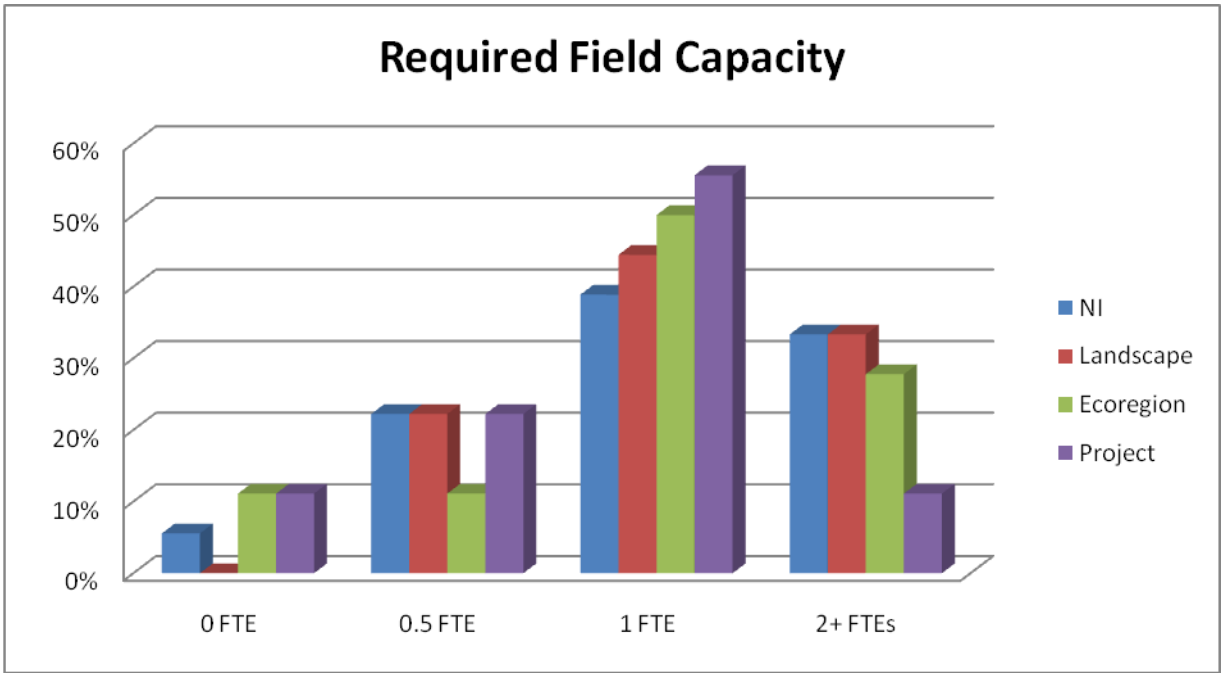
Comments:

- The criteria should be more detailed, vary by place, population (landscape) have more depth. what if there are 100,001 fur seals?
- Purely monitoring numbers really doesn't tell you anything. You must understand the context for each species. Determining viability can be quite difficult because there's not enough information. But teams must do their best to come up with some framework so that there monitoring can be qualified.
- We think that numbers have to be calculated in relation to the realistic potential of habitat now and in the future. Also, categorization by numbers alone cannot demonstrate the success of a conservation initiative. For example on common property regimes, the most significant conservation success may to halt or reverse downward trends. Thus, even though you may only be in a poor category in numbers, you might have actually sponsored a very solid conservation success if you have changed the situation so numbers are no longer declining. Thus, while numbers are useful as targets, there are other key parts of the story which also must be considered.
- Establishing viability for our biological targets is absolutely essential - whether WWF should do this work, or partners should do it instead, is the question.

- There is no point in have data on biological targets without being able to put that information in context, relative to our conservation goals.
- without knowing how critical the situation is for our biological targets we cannot decide appropriately were to put funding priorities
- viability criteria should not be limited to the number of individuals, which is only a single parameter.
- i think this is very important particularly when it comes to species conservation but realistically in the field we do not have the resources or expertise to do this. At the ecosystem level, we have usually follow existing criteria established, for e.g. coral reefs. According to the ASEAN-Australia Living Resources Project, 0-20% live coral cover is poor, 20-40% is fair, 40-60% is good, >60% is excellent.
- only when we have the knowledge to do so
- Criteria might have to be refined in the process, should be "process and interaction criteria" rather than "status criteria"? Do we need "satisfaction" or "well-being" criteria too for comparing and assessing positive contribution of conservation interventions?
- it is very important (viability assessment) in light of the current circumstance (entails the carrying capacity as well). it shows the current status/rank of the biological targets and gives us the exact picture.
- While desirable from a scientific perspective, viability analysis and the higher-level decision of prioritizing a species (or ecosystem) as a priority (i.e. flagship) are actions that should be, and allegedly were, taken at the WWF mgmt. level to decide that the species would be the target of conservation intervention regardless of its specific status. The species teams in WWF ought to know and state what viabilities of species are
- This will enable the setting up of strategy in trying to conserve the target, at the same time assess whether it is viable to include the targe
- viability analysis is rather complicated but extremely important to establish our "threshhold" values.

Question 6

In order to understand the status of biological targets, threats, conservation management, and social well-being at each of the following scales, how much measures field capacity (as measured by FTEs) is necessary per year?



Comments:

NI:

- If NI monitoring can rely upon work done at smaller scales.
- I am uncertain what a FTE is, thus it is difficult to respond to this question. In general, however, I think that 15% of a programmatic budget should be aimed at putting in place performance monitoring systems that allow conservation staff to assess conservation performance in relation to conservation results. Such systems should also be designed to allow staff to adaptively manage their interventions as the feedback loop dictates. In the absence of knowing what a FTE is (and the fact that the questionnaire requires this question to be answer before it can be submitted) I have marked all interventions with 1 FTE
- NI's can be enourmous, and are usually cross-boundary, requiring at least one M&E person per country.
- no experience with measures staff FTEs, but with field staff FTE is usually one full-time staff per species or project with field support staff
- 0.5 FTE at the NI level can consolidate the information from the field, being collected, collated by 1 FTE at the field level for each landscape.
- n/a i ticked 1 because the survey required an answer but i can't comment because I haven't been closely involved
- adjsuted to scale
- much larger coverage
- For quality monitoring of biol. & social conditions, and threat and cons. mgmt. there would need to be a team of people (for an NI) with M&E people in each office and an NI M&E coordinator
- This could be integrated into the network staff goals and not require additional staff.
- At NI level, data collection should be conducted in relation with existing network of data collectors
- mainly coordination and providing overview of landscapes data analysis

Landscape:

- work should be integrated into projects in the landscape. may need some additional people
- Actualy data collection at such large scales would be rather labor intensive depending on the size of the area and the type of data being collected.
- 1 FTE at the FIELD LEVEL
- adjusted to scale
- coverage is a bit less than NI
- For quality monitoring of biol. & social conditions, and threat and cons. mgmt. there would need to be a team of people (for an NI) with M&E people in each office and an NI M&E coordinator
- This could be integrated into the landscape staff goals and not require additional staff.
- At Landscape level , data collection should be conducted in relation with existing network of data collectors
- the major data analysis, coordination and communication will be at this level

Ecoregion:

- Likely fewer FTEs than landscape, but still this is the real boots on the ground work.
- At the ecoregion scale, there may be more than one country involved, in which case more than one M&E person may be needed.
- if it involves transboundary
- For quality monitoring of biol. & social conditions, and threat and cons. mgmt. there would need to be a team of people (for an NI) with M&E people in each office and an NI M&E coordinator
- At least one person per ecoregion is required to supervise project staff
- At an ecoregion level, often involving one or more countries, data collection will involved coordination of data collection between one or more countries.
- we can skip this level (it's between NI and landscape/project)

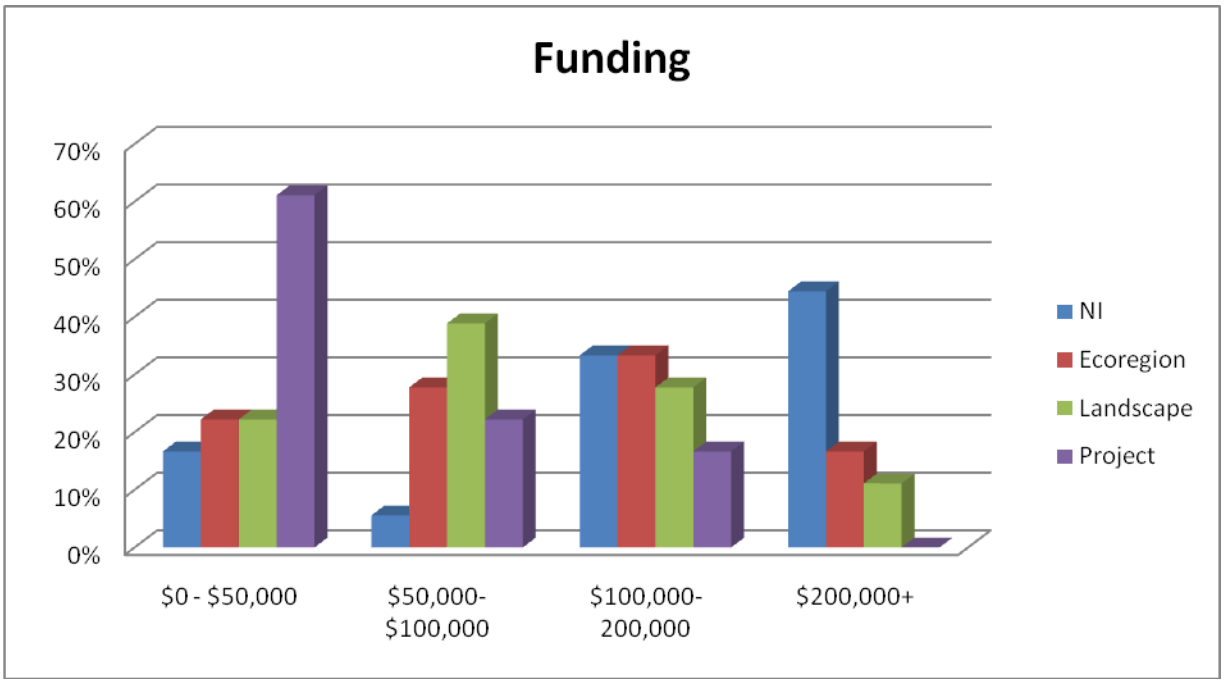
Project:

- too small scale, should be integrated into current work plan
- Realistically projects probably can't afford more than 1FTE; evidenced by the fact that most don't devote any resources to monitoring. The work load though will greatly depend on the size of the project.
- Assuming there are several projects in a single landscape, 1 FTE for each landscape should be able to collect information from the field and collate and analyse.
- extent is less
- For quality monitoring of biol. & social conditions, and threat and cons. mgmt. there would need to be a team of people (for an NI) with M&E people in each office and an NI M&E coordinator
- the most time and effort are required at the project level to insure quality of data
- The data collected could be primary data to provide a more detailed picture of the area, and often initially involved many people but at monitoring phase may not necessarily need a lot of people.

- particularly for field data collection and analysis

Question 7

In order to understand the status of biological targets, threats, conservation management, and social well-being at each of the following scales, how much funding (as measured in US$) should be allocated for field capacity for conservation measures?



Comments:

NI:

- should be distributed at the discretion of the NI
- honestly i'm guessing on this one and just trying to make relative estimations based on the number of FTEs I put below. But I have no idea of the true monitoring expense in terms of equipment, training, analysis, etc.
- I don't think it is realistic to try and budget for measures as a separate cost. Rather, monitoring should be built into and integrated into the design and implementaion of conservation activities at each of the four described levels. Further, without fully understanding a particular NI, ecoregion, landscape, or project, it is difficult to even recommend how much money to set aside for monitoring.
- from experience just to measure one species status in one landscape costs at least 120k per year and usually there are several target species per NI, landxscape or ecoregion
- i TICKED $100,000 BECAUSE IT DEMANDED A RESPONSE BUT I CAN'T REALLY COMMENT. dependent on availabiltity of information, other organisations, number of networks. CAn't quantify this.
- adjusted to scale
- coverage huge area across countries

- M&E, if it is to be done adequately, is expensive. Without the minimum investment to do decent even if not perfect M&E it would be almost a wasted effort, producing little reliable and informative data
- Answers to this set of questions correspond to Question 10 above.
- Involving setting up of a core unit and satellite unit in each participating countries in the NI
- mainly coordination and providing overview in an office

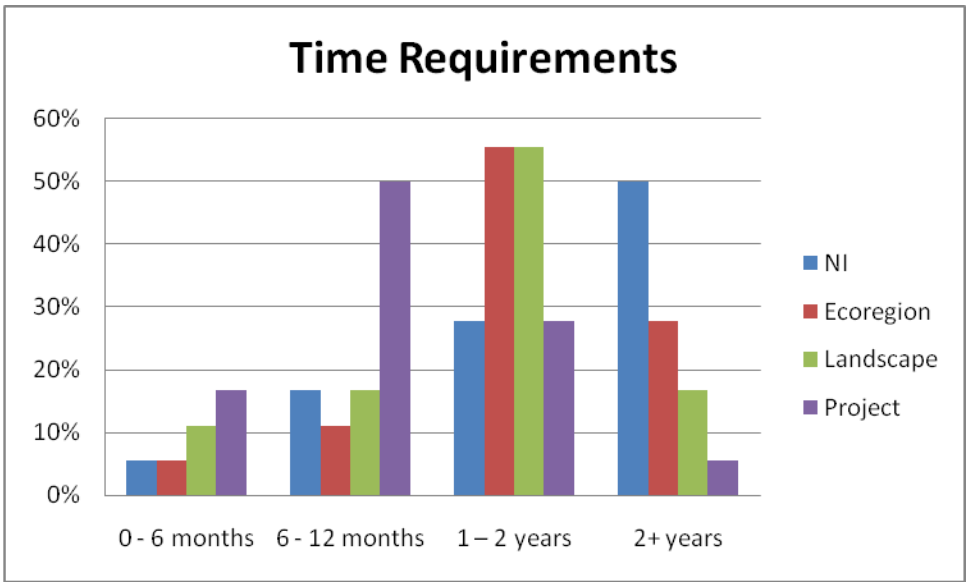
Ecoregion:
- none required
- AS ABOVE dependent on availability of information, other organisations, number of networks. Can't quantify this.
- adjusted to scale
- Involving setting up of a core unit and satellite unit in each participating countries in the ecoregion
- we can skip this level (it's between NI and landscape/project)

Landscape:
- cost should/would be built into project budgets in the landscapes.
- AS ABOVE dependent on availability of information, other organisations, number of networks. Can't quantify this.
- it is based upon current experience
- Involving setting up of a core unit and satellite unit in each participating countries in the landscape
- for coordination, travel, data analysis staff

Project:
- for one species usually 150k
- cost should/would be built into project budgets.
- AS ABOVE THE SAME APPLIES TO QUESTION BELOW
- Involve setting up of one full time data collector, and collection of primary data where needed.
- idem, but more needed in case of more data collection

Question 8

In order to understand the status of biological targets, threats, conservation management, and social well-being, how much time does it take to establish a measures program (human capacity, organizational systems, program alignment, etc.), define appropriate indicators and collect data to develop an understanding of status at each scale?



Comments:

NI:

- The challenges of scale and combining all data from lower scales will likely take some time.
- One can gain a snapshot understanding of the status of these parameters with a study, but it takes years to fully comprehend what is taking place, why, and to develop an appropriate data collection and management system to truely understand what is happening.
- depends on the species, habitat type or scale but at least a year for just a project and more as you scale up
- i TICKED 1-2 YEARS BECAUSE IT DEMANDED A RESPONSE BUT I CAN'T REALLY COMMENT dependent on availabiltity of information, other organisations, number of networks. CAn't quantify this.
- The process of definition of indicators becomes the key issue and should take the same amount of time at all scales
- it is much larger (in light of LHNI)
- Supervisory role
- Setting up of core unit and satelite unit in participating countries, and eventual data collection and establishment of data management system

Ecoregion:

- The real intensive work will be done at the ecoregion and landscape scales, so I would think that these would take more time to establish.
- none required at this scale
- dependent on availabiltity of information, other organisations, number of networks. Can’t quantify this.
- it could go slightly more than 2 years based on the criteria
- The most work should be done at the ecoregion level
- Setting up of core unit and satelite unit in participating countries, and eventual data collection and establishment of data management system
- Skip

Landscape:

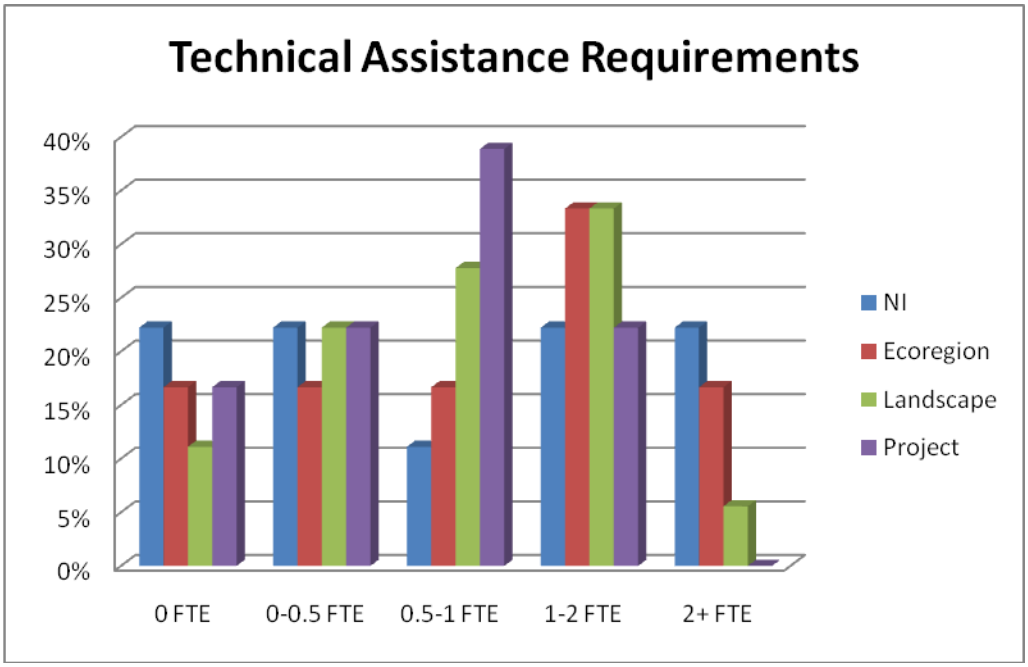
- The real intensive work will be done at the ecoregion and landscape scales, so I would think that these would take more time to establish.
- dependent on availabiltity of information, other organisations, number of networks. Can't quantify this.
- could be done within a year
- Setting up of core unit and satelite unit in participating countries, and eventual data collection and establishment of data management system
- landscape and project integrated

Project:

- Just guessing based on the relatively smaller scale, but this could well take longer.
- I CAN'T ANSWER THE QUESTION BELOW EITHER
- Most project staff will be contributing advice and data at the program level
- Setting up of a unit and support system for data collection and data management system.
- avarage, some indicators need more time

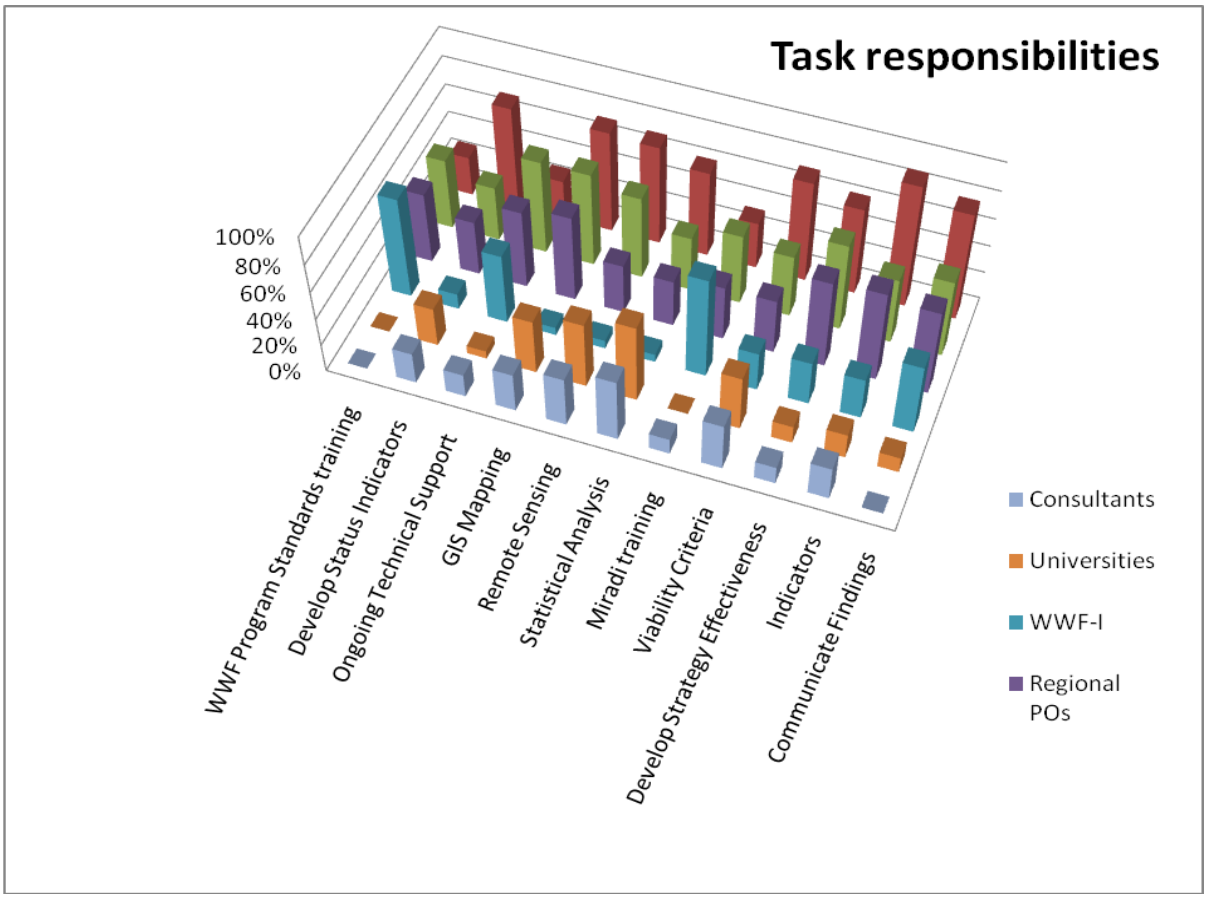
Question 9

In order to understand the status of biological targets, threats, conservation management, and social well-being at each of the following scales, how much technical support and guidance is needed to support field staff for each WWF geography?



Question 10

Depending on the answers above, who is best suited to complete the following tasks?



Comments:

WWF Program Standards Training

- Should be centralized to minimize number of FTEs.
- I hesitate to make recommendations on these, as the situation varies so greatly from one field office to another, between one donor NO and another, between one PO and another, etc. So much of this depends on the level of expertise available in a field office or PO. In general, the closer one can keep this activity to the place where it is happening, then the mroe effective it will be.
- all of these answeres to 17 completely depend on the field office and their capacity. some can do it there some cant.
- This is a good training for conservation practitioners
- through the trainers in NOs / POs being trained by Internationa;
- Process already in place and led by WWF-I
- WWF-I provides capacity building to POs
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Best done by upper level WWF staff with a in-depth knowledge of programatic goals
- This involved strategic planning for implementation on the ground, which can involved donor NOs to enable donor requirement input
- best known in WWF-US

Develop Status Indicators
- This requires on the ground knowledge and scientific support.
- through agreeing clear purpose and 'questions' that need to be understood
- Field offices should always be involved in development, planning, training, and implementation
- it is better if the two team could sit together
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- same as above with direct input from field staff
- Field office would normally hold primary and most secondary data needed for this purpose
- extensive field knowledge needed

Ongoing Technical Support
- Again, a degree of centralization makes sense here. In some cases, Regional POs may be better due to proximity.
- ideally ownership and capacity would be developed nationally or regionally. but in interim external support may be needed
- Team work essential to get various perspectives
- PO sometimes needs support from donor NO
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Donor NO can be involved in this or appoint a consultant to provide technical support
- technical background knowledge WWF-US

GIS Mapping
- capacity is not present, and won't be anytime soon
- This is a specialized skill requiring lots of software and equipment. It can be done remotely so it can be centralized.
- Depending on field office capacity
- either in local office or local institutions
- Capacity building for field offices and other partners essential
- PO has sound capacity, but matter of timing allocation
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- anyone with appropriate expertise
- Field office should have capacity in completing this, while donor NO can be involved in completing this task
- data work at field office, technical support from WWF-US

Remote Sensing
- capacity is not present, and won't be anytime soon

- Again very easy to centralize. Universities a great source of support.
- Depending on field office capacity
- technical expertise
- donor NO should help
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Field office should have capacity in completing this, while s taskdonor NO can be involved in completing thi
- data work at field office, technical support from WWF-US

Statistical Analysis
- let this work be done locally (within the region)
- Depending on field office capacity
- as above - certainly other analysis of data needs to be conducted by programme staaff and other stakeholders to ensure they buy in and understand the analysis
- technical expertise
- PO can have the capacity
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Field office should have capacity in completing this, while s taskdonor NO can be involved in completing thi
- done by data collector

Miradi training
- This is a good training for conservation practitioners
- as with prog standards and technical support
- led by ?
- PO can have the capacity (easy and user friendly software)
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Depending on capacity of field office, this can either be complted by Field office, donor NO or consultant well-verse in the software
- best known in WWF-US

Viability Criteria
- Requires expertise. Can be facilitated by Standards trainers, but ultimately needs special knowledge.
- as in prog standards and technical support
- Consultants in coordination with field offices and local experts
- criteria for each has to be thoroughly derived
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.

- same as above
- Field office or other institutions that holds the data of the area
- extensive field knowledge needed

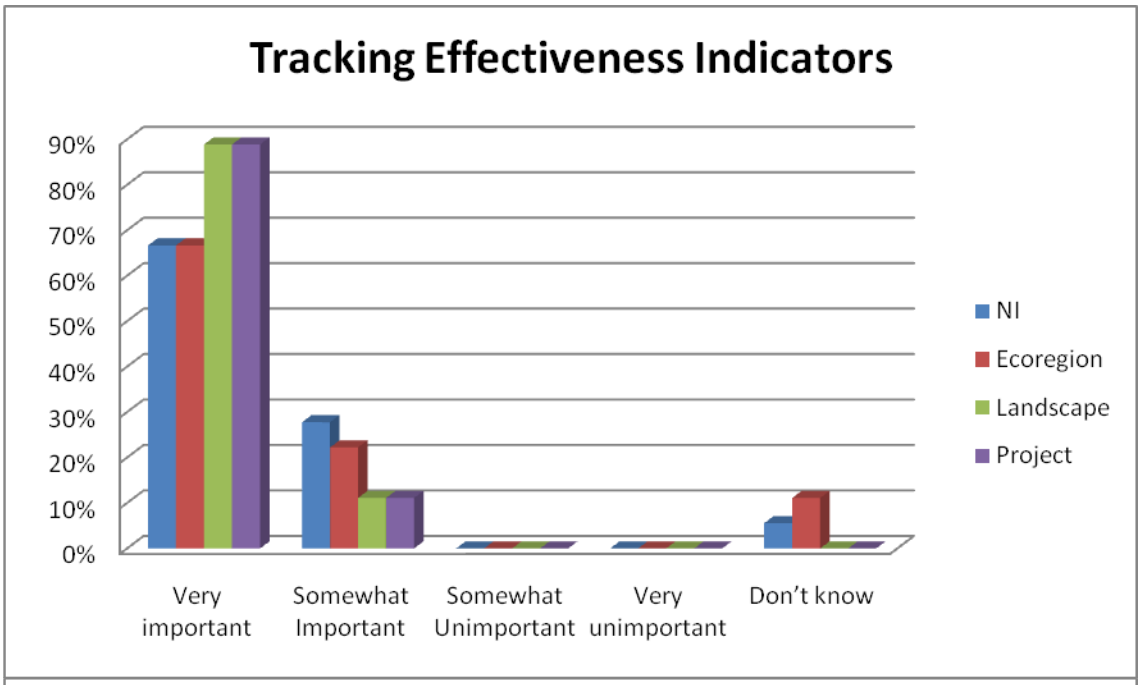
Develop Strategy Effectiveness
- this is adaptive management yes? So needs to be owned by programme
- essential to involve people on the ground and all relevant stakeholders
- donor NO and PO have to discuss
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Requires institutional knowledge
- can be conducted in collaboration between Field Office and donor NO

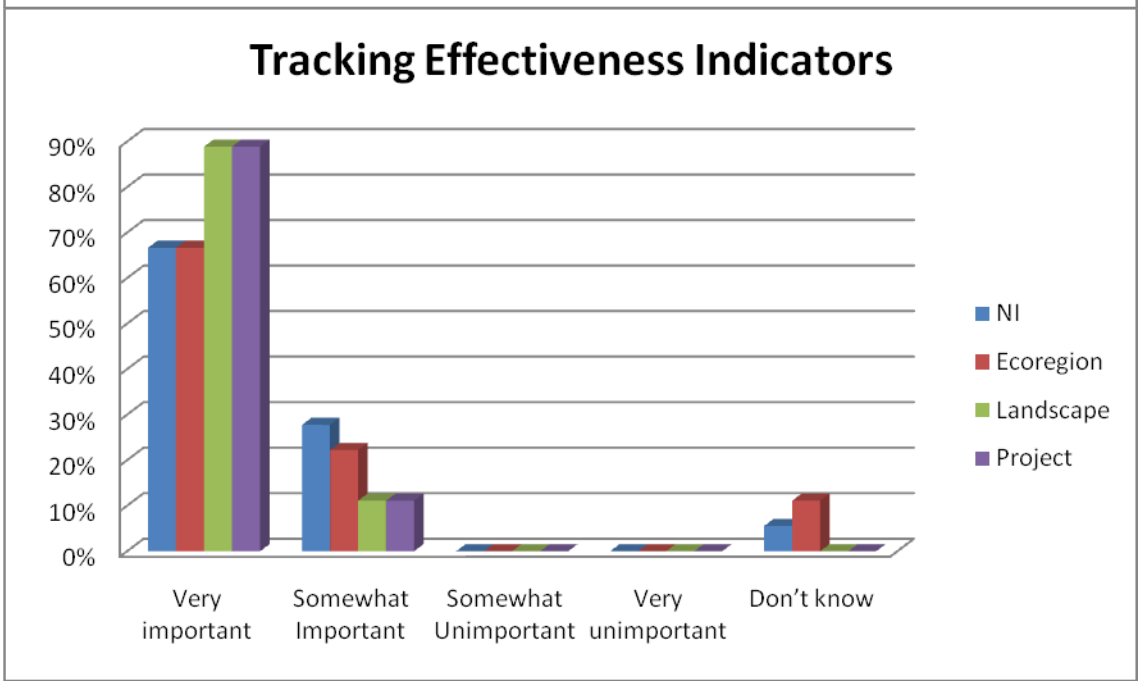
Indicators
- ? not sure what this line means here.
- needs to be fully owned by programme but possibly with external facilitator (consultant?) to ensure rigour and help
- Same as status indicators
- donor NO and PO have to discuss
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- extensive field knowledge needed

Communicate Findings
- Depends. Donor NOs etc could help in disseminating broad message for fundraising.
- Conservation successes should be promoted at relevant levels
- all those involved as partners in the process should be involved
- Coordinated action between field and donor NOs
- PO can do it
- applying to all tasks, while CURRENTLY the entities checked are the best suited, eventually the goal would be to transfer these capacities away from the donor NOs and WWF-Int to the POs and field offices.
- Should be done by WWF staff
- wider scale

G. *Question 11*

One method to measure the effectiveness of WWF strategies is to build a results chain that maps out the logic of a conservation strategy; and then define indicators that will track progress on the strategy in the short-, medium-, and long-term. In order to achieve WWF program goals, how important is it to track these indicators over time?





Comments:

NI

- The overall biological goals for NIs are far into the future, so interim indicators are very important. The only tricky thing is that the results chains for many NIs are fairly generalized. Often the indicators are composites of those at smaller scales (eg, X started in 3-5 landscapes).
- We believe the results chain analysis is a good process at all levels (NI, ER, landscape, Project). However, as the level of intervention becomes more specific (i.e., landscape and project), then more specific and very useful information can be acquired from this analysis.

- I would suggest a tiered monitoring system with increasingly levels of details as you get more specific. the PURPOSE of monitoring may be slightly different for different levels. NI level - what are the key issues - for GPF, for reporting, for tracking impact, for learning lessons at highest level
- Understanding of causal context based on long-term experience and knowledge of the area can help the process (making sure that the results of result chains are relevant)
- effectiveness measurement by indicators very important
- for all scales, tracking these indicators is the most essential monitoring as this will tell us the effectiveness of our interventions
- The most important function of a measures program is to track changes in indicators over time, at all levels.
- to assess effectiveness of WWF; and to plan future strategy
- general overview

Ecoregion

- Any interim indicators here would be for more far-reaching results (eg, policy passed, % forest conserved). These are important, but hopefully will be relatively easy to observe.
- effectiveness measurement by indicators very important
- for all scales, tracking these indicators is the most essential monitoring as this will tell us the effectiveness of our interventions
- The most important function of a measures program is to track changes in indicators over time, at all levels.
- to assess effectiveness of WWF; and to plan future strategy

Landscape

- Interim results for a strategy often depend on change at a larger scale. Achieving these results show the broader impact of a strategy to ultimately help the biological targets.
- effectiveness measurement by indicators very important
- for all scales, tracking these indicators is the most essential monitoring as this will tell us the effectiveness of our interventions
- The most important function of a measures program is to track changes in indicators over time, at all levels.
- to assess effectiveness of WWF; and to plan future strategy
- field level, combined landscape and project

Project

- Interim indicators at this level are most likely to allow teams to adapt their workplans as needed.
- at this level I think priority needs to be given to participatory reflection with stakeholders / partners about what works what doesn't as well as collection of data.
- effectiveness measurement by indicators very important
- for all scales, tracking these indicators is the most essential monitoring as this will tell us the effectiveness of our interventions

- The most important function of a measures program is to track changes in indicators over time, at all levels.
- to assess effectiveness of WWF; and to plan future strategy
- field level, combined landscape and project

Question 12

Is there anything else that WWF should know or consider regarding conservation measures?

- Short or medium term effectiveness (#19) is really important but is not "status" or "conservation management" Should differentiate, and support.
- It really needs to be bottom up (from the field) and not top down (from WWF US) for it to be accepted. It should be integrated into any project as default, not added external work.
- We think that we should be focusing much more effort on integrating conservation planning and measures with performance monitoring of programmatic conservation interventions. Similarly, our experience in Namibia reflects a much stronger "opportunity" driven approach for planning and monitoring than what is promoted through Measures to date. We believe this is a weakness of the current focus of Measures that needs to be rectified, as if we followed this approach exclusively we would spend more time collecting data against threats than we do against achievements. In our case, the latter is much more meaningful, than the former.
- M&E should be built into the budget of WWF at all levels from WWF-I, donor NO's, NO's, PO's, NI's, ecoregion, landscapes, and projects. Support from central support teams is critical if there is to be any consistency and rigor to allow measures to be rolled up. It takes time to get it right, and it's not easy - otherwise we would have been doing it all along!
- future measures training and tracking can be done by staff based in the region.
- YES!
  Greater ownership should come from the programme of the purpose, the big questions that measures data can be used to solve. This is critical for any future work.
  Greater understanding of how this work fits into a broader strategy of PRogramme DEsign, Monitoring and EValuation (e.g. reflection and learning, qualitative analyses, participatory M&E etc.).
  -greater investment in engaging with programme staff (and possibly external partners) in the initial conception of the measures process to clearly articulate what those big questions are to secure their buy in.
  Social Measures work needs refining further - it;s important but we're not quite there yet.
  - greater focus needs to be placed on the process of engaging stakeholders in understanding the links between people and conservation first and then pulling out some indicators based on this qualitative analysis and clearly focusing what's particularly important for WWF to understand through this type of data (or what other options and approaches could be used to understand this issue better - e.g. through community based participatory analysis etc.).
- Programmatic alliance with other M&E efforts, and adaptive management

- this is at pilot phase, so there are things to be considered especially for conservation management and social indicators.
- There needs to be a clear understanding of the distinction between information-gathering for planning and that for baseline collection
- Coordination between WWF field offices annment d donor NO should be improved. Role of each when it come to measure activities should be well defined, for alignment in expectation etc.