

Engaging with Communities on Freshwater Protected Area Establishment and Management

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Villagers bring in their catch of daaga, a kind of sardine on the shores of Lake Tanganyika in the village of Mgambo, Tanzania.

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Purpose of this Study

This report was prepared by David Groenfeldt for The Nature Conservancy's Freshwater Community-Based Conservation program², and contributes to the knowledge base needed for developing TNC's program on freshwater community-based conservation and particularly in the context of Indigenous or traditional communities collaborating with government conservation agencies and/or conservation NGOs in co-managing protected areas. The term "Indigenous Peoples and Local Communities" (IPLC)³ is used to refer to culturally distinct communities in close interaction with local land and water resources. A guiding principle embedded in the study's approach is that IPLCs should ideally serve as the direct managers or co-managers of protected areas, with conservation scientists playing a support role in establishing the PA; developing governance structures; monitoring ecosystem health, species status, and water quality; and other technical activities.

The rationale in forging partnerships between IPLCs and conservation organizations is a common interest in healthy freshwater ecosystems. The advantages of healthy ecosystems to IPLCs include a stronger subsistence base (e.g., more fish and more secure irrigation), safer drinking water, new income opportunities (ecotourism and new markets for crafts, crops, and non-timber forest products), protection of their biocultural heritage, and enjoyment of territorial sovereignty. The interest of conservation organizations focuses on conserving aquatic and riparian biodiversity and habitat to meet the needs of nature and people. Conservation advocates have come to appreciate both the ethical and practical arguments for engaging with IPLCs in protecting freshwater ecosystems for different but overlapping reasons, and IPLCs have come to view protected areas as an overall benefit (when they are co-managed) rather than a threat. This paradigm of an alliance of interests, rather than a competition over resources, is a new development within the world of conservation policy. Co-management which was once considered radical, has become the new norm. Fortress conservation, which formerly served as justification for evicting local communities from protected areas, has become the rare exception.

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³ The Nature Conservancy's definition of "community" is as follows: a well-defined group that self-identifies as a people and that has a shared identity, culture and/or values. We use the term "indigenous and local communities" to refer to communities that possess a close and profound relationship with their natural landscapes (territory, area or habitat) which they depend on for cultural, religious, health and economic needs. This includes the original inhabitants, generally indigenous people, of a place and/or migrants who have settled in a place who have the aforementioned relationship with the natural landscape.

There are three reasons for this policy reversal. One reason is that co-management seems to bring better conservation outcomes, and if it does not, the cause can usually be attributed to faulty implementation rather than to the concept itself. The second reason is that co-management brings powerful incentives on both sides to seek new opportunities and solve problems as they arise; there is a healthy, creative dynamic that is engendered which itself is important for sustainability. And the third reason is that co-management is consistent with the unfolding human rights agenda which embraces cultural diversity as a fundamental right, the "right to culture".

The Urgency of Freshwater Conservation

A recent WWF report estimates an 83% drop in global populations of freshwater vertebrates over the past 50 years, with fully one third of freshwater fish at risk of extinction (Acreman and Duenas-Lopez 2019).⁴ Yet few protected areas incorporate *freshwater* biodiversity into their conservation mission in any serious way, and protected areas focusing specifically on freshwater biodiversity are even more rare. Indeed, the only cases I am aware of focus primarily on the economics of fisheries in confined lakes, rather than addressing the messier challenge of conserving (or first restoring) aquatic biodiversity in rivers. Inviting IPLCs to co-develop a freshwater conservation agenda will go a long way toward filling the gap of freshwater protected areas and rebalancing the terrestrial-aquatic divide within conservation biology. Local communities that depend on local natural resources for economic, social, and cultural "buen vivir" (Solon 2017), will naturally integrate freshwater and terrestrial priorities.

Freshwater Conservation is Different

Freshwater conservation needs to be addressed specifically because freshwater ecosystems are qualitatively different from either terrestrial or marine ecosystems. Pittock et al (2015, p. 576) cite five unique features of freshwater systems:

- **Flow regimes:** Water is critical for maintaining freshwater biodiversity, including the volume, timing and quality of surface water flows as well as surface water–groundwater dynamics.
- **Longitudinal and lateral connectivity:** Protecting water flows along rivers and from channels onto floodplains is essential. This involves preventing or removing artificial physical and chemical barriers and providing bypass facilities for aquatic wildlife.
- **Groundwater–surface water interactions:** Protection of groundwater flows is needed since most surface waters depend to some extent or at some times on aquifers (the water table).
- **Relationship to the broader landscape:** Wetland systems in a protected area cannot usually be 'fenced off' from impacts arising in the wider terrestrial landscape and will normally require integrated threat management at the catchment scale.
- **Multiple management authorities:** Different government agencies usually have overlapping and often conflicting responsibilities concerning freshwater management. Conservation is complicated by the need to coordinate management activities among government agencies with diverse mandates.

⁴ See also this WWF blogpost, <https://medium.com/@WWF/its-our-planet-too-emergency-action-plan-for-the-world-s-freshwater-species-f6470e13b6d3>

With the growing popularity and sophistication of landscape-level approaches to natural resources management (for example, see the Concept Note for the 2019 Global Landscapes Forum in Bonn, https://www.globallandscapesforum.org/wp-content/uploads/bonn-2019/GLF_Bonn_2019_Concept_note.pdf), the need for a solid field of freshwater conservation is only enhanced. The new paradigm of protected area co-management provides an opportunity for a "reset" of freshwater conservation as a critical dimension of landscape approaches, the 17 Sustainable Development Goals, and climate change resilience.

It Takes a Village (to ensure sustainable and just conservation outcomes)

The terminology that dominates the literature on community-led conservation is ICCA, or "Indigenous and Community Conservation Areas". Here is Wikipedia's concise summary of what this means:⁵

Indigenous and community conserved areas (ICCAs), or indigenous peoples' and community conserved territories and areas, are spaces de facto governed by indigenous peoples or local communities with evidently positive outcomes for the conservation of biological and cultural diversity. In ICCAs, the continuation, revival or modification of traditional practices...succeed in protecting and restoring natural resources and cultural values in the face of new threats or opportunities. Some ICCAs are situated in remote ecosystems that have had minimum human influence, while others encompass areas of various regulations and magnitudes within regions strongly affected or modified by human occupation. ICCAs may or may not fit the IUCN definition of "protected area" but, when they do, they can fall into any IUCN protected area categories.

The following three characteristics are used to identify an ICCA:

- A strong relationship exists between an indigenous people or local community, and a specific site (territory, ecosystem, species, habitat). This relationship is often embedded in the people's or community's sense of identity and/or dependence for livelihood and well-being.
- The indigenous people or local community is the major player in decision-making and implementation regarding the management of the site, implying that a local institution has the capacity to develop and enforce decisions (other stakeholders may collaborate as partners, especially when the land is owned by the state, but de facto decisions and management efforts are predominantly taken by the concerned people or community).
- The people's or community's management decisions and efforts lead to the conservation of habitats, species, genetic diversity, ecological functions/ benefits and associated cultural values, even when the conscious objective of management is not conservation (i.e., it may be livelihoods, security, safeguarding cultural and spiritual values, etc.)

⁵ https://en.wikipedia.org/wiki/Indigenous_and_community_conserved_area

The institutional support for the ICCA paradigm includes the major conservation NGOs (e.g., WWF, TNC, CI) think tanks (IIED), coalitions (Global Forest Coalition, and Rights and Resources) as well as IUCN, GEF, CBD, IBPES, and UNDP (through the Equator Initiative), and more recently, the UN Permanent Forum on Indigenous Issues. But the center of the ICCA world is found not in any one organization, but in a new partnership that joins most of these organizations together, the ICCA Consortium (<https://www.iccaconsortium.org>).

1. BEST PRACTICE

As befits a new paradigm, one of the first products of the ICCA "industry" is advice about best practices that can advance the new paradigm. The guidance tends to be based more on the social science literature than on process documentation of actual implementation of ICCA initiatives, but generally seems reasonable and useful. Meanwhile, the implementation process and outcomes of particular initiatives (discussed in Section 4) are sorely under-studied and typically report on the initial phase of establishing the ICCA a decade or so in the past, with no updates since. Thus, the best practices presented in this section remain frustratingly theoretical.

One element of best practice in advocating for the rights of ICCAs/IPLCs is to recognize the distinction between Indigenous Peoples as such, and local communities that are not able to claim indigeneity in either a cultural or legal sense. There are usually national laws granting special consideration to recognized Indigenous or otherwise historically marginalized traditional groups (e.g., in India the legal status is "tribal" which qualifies for certain legal benefits under the Indian constitution, even though the Indian government does not recognize these tribal communities as officially "Indigenous"). Even if there is no national advantage to claiming Indigenous status, that designation has a meaning under international "soft law" through the provisions of the UN Declaration on the Rights of Indigenous Peoples (DRIP). Thus, when the Kenyan government evicted the Sengwer ethnic community from the Mount Elgon and the Cherangani Hills areas, citing the need for conserving the forest in order to protect the watershed, it sparked a protest from the UN Special Rapporteur on the Rights of Indigenous Peoples. That protest did not sway the Kenyan government, but it was enough to prompt a suspension of EU funding to Kenya for the WaTER Project (Malmer et al 2018). Other recent cases that have affirmed the rights of Indigenous communities threatened with eviction from protected areas include: (1) 2014 *Kaliña and Lokono v. Suriname* in Inter-American Court of Human Rights⁶ and (2) 2017 *Ogiek Judgment* in African Court on Human and Peoples Rights⁷ (Ibid, p. 38).

There has been progressive recognition of Indigenous peoples as a distinct group in several global fora, most notably through the establishment in 2000 of the UN Permanent Forum on Indigenous Issues, but also through the formal inclusion of Indigenous Peoples in the CBD, recognition as a formal UN 'Major Group'; formal advisory mechanisms established by the Global Environment Facility, and the last World Conservation Congress which opened the door for Indigenous organizations to acquire IUCN membership (Ibid, p. 38). This reflects a larger global trend towards recognizing the unique cultural connection that Indigenous Peoples have with their traditional lands and waters.

⁶ www.ijrcenter.org/2016/02/12/iacthr-confirms-indigenous-peoples-land-and-access-to-information-rights/

⁷ <https://ilg2.org/2017/05/28/ogiek-the-african-court-of-human-and-peoples-rights-first-decision-on-indigenous-rights/>

Best Practice for engaging local stakeholders in conservation initiatives

The default context addressed in this report is that local stakeholders (the IPLC) are approached by a conservation organization or partnership to ascertain their interest in collaborating on a conservation initiative. Typically, there is a pre-existing organization, whether formal or informal, and a pre-existing protected area, whether defacto (traditional use area of the IPLC) or legally recognized (e.g., an adjacent or overlapping national park). What comes next? How can we as outsiders with a specific agenda of freshwater conservation, approach the local community to start a conversation?

Based on a review of 82 case studies and 31 meta-analyses published from 2011 to 2015 (Sterling et al 2017), the following guidance is offered for engaging local stakeholders in planning and eventually co-managing a conservation area:⁸

First Steps

- Identify stakeholders and recognize and respect stakeholder values
- Identify the right balance of stakeholders
- Engaging too large a group can dilute outcomes,
- A focus on “key” (defined by stakeholders themselves as well as external organizers) stakeholders is important
- Invest in learning about the stakeholders' culture and value system
- Be sensitive to gender roles/divisions as well as ethnic and factional complexities

Timing and intensity of stakeholder engagement

- Engage key stakeholders as early as possible and work collaboratively to incorporate stakeholders into key activities in all phases of the decision-making process.
- Involve communities in setting and upholding rules, such as monitoring and enforcement.
- Participation consisting of passive listening rather than active involvement may not be effective at reaching outcomes.
- Hidden barriers to participation, such as power inequities, inadequate funds for travel to meetings, lack of background knowledge, and language barriers, inhibit a true collaborative process.

Stakeholder motivation for engagement

- Stakeholders have different motivations for participating in a program, and as such the effectiveness of projects can be enhanced by identifying significant predictors or motivators for participation.
- When stakeholders self-select, they are most motivated by non-financial or intangible benefits, including social factors such as personal well-being, conservation for future generations, heritage, or by providing a public environmental good.

Leadership

⁸ This is a partial and highly summarized list of best practice guidance. See the full (open access) article for details: <https://reader.elsevier.com/reader/sd/pii/S0006320717302069>

- Success of conservation projects will be enhanced if leaders come from within local communities, avoiding an outside-in approach to management when feasible;
- Leadership capacity should be expanded through training, professional development, and mentoring.

Partnerships

- Trust-building involves effective communication, transparency, outreach, and co-learning throughout.

This guidance is broadly consistent with the organizational rules suggested by Elinor Ostrom (1992) in her book, *Crafting Institutions for Self-Governing Irrigation Systems*. Below I adapt Ostrom's rules for community-based irrigation groups to the context of community-based

Guidance for Establishing an Effective ICCA

[adapted from Ostrom (1992)]

- Establishing protected areas
 - Building consensus among IPLCs, the local and national conservation community, and TNC about the purpose of the protected area (e.g., safeguarding river health and/or particular aquatic species; helping IPLCs realize their socio-cultural and economic values, etc.).
 - Setting and mapping the boundaries
 - clarifying membership (who has access to protected area resources?)
- Establishing rules
 - about conservation (e.g., fishing limits; no-catch areas; controlling artisanal mining, etc.)
 - about how the rules may be changed (by a committee? by general vote?)
- Monitoring and enforcement (sanctions)
 - establish how the monitoring will be done
 - agree on what the sanctions will be
 - decide who will perform these functions (or how s/he will be selected) [park guards from the community? hired from outside? Accountable to whom?]
- Conflict resolution mechanisms
 - help the community establish something based on traditional custom
 - address whether and how outsiders (local government?) would be involved
- Ensure the community's right to organize is respected by outside govt. authorities
 - very localized committee and
 - nested levels to cover the entire protected area
- Capacity Building - Assess needs among
 - Indigenous / local community
 - local govt functionaries
 - local businesses, especially those impacting local rivers/waters

conservation. Regardless of whether the community is the sole manager of the protected area, or is a co-manager with a government agency, the community's organization has almost identical organizational requirements.

What does organizational development have to do with community conservation? Almost everything! Whether community conservation fails or succeeds depends more than any other single factor, on the resilience of the community organization that is implementing the conservation management or co-management.

Best Practices Regarding Land/Water Tenure

The following recommendations are excerpted from Borrini-Feyerabend et al. (2010), pp 33-34. *"To be effectively managed, ICCAs should encompass coherent socio-ecological 'units'. In ecological terms, coherence may refer to the fact of encompassing an eco-system (e.g. a watershed) ... common culture and size are also important concerns, and communities that are naturally constituted and relatively small (e.g. a village rather than a rural municipality) have simpler and more frequent chances to meet and organize (social cohesion)."*

"In terms of ICCA land tenure, community ownership of the land can effectively sustain an ICCA. Local by-laws and municipal ordinances can be used as grounds on which to establish regulations for an ICCA as can long-term and renewable community leases (e.g., >50 years, as currently stipulated for social forestry contracts in Vietnam). The important element is that the arrangements succeed in developing a strong association between the natural resources and the relevant communities."

"A few tenure characteristics, however, appear to offer great strength to ICCAs. The first and the most important is the fact that property...rights (including rights to freshwater resources) are held in common, fostering the engagement of an entire community in management, wise use and conservation. The second is that the community is self-identified, and not subject to arbitrary definition by outsiders...The third characteristic is that— when common property is at stake— the land and resources are also inalienable, indivisible and established in perpetuity, i.e. cannot be sold....This ensures that the community cannot be lured or forced to cede control, and it has incentives to invest in the long-term."

Other Best Practices

Additional best practices pertain to the next phase of community conservation, when the organization has formed, and is undertaking its conservation duties. Here the organization and its leaders, perhaps in dialogue with conservation partners, would devise the details. For example, the task of monitoring might require training in how to test water quality, or what observations of fish, birds, or wildlife could be used as indicators of riparian health. Similarly, the task of enforcement might be met through training guards, who might come from within the community, be hired from outside, or be provided through a co-management agreement with the Park Service, for example. These and other details will depend on the specific context for which there is no best practice guidance, other than ensuring that the community organization is functioning well.

2. REVIEW OF GUIDELINES

While best practice guidelines deal with the implementation of community managed conservation areas, the guidelines considered in the section have to do with conservation policies: What policies can provide an enabling environment for IPLC self-managed or co-managed conservation success? How can we ensure that the human rights, including cultural rights and gender rights, are being respected through the policies and initiatives of the professional conservation community? How can we engage with local communities in a supportive manner devoid of arrogance or colonialism?

At the risk of over-simplifying, the guidance on conservation policies related to community co-management can be divided into two types: (1) Guidance from conservation professionals on how to engage with IPLCs for effective conservation outcomes, and (2) Guidance from social justice and human rights advocates on how to empower IPLCs, safeguard human, gender, and cultural rights, and enhance livelihood security. There are also attempts to combine both perspectives, but these tend to be written by conservation professionals, albeit socially progressive ones. For purposes of listening to the full range of perspectives, it is important to make an extra effort to learn directly from Indigenous Peoples and local communities.

Indigenous People's Rights Commonly Ignored ⁹

The rights of indigenous peoples continue to be violated in the course of conservation initiatives, in particular the following rights set out in the United Nations Declaration on the Rights of Indigenous Peoples:

- (a) Right to self-determination, to freely determine their political status and to freely pursue their economic, social and cultural development (art. 3);
- (b) Right to self-government in matters relating to internal and local affairs (arts. 4, 5, 33 (1), 34 and 35);
- (c) Right to free, prior and informed consent (arts. 18, 19, 29 (2) and (3) and 30 (2));
- (d) Right to lands, territories and resources that indigenous peoples possess by reason of traditional ownership or other traditional occupation or use (arts. 8 (2), 10, 14, 15 (1), 16, 17, 18, 25 and 26 (1));
- (e) Right to life, physical and mental integrity, liberty and security; right to live in freedom, peace and security as distinct peoples (arts. 2, 7, 8 (1), 10, 15 (2), 22 and 44);
- (f) Right to the conservation and protection of the environment and the productive capacity of their lands, territories and resources (arts. 29 (1) and 41);
- (g) Right to cultural and spiritual traditions, customs, heritage and traditional knowledge (arts. 9, 11, 12, 15 (1), 31 and 34);
- (h) Right to traditional medicine and health practices and to the conservation of their medicinal plants, animals and minerals (art. 24);

⁹ Excerpted from UNPFII 2018 report, "Study to examine conservation and indigenous peoples' human rights" <https://undocs.org/E/C.19/2018/9>

- (i) Right to maintain and develop their political, economic and social systems, to be secure in the enjoyment of their own means of subsistence and development, to engage freely in traditional and other economic activities and to determine their own development priorities (arts. 21 and 23);
- (j) Right to transboundary relationships (art. 36 (1));
- (k) Right to use and maintain languages and knowledge (art. 13 (1));
- (l) Right to establish and control educational systems and institutions (arts. 14 (1) and 15 (1));
- (m) Right to non-discriminatory employment (art. 17);
- (n) Right to redress for lands, territories and resources that are taken, occupied, used or damaged (arts. 8 (2), 11 (2), 20 (2), 28 (1), 32 and 40).

Guidelines for Community Co-managed Conservation

Given the richness of initiatives supporting community co-management, it is surprising that there are relatively few formal statements of the basic principles underlying the co-management approach. By comparison, when the new paradigm of "Integrated Water Resources Management" (IWRM) was emerging in the early 1990s, a major conference held in Dublin in 1992 endorsed a concise set of four best practice principles, known as "the Dublin Principles," which functioned as an enduring reference point for the IWRM approach.¹⁰ We do not have such a core set of principles describing ICCAs; not even from the ICCA Consortium itself (<https://www.iccaconsortium.org>) which serves as the go-to source of guidance, examples, and discussion about the ICCA approach. The implicit message seems to be that ICCAs are complicated and not conducive to a reductive list of key principles.¹¹ Instead, this section on "Guidelines for Community Co-managed Conservation" features more limited sets of guidelines:

Bennett Code

[assets.survivalinternational.org/documents/298/bennett_code_May_2010.pdf](https://www.survivalinternational.org/documents/298/bennett_code_May_2010.pdf)

- Gordon Bennett was the lead lawyer in the landmark case which overturned the Botswana government's eviction of the Bushmen of the Central Kalahari Game Reserve. Based on his experiences of how tribal people are affected by conservation projects, Mr Bennett has drawn up a Code of Conduct for conservation organizations, which has been endorsed by Survival International. The objective of the Bennett code is to create a fair, equal dialogue between the conservation organization and the local people, ensuring that – if the tribe's rights are infringed, or if the conservation organization feels that a community is not keeping to their side of an agreement – either party has a way to seek justice.

IUCN Policy on Conservation and Human Rights for Sustainable Development (2012)

<https://www.ohchr.org/Documents/Issues/Environment/.../IUCN2.pdf>

- This statement is an overarching policy for IUCN to consider and integrate human rights issues into its work. It builds on already established IUCN policies on gender (adopted in

¹⁰ https://en.wikipedia.org/wiki/Dublin_Statement

¹¹ The ICCA Consortium document which comes closest to providing core principles is Policy Brief #4, *ICCAs and Overlapping Protected Areas: Fostering Conservation Synergies and Social Reconciliation* (<https://www.iccaconsortium.org/wp-content/uploads/2016/11/policy-brief-4-overlapping-protected-areas.pdf>)

1998) and on social equity (adopted in 2000). The statement also reaffirms IUCN's commitment to upholding the 2007 UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and earlier IUCN endorsement of protected area policies, "including the acknowledgement of rights to the restitution of lands taken without free, prior and informed consent and the right to full and effective participation in protected area governance and management." The 2012 statement also adds the further comment (p. 3) that, "Whilst the UNDRIP is an instrument of 'soft' international law, it represents nonetheless a strong moral position on the part of its signatory states and should inspire major conservation actors such as IUCN."

Conservation Initiative on Human Rights (CIHR)

<http://www.thecihr.org>

- established in 2009, CIHR is a consortium of seven international conservation organizations (Bird Life Int'l, CI, Fauna & Flora Int'l, IUCN, TNC, WCS, and WWF) seeking to improve the practice of conservation by promoting the integration of human rights in conservation policy and practice through four basic principle: (1) Respect human rights, (2) Promote human rights within conservation programs, (3) Protect the vulnerable, and (4) Encourage good governance.

Whakatane Mechanism

<http://whakatane-mechanism.org>

- Taking its name for Whakatane, New Zealand where a meeting was held in 2011, the aim of the Mechanism is "to assess the situation in different protected areas around the world and, where people are negatively affected, to propose solutions and implement them." Three pilot assessments were conducted in Congo, Kenya and Thailand in an initial spurt of activity, but the Whakatane Mechanism has been quiet since. Nonetheless, it is often referred to as an honest broker and may have a future role.

Human rights standards for conservation: rights, responsibilities and redress

<https://www.iied.org/human-rights-standards-for-conservation-rights-responsibilities-redress>

- A project of IIED and Natural Justice between 2013-2016, the two organizations "sought feedback on a series of papers that aimed to serve as a foundation for clear guidance about the human rights obligations of conservation actors, and specific details of the rights and forms of redress available." The results were drafted into a series of papers (available on the website) presented to the 2014 IUCN World Parks Conference.

3. LITERATURE REVIEW

This section reports on a single source (Acreman and Duenas-Lopez 2019) which is a systematic survey of the literature, commissioned by WWF-UK, to address the question: "How effective is protected area designation for the conservation and restoration of freshwater diversity?" The following is a summary of key elements of the review. Full citations to the articles referenced in

the Acreman and Duenas-Lopez report are omitted in this summary but can be found in the original article.¹²

Freshwater areas may be protected by association (when they happen to be within areas designated for terrestrial biodiversity) or by design (protected areas created specifically for freshwater conservation). In both cases, unless the entire river basin is protected, the need for connectivity between critical life-stage habitats of migratory species - such as spawning and nursery areas, migratory corridors, and feeding zones, can pose daunting challenges. Azevedo-Santos et al (2018) concluded, for example, that Brazil's protected areas are biased towards terrestrial ecosystems and have limited efficacy in the protection of freshwater biodiversity. However, a study in 2017 by Britton et al. found that fish diversity was much higher within protected areas of Lake Tanganyika than outside of them (as would be expected), although the reserves might be too isolated to act as a source of populations for colonization of less diverse areas of the lake. They also found that fish diversity was up to 50% higher in sections of the Lake adjacent to terrestrial (forests) protected areas, probably through local reduction in sediment deposition and/or pollution.

Catchment Approach

Abell et al. (2017) reported that around the world, about 70% of river reaches (by length) have no protected areas in their upstream catchments, and only 11.1% (by length) achieve fully integrated protection. Given that all freshwater ecosystems are within catchments, there is a need to move from protecting specific areas to 'wholescape' management (Acreman et al., 2018). Concepts, such as environmental flows (Arthington, 2012) or, more broadly, environmental water (Horne et al., 2017) that define the water regime required for freshwater ecosystems, are now being applied across all water bodies within catchments (Arthington et al., 2018).

Madella-Auricchio et al. (2017) studied reptile diversity in Caatinga-Cerrado ecotone areas the Parnaíba Basin, Brazil, where rapid expansion of agriculture threatens biodiversity and hastens its loss. They recorded 40 species on average within National Parks and Ecological Reserves, whereas the mean in other areas sampled was 23 species.

Water Quality

Water quality within protected areas can be affected by upstream land use or within-reserve developments, such as agriculture and tourism. Dudley et al. (2106) recognized that while designated primarily for nature conservation, protected areas supply a range of other ecosystem services to human society, such as water quality improvement by removing pollutants.

Role of Local Communities

Institutions and rules governing protected areas should ensure that they are better embedded in society and that governance should be adaptive to changing challenges (Borrini-Feyerabend et al., 2013). In a global meta-analysis on 165 protected areas, Oldekop et al. (2016) found that

¹² <https://www.wwf.org.uk/protectedareasforfreshwaterbiodiversity>

protected areas associated with positive socioeconomic outcomes were more likely to report positive conservation outcomes. Successful outcomes resulted from co-management regimes, empowered local people, reduced economic inequalities, and maintained cultural and livelihood benefits. Castro et al. (2002) assessed the prospects for conservation in over 660 Ramsar sites worldwide and concluded that the success of site designation improved with increased participation by local stakeholders in conservation and wise use.

Norris et al. (2018) assessed populations of yellow-spotted river turtles (*Podocnemis unifilis*) that were suffering from nest harvesting by humans along a 33km of river that runs between two sustainable use reserves in Brazil. Two years of patrols by park officials to enforce lawful protection regulations had no effect on nest harvesting. In contrast, for one year when community-based management approaches were enacted, harvest levels dropped nearly threefold to a rate (26%) that is likely sufficient for river turtle population recovery.

Kleijn et al. (2011) analysed data from many bird species in African wetlands. They reported that trends did not differ significantly between Ramsar sites and non-designated sites nor between IBAs and non-designated sites. Across wetlands in Africa the increasing area of arable land, livestock numbers and deforestation resulted in increasing degradation of habitats. A key factor was the lack of penalties for violations in protected areas.

Governance Recommendations

Kingsford and Biggs (2012) provide a generic Strategic Adaptive Management framework, with four essential steps, to assist rigorous implementation of adaptive management in aquatic protected areas and for management of environmental flows.

Protected area scale

- Principle 1. The entire catchment with its land, water and biogeochemical resources is the ideal unit to be protected and managed.

Water dynamics and quality

- Principle 2. The flow of water is one of five dynamic environmental regimes that regulate much of the structure and functioning of every running water ecosystem and many aspects of lentic and groundwater systems.

Hydrological, biogeochemical and ecological connectivity

- Principle 3. The spatial and temporal connectivity patterns and processes of aquatic ecosystems in their natural state are important elements for consideration in protected area design and management.

Species-rich habitats, radiations and vital resources

- Principle 4. A primary goal of biodiversity conservation is to delineate protected areas that conserve species-rich habitats and vital resources, important species radiations and the greatest number of threatened endemic species.

Ecological resilience

- Principle 5. Maintaining catchment integrity, natural flow and standing water regimes, the spatial and temporal dimensions of connectivity and native biodiversity hotspots will help to maintain the ecological resilience of aquatic systems in protected areas and support societal adaptations to shifting environmental and climatic regimes.

Broaden participation

- Principle 6. Participation is considered fundamental to promoting the collective action required to respond to disturbance and changes in socio-ecological systems. The participation of a diversity of stakeholders improves legitimacy, facilitates monitoring and enforcement, promotes understanding of system dynamics, improves the capacity to detect and interpret shocks and disturbances and builds trust and a shared understanding for cooperation.

Promote polycentric governance

- Principle 7. In polycentric governance, multiple governing bodies interact and have the power to make and enforce rules within a specific policy arena and geography. This form of decentralized governance is believed to promote local self-organization where more centralized formal procedures seem to fail. p. 39

Main lessons from the Systematic Review

Lesson 1: More monitoring and research is required to quantify the effectiveness of protected areas for freshwater biodiversity conservation and to elucidate the factors that are important for their design, designation, and management.

Lesson 2: Protected areas need to be of sufficient size and to incorporate various connected diverse elements of the waterscape to enable species to breed and migrate.

Lesson 3: Areas designated to protect terrestrial ecosystems can be effective for freshwater biodiversity conservation but may not always adequately integrate issues pertinent to freshwater ecosystem protection.

Lesson 4: Conserving aquatic habitat, including hydrological regime, water quality, waterbody morphology and riparian terrestrial vegetation is vital to supporting freshwater biodiversity.

Lesson 5: Protected areas should reduce pressures from grazing, inappropriate land and water management, pollution, tourism or general human disturbance.

Lesson 6: External pressures in the surrounding landscape can have major control over freshwater biodiversity that may over-ride protection measures. However, in some cases protected areas can provide a defense against human pressures.

Lesson 7: Invasive species pose a major threat to freshwater biodiversity both within and outside protected areas and connectivity may enhance vulnerability. Managing pathways for invasive species can reduce their spread and protection can provide a buffer.

Lesson 8. Laws associated with designation and management of protected areas need to be enforced, but regulation activities should involve engagement with and support for local community initiatives.

Lesson 9: Maintaining traditional management practices that support cultural heritage is a central objective of many protected areas.

Lesson 10: There are many factors, including variations in natural drivers and human pressures, acting on the environment that determine biogeography and are not within the control of protected area managers, such as climate, natural water quality and river channel morphology. However, protected areas may help mitigate the influence of changes in some of these factors.

4. ILLUSTRATIVE CASE STUDIES OF IPLC (CO-)MANAGEMENT

Indigenous freshwater conservation can merge uncomfortably into unilateral armed protection of traditional water and land resources. The Munduruku, for example, have been demarcating ancestral territories along the middle Tapajós River in Brazil since 2014.¹³ Frustrated by the inaction of FUNAI to do this officially, "the Munduruku decided—collectively, in assemblies of men, women, and children—to risk their own lives to demarcate their lands, fittingly, 'to the standards of the state'....For months, warriors cut boundary paths through the woods and encountered the camps of illegal loggers and land-grabbers who had disturbed indigenous sacred sites" (Inman and Smis 2018). One year later the Ipreg Ayu movement was awarded the UNDP's Equator Prize in recognition of their efforts.¹⁴

But most examples of Indigenous freshwater conservation are decidedly less dramatic. This section showcases a range of cases to illustrate the state of the art of freshwater conservation initiatives involving Indigenous Peoples and/or local communities (IPLCs). I have also included some cases that do not have a stated freshwater conservation objective if there is some other interesting lesson to be gained.

Case #1 - Kaa-Iya del Gran Chaco National Park and Integrated Management Area (Bolivia)
Sources: Redford and Painter (2006) and the UNDP Equator Case Study¹⁵

The Integrated Management Area of Gran Chaco was designed and implemented as the result of a collaboration between the Wildlife Conservation Society and the Capitanía de Alto y Bajo Izozog (CABI), the organization representing the 10,000 Guaraní people known as Isoceños. The park, encompassing approximately 3.5 million hectares of Bolivian Chaco, is the only national park in the Americas established on the initiative of a Native American People, and the only one where a Native American organization shares primary administrative responsibilities with the national government. The Gran Chaco includes the largest expanses of dry tropical forests in the Neotropics and had been deeply degraded by overgrazing and commercial hunting.

¹³ <https://vimeo.com/154789915>

¹⁴ <https://www.internationalrivers.org/resources/pr-brazilian-indigenous-movement-receives-prominent-un-environmental-prize-at-cop-21-in>

¹⁵ https://www.equatorinitiative.org/wp-content/uploads/2017/05/case_1348150898_EN.pdf

Independently of WCS, CABI's leadership reached the conclusion that the establishment of a protected area would provide a legal basis for halting the expansion of agriculture and provide a focal point for defining new production alternatives.

Negotiations between Bolivia's government and CABI, on behalf of the Guaraní-Izoceño, began in the 1990s. With technical support from the Wildlife Conservation Society, CABI successfully proposed the establishment of the 3.4m ha park in 1995 and was named co-administrator. The Guaraní-Izoceño won the right to pursue sustainable activities, such as ecotourism and fishing, in some park areas, while closing the entire area to new settlers. The Park also allows a non-contacted group of Ayoreode hunter-gatherers to continue their traditional nomadic lifestyle, albeit within a restricted range. A participatory land use zoning approach has allowed CABI to reach agreements with the majority of the ranchers and farmers in the area, creating a basis for broad participation in the management of the national park.

Two Ramsar site were designated in 2001 including a strip of riverine forest where Izoceño communities and their agricultural activities were concentrated, which entailed adjustments to meet Ramsar guidelines for habitat conservation, while also supporting Izoceño livelihoods through (reduced) farming plus fuelwood and timber, the production of mesquite flour and honey, and small-scale fisheries.

Case #2 - Ese'ija Native Community of Infierno (Peru)

Source: UNDP Equator Case Study¹⁶

The Ese'ija Native Community of Infierno is an indigenous group in Peru whose ancestral homeland is located on the Tambopata River in the Madre de Dios region. The formation of the Ese'ija Native Community of Infierno dates back to 1974, when the Peruvian government passed the Law of Native Communities, which stipulated that indigenous peoples in the Amazonian region were entitled to form communities, have their lands demarcated, and gain legal recognition of those lands. Ese'ija joined with other local inhabitants to form the Native Community of Infierno with title to 9,558 ha of land on both sides of the Tambopata River.

The designation in the 1990s of the Tambopata National Reserve, a 275,000-hectare conservation area mistakenly overlapped with 3,000ha of Infierno's lands and gave the community an idea. The community recovered the 3,000ha but agreed to maintain the tract (30% of their territory) as a natural reserve and enter the business of ecotourism. They contracted with a private partner, Rainforest Expeditions, to construct an Amazonas eco-lodge and after 20-years to transfer the lodge over to the community. Until that time, community members would be trained to independently co-manage the business with 40% of profits going to Rainforest Expeditions and 60% to the community.

The Ese'ija Native Community of Infierno is composed of just over 500 people, 20% of whom are Ese'ijas, 21% Andean immigrants, 23% local immigrants, and 34% mestizos. Prior to the

¹⁶ <https://www.equatorinitiative.org/wp-content/uploads/2017/05/Eseeja-Peru.pdf>

initiative, the community was economically poor, subsisting on agriculture, the collection and sale of Brazil nuts, and small-scale hunter-gathering. Now in addition to the ecotour lodge, the Community has also developed partnerships with conservation NGOs. For example, Conservation International (CI) supports a community wildlife monitoring program where community members gather data that CI analyzes and reports back to the community. Other monitoring programs have been incentive-based, such as the “Harpy Eagle Nest Watching Program.” If a community member locates an active Harpy eagle nest on their parcel of land, they receive a monetary award – a percentage based on the number of tourists that have the opportunity to view it. The ‘finder’s fee’ is paid until the eagle chick fledges, a period that can last up to nine months. A consultative process on the rules governing this program was undertaken in a collective, participatory manner, thereby ensuring community involvement and ownership.

Another species that has benefited from the community’s conservation efforts are the giant otters that inhabit nearby oxbow lakes. Previously, this population of endangered otters was hunted for their pelts or targeted by local fishermen because of their negative influence on fishing returns. Now the community regulates fishing and access rights for the oxbow lakes that form the otter habitats. In cooperation with the Frankfurt Zoological Society, the community set codes of conduct to protect reproductive sites including a ‘special reserve zone’, comprising half the oxbow lake area which are off-limits to tourists and community members alike.

Case #3 - Sociedade Civil Mamirauá (Brazil)

Sociedade Civil Mamirauá is a Brazilian environmental research and policy organization working toward the sustainable management of a vast area of flooded tropical forest and wetlands. In the 1980s, these areas in the state of Amazonas were under severe pressure from commercial fisheries. Local populations began to mobilize in opposition to the degradation of the local environment, forming a social movement called the Preservation of the Lakes Movement. This campaign was supported and backed in the Mamirauá region by the Catholic Church and was bolstered by scientific and legal research.

With the founding of the organization in 1992, Sociedade Civil Mamirauá became co-manager of the 1,124,000 ha Mamirauá Reserve. Initially the state government allowed neither human settlements nor the sustainable use of natural resources within the reserve. Sociedade Civil Mamirauá pushed for integrating alleviation of poverty and creation of sustainable livelihoods into the management model, in stark contrast to traditional Brazilian conservation practice.

By producing a sound, science-based management plan for the Reserve, combining a conservation strategy with sustainable natural resource management activities for the local population, Sociedade Civil Mamirauá provided the state government with a reasoned argument for what was labeled as a ‘Sustainable Development Reserve’ in 1996. The creation of this designation as a category of protected area in Brazilian conservation and development policy was a breakthrough that led to replications: The Amaña Sustainable Development Reserve (1998) located in the course of the Middle Solimões River, near the confluence with the river Japurá, Amaña is one of the largest protected areas of tropical forest in South America with an area of 2,350,000 hectares. Coupled with the Mamirauá Reserve (1,124,000 ha) and its neighbor

Jau National Park (2,272,000 ha), the areas form a combined area of protection of about 5,746,000 hectares, or around 22,000 square miles.

Sociedade Civil Mampirauá currently manages both the Mampirauá and Amaña Sustainable Development Reserves, and has as its overall objective the promotion of biodiversity conservation and sustainable livelihoods through science-based management. The target population is the residents of the two protected areas under the organization's sphere of influence, totaling over 14,000 people. As of 2005, roughly 45 settlement communities in the reserves were carrying out resource management activities which were overseen by Sociedade Civil Mampirauá. The majority of communities concentrate on activities that broadly relate to fisheries, but a number also work in agroforestry, non-timber forest products, and ecotourism.

Case #4 - Association of Manambolo Natives (FITEMA), Madagascar
Source: UNDP Equator Initiative Case Study¹⁷

This association has helped community groups from 12 forest villages in the Manambolo Valley to take advantage of Madagascar's reintroduction of a customary resource management system in rural and coastal settings known as Dina. Traditionally, Dina are local rules or codes of conduct developed and applied by communities and typically passed on as oral tradition. While Dina are still fairly common throughout Madagascar, they do not carry the force of law. The abolition of the Dina system following French colonization of Madagascar in the 17th century led to extensive deforestation as populations grew and unregulated forest conversion to agriculture expanded.

In an attempt to re-integrate such customary rules with laws governing the use of natural resources, the Malagasy state adopted Dina as a legally recognized governance tool in 1996. The new law allowed the transfer of limited management rights over natural resources from the state to community associations according to a renewable contract between the state, the community association and communal authorities. According to the Dina in the Manambolo Valley area, village elders direct the timing, frequency, and quantity of the harvest or use of all forest products, including wildlife, fish, and even honey. Thanks to the work of FITEMA, reviving the Dina system has helped to preserve rainforest habitat, which provides a home for lemurs and other endemic species that fuel a growing ecotourism trade. In addition, FITEMA has focused on relieving pressure on forest areas by increasing and diversifying crop yields in adjacent agricultural zones through introduction of new crops and farming practices and installation of irrigation systems. Currently, local communities manage nearly 19,000 ha of government-owned rainforest under the Dina system; of this, some 1,000 ha have been legally transferred to local jurisdiction through signing of formal agreements with the Department of Water and Forests.

Case #5 - Fishers' Association of the Rural Community of Mangagoulack
Sources: Borrini-Feyerabend et al (2010) and UNDP Equator Initiative Case Study¹⁸

¹⁷ https://www.equatorinitiative.org/wp-content/uploads/2017/05/case_1348150616.pdf

¹⁸ https://www.equatorinitiative.org/wp-content/uploads/2017/05/case_1370356293_EN.pdf

The Fishers' Association of the Rural Community of Mangagoulack (APCRM) was established in 2008 among eight villages (12,000 people) of the municipality of Mangagoulack, in the Ziguinchor region of Casamance. The initiative was a response to declining fish stocks and indiscriminate fishing and resource extraction by outsiders. The agreed upon intervention was the establishment of a community conserved area, where no-takes zones would allow for the regeneration of marine biodiversity. The association has also applied itself to the restoration of degraded rice-growing land through the repair and reconstruction of miles of traditional anti-salinization dykes. Together, these activities have had positive impacts on local food security, biodiversity and community wellbeing.

The local landscape is a tropical estuarine system of winding inlets and mangrove forests traditionally protected by local customs about where members of each village could fish. Gradually, however, local fisheries began to decline, as traditional natural resource management techniques were neglected and fishers from other coastal areas of Senegal – equipped with far larger and more powerful boats than local fishermen, who typically work in wooden pirogues with no engines – began fishing indiscriminately in what was regarded as 'open-access' water. Additionally, the coastal areas where people used to cultivate rice were also declining in productivity due to the degradation of an ingenious system of dams, built in ancient times, but which had fallen into disrepair. The result was that two of the main local sources of food – fishing and rice cultivation – were severely threatened.

In 2008, the fishers' association of Mangagoulack decided to address the situation by establishing a 'community-conserved area' to allow fish stocks to regenerate and lay the foundation for more sustainable management of the waterways. The process of establishing the community-conserved area took several years; during this time, the association initiated a number of complementary initiatives, including mangrove reforestation and banning destructive fishing practices. APCRM has led a campaign against the local use of monofilament nets, burning them where they are found. These nets are cheap and are typically used, quickly damaged, and then discarded in shallow coastal areas, where they remain for years, creating destructive traps for fish and other marine mammals.

The community-conserved area was named Kawawana – an acronym for the Diola expression Kapooye Wafolal Wata Nanang, meaning 'Our patrimony, for us all to preserve'. Kawawana is remarkable in that it was conceived, developed and implemented exclusively by the local fishermen themselves. Where external actors were approached – as in the case of the Centre for Sustainable Development and Environment (CENESTA), an Iranian NGO – it was to request funding for meetings to consult the wider community on the proposed plan. At community meetings, local people identified a number of threats. Primary among them was the challenge of unregulated, open access fishing. A second was the harvesting of marine resources by migrant fishermen from northern Senegal who used tiny mesh nets to catch shrimp, with devastating effects on fish stocks. Because these migrant fishermen operated under a national licence, however, their activity was legal and they could not be prosecuted. A third identified threat was the perceived loss of community cohesion as a result of acculturation and the penetration of foreign values and lifestyles. It was felt that this had degraded local Diola culture, which is characterised by community solidarity and respectful interaction with nature. The community

enthusiastically endorsed Kawawana as a means of simultaneously addressing all of these threats.

Kawawana spans nearly 10,000 hectares and is managed directly by APCRM. To draw a clear distinction between their community- conserved area and the Community Marine Protected Areas (Aires Marines Protégées Communautaires - AMPCs) that already existed in Senegal, the Association named Kawawana an 'Indigenous Heritage and Community Area' (Aire du Patrimoine Autochtone et Communautaire – APAC). AMPCs are declared by the state and managed by a government-appointed official. Local communities are rarely involved in their governance, and at best, tolerate them. Kawawana bears little resemblance to this model, having been conceived, developed and implemented by the local community, and in its combination of modern conservation methods with traditional knowledge and practices.

Case # 6 - Local government initiative in Uganda (Lake Victoria)

Source: John Stephen Okuta, in Borrini-Feyerabend et al (2010), p. 55.

In Uganda, a GEF SGP project supported the participatory development of by-laws and an ordinance for the protection of biodiversity in the Musambwa Islands, an important bird area in Lake Victoria. The exceptional biodiversity of the islands had been for some time under threat by excessive consumption of birds' eggs by resident and transient fishermen. In response to the alarming rate of environmental degradation, the local communities submitted resolutions to their sub-county Councils, which were then consolidated at district council level. Thus, the District Council passed an ordinance providing a legal instrument for the protection of Musambwa Islands as a bird sanctuary. This is nothing less than local communities taking a democratic decision to initiate a conservation initiative! The by-laws and ordinance development are a demonstration that politicians respect the views and aspiration of the local communities when the latter stand together and talk with one voice, and when limited but crucially targeted support is available. Self-governance through by-laws and ordinances is a powerful self regulatory mechanism for community conservation and sustainable use of natural resources... such as establishing and running ICCAs.

Case #7 - Strengthening Community Watershed Management (Malaysia)

Source: Global Forest Coalition (2018), pp. 53-59

With funding from the Commonwealth Foundation, this three-year project (2015-2017) aims to increase the resilience of the Indigenous Peoples' customary institutions and natural resource stewardship systems through constructive engagement with decision-making processes. The project involves documentation of customary institutions and natural resource stewardship systems, strengthening of local and international networks, and engagements with policy- and decision-makers to improve implementation of supportive laws and to promote legal and institutional reform.

The Dusun community in Terian are mainly farmers who grow paddy (rice) and cash crops such as rubber. They depend on the Terian River for their livelihood and have a micro-hydro turbine to generate electricity and a gravity-fed water system to provide clean water. They are actively managing and maintaining the condition of the river and watershed in their village. While Terian

is fairly isolated and has poor access to gravel roads, it is among nine villages in danger of being submerged or relocated by development of the proposed Kaiduan Dam (12 km² would be submerged and 350 km² gazetted as water catchment reserve). Even before the proposed dam, Terian struggled to get recognition of the parts of their territory, including hunting grounds, which overlapped with a state park (Crocker Range Park).

Terian will appoint a working committee, organize awareness campaigns and dialogues with relevant stakeholders to show that they are stewards of the watersheds and surrounding forests—which are also part of the UNESCO Biosphere Reserve. The community hopes that plans for the Kaiduan Dam will be reconsidered if not halted altogether and their traditional protocols recognized. Efforts to establish a Community Use Zone in cooperation with the Sabah Parks authority have yet to come to fruition, though this area is now recognized as a UNESCO Biosphere Reserve. There could be an opportunity to engage with UNESCO over the concerns with the dam, though more pervasive challenges remain with government funding and approval processes.

Recommendations: Sabah Parks and the Ministry of Tourism, Culture and Environment should play a more active role in supporting the communities in Ulu Papar to resist the dam and should leverage the designation of the UNESCO Biosphere Reserve to recognize the communities' contributions to water catchment stewardship and biodiversity conservation more broadly, and the need for sustainable economic activities in the area. This could include legally recognizing Water Conservation Areas and Community Use Zones.

Case #8 - Fishery Co-Management Systems along the Mekong River in Khong District, Laos
Source: Baird (2007)

Operating at the village level, local fishers have adopted their own system of rules for managing their traditional fishing areas in the Mekong. Between 1993 and 1999, 63 villages in Khong District established regulations to manage and conserve inland living aquatic resources, including fish, in the Mekong River, streams, backwater wetlands and rice paddy fields (see Fig 12.2). The community-based systems in Khong have been supported by two NGO supported projects, the Lao Community Fisheries and Dolphin Protection Projects, which evolved into the Environmental Protection and Community Development in Siphandone Wetland Project (EPCDSWP). The local government endorsed the process, so that villages can incorporate their local ecological knowledge (LEK) into the design, implementation, and enforcement of regulations. These regulations are consensus based and can be altered in response to changing circumstances. Recognized as 'village law' the regulations established in each of the villages are different. Nevertheless, many communities have adopted similar regulations, with slight variations. The most commonly adopted regulations relate to:

1. The establishment of permanent or seasonal 'no-take' Fish Conservation Zones (FCZs) in deep parts of the Mekong River. These areas (up to 50m deep) are especially important as low-water fish refuges for protecting large brood stock in the dry season.
2. Banning the blocking of streams with fish traps at the beginning of the rainy season to prevent the harvesting of fish making short spawning migrations into inundated rice fields and other wetlands.

3. The banning of 'water banging' fishing, where a long wooden pole with a metal piece at the end of it is used to bang the surface of the water where they can be too easily captured in small-meshed gillnets, leading to lower catches for those fishers who set stationary gill nets without chasing fish into them.
4. The banning of spear fishing with lights at night. This ban has been implemented because it is seen to be too effective a fishing method, catching large quantities of brood fish.
5. The banning of catching juvenile snakeheads (*Channa striata*) especially when they are less than about two weeks old and are still traveling in schools and are very vulnerable to being caught.
6. The banning of frog (*Rana* spp.) catching at the beginning of rainy season, when they spawn, and in some cases, at other times of year. Local farmers see frogs as important for controlling insect attacks on their rice crops.
7. The banning of tadpole (*Rana* spp.) catching at the beginning of the rainy season after spawning takes place.
8. The protection of inundated forest habitat by encouraging villagers not to cut down wetland trees and bushes in the mainstream Mekong River.

The establishment of FCZs was an idea that fishers came up with by themselves, based on observations that during the dry season many fish species, especially large ones, congregate in deep-water areas, where they are potentially vulnerable to gillnetting. While fishers in Khong began protecting deep-water FCZs in Khong in 1993, the validity of this strategy was only confirmed by scientists years later.

One of the important reasons why CBFCM has been successful in Khong is that villagers have a strong sense of belonging to their communities, and a strong belief that their children and grandchildren will be living in the same villages in the future. This has helped to encourage a conservation ethic, and to ensure that many locals manage resources for the long-term. The capacity-building work of the above-mentioned NGOs also helped, particularly in develop a formalized data collection program to monitor the results of management decisions related to the establishment of FCZs. Between five and twenty fishers were selected by villagers in eight communities (as a pilot initiative) to record daily fish catch data. After months of data collection, the data from different individuals were pooled and statistically analysed. Although not all data were correctly recorded, most were useable in the analysis. The data were then returned to the villagers to be reviewed and verified.

5. IMPLICATIONS FOR TNC'S FRESHWATER CONSERVATION INITIATIVES

IPLCs should be considered as strategic partners in meeting TNCs freshwater conservation goals, just as the government agencies that manage protected areas are already recognized as strategic partners. By "strategic partner" I mean that (1) there are substantial overlapping interests and (2) the partner's cooperation is important to successfully realizing TNCs own

conservation interests. So, the first implication is that working with IPLCs in freshwater conservation is strategic, and probably essential, to successful conservation outcomes.

The second implication is that TNC can meet its social welfare goals as well (though these might need to be clarified) of promoting sustainable and equitable development. Partnering with IPLCs in freshwater conservation can be empowering for the IPLCs and advance the UN sustainable development goals of gender equity, health outcomes (from clean water), democratic governance, greater economic and personal security, etc., plus the intangible benefits of cultural and spiritual life, inadequately captured in the term, "buen vivir", or "living well".

Forging conservation partnerships with IPLCs, in other words, is essential for successful freshwater conservation and offers many co-benefits in the process. How can it work? What are the best practices for engaging with IPLCs?

Two Contexts

In protected areas that were created through evicting the IPLCs who used to live there, engagement would focus on ways to bring them back in through negotiations involving the protected area authority (whichever government agency is involved), and probably local government representatives, along with TNC (and perhaps other conservation NGOs) and, of course, IPLC representatives/leaders. So far this process of reconciliation remains theoretical and is just starting to be discussed in international fora (e.g., the UN Permanent Forum on Indigenous Issues) and some national policy fora, most particularly in Canada¹⁹ (Zuba et al 2019).

The other context is Indigenous areas that are under de facto conservation authority of the Indigenous community. These conservation areas are most commonly referred to as ICCAs (Indigenous Controlled Conservation Areas) and are usually not conceptualized by either the Indigenous communities themselves, or local or national governments, as "conservation areas." However, the same paradigm shift that has overturned the concept of "fortress conservation" has also raised awareness about Indigenous lands as serving an important conservation function. There is a growing movement, led by international conservation NGOs (e.g., the ICCA Consortium) to officially recognize ICCAs as constituting a type of protected area.

These two different contexts - official protected areas, and Indigenous territories - necessitate different strategies for co-management. In the former context, a conservation organization such as TNC might play a mediating role between the agency in charge of the protected area, and the local Indigenous communities that were displaced when the park was established. However, the agency would hold the power to engage or not engage with the historically wronged communities. In the latter context, TNC could also play a mediating role, but the locus of power would lie with the Indigenous community who could choose to explore a co-management model, or not.

¹⁹ <https://www.iucn.org/news/protected-areas/201802/indigenous-protected-and-conserved-areas-ipc-as-pathway-achieving-target-11-canada-through-reconciliation>

Framing IPLC Co-management

The frame or container within which the conservation paradigm of co-management is applied, becomes interwoven with the messaging employed. In Canada, discussions about whether and how to recognize the conservation role of Indigenous communities is framed within the national priority to increase the extent of terrestrial and freshwater protected area from the current 10.5% of the country's total area to 17%, in order to conform with the Aichi Targets. There is a clear incentive for the Canadian government to recognize ICCAs as official protected areas to cover that 6.5% gap, and there is also a strong incentive for the First Nations to gain national recognition for their long-standing conservation efforts.²⁰ But from the Indigenous perspective, that recognition has particular significance against the backdrop of the UN Declaration on the Rights of Indigenous Peoples, the reports from the Canadian Truth and Reconciliation Commission, the Royal Commission on Aboriginal Peoples, and historic (and usually broken) treaties, and other agreements. Formal recognition of First Nations' contributions to conservation is seen against this larger frame of historic wrongs and the need for redress and reconciliation (Indigenous Circle of Experts 2018).

The framing of IPLC co-management will be different in each setting, but whatever the circumstances, identifying the details of the conceptual frame will be an important initial step in developing a conservation co-management strategy. In Canada, the government has embarked on an active reconciliation agenda with First Nations, so both government agencies and First Nations leaders share a common understanding of that reconciliation process, albeit from different perspectives. In more typical contexts, government agencies can be expected to be more defensive in trying to justify their conventional authority over protected area. In such cases, research evidence on the conservation effectiveness of Indigenous governance can be invoked.

Framing Devices

As a new category of protected area, ICCAs need to be accepted by the conservation status quo and the larger political and social context, in order to thrive. In Canada, the term "ethical space" is being applied to the culturally sensitive arena that mixes concepts of reparations for past wrongs endured by Indigenous Peoples at the hands of both the government as well as the churches. Acknowledging the past injustice is a step towards acknowledging that Indigenous cultures have a human right to exist, and to co-exist with the politically dominant European-derived "settler" culture. This cultural piece is critical to the overall frame of legitimizing Indigenous roles in conservation. The UN Declaration on the Rights of Indigenous Peoples provides international recognition, but that needs to be reinforced at the local and national levels to overcome the superficial assumption that Indigenous Peoples, and the forests (and river valleys) where many of them live, are inevitably doomed to extinction. The entire paradigm of conservation is called into question when Indigenous cultures are actively disrespected or even passively overlooked.

The Aichi Target of 17% of national territories to fall under the category of protected areas "or other effective conservation mechanism" (OECM) becomes an important element in the framing

²⁰ See the 2018 report, *One with Nature: A Renewed Approach to Land and Freshwater Conservation in Canada*, <http://www.conservation2020canada.ca/s/Pathway-Report-Final-EN-rdnk.pdf>

of ICCAs. The path is open for ICCAs to be acknowledged in the Aichi accounting, even without meeting the conventional criteria of what constitutes a protected area as defined in IUCN's six-category typology. Not only does this provide countries with an incentive to take ICCA territories into account, but it also gives Indigenous communities a strong incentive to gain recognition of their role in conservation. Through the official recognition of a defined ICCA territory as counting towards the Aichi Target, that particular protected area becomes protected by both the Indigenous community and the national government together. Moreover, a process leading to recognition of some ICCAs as a type of protected area or "OECM" would also serve as de facto recognition of Indigenous knowledge systems and management systems.

"One water - one health - one life"

Another important dimension of an enabling water conservation framework is that of linkage. Water is the world's great connector, but it is difficult to convey this message. Within the urban water discourse, the term "One Water" is in vogue as a reference to the reuse of water along nature's supply chain, with one city's effluent feeding into the downstream city's water supply. In the emerging discourse of freshwater conservation, the term "one health" refers to the positive impact of river protection on domestic water quality and better human health outcomes. The ubiquitous message from Indigenous communities about protecting their traditional waters is that their cultural and physical wellbeing is tied to the health of their rivers: "Water is life". A suggestion for branding freshwater conservation as having both long-term but also practical short-term benefits, is to combine all three of these messages into one: "One water, one health, one life". The idea being conveyed is that by taking care of water ecosystems, we will also be improving human health, and the health of the whole planet.

ICCA Considerations in TNC's priority Geographies²¹

Tapajós Basin, Brazil. The Tapajós Basin epitomizes the potential and perils for freshwater conservation in the Amazon. Well-organized indigenous communities offer hope, while relentless impacts of hydroelectric dams, mines, logging, and agricultural run-off pose existential challenges. Can even a well-crafted ICCA stand a chance against the inevitability of collapsed mine tailing dams, or one of the multiple mega hydroelectric dams planned for the Tapajós and its tributaries? The implications for TNC and the conservation community are already well known but bear repeating: Take a whole-basin approach (or at least a natural sub-section of the whole basin) in planning the ICCA. Take inspiration from the Association of Indigenous Leaders of the Yaigojé Apaporis in Columbia, an alliance of 21 Indigenous communities that successfully lobbied the government to create a national park that is Colombia's 3rd largest protected area and is co-managed with the Association.²²

²¹ This refers to four of the five regions targeted for initial consideration for TNCs emerging program on freshwater community-based conservation: (1) Tapajós Basin of Brazil, (2) Northern Andes - Ecuador and Colombia), (3) Okavango Basin - Angola and Botswana, (4) and Lake Tanganyika (Tanzania and Zambia). The author has no experience with, and was not able to track down relevant resources for the fifth geography, the Ogooué Basin in Gabon.

²² https://www.equatorinitiative.org/wp-content/uploads/2017/05/case_1490725991_EN.pdf

Northern Andes. Ancient traditions of irrigated crops and pasture lands, with complex traditional management institutions, are key features of this "hydrosocial territory" (Boelens et al 2016). Well-developed legal systems and sophisticated government agencies dealing with both water and conservation offer great potential for developing IPLC conservation co-management initiatives, but the complexity of the political as well as ecological context preclude any simple suggestions. Developing an ICCA-oriented program would necessitate networking and collaboration among the IPLCs in the area, relevant government agencies (including national and local levels), as well as the international donor and NGO communities.

Okavango Headwaters - Angola. The headwaters rivers of the Cuito and Cubango in Angola provide 90% of the water that eventually flows into the Okavango Delta. There are designs to use that water for hydropower and large-scale agriculture to bring economic development to speed Angola's recovery from recent warfare. Yet there is also great interest in ecotourism. Because of the war, the traditional Bantu communities were displaced. How can IPLCs be approached to discuss their interest in a protected area, when short-term economic needs are so great? Yet now is the time to act on behalf of conservation, while the landscape and river systems are still healthy. One institutional resource is OKACOM, selected in 2012 as a finalist for the Thiess International River Prize.²³ Various donors (e.g., GEF) and conservation organizations are also involved with OKACOM; expertise is plentiful. Here the priority would seem to be high-level planning that incorporates freshwater conservation strategies, while at the same time developing practical on-the-ground partnerships with prospective riparian ICCAs incorporating eco-tourism, hunting/fishing along the lines of the CAMPFIRE program in Zimbabwe (Tchakatumba et al 2019), and agricultural development based on agro-ecological principles (to fit in with conservation and ecotourism).

Lake Tanganyika Basin. Beach management units (BMUs) are the current toehold for building a freshwater conservation program oriented around fishing exclusion areas. These could be scaled up and/or replicated and given institutional support. As with the Okavanga, big-picture planning is already being addressed, e.g., through the World Bank-financed Lake Tanganyika Environmental Management Project²⁴ which is being implemented by the Lake Tanganyika Authority. A particular focus is reducing agricultural erosion within the catchments draining into the lake. This might be a suitable context for agricultural ICCAs focusing on low-impact agroecology. Another idea could be a water museum that would raise both local and touristic awareness about the lake, fisheries, agriculture, and the role of local communities.

6. CONCLUSIONS AND SUGGESTIONS

This is an exciting moment to address freshwater conservation through the IPLC/ICCA approach. Both of these concepts are new, innovative, and still emerging. Freshwater conservation is not normally considered as a new topic, but its surprising neglect as compared with marine and terrestrial conservation, even as the theme of water policy is increasingly in the

²³ <http://www.okacom.org/okacom-news/news/okacom-selected-as-the-2012-thiess-international-riverprize-finalist>

²⁴ <http://documents.worldbank.org/curated/en/668911539594000200/pdf/Concept-Project-Information-Document-Integrated-Safeguards-Data-Sheet-Lake-Tanganyika-Environmental-Management-Project-P165749.pdf>

spotlight, reveals freshwater conservation as a topic whose time has come, and Indigenous and community co-management is the most promising way to approach freshwater conservation.

Because community-led co-managed freshwater conservation is so new, there is both opportunity and responsibility to get the process right, with few clear precedents. The case studies presented in this report were selected more for their information about co-management than their insight into freshwater conservation, and even here the process documentation that would be needed to really understand how the community co-management system evolved does not seem to be available. There is, however, enough of an information base to build upon and to guide the planning and strategy development for co-managed freshwater conservation initiatives.

But how might the information base be developed further? What more do we need to know, and what can we do now, to develop the subfield of freshwater conservation through IPLC co-management? Here are some suggestions:

- Prioritize process documentation in establishing co-managed freshwater protected areas; otherwise what passes for lessons from practice will continue to be anecdotes when what is most needed is careful analysis of the process.
- Integrate the concept of "One Health" into the concept of potential IPLC co-benefits from freshwater conservation (through safer drinking water).²⁵
- Land titling could be an important incentive/benefit for IPLCs to become interested in protected area co-management.
- Apply the catchment/watershed scale concept more explicitly to freshwater conservation planning. This is fundamental in water resources planning and could help counter the prevailing terrestrial/forestry bias.
- Consider local or river basin water museums as a way of raising awareness about freshwater conservation and the roles of Indigenous Peoples in that conservation effort. A new UNESCO initiative on water museums could offer guidance and help identify prospective partners.²⁶
- Update the ICCA registry (<http://www.iccaregistry.org>) which currently contains only a smattering of ICCAs. Alternatively, if it is not feasible to update it, UNDP should consider terminating the service, as in its present state it is not useful.
- Establish an ICCA learning network as a stand-alone project within the ICCA Consortium but staffed separately, with a mission to expand the network (through establishing national or regional nodes), and raise awareness among policy makers, activists and researchers.
- Engage with CBD preparations for the post-2020 Biodiversity Framework (<https://www.cbd.int/conferences/post2020>), particularly on freshwater biodiversity and/or Article 8J (Indigenous) discussions of protected areas.
- Engage with the UN Permanent Forum on Indigenous Issues (UNPFII), on the issue of human rights and freshwater biodiversity conservation.
- World Conservation Congress 2020 presents an opportunity for IUCN to commit to a set of principles for IPLC partnerships.

²⁵ <https://medium.com/usaid-global-waters/a-win-win-approach-to-biodiversity-23bf2d5a9055>

²⁶ <https://www.watermuseums.net>

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