

Gunnison Basin Project

Measures of Conservation Success

The Gunnison Basin is a vast sagebrush landscape containing the largest population of Gunnison Sage-Grouse and all the world's skiff milkvetch, a rare plant. An area in need of restoration and habitat protection, the Gunnison Basin has been identified by The Nature Conservancy as a priority landscape for its conservation efforts. This document describes the work the Conservancy in partnership with private landowners, local land trusts, and public agencies is doing to conserve this important area.

What We Want to Conserve

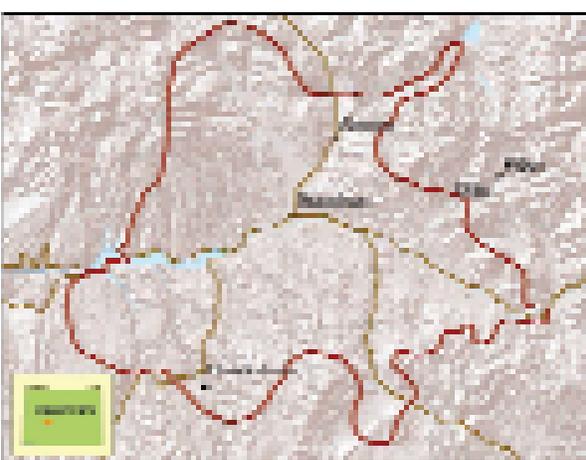
The primary focus of our conservation efforts in the Gunnison Basin will be directed towards protection and restoration of extensive areas of sagebrush shrubland which contain the largest population of the Gunnison Sage-Grouse, all known populations of the skiff milkvetch, as well as other rare plants and animals, and riparian systems.

Our Conservation Vision

The long-term vision for the Gunnison Basin is to protect and manage, as a natural landscape, an approximately 300,000-acre montane sagebrush shrubland system with viable populations of Gunnison Sage-Grouse and skiff milkvetch. This vision includes increasing awareness, appreciation and support for conservation among landowners, political officials, donors, and the public.



Gunnison Basin Project Area



The Gunnison Basin Project Area is within the Southern Rocky Mountains ecoregion.

Science guides our work in the Gunnison Basin. This document highlights key features of the biodiversity in the Gunnison Basin area, the challenges to their successful conservation, and ways of measuring progress toward effective conservation. The project planning process used to generate this report was developed by The Nature Conservancy based on 50 years experience in conservation. To fulfill our long-term vision and achieve our goals, the Conservancy employs an integrated conservation process called Conservation by Design. This living process identifies the key places where conservation needs to occur (or will be most successful), develops strategies, involves taking action, and measures success of the effort and outcomes. This process is adaptable over time and uses the measures of progress and success to stimulate continued thinking and actions for conservation.

Conservation by Design

Through Conservation by Design, a common vision is created to ensure the long-term survival of native species and natural communities. This process focuses attention on key issues including the biodiversity status, degree of threats and progress toward conservation. Such information, when available, empowers people from all walks of life to discuss, interact, and consider alternative ways of interacting with nature. Nothing could be more fundamental to fostering a high standard of sustainable living and successful conservation than having objective status information to inform individual and group decisions. The Nature Conservancy hopes that you will find this report informative and that it will inspire you to take a strong interest in the ecological health of the landscape in which we work and live. Good decisions about the future will depend on it

Landscape view of rolling hills and sagebrush shrubland on a ranch easement near the Gunnison river



Conservation Planning

The Conservancy uses conservation plans to develop site-specific conservation strategies and prepare for taking action and measuring success. These plans follow what we call the 5-S Framework:

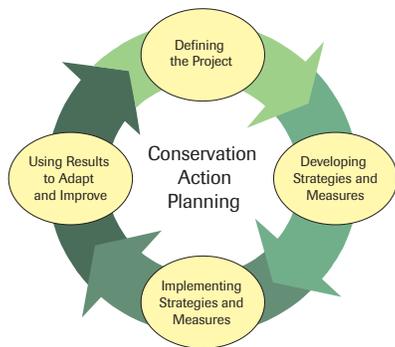
- ◆ **SYSTEMS.** The conservation planning team identifies the species and natural communities that will be the focus of conservation for the area. To do so, biodiversity lists developed during the ecoregional assessment are modified to include site-specific priorities.
- ◆ **STRESSES.** The team determines how ecological systems are compromised; by habitat reduction or fragmentation, or by changes in the number or type of species, or by alteration of ecological processes such as fire and hydrology.
- ◆ **SOURCES.** The team will then identify and rank the causes, or sources, of stress for each ecological system or key species. The

analysis of stresses and sources together make up the threat assessment

- ◆ **STRATEGIES.** An important step in the process is finding practical cooperative ways to mitigate or eliminate the identified threats and enhance biodiversity.
- ◆ **SUCCESS.** Each plan outlines methods for assessing our effectiveness in reducing threats and improving biodiversity—usually by monitoring progress toward established biological and programmatic goals.
- ◆ **SITUATION.** An understanding of the cultural, political and economic situation behind the threats to biodiversity is essential to for developing sound strategies. This human context is often referred to as the sixth “S”.

Site Description

The Gunnison Basin is a vast intact sagebrush shrubland harboring rare species most notably the largest population of the Gunnison Sage-Grouse and skiff milkvetch. This high-elevation mountain basin is surrounded by mountain peaks prized as recreational destinations including the Crested Butte and Lake City areas.



Key Conservation Targets

RARE, DECLINING OR SENSITIVE ANIMALS

- ◆ Gunnison Sage-Grouse
- ◆ Wintering Bald Eagles
- ◆ Colorado River cutthroat trout

RARE PLANTS

- ◆ Skiff milkvetch
- ◆ Gunnison milkvetch

RARE PLANT COMMUNITIES

- ◆ Riparian forests

ECOLOGICAL SYSTEMS

- ◆ Sagebrush shrublands
- ◆ Sagebrush steppe
- ◆ Montane grasslands

Photo © Chris Pague/TNC

Long Term Ecological Goals

- ◆ Conserve at least 200,000 acres of montane sagebrush shrublands
- ◆ Maintain and/or restore a viable population (more than 3600 adults) of Gunnison Sage-Grouse
- ◆ Maintain viable populations of skiff milkvetch, the global range of this species is limited to a small portion of this landscape
- ◆ Maintain at least 15 wintering Bald Eagles
- ◆ Maintain Colorado River cutthroat trout populations
- ◆ Maintain high quality rare riparian communities
- ◆ Maintain key aquatic systems
- ◆ Maintain rare mayfly population

Critical Threats

The conservation targets are threatened by multiple stresses, which can act together to effect the viability or integrity of each ecological system. Based on surveys, interviews with land managers, ecoregional assessment information and personal observations, we ranked the main sources of stress for each conservation target (see chart of “Threats to Conservation Systems” on page 9). Since the landscape is dominated with public lands, the Gunnison Basin has no high ranking threats. Moderate sources of stress, or “critical threats” are:

- ◆ Residential home development
- ◆ Hay production practices
- ◆ Whirling disease
- ◆ Nonnative fish
- ◆ Invasive plant species
- ◆ Development of roads and utility corridors
- ◆ Operation of dams
- ◆ Recreational use on public lands

These threats have direct and indirect impacts on terrestrial and freshwater biodiversity within the Gunnison Basin. For example, residential home development including associated roads removes and fragments critical habitat for Gunnison Sage-Grouse. Hay production practices also reduce the quality of critical grouse habitat. Invasive plant species degrade many ecological systems.

In addition, some threats are localized in scope or only affect one conservation target. For example, whirling disease and nonnative fish species primarily impact Colorado River cutthroat trout. The operation of dams alter the amount and timing of stream flow which affect the type and quality of aquatic habitat.

Conservation Objectives

The conservation goals for the Gunnison Basin Conservation Area are to enhance the viability or integrity of the conservation targets and abate the threats to those targets. Within the Gunnison Basin, restoration strategies are equally as important as threat abatement strategies.

OBJECTIVE 1: By 2015, permanently protect/conservate (by conservation easement or public land management planning) at least 15,000 additional acres of critical Gunnison Sage-Grouse habitat.

OBJECTIVE 2: By 2015, apply management actions needed to restore at least 20% (40,000 acres) of critical grouse nesting habitat.

OBJECTIVE 3: By 2015, apply management actions needed to restore an additional 20,000 acres of sagebrush shrublands.

OBJECTIVE 4: By 2015, maintain or improve riparian/aquatic condition within Ohio Creek basin, Antelope Creek and the Taylor River.



Through 2015, maintain or improve viability of Colorado River cutthroat trout populations.

Conservation Strategies

To achieve the aforementioned objectives, The Nature Conservancy will work with its partners to undertake the following strategic actions.

Strategic Action 1

PROTECT KEY AREAS OF PRIVATE LAND

- ◆ Protect 15,00 additional acres of private land in conservation easements that contribute to a large contiguous area of high priority Gunnison Sage-Grouse habitat protected and conserved.
- ◆ Support biodiversity incorporation into county master plan to influence zoning that will reduce impacts to biodiversity especially to sage-grouse
- ◆ Support public funding sources that most effectively protect, restore, and manage sagebrush systems

Strategic Action 2

RESTORE SAGEBRUSH SHRUBLANDS AND GUNNISON SAGE-GROUSE HABITAT

- ◆ Determine amount and type of restoration, with appropriate monitoring and adaptive management framework, which supports Gunnison Sage-Grouse habitat restoration.

- ◆ Integrate sage-grouse and sagebrush habitat into a restoration plan
- ◆ Support public funding sources that most effectively protect, restore, and manage sagebrush systems
- ◆ Develop and implement sage-grouse and grouse habitat strategy focused on private and BLM lands

Strategic Action 3

MAINTAIN AND RESTORE AQUATIC, RIPARIAN AND CUTTHROAT TROUT HABITAT

- ◆ Develop and implement watershed plan for Ohio Creek Basin that will maintain or improve aquatic/riparian condition.
- ◆ Develop strategy for conservation of Colorado River cutthroat trout
- ◆ Minimize the possibility of the introduction of whirling disease
- ◆ Prevent introduction of nonnative fish into viable populations of Colorado River cutthroat trout
- ◆ Protect key private lands for riparian and aquatic biodiversity

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

Bald Eagle perched in winter branches



Photo © Lance Beeny

Measuring our Success

Two fundamental questions facing any conservation project team are: “How is the biodiversity doing?” and “Are the conservation actions we are taking having the intended impact?” To answer these questions, we evaluate a number of indicators that gauge the status of biodiversity and critical threats. Tracking progress toward our goals and evaluating the effectiveness of our actions provide feedback we need to adjust our priorities and strategies. Measuring results closes the loop of our conservation approach.

Overview of Priority Measures — Framework for the Gunnison Basin Conservation Area

INDICATORS	
THREAT MONITORING	
1. Residential Development	<ul style="list-style-type: none"> ◆ Extent of residential development in grouse production areas and winter range ◆ Protection status of grouse production and critical winter areas ◆ Protection status of Colorado River cutthroat trout private lands
2. Nonnative fish	<ul style="list-style-type: none"> ◆ Genetic purity of Colorado River cutthroat trout populations ◆ Composition of native fish community
3. Whirling disease	<ul style="list-style-type: none"> ◆ Prominence of whirling disease
PROGRESS MONITORING	
4. Restoration of Gunnison Sage-Grouse habitat	<ul style="list-style-type: none"> ◆ Acres of restoration treatments for grouse ◆ Integrated adaptive grouse restoration plan is in place and being implemented ◆ Proportion of leks in desired condition ◆ Proportion of nesting and early brood-rearing habitat in desired condition
5. Restoration of Sagebrush shrublands	<ul style="list-style-type: none"> ◆ Integrated adaptive restoration plan in place and being implemented
VIABILITY MONITORING	
6. Gunnison Sage-Grouse	<ul style="list-style-type: none"> ◆ Condition of surrounding natural vegetation ◆ Number of active leks ◆ Population size, based on number of males counted on leks
7. Colorado River cutthroat trout	<ul style="list-style-type: none"> ◆ Effective population size ◆ Occupied stream miles
8. Sagebrush Shrublands	<ul style="list-style-type: none"> ◆ Number and sizes of patches of all types of sagebrush, other shrublands, and grasslands distributed throughout the landscape
9. Skiff milkvetch	<ul style="list-style-type: none"> ◆ Number of plants

Rolling hills and sagebrush shrubland

Photo © Chris Pague/TNC



Biodiversity Viability or Integrity Ranking System

The viability or integrity of the selected conservation elements should be assigned a rank using a four-level scale. The viability or integrity ranking system uses simple categorical ranks, as follows:

VERY GOOD. The factor is functioning at its ecologically desirable status and requires little human intervention.

GOOD. The factor is functioning within its range of acceptable variation. However, it may require some human intervention to maintain this status.

FAIR. The factor lies outside of its range of acceptable variation and requires human intervention. If unchecked, the target will be vulnerable to serious degradation.

POOR. Allowing the factor to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.

Integrity/Viability Criteria

The assessment of viability or integrity is based on three criteria:

SIZE. This is a measure of the area or abundance of the conservation target or element's occurrence. For ecological systems and communities, size is simply a measure of the occurrence's geographic coverage. For species, size takes into account the area of occupancy and number of individuals. Minimum area needed to ensure survival or re-establishment after natural disturbance is another aspect of size.

CONDITION. This is an integrated measure of the composition, structure and biotic interactions that characterize the occurrence. This includes factors such as reproduction, age structure, biological composition (e.g., presence of native versus non-native species; presence of characteristic patch types for ecological systems), structure (e.g., canopy, understory, and groundcover in a forested community) and biotic interactions (e.g., levels of competition, predation, and disease).

LANDSCAPE CONTEXT. This is an integrated measure of two factors: the dominant environmental regimes and processes that establish and maintain the occurrence, and connectivity. Dominant environmental regimes and processes include herbivory, hydrologic and water chemistry regimes (surface and groundwater), geomorphic processes, climatic regimes (temperature and precipitation), fire regimes and other kinds of natural disturbance. Connectivity includes such factors as species having access to habitats and resources needed for life cycle completion, fragmentation of ecological systems and the ability to respond to environmental change through dispersal, migration, or re-colonization.

Threat Ranking Guidelines

Threats are composed of stresses and sources of stress (or "sources"). A stress is defined as a process or event with direct negative consequences on the biodiversity (e.g., alteration of water flow into a marsh). The source of stress is the action or entity that produces a stress

(e.g., channel building). The planning team must identify and rank the stresses and sources for each of the species and ecological systems. Guidelines for selection and ranking of stresses and sources are below.

The stress ranks and source ranks:

1) help elucidate the factors influencing that species and ecological systems and subsequently, the necessary conservation strategies, and 2) contribute to the analysis of threats for the conservation area.

The stress and source rankings are analyzed together via computer to provide threat ranks for the element

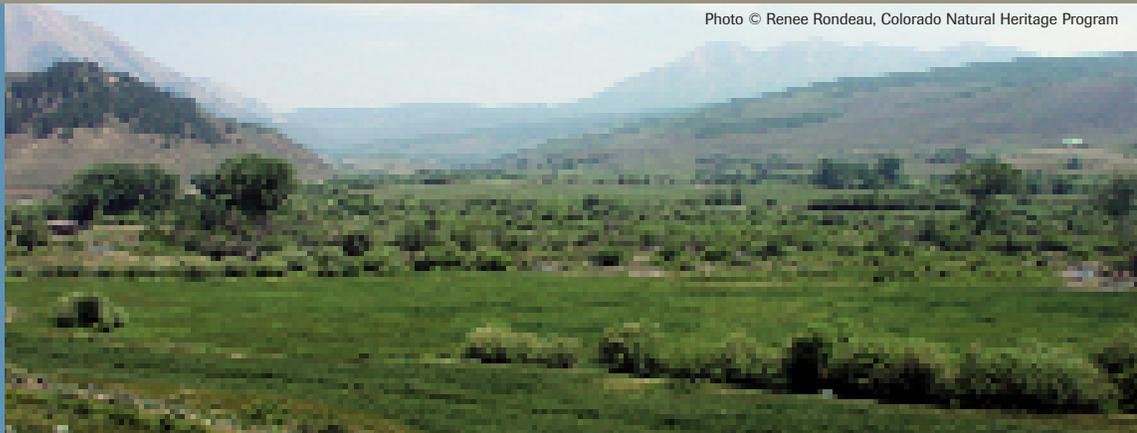
Stresses are ranked based on the severity and scope of damage expected within 10 years under the current circumstances. Sources of stress are ranked based on the expected contribution of the sources and the irreversibility of the impact

The threat rank is a summary ranking of all ways that a target is stressed by a particular threat. For example, water diversions may affect several aspects of a conservation target, a given stream reach in this case, including both riparian and aquatic condition. All these aspects are combined into an overall threat rank for a particular source (i.e., operation of dams) to all ecological systems.

The overall threat status of each conservation target, the last row in the threats table Page 9, is an assessment of the combination of all threats. A ranking is determined using a "2 prime rule" such that 2 ranks of very high yield an overall threat rank of very high and that 1 high and 2 mediums yield an overall threat rank of medium.

Carbon Creek's riparian areas provide ideal habitat for Gunnison Sage-Grouse.

Photo © Renee Rondeau, Colorado Natural Heritage Program



Integrity Background

Assessing the current condition of the biodiversity is critical in the development of conservation strategies. Where viability and integrity are high, the strategy is to prevent degradation. On the other hand, if the integrity is poor, then restoration, reintroduction, or reclamation might be important actions to elevate the condition.

Integrity ratings are made using the best science available and often with vigorous discussion. The planning team develops categories that define the relative condition in terms of size, ecological condition, and the landscape context. The team determines which category best reflects the current state at the project area. Clearly, in deciding how to allocate scarce conservation dollars, we should, where it is possible, focus conservation actions on the populations with the highest integrity or otherwise stated as the most likely to persist.

Viability or Integrity Summary

	LANDSCAPE CONTEXT	CONDITION	SIZE	VIABILITY/INTEGRITY RANK
Mountain Sagebrush Shrubland	FAIR	FAIR	VERY GOOD	GOOD
Gunnison Sage-Grouse	FAIR	FAIR	FAIR	FAIR
Skiff Milkvetch	VERY GOOD	GOOD	FAIR	GOOD
Bald Eagle winter roosting	GOOD	GOOD	FAIR	GOOD
Montane Riparian Shrublands & Forests	GOOD	FAIR	GOOD	GOOD
Colorado River Cutthroat Trout	GOOD	GOOD	GOOD	GOOD
Aquatic Systems*	—	—	—	—
Mayfly*	—	—	—	—
Site Biodiversity Rank				GOOD

VERY GOOD

Functioning at its ecologically desirable status. Requires little human intervention.

GOOD

Functioning within its range of acceptable variation. May require human intervention to maintain this status.

FAIR

Outside its range of acceptable variation. Requires human intervention. Vulnerable to serious degradation if left unchecked.

POOR

If condition remains for extended period, restoration or prevention of extirpation will be practically impossible.

* Biodiversity status for aquatic systems and mayfly is unknown.

Collecting conservation data



Photo © J. Dale Swenarton

Threats to Conservation Targets

	MOUNTAIN SAGEBRUSH SHRUBLAND	GUNNISON SAGE GROUSE	SKIFF MILKWETCH	BALD EAGLE WINTER ROOSTING	MONTANE RIPARIAN SHRUBLANDS & FORESTS	COLORADO RIVER CUTTHROAT TROUT	AQUATIC SYSTEMS	MAYFLY*	OVERALL THREAT RANK
Residential Home Development	MEDIUM	HIGH	LOW	LOW	MEDIUM	MEDIUM	MEDIUM		MEDIUM
Hay Production Practices		HIGH			MEDIUM				MEDIUM
Whirling Disease						HIGH			MEDIUM
Brown Trout						HIGH			MEDIUM
Rainbow and Other Cutthroat Trout						HIGH			MEDIUM
Brook Trout						HIGH			MEDIUM
Invasive/Alien Species	LOW	MEDIUM	MEDIUM		MEDIUM				MEDIUM
Development of Roads/Utilities	LOW	MEDIUM	LOW		MEDIUM		LOW		MEDIUM
Operation of Dams or Reservoirs				LOW	MEDIUM		MEDIUM		MEDIUM
Grazing Practices	LOW	MEDIUM			LOW				LOW
Recreational Use		LOW		LOW		MEDIUM			LOW
Conversion to Agriculture	LOW	MEDIUM							LOW
Fire Management Practices	LOW	MEDIUM							LOW
Urban & Exurban Water Quality Issues							MEDIUM		
Recreational Vehicles			MEDIUM						
Amount of Available Habitat						MEDIUM			
Threat Status for Targets and Site	LOW	HIGH	MEDIUM	LOW	MEDIUM	HIGH	MEDIUM		MEDIUM

LOW Threat is likely to slightly impair the ecological system over a portion of the area.

MEDIUM Threat is likely to moderately degrade the ecological system over some portion of the area.

HIGH Threat is likely to seriously degrade the ecological system over much of the area.

VERY HIGH Threat is likely to destroy the ecological system over much of the area.

* Threat status for mayfly is unknown.

Colorado River cutthroat trout

Photo © BLM Wyoming



Situation Analysis Process

A good situation analysis diagram provides a team with a clear and common understanding of the context in which the project occurs. The model will show assumptions and potential obstacles as well as data gaps. The situation diagram process has proven useful and has led to innovative and different strategies. The diagram seeks to demonstrate the complexity and interrelatedness of factors affecting biodiversity within the project area. Ecological systems, along with high priority dependent species—nested targets—are linked to ecological processes, and factors that directly impact the biodiversity and processes, resulting challenges and key strategies.

How the System Works: Gunnison Basin

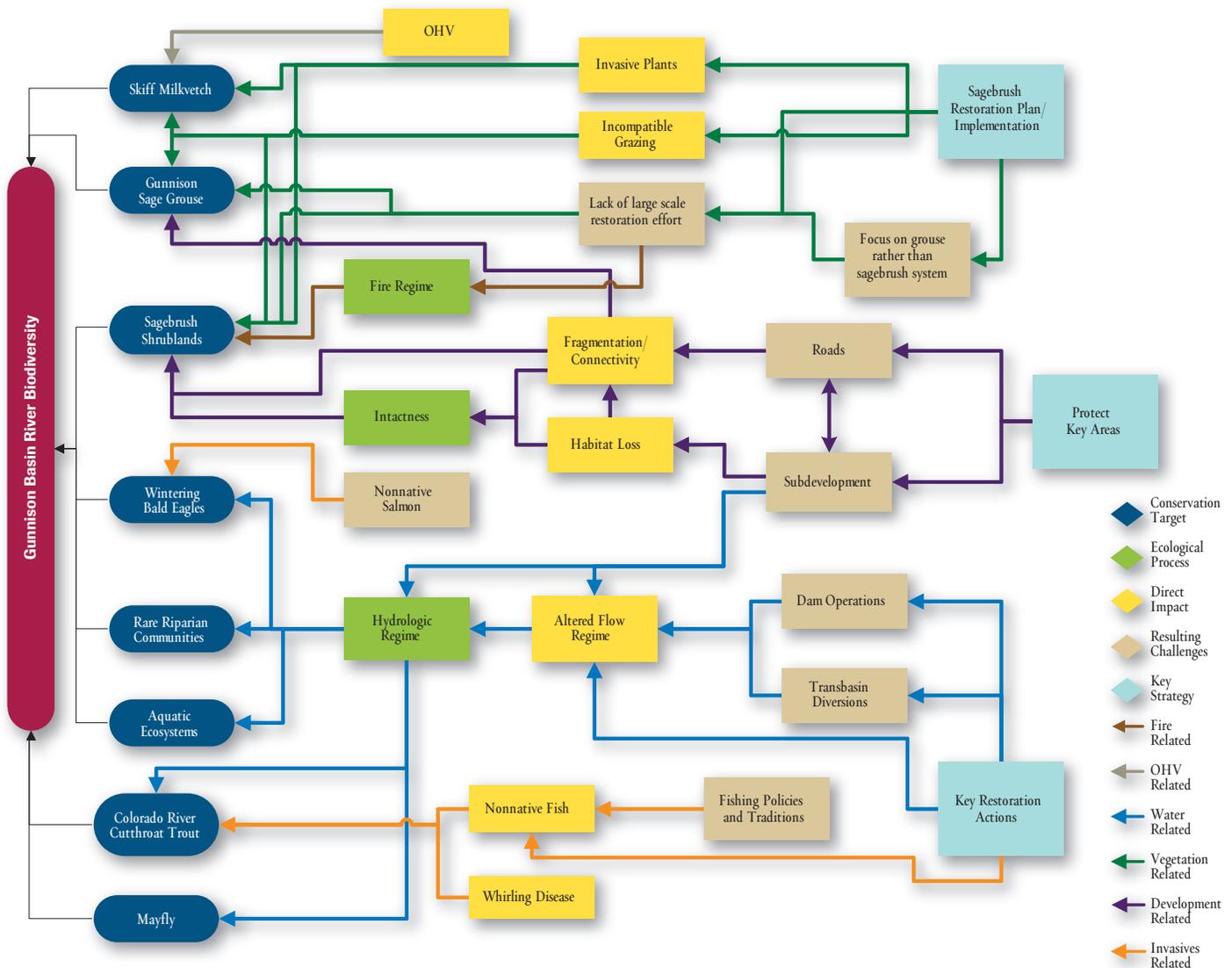
The situation diagram illustrates the interactions among these focal species, systems and threats, and the underlying causes and factors that influence the biodiversity of the Gunnison Basin. The Gunnison Basin is composed of a vast sagebrush shrublands mosaic with significant aquatic and riparian resources flowing through the area. Species such as Gunnison Sage-Grouse, and skiff milkvetch, a rare plant, are also part of this sagebrush landscape. Several factors have a direct impact on the local biodiversity, including: invasive plant and fish species, fragmentation from roads and sub-development, altered flow regime and whirling disease. Additional factors impact the continued persistence of the biodiversity of the Gunnison Basin and affect our ability to restore this important landscape.

The following is an example of how to read this diagram. The sagebrush shrublands have two key ecological processes or features, the fire regime and the inherent intactness of this large system. Fragmentation and loss of sagebrush shrublands directly impact the intactness of the sagebrush shrublands. Roads and subdevelopment are the challenges causing the fragmentation and loss of sagebrush shrublands. The key strategy to abate these threats is protection of key areas.

Ranchland under conservation easement near Gunnison river



Photo © Chris Pague/TNC



Conclusion

The Nature Conservancy is proud to be working with public and private partners to achieve a common vision: to preserve the biodiversity of the Gunnison Basin by protecting key parcels, creating incentives for compatible land management, and restoring ecological systems. This vision is achievable by leveraging our strengths to achieve tangible and lasting results. We believe that good science will be the cornerstone of our future success.

Bald Eagle

Photo © istockphoto.com





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