



CONSERVATION PROGRESS ASSESSMENT: Land Protection Objectives

Cover Photo

Trampe Ranch in Gunnison County, Colorado © *Barbara East*

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Table of Contents

Executive Summary	4
Introduction	9
Methods	12
Conservation Progress Assessments.....	14
Chico Basin Project Area.....	15
<i>Assessed Conservation Target: Functional Prairie Landscape</i>	16
Greater Pawnee Prairie Project Area	19
<i>Assessed Conservation Target:</i>	
<i>Functional Prairie</i>	20
Gunnison Basin Project Area	23
<i>Assessed Conservation Target: Gunnison Sage-Grouse</i>	24
Laramie Foothills Project Area.....	27
<i>Assessed Conservation Target:</i>	
<i>Riparian Systems and Preble’s Meadow Jumping Mouse Habitat</i>	28
North Platte Headwaters Project Area	31
<i>Assessed Conservation Target:</i>	
<i>Greater Sage-Grouse</i>	32
<i>Assessed Conservation Target: North Park Phacelia</i>	35
San Miguel and Lower Dolores River Project Area	36
<i>Assessed Conservation Target: Rare Plants and Plant Communities</i>	37
Upper Yampa River Project Area	39
<i>Assessed Conservation Target: Greater Sage-Grouse</i>	40
<i>Assessed Conservation Target: Riparian Areas</i>	43
Conclusions: Key Insights for Conservation Planning & Implementation	45
References.....	49
Appendix 1.....	52
Appendix 2	59

Executive Summary



What progress has been made toward long-term conservation objectives set by The Nature Conservancy's Colorado Chapter (TNC Colorado)? How should TNC Colorado evolve and adapt its approach to setting conservation objectives and creating strategies to achieve those objectives? Addressing these questions requires an assessment that retrospectively assesses our past progress toward meeting conservation objectives and prospectively makes recommendations about how TNC Colorado's planning, implementing and adapting of strategies over time might change in the future.

TNC Colorado's Science Team is committed to regularly stepping back to look at the big picture of conservation in Colorado to inform and refine conservation strategies to reflect current needs and incorporate the best science over time. To fulfill this commitment, the Science Team created a multi-year, multi-phase project referred to as the Conservation Progress Assessment (Assessment). This document reports on the first phase of the Assessment which focused on land protection and management objectives set by Conservation Action Plans (CAPs) for seven project areas throughout the state of Colorado. Specific objectives for this phase included:

1. reporting on progress towards land protection and management objectives
2. providing recommendations about whether these objectives should still guide TNC Colorado's land conservation work
3. evaluating how scientific and programmatic factors influenced our goal achievement
4. recommending ways to adapt our conservation planning and actions to achieve greater outcomes
5. building a foundation for the next strategic plan revision

Table 1 summarizes quantitative assessments of progress towards land protection and management objectives. Subsequent sections detail (1) specific actions needed to maintain and continue progress towards CAP conservation objectives in project areas and (2) insights for conservation planning and implementation at TNC Colorado.

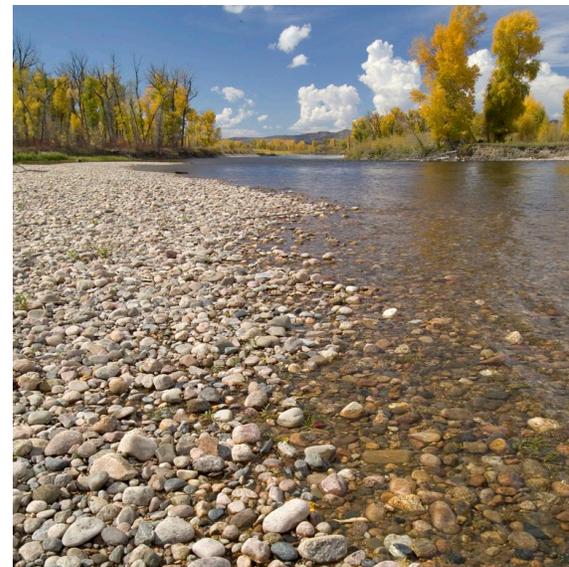
Table 1. Progress assessments for land protection and management objectives set in Conservation Action Plans for seven project areas throughout Colorado. Colors correspond to > 100% objective achievement (green), >50% objective achievement (yellow), and <50% objective achievement (red). Comments provide further clarity on progress towards an objective.

<i>Landscape</i>	<i>Objective</i>	<i>Progress Assessment</i>	<i>Comments</i>
Chico Basin	By 2015, permanently protect/conservate at least 300,000 acres in a functional prairie landscape—at least 80,000 shortgrass, 70,000 sandsage, 30,000 midgrass, 12,000 arid shrublands, approximately 100 miles of stream and 5,000 acres greasewood with associated wetlands—at least 240 playas.		Objective has been achieved for shortgrass and sandsage prairies and streams. Lasting protection of State Land Board lands is critical to securing these achievements.
Greater Pawnee Prairie	By 2015, permanently protect 300,000 acres of shortgrass prairie, chalk bluffs and riparian in functional blocks.		Protection extends over more than 311,000 acres of shortgrass prairie, chalk bluffs, and riparian areas. Lasting protection of State Land Board lands is critical to securing this achievement.
Gunnison Basin	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.		By 2016, 13,300 (89% of objective) additional acres were protected. Conservation easements on the Trampe property (2,063 acres) expected in 2017 will lead to this objective being exceeded.
Laramie Foothills	By 2015, protect 100 miles of riparian and Preble’s Meadow Jumping Mouse habitat.		Protection of 123 stream miles has been achieved within the occupied range of Preble’s Meadow Jumping Mouse.
North Platte	By 2015, all known occurrences (approximately 500 acres) of the globally rare plant (Phacelia) occurrences are protected.		Three of ten known element occurrences of Phacelia are completely protected and five are partially protected.
	By 2015, 50,000 acres of private critical Grouse habitat permanently protected from subdevelopment and oil and gas threats in functional landscapes.		Approximately, 22,000 acres (44% of objective) are protected.

<i>Landscape</i>	<i>Objective</i>	<i>Progress Assessment</i>	<i>Comments</i>
San Miguel/Lower Dolores River	By 2015, ensure that oil and gas roads and well-pads do not occur within rare plant or plant communities. Where oil and gas development does occur, minimize impacts to biodiversity.		No active or permitted wells occurred in 39 rare plant community element occurrences, and only 4 of 218 (1.8%) rare plant element occurrences had active or permitted wells.
Upper Yampa River	By 2009, protect 50% (approximately 20,000 acres) of West Routt critical private Sage-Grouse habitat.		Protection on private lands extends over 25,555 acres (128% of objective) of Greater Sage-Grouse habitat.
	By 2009, protect 65% or additional 4400 acres of key lower montane riparian areas that are privately owned along the Elk River and the main stem Yampa, from the Elk confluence to Hayden.		Protection covers 36% of riparian areas on private lands.

Specific actions that remain critical to achieving conservation success in project areas:

- CHICO BASIN PROJECT AREA — Conservation objectives for intact functional prairie in this landscape cannot be achieved without many of the State Land Board lands. The Conservancy should engage with the SLB to ensure that these lands remain with the body of State Stewardship Trust lands. We should also develop a strategy to protect these lands permanently, either through a conservation easement or a conservation buyer.
- GUNNISON BASIN PROJECT AREA — While the Trampe conservation easements will allow us to reach the original short-term objective for protection of Gunnison Sage-Grouse habitat, the long-term objective is to protect the entire amount of critical habitat within the Gunnison Basin. As opportunities arise to assist other land trusts in protecting this habitat, we should pursue those opportunities.
- LARAMIE FOOTHILLS PROJECT AREA — Direct threats to Preble's Meadow Jumping Mouse habitat remain within the Laramie Foothills. For example, the Halligan and Seaman Reservoir projects will inundate known mouse habitat. TNC Colorado should continue to work with Colorado Open Lands to fully offset these impacts and to protect the additional habitat identified in the recovery plan to achieve long term success for the mouse.
- NORTH PLATTE HEADWATERS PROJECT AREA — Land protection is still needed to ensure the long-term survival of the Greater Sage-Grouse, but there is no significant land trust capacity focused on Colorado's North Park. TNC Colorado's Land Protection Team should consider expanding the Northwest Colorado priority land protection area to include North Park.
- UPPER YAMPA RIVER PROJECT AREA — We cannot be successful with Greater Sage-Grouse rangewide protection without the private lands in the Yampa River watershed, including the Upper Yampa and the Lower Yampa. TNC Colorado should keep a focus on protecting Grouse habitat in large private lands.



Key Insights for Conservation Planning and Implementation at TNC Colorado

In reviewing our past efforts, we were able to develop recommendations from key insights into contextual factors that influenced objective achievement and should influence future conservation planning and management:

- Defining clear, specific, measurable objectives is essential for focusing our work and being able to assess progress toward those objectives.
- Frequently monitor progress towards conservation objectives throughout the lifespan of the plan rather than waiting to the end of a plan's time frame. To be the most effective, our conservation planning and strategies need to be responsive to changes in information and threats.
- Conservation by Design 2.0 is a well-considered approach to effective conservation planning, and we should apply this approach more systematically in the future at TNC Colorado when new strategies are considered.
- All future conservation goals and objectives should consider climate change and explicit goals should be created for climate specific strategies—Natural Climate Solutions and climate adaptation.
- Human well-being outcomes should be determined for conservation strategies and linked to conservation outcomes as appropriate.
- In the future, when large changes in staffing and geographic focus occur, we recommend revisiting existing conservation objectives and their subsequent feasibility.
- TNC Colorado should continue to create and work toward conservation objectives with partners so that we can leverage our strengths to larger results.
- TNC Colorado's Science Team and conservation component leads should be jointly responsible for providing new staff, as part of their orientation to the organization, and existing staff, as part of their professional development and active management, with access to foundational data, methods, tools, documents, and decisions that focus and prioritize our conservation objectives. In the future, our conservation plans should be living and dynamic tools familiar to all team members.



Swift fox kits © Rob Palmer, Sagebrush landscape in Gunnison County © TNC (Betsy Neely), Chris Pague looking for riparian species © Mark Godfrey, Rob Addington logs grass transects © Jason Houston

Introduction



What progress has been made toward long-term conservation objectives set by The Nature Conservancy’s Colorado Chapter (TNC Colorado)? Given the progress found in this assessment, how should TNC Colorado evolve and adapt its approach to setting conservation objectives and creating strategies to achieve those objectives? Addressing these questions requires an assessment of progress that is both retrospective and prospective—retrospectively assessing our past progress toward meeting conservation objectives and prospectively making recommendations about how TNC Colorado’s planning, implementing and adapting strategies over time might change in the future. This assessment and its key insights should improve TNC Colorado’s conservation outcomes for nature and people by:

1. informing the approach to Conservation by Design and the Shared Conservation Agenda
2. highlighting the need for a shared understanding and use of existing planning documents, including Ecoregional Plans (ERPs) and Conservation Action Plans (CAPs)
3. improving the process of adapting strategies to make them more climate smart
4. setting a foundation for the next revision of the strategic plan

TNC Colorado’s Science Team is committed to regularly stepping back to look at the big picture of conservation in Colorado to inform and refine our conservation strategies to reflect current needs and incorporate the best science over time. To fulfill this commitment, the Science Team created a multi-year, multi-phase project referred to as the Conservation Progress Assessment (Assessment). Broad goals of the Assessment include:

1. reporting progress towards established conservation objectives
2. assessing our processes for setting objectives and strategies and maintaining the organization’s focus on set objectives and strategies
3. informing opportunities in current strategies
4. and familiarizing new staff with documents providing the science behind conservation strategies and objectives

The Science Team expects the Assessment to inform conservation actions under the current strategic plan (The Nature Conservancy 2015a) and the formulation of the next strategic plan in 2020.

Annually, the Assessment will address one of TNC Colorado’s strategies to reflect on what progress towards conservation objectives means for the organization’s work. This report summarizes the Assessment’s first year which focused on TNC Colorado’s land protection and management strategy. As background for understanding the scope and goals of this land protection and management phase of the Assessment, we provide a brief overview of conservation planning at TNC Colorado.

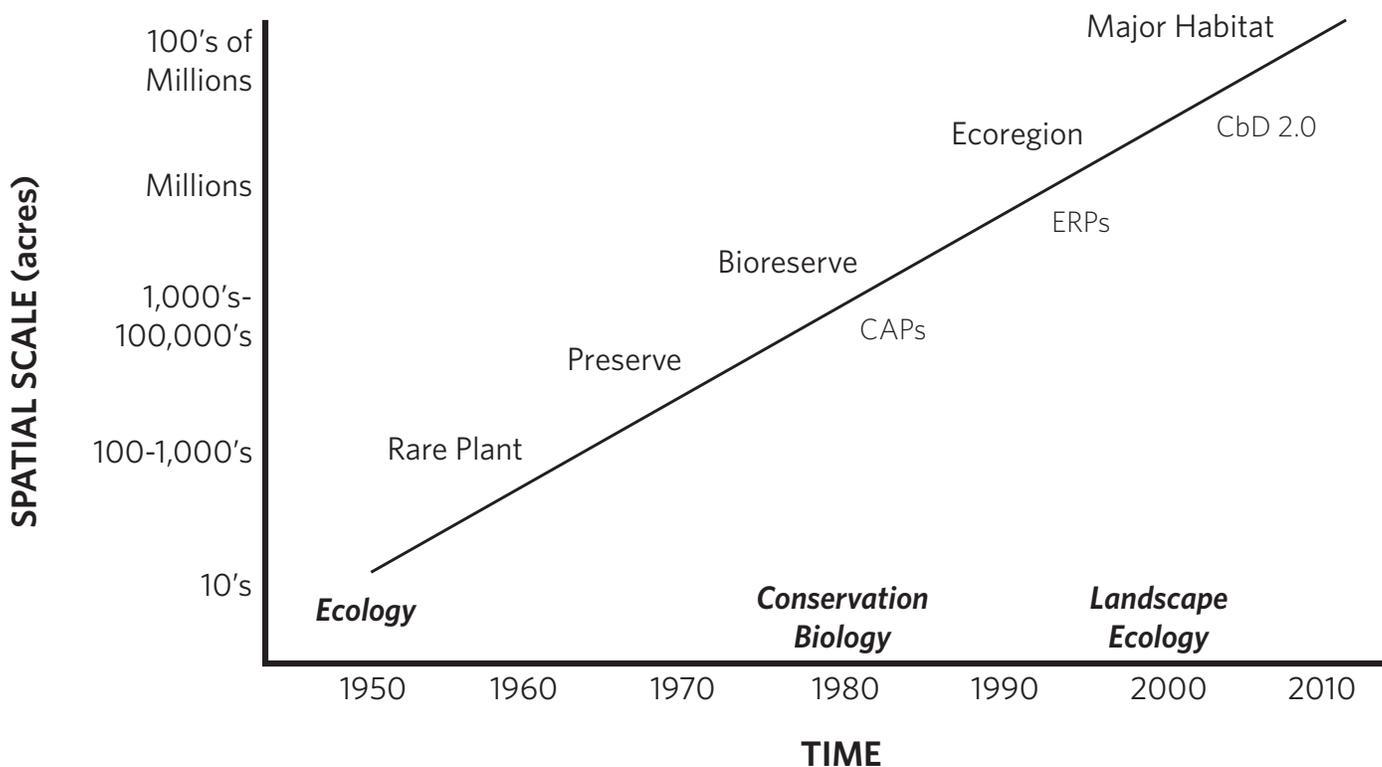
A Brief History of Conservation Planning at The Nature Conservancy

The history and evolution of conservation planning at TNC has been well documented (Kareiva et al. 2014). Major steps in TNC Colorado’s conservation planning have been (Figure 1):

- Natural Heritage Programs were established by TNC beginning in the 1970s, including the Colorado Natural Heritage Program (CNHP), established in 1992. These programs document and inventory rare species and habitat.
- In the 1990s, TNC created its signature approach to conservation planning called Conservation by Design (The Nature Conservancy 2015b). Conservation by Design resulted in ERPs in Colorado that designed a network of lands—and later waters—that, if protected, would lead to conservation success. There are portions of six ecoregions in Colorado: Central Shortgrass Prairie, Southern Rocky Mountains, Wyoming

Basins, Utah-Wyoming Rocky Mountains, Utah High Plateaus, and Colorado Plateau. In this assessment we used three ERPs: Central Shortgrass Prairie (Neely et al. 2006), Southern Rocky Mountains (Neely et al. 2001), and Wyoming Basins (Sochi et al. 2013). ERPs are important foundational information and guides for TNC Colorado’s conservation work. For example, the Central Shortgrass Prairie ERP clearly identifies southeastern Colorado as the largest, most intact, and best condition block of native habitat in eastern Colorado (Neely et al. 2006). ERPs are still required documentation for land protection projects (i.e., TNC Colorado’s internal Project Approval Package).

Figure 1. A timeline of conservation planning at The Nature Conservancy.



- For many of the landscapes (hereafter, “project areas”) identified in ERPs, TNC Colorado joined with partners to create CAPs, science-based plans that describe the most important actions needed to achieve conservation success. When a project area was chosen for CAP development, the boundary for planning was based on the needs of a select group of target species and natural communities/ecological systems, as well as other geographic considerations. For example, the Upper Yampa River Project Area was based on watershed boundaries. The process for creating a CAP is to identify conservation targets (species, plant communities, and ecological systems identified in the ERPs and from partners); assess the conditions of the conservation targets; identify threats (including the stresses on the targets and the sources of those stresses); develop objectives and strategies for restoring the status of the targets and reducing the threats, both in the short-term (ten year) and with regard to ultimate outcomes; and then to develop measures to assess progress toward the objectives. Many CAPs were completed in the mid-2000s to intentionally direct conservation actions across Colorado¹. CAPs are still required documentation for land protection projects (i.e., TNC Colorado’s internal Project Approval Package).
- The CAP planning process has greatly evolved over 20 years of practice into a standardized process with guidance and tools used by dozens of conservation groups and hundreds of practitioners (Conservation Measures Partnership 2013). CAP (also called Open Standards) is supported by the Conservation Measures Partnership (Conservation Measures Partnership 2013), and the Conservation Coaches Network (500+ practitioners devoted to facilitating conservation planning; <http://www.ccnetglobal.com/about-ccnet/>).
- Recently, TNC announced a major update to Conservation by Design. This update does not call for the strongly place-based planning of ERPs. However, although different from Conservation by Design of 20 years ago, this updated version—called Conservation by Design 2.0 (CbD 2.0; The Nature Conservancy 2015b)—still employs many of the same concepts and tools that are used in developing CAPs. Notably, the last two of the 14 steps of CbD 2.0 call for evaluation (are we achieving our goals?) and adaptation (what do we need to change to improve outcomes?). We believe that successful implementation of CbD 2.0 demands evaluating our past successes and adapting our conservation planning and actions accordingly (The Nature Conservancy 2015b).



¹ When many of the CAPs were created the conservation paradigm in Colorado was focused on community-based conservation with a Project Director living in or specifically focused on a particular geography. These community-based staff members along with additional TNC staff and partners were the authors of these documents and the ones committed to achieving these objectives.

Conservation Progress Assessment - Land Protection and Management

For the current report, we reviewed CAP land protection and management ten-year objectives set for project areas throughout the state and created between 2004 and 2007. Specific report objectives include:

1. report on progress towards CAP land protection and management objectives
2. provide recommendations about whether these objectives should still guide TNC Colorado's land conservation work
3. evaluate how scientific and programmatic factors influenced our goal achievement
4. recommend ways to adapt our conservation planning and actions to achieve greater outcomes
5. and begin building a foundation for the next strategic plan revision

To maximize the applied impact of this report, TNC's Colorado Science Team has and will continue to consult with TNC Colorado's Lands Team on interpretation of the results and creation of recommendations for future work.



Methods

We gathered 51 land protection or management objectives (Appendix 1) from the 11 CAP project areas throughout the state (Figure 2). We eliminated 18 objectives because data for assessment were not available, 19 because of insufficient time, 3 because they weren't clear, and 2 because they turned out not to be relevant (Appendix 1). This left nine objectives in seven project areas for the assessment (Figure 2).

For this assessment, we overlaid maps representing past and present protected lands within these project areas onto maps of conservation targets such as vegetation types and wildlife habitat. We then quantified the degree to which conservation targets overlapped protected lands owned and managed by different conservation organizations and management agencies. Table 2 provides abbreviations used to identify ownerships and protection mechanisms when reporting quantitative results throughout the report.

Protected lands and conservation target data came from state and federal agencies (e.g., Colorado Parks and Wildlife [CPW]) as well as non-governmental entities (e.g., CNHP). We mapped protected lands at two time points using Colorado Ownership, Management, and Protection (COMaP) versions 5 (2006) and 10 (2016). We updated COMaP v 5 and 10 with internal data sets representing TNC Colorado's fee ownership and conservation easements lands. We acknowledge that acreages reported here are an underestimate as not all land trusts report their conservation easements for inclusion in COMaP.

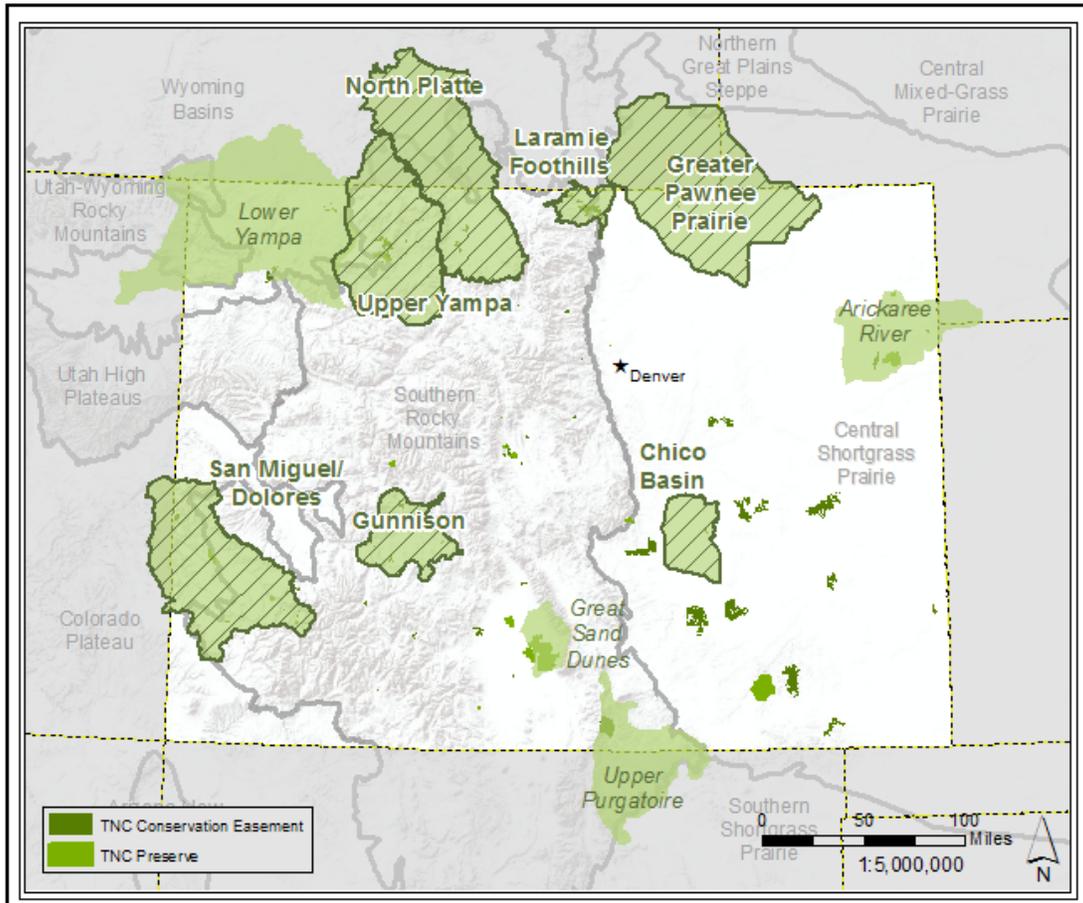


Figure 2. Conservation Action Plan project areas (green polygons) assessed for inclusion in the land protection and management phase of the Conservation Progress Assessment. After further filtering (e.g., based on available data), objectives from seven project areas (hatched polygons) were included in the assessment.

For our assessments, we defined protected lands as publicly owned lands and private lands with a conservation easement, exchange of use agreement, or memorandum of understanding. We excluded private lands with only access easements or deed restrictions as these lack a conservation focus or are subject to change. For applicable objectives, we report progress with and without State Land Board (SLB) lands considered protected. In general, SLB lands are subject to sale if three out of five SLB commissioners agree to the sale. Passed in 1996, Amendment 16 required that 10% of SLB lands would be designated as Stewardship Trust Lands. Under this amendment, sale of these lands would require votes from 4 of 5 commissioners, and land management of these properties should account for more than economic returns. Since the passage of this amendment, the SLB has made administrative and legal moves to lessen protection of Stewardship Trust Lands. By reporting progress with and without SLB lands in Chico Basin and Greater Pawnee Prairie Project Areas, we are recognizing the provisional protection of these lands and acknowledging the need for additional action to secure their long-term protection.

More detailed methods are provided in Appendix 2.

Table 2. Abbreviations used to identify ownerships and protections mechanisms.

<i>Abbreviations</i>	<i>Ownerships</i>
ARS	U.S. Agricultural Research Service
BLM	U.S. Bureau of Land Management
BOR	U.S. Bureau of Reclamation
CPW	Colorado Parks and Wildlife
CRWCD	Colorado River Water Conservation District
DoD	U.S. Department of Defense
NPS	U.S. National Park Service
SLB	Colorado State Land Board
TNC	The Nature Conservancy’s Colorado Chapter
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
	<i>Protection Mechanisms</i>
CE	Conservation easement
EOU	Exchange of Use Agreement
MOU	Memorandum of understanding

Conservation Progress Assessments

Below, progress assessments for conservation objectives are reported by sections organized by CAP project area.

- Each section starts with an overview of the CAP project area and planning results. An Overview provides a brief description of the project area, lists the conservation targets, and describes the threats to the conservation targets when the CAP was completed.
- Assessments for each objective follow a common form:
 - » ASSESSED CONSERVATION TARGET section describes the specific target—among all the conservation targets in the project area—that was assessed in this report. For some project areas, multiple conservation targets were assessed.
 - » OBJECTIVE AND PROGRESS ASSESSMENT subsections then clearly state the objective and the results of a quantitative assessment of whether the objective has been met.
 - » A MAIN TAKEAWAYS subsection takes a retrospective look at factors that facilitated or hindered achievement or lack thereof of an objective. The section also takes a prospective look at whether the objective remains relevant for land conservation decisions.

Chico Basin Project Area



The Chico Basin Project Area was identified in the Central Shortgrass ERP (Neely et al. 2006, The Nature Conservancy 1998). The Chico Basin CAP was completed in 2005 with partners including CPW, SLB, and local ranchers (The Nature Conservancy 2005a). Below is a summary of that planning effort.

The Chico Basin Project Area is a large, relatively unfragmented landscape of shortgrass prairie and sandsage prairie. While the Chico Basin is close to the sprawling communities of Colorado Springs and Pueblo, a trip to the Chico Basin is reminiscent of the historic past as much of the landscape resembles what was seen by explorers. Cattle are now the grazers of this conservation area rather than herds of bison. However, many of the other species from that time, antelope, prairie dogs, ornate box turtles and numerous prairie birds, still call the Chico Basin home. Chico Basin supports outstanding examples of native sandsage and shortgrass prairie, wetlands, riparian systems, imperiled species and a host of animal species that are rare and/or declining, such as Brewer's sparrow, mountain plover and swift fox (The Nature Conservancy 2005a).

The conservation targets for the Chico Basin Project Area were identified as:

Rare or Declining Species

- Cassin's Sparrow (*Peucaea cassinii*)
- Brewer's Sparrow (*Spizella breweri*)
- Mountain Plover (*Charadrius montanus*)
- Black-tailed Prairie Dog (*Cynomys ludovicianus*)
- Swift Fox (*Vulpes velox*)
- Arkansas Darter (*Etheostoma cragini*)
- Plains Leopard Frog (*Rana blairi*)
- Plains Ragweed (*Ambrosia linearis*)

Ecological Systems

- Sandsage Prairie
- Shortgrass Prairie
- Midgrass Prairie
- Arid Shrublands
- Greasewood Shrublands
- Wetlands and Seeps
- Playas
- Chico Creek Riparian Areas

The greatest threats to the Chico Basin were identified as:

1. Residential home development
2. Development of roads and utility corridors
3. Toll Road

The Chico Basin is close to two large metropolitan areas, Colorado Springs and Pueblo. Residential home development and associated roads remove and create smaller patches of habitat for prairie species such as mountain plover. Expanding populations and residential development lead to an increasing probability of proposals for major roads, such as a toll road that was proposed within and adjacent to the Chico Basin (The Nature Conservancy 2005a). Such major roads also cause habitat loss and fragmentation of habitat into smaller patches.

While the above threats will affect most conservation targets in the basin, some threats disproportionately impact one conservation target. For example, digging in playas is done to make them deeper and more reliable water source for livestock. The result may be loss of suitable habitat for the globally rare plains ragweed or the amphibian species that depend on the playas being wetted (The Nature Conservancy 2005a).

Assessed Conservation Target: Functional Prairie Landscape

For this Assessment, we focused on protection of a functional prairie landscape at Chico Basin. A functional prairie landscape was defined as having a minimum amount of all of its major ecosystem components, including shortgrass, sandsage, midgrass, arid shrublands, greasewood, streams and wetlands. Large areas of native prairie vegetation are increasingly rare in Colorado. Approximately 45% of Colorado's prairie has been converted to croplands and other land-uses (Neely et al. 2006, The Nature Conservancy 1998). These prairies support breeding, migratory, and overwintering populations of species known to be in decline, such as Mountain Plover, Cassin's Sparrow, Arkansas Darter, and Black-tailed Prairie Dog. Most of Colorado's prairie is composed of shortgrass prairie and associated vegetation types. Sandsage prairie dominates the Chico Basin Project Area and occurs largely as five "islands" within the Central Shortgrass Prairie (Neely et al. 2006, The Nature Conservancy 1998). Chico Basin sandsage is in good condition and supports many dependent species (The Nature Conservancy 2005a).



Objective for Functional Prairie Landscape: Permanently protect/conserves at least 300,000 acres in a functional prairie landscape—at least 80,000 shortgrass, 70,000 sandage, 30,000 midgrass, 12,000 arid shrublands, approximately 100 miles of stream and 5,000 acres greasewood with associated wetlands—at least 80 % of the 300 playas.

Progress Assessment: When SLB lands were considered protected, objectives were met for the shortgrass and sandage ecological systems, but not met for other ecological systems (Table 3; Figure 3). When SLB lands were excluded, acreage goals were not met for any ecological system. While SLB lands represented the dominant form of protection for all ecological systems, notable contributions were made to some ecological systems by BLM and private lands with conservation easements, including easements put in place by TNC Colorado.

With respect to protected stream miles, the objective was nearly met, (79 miles of 100 miles protected) without SLB lands and was far exceeded when SLB lands were included. As with above ecological systems, BLM and private lands with conservation easements are the majority of the protected miles and contribute greatly toward achieving the stream protection objective (Table 3).

Regardless of whether SLB lands were included, the objective for playa protection was not met (Table 3). Based on the latest data sets, a total number of 137 playas are identified in the Chico Basin. The original objective (protecting 80% of 300 playas, or 240 playas) cannot be achieved because the latest scientific data that can be assessed with GIS suggests that many of the 300 playas cannot be mapped. Therefore, in this assessment the “percent of objective” was compared to 80% of mapped existing playas, or 110 playas. Of the 137 playas, 28 occur entirely on protected lands with the greatest numbers occurring on SLB and DoD lands.

Table 3. Protected acres of vegetation types, playas, and stream miles by ownership and protection mechanism within Chico Basin Project Area. Vegetation types are abbreviated: arid shrubland (AS), greasewood (GW), midgrass (MG), shortgrass (SG), and sandage (SS).

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>					<i>Stream Miles</i>	<i>Playas (#)</i>
		AS	GW	MG	SG	SS		
BLM	Fee	3	16	23	2,773	6,801	15	0
City	Fee	0	0	0	7	0	0	0
DoD	Fee	1	1,694	0	18,654	2,304	34	7
DoD	Unknown	0	0	695	288	0	3	1
Private	CE	39	341	31	10,672	5,094	27	1
Private	TNC CE	0	0	0	2,073	5	0	2
SLB	CPW Fee/Lease	23	0	852	3,737	4,228	2	0
SLB	DoD Unknown	0	0	0	2	0	0	0
SLB	Fee	4,542	1,953	15,283	150,305	63,084	376	17
Total		4,608	4,304	16,884	188,511	81,516	457	28
Percent of Objective		38	86	56	236	116	457	25
Total without SLB		43	2,351	749	34,467	14,204	79	11
Percent of Objective		0	47	2	43	20	79	10

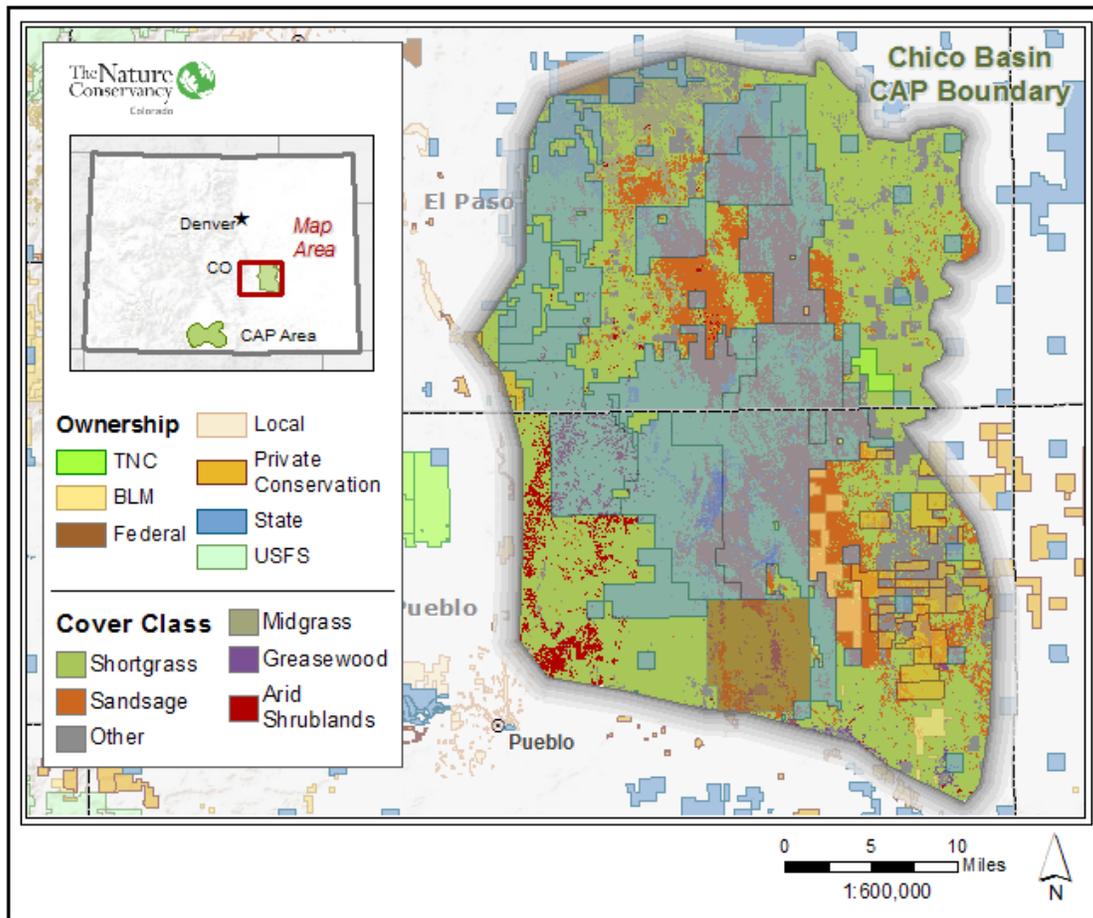


Figure 3. Protected lands by ownership and vegetation cover classes within in the Chico Basin Project Area.

Main Takeaways for the Functional Prairie Landscape

The largest area of protected lands in the Chico Basin Project Area is owned by the SLB. TNC Colorado secured a long-term conservation lease on the SLB's 48,000 acres Bohart Ranch. Ranchlands, LLC has a similar lease on the SLB's Chico Basin Ranch (88,000 acres). TNC Colorado and CNHP were key in nominating lands of high conservation value to the Stewardship Trust including the Bohart Ranch and Chico Basin Ranch. With the designation of these lands highlighting the significance of this project area, several landowners subsequently placed conservation easements on their prairie lands. SLB leases remain in effect and the largest lands of the Chico Basin Project Area remain as Stewardship Trust Lands.

Even though there is rapid residential growth in the Chico Basin Project Area, SLB holdings provide a provisionally protected area of almost 300,000 acres

of intact shortgrass prairie and sandsage shrublands. While the original toll road proposal was withdrawn, it is likely that a similar proposal will arise in the future since the travel corridor issue remains in one of the fastest growing parts of the state. The project area remains a land conservation priority (The Nature Conservancy 2014), and these properties should remain in the Stewardship Trust otherwise we risk a major setback in achieving our conservation objectives. In addition, because SLB can remove these properties from the Stewardship Trust, sell them, lease them for various incompatible kinds of resource development, or subdivide the properties, a strategy for permanent protection of these lands is warranted. To meet the overall objective of 300,000 acres, additional protection will need to occur on private lands.

Greater Pawnee Prairie Project Area



The Greater Pawnee Prairie CAP was completed in 2007 with partners including the USFS, and Weld County (The Nature Conservancy 2007). Below is a summary of that planning effort.

Conservation of shortgrass prairie is urgent—temperate grasslands are one of the least protected and most highly threatened habitat types on Earth, with only 2% protected globally and less than 5% protected in the USA. One of the biggest challenges of prairie conservation is that grasslands require large, unfragmented tracts of land in order to maintain their species and ecological function.

The Greater Pawnee Prairie is a vast region of intact shortgrass prairie with chalk bluffs arising on the northern end. This conservation area harbors native wildlife and several rare species, most notably the Mountain Plover. While the Greater Pawnee Prairie is close to the sprawling communities of Greeley and Fort Collins, a trip to the Greater Pawnee Prairie is reminiscent of the past. Cattle are now the grazers of this project area rather than enormous herds of bison. However, many of the other species from that time, antelope, prairie dogs, and numerous prairie birds, still call the Greater Pawnee Prairie home (The Nature Conservancy 2007).

The conservation targets for the Greater Pawnee Prairie Project Area were identified as:

Rare Species

- Mountain Plover (*Charadrius montanus*)
- Colorado Butterfly Plant (*Gaura neomexicana* var. *coloradensis*)

Animal Communities

- Black-tailed Prairie Dog Animal Community
- Native Fish Assemblages

Ecological Systems

- Shortgrass Prairie
- Mixed Grass Prairie
- Chalk Bluffs

The greatest threats in the Greater Pawnee Prairie were identified as:

1. Homogeneous grazing practices
2. Parasites and Pathogens – plague in prairie dogs
3. Incompatible residential home development
4. Conversion to agriculture
5. Wind farm development
6. Oil and gas development
7. Uranium mining

Homogeneous grazing practices lead to similar grassland structure across thousands of acres of prairie. This structure leaves little habitat for species that prefer either low or high stature grasses. Residential home development and oil and gas development including associated roads removes and creates smaller patches of habitat for prairie species such as Mountain Plover. The Greater Pawnee Prairie is close to several large metropolitan areas, Greeley, Windsor, Loveland, and Fort Collins.

In addition, some threats are localized in scope or only affect one conservation target. For example, plague only affects Black-tailed Prairie Dogs. Wind farms are threatening the intactness of the chalk bluffs and some of the species that are tied to them (The Nature Conservancy 2007).

Assessed Conservation Target: Functional Prairie

Shortgrass prairie was a conservation target in the Central Shortgrass Prairie ERP (Neely et al. 2006). Incompatible residential development and conversion to dryland agriculture were identified as high threats to the shortgrass prairie in the CAP (The Nature Conservancy 2007).



Objective for Functional Prairie: Permanently protect 300,000 acres of shortgrass prairie, chalk bluffs and riparian areas in functional blocks.

Progress Assessment: Over 313,000 acres of shortgrass prairie, chalk bluffs, and riparian areas are permanently protected within the Greater Pawnee Prairie (Table 4; Figure 4). Without SLB lands, protected acreage

drops to approximately 211,000 acres. Aside from SLB lands, USFS lands (58% of protected acres) are critical to the achievement of this objective. TNC Colorado conservation easements and other protections make comparatively small contributions towards the objective, with a little more than 25,000 acres protected in conservation easements.

Table 4. Total protected acres of shortgrass prairie, chalk bluffs, and riparian areas reported by ownership and protection mechanism within Greater Pawnee Prairie.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>		
		<i>Shortgrass Prairie</i>	<i>Chalkbluffs</i>	<i>Riparian</i>
ARS	Fee	11,250	1	6
BLM	Fee	222	0	0
CPW	Fee	135	0	9
Private	CE	19,024	222	31
Private	CPW Fee	10	0	42
Private	CPW Lease	3	0	0
Private	TNC CE	6,359	3	18
SLB	CPW Fee	538	0	21
SLB	CPW Fee/Lease	4,883	0	2
SLB	Fee	95,576	660	57
Special District	CPW CE	89	0	4
USFS	Fee	172,931	1,023	31
Total		311,020	1,909	221
Grand Total		313,150		
Percent of Objective		104		
Total without SLB		210,023	1,249	141
Grand Total		211,413		
Percent of Objective		70		

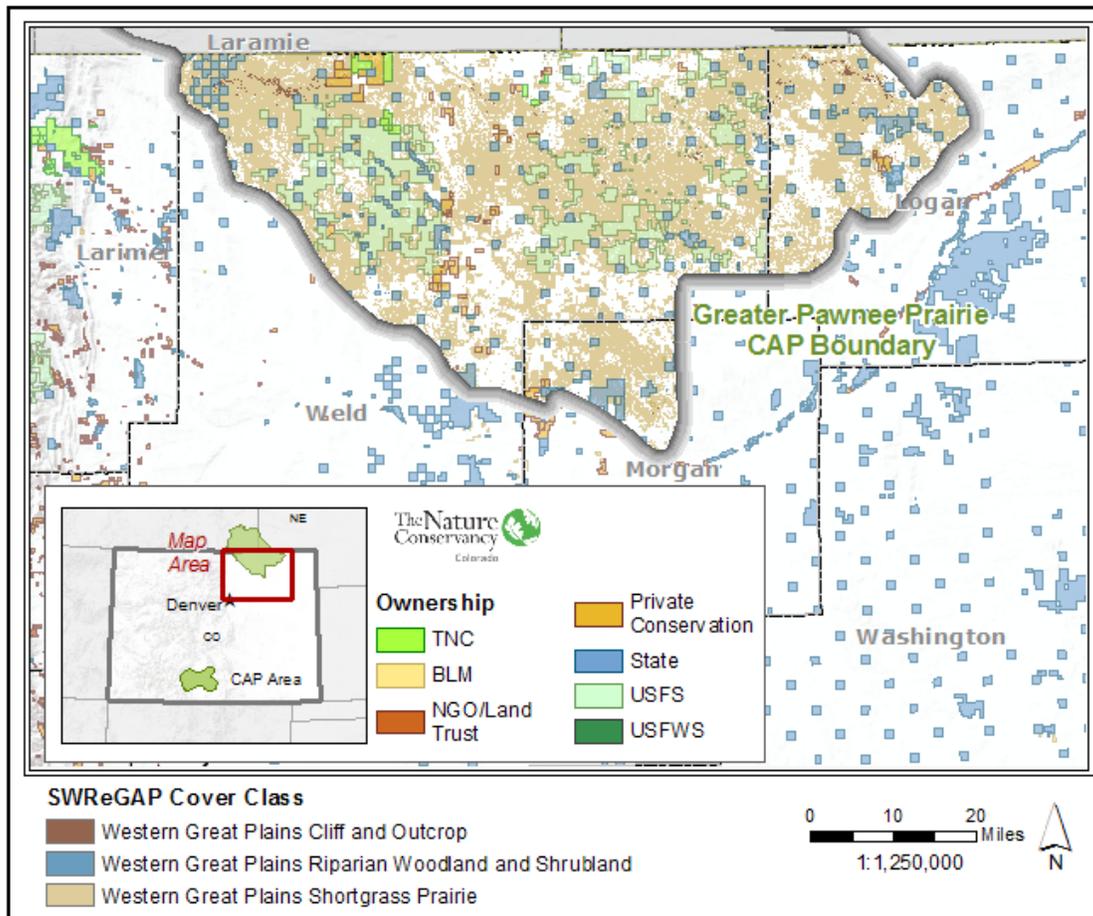


Figure 4. Protected lands by ownership and cover classes in the Greater Pawnee Prairie Project Area.

Main Takeaways for Functional Prairie

During this assessment, we have underestimated the total number of acres that are permanently protected because two of the vegetation types within the objective could not be easily mapped, cliffs and outcrops and riparian areas. We have also overestimated the amount of protected prairie in functional blocks as we were not able to assess the number of acres in these connected blocks in the time given for this assessment. In the future, we should more clearly define functional blocks and the ecological systems in ways that can be clearly assessed. As Figure 4 shows, the public lands are scattered across the landscape within a matrix of unprotected private lands. If the unprotected lands are converted, the landscape might not support some of the species that exist in the Greater Pawnee Prairie.

Conservation easement progress slowed in recent years because of the extent and rate of oil and gas development. One potential reason could be that some funders seem to be reluctant to fund conservation easements with active

oil and gas or severed mineral rights in this and other landscapes with significant oil and gas development. As oil and gas exploration and development has slowed in recent years, land trusts including Colorado Open Lands may begin to work again in this area. While land protection mechanisms cannot stop oil and gas development from occurring, the impacts from oil and gas can be minimized through negotiation of a surface use agreement. Since the objective is to protect lands in functional blocks, additional targeted private land protection is needed to fill in the gaps in protection and ensure species such as Pronghorn Antelope can be sustained in the landscape. In the past, we have considered working on federal land consolidation in this landscape as a way to end up with more functional blocks of protected lands. This approach should be considered in the future under the right political climate and if there is local stakeholder acceptance of the approach.

Gunnison Basin Project Area



The CAP for the Gunnison Basin Project Area was completed in 2005 with partners including the CPW, Bureau of Land Management (BLM), Western State University, and National Park Service (NPS) (The Nature Conservancy 2008a). Below is a summary of that planning effort.

The Gunnison Basin is a vast sagebrush landscape containing the largest population of Gunnison Sage-Grouse and all of the world's skiff milkvetch, a rare plant. This high-elevation mountain basin is surrounded by mountain peaks prized as recreational destinations including the Crested Butte and Lake City areas (The Nature Conservancy 2008a). An area in need of restoration and habitat protection, the Gunnison Basin was identified by TNC Colorado as a priority conservation area for its conservation efforts (Neely et al. 2001). TNC Colorado worked in partnership with private landowners, local land trusts, and public agencies toward conservation objectives in this important area. The primary focus of TNC Colorado's efforts in the Gunnison Basin was 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. The long-term vision for the Gunnison Basin was to protect and manage, as a natural landscape, ~300,000-acre montane sagebrush shrubland system with viable populations of Gunnison Sage-Grouse and skiff milkvetch. This vision included increasing awareness, appreciation and support for conservation among landowners, political officials, donors, and the public (The Nature Conservancy 2008a).

The conservation targets for the Gunnison Basin Project Area were identified as:

Rare, Declining, or Sensitive Species

- Gunnison Sage-Grouse (*Centrocercus minimus*)
- Wintering Bald Eagles (*Haliaeetus leucocephalus*)
- Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*)
- Skiff Milkvetch (*Astragalus microcymbus*)
- Gunnison Milkvetch (*Astragalus anisus*)

Rare Plant Communities

- Riparian Forests

Ecological Systems

- Sagebrush Shrublands
- Sagebrush Steppe
- Montane Grasslands

The greatest threats to conservation targets in the Gunnison Basin were determined to be:

1. Residential home development
2. Crop production practices
3. Whirling disease
4. Nonnative fish
5. Invasive plant species
6. Development of roads and utility corridors
7. Operation of dams
8. Recreational use on public lands

Residential home development including associated roads removes and fragments critical habitat for Gunnison Sage-Grouse. Crop production practices also reduce the quality of critical habitat for grouse. Invasive plant species degrade many ecological systems. Other 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 alters the amount and timing of stream flow which affect the type and quality of aquatic habitat (The Nature Conservancy 2008a).

Assessed Conservation Target: Gunnison Sage-Grouse

The Gunnison Sage-Grouse, a species that is closely related to the Greater Sage-Grouse, only recently gained formal recognition as a separate species (Young et al. 2000). Occurring in small, isolated pockets of southwestern Colorado and southeastern Utah, Gunnison Sage-Grouse are geographically isolated from the Greater Sage-Grouse, are smaller in size, have a distinctive barred tail pattern, and are genetically distinct (Oyler-McCance et al. 1999; Young et al. 2000; Oyler-McCance et al. 2015a; Oyler-McCance et al. 2015b). They share the Greater Sage-Grouse's affinity for sagebrush habitat and showy strutting behavior that congregating males use to attract females (Young et al. 2015). At one time, Gunnison Sage-Grouse may have occupied 22 counties in southwestern Colorado, but currently, they only occur in 8 counties (Braun et al. 2014; Young et al. 2015). A significant factor driving the decline of the grouse has been the conversion and degradation of sagebrush habitat. Recent estimates suggest only 4,600 birds remain with most occurring in a single population in the Gunnison Basin, and the species is federally listed as threatened under the Endangered Species Act (Partners in Flight Science Committee 2012; U.S. Fish and Wildlife Service 2014). Gunnison Sage-Grouse is a conservation target in the Southern Rocky Mountains ERP (Neely et al. 2001). The CAP completed in 2005 identified home development as a very high threat and developed the below objective to counter that threat.



Gunnison Sage-Grouse © Lance Beeny

Objective for Gunnison Sage-Grouse: Permanently protect/ conserve at least 15,000 additional acres of critical Gunnison Sage-Grouse habitat.

Progress Assessment: Between 2006 and 2016, an additional 13,330 acres of private critical Gunnison

Sage-Grouse habitat was protected (Table 5; Figure 5). During this period, TNC Colorado added 4,722 acres of conservation easements, 35% of the protected acres added. As of 2016, more than 380,000 acres are protected with the largest contributing landowners being the BLM and FS.

Table 5. Change in protection for critical Gunnison Sage-Grouse habitat between 2006 and 2016 in the Gunnison Basin Project Area. Protection is reported by ownership and protection mechanism. As mapped by Colorado Parks and Wildlife, critical habitat includes important nesting and brood rearing areas and areas that support 90% of individuals during winter time extremes of snowpack or minimum temperatures. A negative number does not necessarily mean that protection was lost rather the protection designation may have changed.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>		
		<i>2006</i>	<i>2016</i>	<i>2016-2006</i>
BLM	Varied	263,667	263,925	258
BOR	Varied	7	10	3
City/County	Varied	80	80	0
CPW	Varied	12,002	12,682	680
NPS	CPW MOU	0	47	47
NPS/BOR	Varied	11,876	11,877	1
Private	TNC CE	2,774	7,496	4,722
Private	CE and Others	22,620	29,350	6,730
SLB	Varied	2,407	2,392	-15
USDA	Fee	0	774	744
USFS	Fee	51,416	51,516	100
Total		366,849	380,149	13,330
Percent of Objective		89		

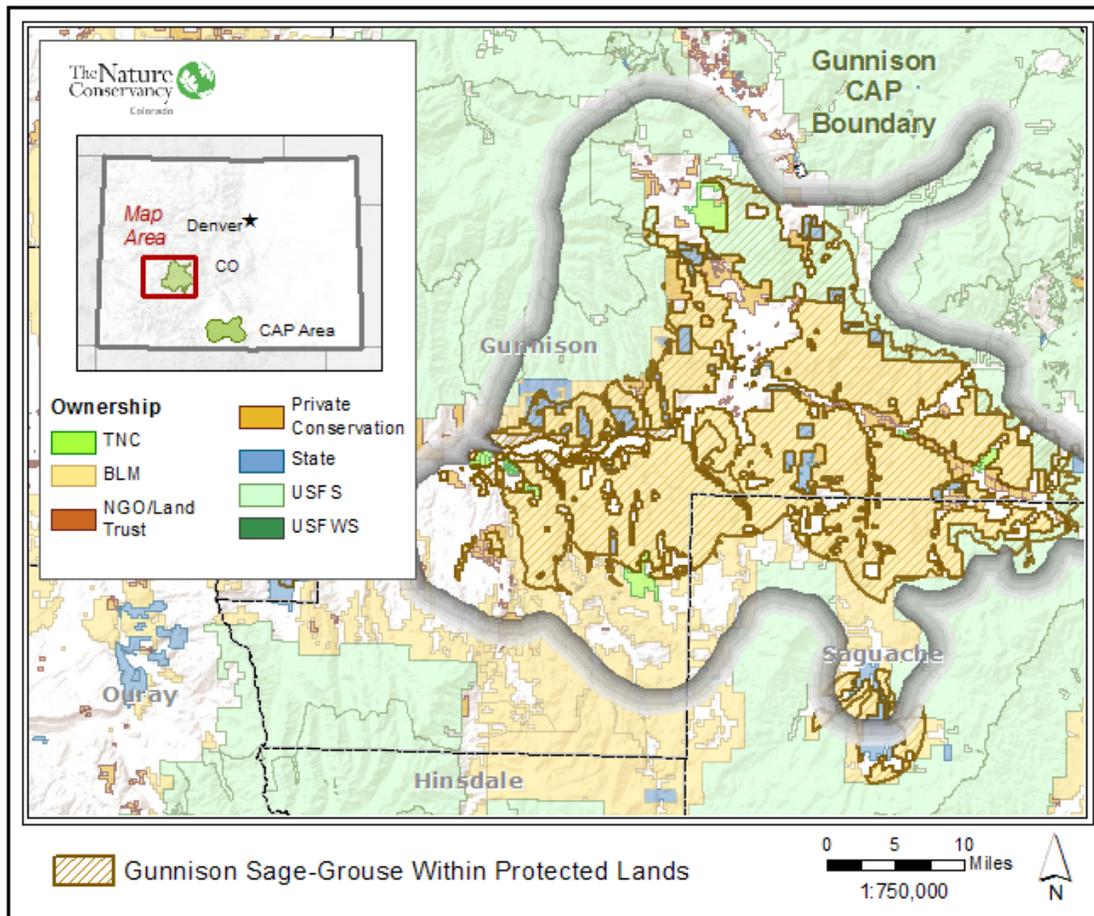


Figure 5. Critical habitat for Gunnison Sage-Grouse and protected lands by ownership within the Gunnison Basin Project Area. As mapped by Colorado Parks and Wildlife, critical habitat includes important nesting and brood rearing areas and areas that support 90% of individuals during winter time extremes of snowpack or minimum temperatures.

Main Takeaways for Gunnison Sage-Grouse

Even prior to the Endangered Species threatened species status listing in 2014, state, federal and local agencies, along with private landowners and non-profit conservation organizations created extensive cooperative efforts to restore and conserve Gunnison Sage-Grouse habitat (U.S. Fish and Wildlife Service 2016). With funding as well as state and federal agency prioritization of the Gunnison Basin, significant land protection and restoration actions have been possible. In the last ten years, TNC Colorado has been leading an effort to coordinate Gunnison Sage-Grouse restoration efforts as well as creation of climate change adaptation strategies in partnership with county, state, and federal agencies, private landowners, and academic researchers.

TNC Colorado and its partners are actively working to protect one of largest remaining private land areas of critical Gunnison Sage-Grouse habitat, the Trampe property, by the end of 2017. The Trampe conservation easement will add an additional 2,063 acres of protected lands and bring the total additional acres protected since 2006 to 15,393 ac, exceeding the objective. The long-term objective is to maintain or restore a viable grouse population (The Nature Conservancy 2008a) which implies protection of all critical habitat within the Gunnison Basin. The area will continue to be the focus for land protection efforts from state and federal agencies as well as non-governmental organizations in order to reach the recovery goals and conservation objectives for the conservation area.

Laramie Foothills Project Area



The Laramie Foothills CAP was completed in 2005 with partners including CPW, Colorado State University, and the U.S. Forest Service (USFS) (The Nature Conservancy 2008b). Below is a summary of that planning effort.

The Laramie Foothills contains one of the most extensive high-quality foothills landscapes remaining along the Front Range of Colorado. The diversity of elevation and topography in this region is expressed in an equally diverse suite of rare and imperiled species. The Laramie Foothills contain vast areas of native prairie, foothills shrublands and ponderosa pine woodlands harboring a diverse assemblage of globally and state rare plants, fish, and other species of interest (mammals, birds, insects) (The Nature Conservancy 2008b). Until recently, much of the area was in large private ranches. In the early 2000's, some portions began to rapidly develop while others were protected by local and national organizations (The Nature Conservancy 2008b).

The conservation targets for the Laramie Foothills Project Area were identified as:

Rare or Declining Species

- Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)
- Townsend's Big Eared Bat (*Corynorhinus townsendii*)
- Steven's Tortricid Moth (*Decodes stevensi*)
- Larimer Aletes (*Aletes humilis*)
- Rocky Mountain Cinquefoil (*Potentilla rubricaulis*)
- Bell's Twinpod (*Physaria bellii*)

Native Fish

- Greenback Cutthroat Trout (*Oncorhynchus clarkii stomias*)
- Brassy Minnow (*Hybognathus hankinsoni*)

Rare Plant Communities

- Riparian Communities
- Mountain Mahogany Shrublands
- Montane Grassland
- Bitterbrush Shrubland
- Ponderosa Pine Woodland

Ecological Systems

- Riparian System
- Montane/Foothill Cliff and Canyon
- Ponderosa Pine Woodlands
- Mixed Grass Prairie
- Lower Montane Shrublands
- Pinyon-Juniper Woodlands
- Aquatic System

The greatest threats to conservation targets in the Laramie Foothills were identified as:

1. Home Development
2. Mining Development
3. Invasive Plants

Of all the ecological systems mentioned above, those most at risk from these threats are foothills shrublands, ponderosa pine woodlands, pinyon-juniper woodlands, and the aquatic system. A primary concern is the loss and fragmentation of habitat for native species from home and mining development (The Nature Conservancy 2008b).

Invasive species can exacerbate habitat loss and fragmentation by increasing competition for limited resources, altering natural fire regimes, and shifting community composition. Some of the invasive plant species that affect grasslands, mountain mahogany shrublands, and ponderosa pine woodlands include cheatgrass, knapweed, Canada thistle, dalmatian toadflax, and leafy spurge (The Nature Conservancy 2008b).

Assessed Conservation Target: Riparian Systems and Preble’s Meadow Jumping Mouse Habitat

Preble’s Meadow Jumping Mouse in the Laramie Foothills is a conservation target in the Central Shortgrass Prairie ERP (Neely et al. 2006), and it is listed as a Threatened Species under the Endangered Species Act (U.S. Fish and Wildlife Service 2003). The Preble’s Meadow Jumping Mouse occurrences in the Laramie Foothills Conservation Area are the largest known in Colorado. The species appears to thrive in riparian systems with an abundance of grasses, sedges, and shrubs of which there is an abundance in the project area (U.S. Fish and Wildlife Service 2003).



Objective for Riparian and Preble’s Meadow Jumping Mouse Habitat: Protect 100 miles of riparian and Preble’s Meadow Jumping Mouse habitat

Progress Assessment: The objective was exceeded with 123 miles protected (Table 6; Figure 6). The majority

of protection was provided by TNC Colorado fee and conservation easements (39 miles), CPW ownership and leases (46 miles), and USFS lands (26 miles). The objective would have been met by these protections alone (111 miles).

Table 6. Protected stream and river miles in the occupied Preble’s Meadow Jumping Mouse range within the Laramie Foothills Project Area. Miles are reported by ownership and protection mechanism.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Miles</i>
BLM	Fee	1
CPW	Fee	40
Private	CE	8
Private	TNC CE	32
SLB	CPW Fee/Lease	6
Special District	Fee	3
TNC	Fee	7
USFS	Fee	26
Total		123
Percent of Objective		123

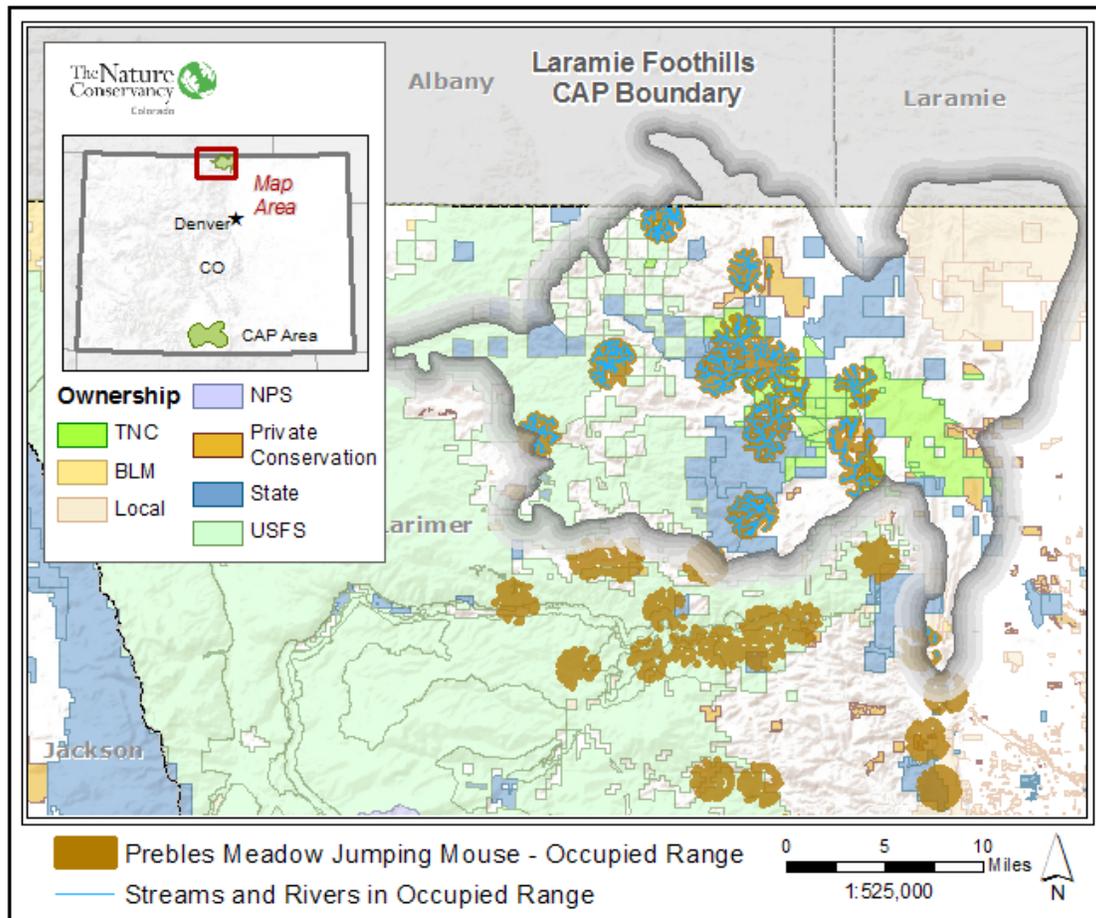


Figure 6. Protected lands by ownership and streams and rivers within the occupied range of Preble's Meadow Jumping Mouse for the Laramie Foothills Project Area.

Main Takeaways for Riparian and Preble's Meadow Jumping Mouse Habitat

Within this conservation area, the long-term land protection focus has been on the North Fork Cache la Poudre River and its riparian zones within and around TNC Colorado's Phantom Canyon Preserve. In addition to land protection, high quality community-based conservation work led by TNC Colorado has played a large role in restoration and protection of the mouse's habitat. TNC Colorado has worked with private landowners to reduce the prevalence of weedy species.

The objective for land protection of 100 miles was a ten-year objective developed before the recovery plan was completed. Additional miles of riparian habitat have been identified in U.S. Fish and Wildlife Service recovery plan for the Preble's Meadow Jumping Mouse (U.S. Fish and Wildlife Service 2003). We did not assess the designated critical habitat against what has been protected, but an assessment for designated critical habitat should be completed and used to set future objectives for land

protection by local land trusts. Because the Laramie Foothills holds one of the largest populations of Preble's Meadow Jumping Mouse, it is particularly important to continue progress to meet habitat protection goals in the recovery plan. The ecological services gained from conservation of the riparian areas, including providing habitat for other wildlife species, are an additional benefit of further protection. Most of the mouse's habitat is currently managed in ways that are compatible with the mouse's needs, but direct threats to habitat remain. For example, the Halligan Reservoir expansion project will inundate known Preble's Meadow Jumping Mouse habitat, and the Seaman Reservoir project will inundate known, critical habitat for the mouse. TNC Colorado should continue to work with Colorado Open Lands to fully offset these impacts and to protect additional acres identified in the recovery plan to achieve long-term success for the mouse.

North Platte Headwaters Project Area



The North Platte Headwaters CAP was completed in 2005 (The Nature Conservancy 2005b). Below is a summary of that planning effort.

The North Platte Headwaters is a vast sagebrush landscape containing Greater Sage-Grouse, White-tailed Prairie Dogs and most of the world's North Park Phacelia, a rare plant. The surrounding mountains contain relatively intact montane forests containing Boreal Toads and Wood Frogs, each of conservation importance. The North Platte River and its tributaries meander through the heart of the conservation area. The primary focus of TNC's conservation efforts in the North Platte Headwaters was towards protection and management of extensive areas of sagebrush shrubland which contain large populations of Greater Sage-Grouse and White-tailed Prairie Dogs, all known viable populations of North Park Phacelia, other rare plants and animals, and intact forests, sand dunes, and riparian systems (The Nature Conservancy 2005b).

The North Platte Headwaters Project Area includes North Park and the Upper North Platte Valley in Wyoming. This high-elevation mountain basin is surrounded by mountain peaks prized as recreational destinations (The Nature Conservancy 2005b).

The conservation targets for the North Platte Headwaters Project Area were identified as:

Rare, Declining, or Sensitive Species

- Greater Sage-Grouse (*Centrocercus urophasianus*)
- White-tailed Prairie Dog (*Cynomys leucurus*)
- Boreal Toad (*Anaxyrus boreas boreas*)
- Wood Frog (*Rana sylvatica*)
- Peregrine Falcon (*Falco peregrinus*)
- Sage Sparrow (*Artemisiospiza nevadensis*)
- North Park Phacelia (*Phacelia formosula*)
- Boat-shaped Bugseed (*Corispermum navicula*)
- Gibben's Penstemon (*Penstemon gibbensii*)

Special Habitats

- Waterbird Aggregation Areas
- Kettleponds

Ecological Systems

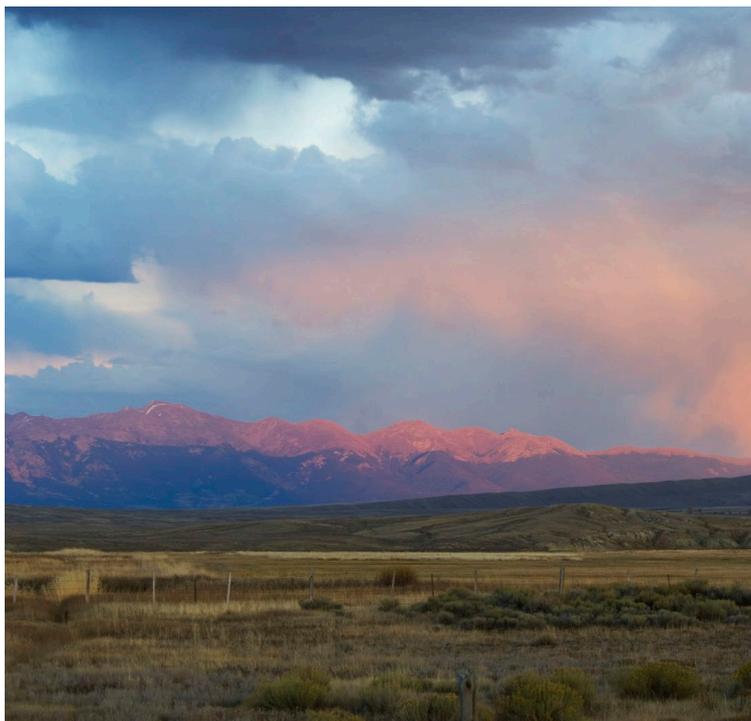
- Mountain Sagebrush Shrublands
- Montane Riparian Shrublands and Forests
- North Park Sand Dunes
- Lodgepole Pine Forest
- Spruce/Fir Forest
- Alpine Tundra

The greatest threats to the conservation targets in the North Platte Headwaters were identified as:

1. Invasive Trout
2. Chytrid Fungus
3. Operation of Drainage and Diversion Systems
4. Recreational Vehicles in Sensitive Areas
5. Home Development
6. Fire Suppression



Freshwater systems and species are most highly threatened by nonnative species and disease. The North Platte headwaters have no native trout, so any introductions may pose a threat to this unusual aquatic system that contains many rare species. In addition, Boreal Toad populations are threatened by disease, the chytrid fungus. The aquatic and riparian systems are also impacted through drainage and diversion which altered the hydrologic flow regime. In the North Park sand dunes, unrestricted recreational vehicle use could significantly impact the boat-shaped bugseed, a rare plant that inhabits the dunes, as well as the overall integrity of this system (The Nature Conservancy 2005b).



Assessed Conservation Target: Greater Sage-Grouse

The Greater Sage-Grouse, an iconic animal of the American West, is best known for the spectacular strutting displays that males put on for females each spring. While still present in 11 states and 2 Canadian provinces, the species has been extirpated from some states and provinces and has experienced range-wide declines largely due to habitat loss (e.g., conversion of sagebrush to cropland) and degradation (e.g., removal of sagebrush) (Schroeder et al. 1999). The North Platte Headwaters Project Area contains a high density cluster of breeding males (Doherty et al. 2010). Made a candidate species for listing under the Endangered Species Act in 2010, the species was recently removed from candidate status due to a massive and collaborative federal, state, and private lands effort to protect grouse habitat from threats (U.S. Fish and Wildlife Service 2015).



Greater Sage-Grouse is a conservation target identified in the Southern Rocky Mountains ERP (Neely et al. 2001). The CAP completed in 2005 identified home development as a moderate threat because of the remoteness of this area and oil and gas was rated as a low threat. However, with such a limited distribution and high sensitivity to the effects of fragmentation, sage-grouse habitat protection was prioritized and the below objective was developed. The North Park population of the Greater Sage-Grouse continues to be the most stable in the State (North Park Sage Grouse Working Group 2001).

Objective for Greater Sage-grouse: Permanently protect 50,000 acres of privately owned and critical Greater Sage-Grouse habitat from sub-development and oil and gas threats in functional landscapes.

Progress Assessment: Progress was made toward permanently protecting Sage-Grouse habitat from sub-development with over 22,000 acres under protection (Table 7; Figure 7). TNC Colorado conservation

easements represent 40% of this protection with the remainder provided by other conservation easements and various CPW protection mechanisms.

We did not assess the potential effects of oil and gas wells on the quality of protected acres as the Science Team felt this required a more in-depth review of current standards and practices than was permitted by the timeline for the Assessment.

Table 7. Protected private acres of critical habitat for Greater Sage-Grouse within the North Platte Headwaters Project Area. Critical habitat was defined using preliminary priority habitat from Colorado Parks and Wildlife.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>
Private	CE	4,175
Private	CPW EOU	2,775
Private	CPW Fee	301
Private	CPW Lease	4,840
Private	Fee/CE	1,221
Private	TNC CE	8,732
Total		22,044
Percent of Objective		44

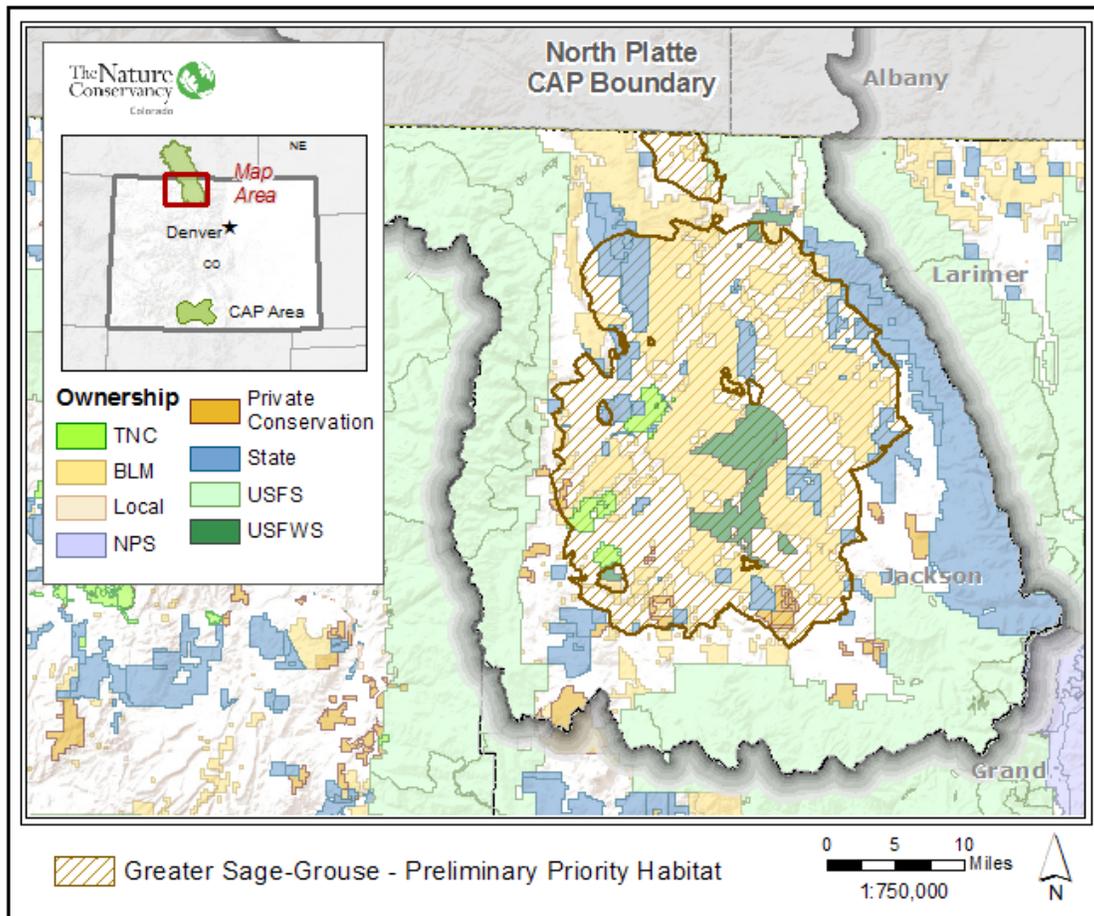


Figure 7. Protected lands by ownership and critical habitat for Greater Sage-Grouse in the North Platte Headwaters Project Area. Critical habitat was defined using preliminary priority habitat from Colorado Parks and Wildlife.

Main Takeaways for Greater Sage-Grouse

When the CAP was completed in 2005, TNC Colorado had local staff in North Park working with private landowners and public agencies to meet the conservation objectives. Conservation easements were placed on critical grouse habitat by several land trusts including TNC Colorado. However, this position was only focused in North Park for a few years. Without local staff in this remote area, establishing relationships with landowners and progress toward conservation objectives, especially beyond land protection has been slowed in the past eight years.

In addition, since we completed the North Platte Headwaters CAP, oil and gas exploration and development has significantly increased in extent. With this increased threat, some funders are reluctant to fund conservation easements where oil and gas is booming, and conservation easement transactions in North Park have slowed for a period of time over the last ten years.

Even though land use change in North Park is slow, sub-development, fragmentation, and oil and gas exploration and development continues to happen. Fragmentation of the large areas of sagebrush continues as oil and gas exploration and development continues, increasing threats to the Sage-Grouse and other species of the area. CPW has played a central role in organizing a sagebrush and Sage-Grouse management strategy in the area.

Land protection is still needed in North Park to ensure the long-term survival of the Sage-Grouse. As there is no other significant land trust capacity focused on North Park, CPW and the land trust community should expand protection of critical Sage-Grouse habitat in this conservation area. TNC Colorado's Land Protection Team should consider expanding its focal area in northwestern Colorado to include North Park.

Assessed Conservation Target: North Park Phacelia

North Park Phacelia is a globally rare plant found only in a small part of Colorado's North Park and is a conservation target identified in the Southern Rocky Mountain ERP. North Park Phacelia is also listed as endangered under the Endangered Species Act (U.S. Fish and Wildlife Service 2012) due to the fact that it's endemic to North Park and there are only a handful of populations with fewer than 20,000 individuals total. The CAP (The Nature Conservancy 2005b) identified home development as a moderate threat to this plant. The limited distribution of this species makes it especially vulnerable to any threat.

North Park Phacelia is found on at the edges of vistas overlooking the rivers in North Park and on barren eroded slopes of the Coalmont formation (U.S. Fish and Wildlife Service 2012). The diminutive biennial plant grows only 6 to 12 inches in height with bright purple flowers (U.S. Fish and Wildlife Service 2012).

Objective for North Park Phacelia: All known occurrences of the globally rare plant (*Phacelia*) are protected.

Progress Assessment: Of the ten North Park Phacelia occurrences, five are partially protected and three are completely protected.



Main Takeaways for North Park Phacelia

Conservation easements were placed on North Park phacelia habitat by TNC Colorado. When the CAP was completed in 2005, TNC Colorado had local staff in North Park working with private land owners and public agencies to meet conservation objectives. This staff position was only focused in North Park for a few years. Without local staff in this remote area, establishing relationships with landowners and progress toward conservation objectives have been slowed.

North Park Phacelia occupies mostly steep and barren slopes above tributaries of the North Platte River. While some populations on private lands have been protected

under conservation easement, this plant is not a conservation priority for any local or state-wide land trust. The Rare Plant Conservation Initiative created an action plan specifically for this species with state and federal agency participation (Panjabi and Neely 2011). While conservation actions were identified to protect North Park Phacelia, the plan relies on cooperation of private landowners. North Park Phacelia does not merit a major focus by TNC Colorado; however, when TNC Colorado and other land trusts protect Greater Sage-Grouse habitat in North Park, we should also protect rare plant habitat if possible.

San Miguel and Lower Dolores River Project Area



The San Miguel and Lower Dolores River CAP was completed in 2005 with partners including CPW, BLM, and San Miguel County (The Nature Conservancy 2008c). Below is a summary of that planning effort.

The San Miguel/Lower Dolores River Project Area is one of the most diverse landscapes on the western slope of the Rocky Mountains. The diversity of elevation and topography in this region is expressed in an equally diverse suite of rare and imperiled species. The San Miguel/Lower Dolores River Project Area contains vast areas of native alpine, forests, and shrublands along with intact riparian and aquatic systems harboring over 60 rare or imperiled plant and animal species, and high quality rare plant communities (The Nature Conservancy 2008c).

The long-term vision for the San Miguel and Lower Dolores River watersheds was the conservation of dynamically functioning river systems with healthy riparian and aquatic communities. The upland systems should support a stable population of Gunnison Sage-Grouse and Gunnison's Prairie Dogs. This vision included working in partnership with local communities and public entities within these watersheds for the long-term conservation of the area's biodiversity.

The conservation targets for the San Miguel and Lower Dolores River Project Area were identified as:

Rare or Declining Species

- Gunnison Sage-Grouse (*Centrocercus minimus*)
- Peregrine Falcon (*Falco peregrinus*)
- Gunnison's Prairie Dogs (*Cynomys gunnisoni*)
- Roundtail Chub (*Gila robusta*)
- Flannelmouth Sucker (*Catostomus latipinnis*)
- Bluehead Sucker (*Catostomus discobolus*)
- Dolores River Skeleton Plant (*Lygodesmia doloresensis*)
- Payson Lupine (*Lupinus crassus*)
- Kachina Daisy (*Erigeron kachinensis*)

Rare Plant Communities

- Dolores Hanging Gardens
- Riparian Shrublands
- Riparian Forests

Ecological Systems

- Ponderosa Pine Forests
- Pinyon-Juniper Woodlands
- Sagebrush Shrublands
- Desert Shrublands
- Montane Shrublands
- Aspen/Spruce/Fir Forests

The San Miguel and Lower Dolores Rivers descend rapidly from the spectacular, snow-capped San Juan Mountains, through the subalpine forests, montane shrublands and grasslands of the Western Slope and into the red sandstone semi-desert of the Colorado Plateau. One of the few naturally functioning rivers remaining in the western United States, the San Miguel supports the last, best example of an intact cottonwood-dominated riparian ecosystem in the Upper Colorado River Basin. The Lower Dolores River, downstream from McPhee Reservoir, meanders 180 miles through a spectacular canyon before flowing into the Colorado River in Utah (The Nature Conservancy 2008c).



The greatest threats to conservation targets in the San Miguel and Lower Dolores River Project Area were determined to be:

1. Invasive plant species
2. Operation of McPhee Dam
3. Oil and gas development
4. Wildlife disease



Invasive plant species such as tamarisk and other non-native trees dominate many riparian areas throughout the southwestern U.S. The operation of McPhee Dam has an impact on native fish and riparian vegetation in the Dolores River by altering the timing and amount of water flow. Oil and gas development fragments habitat through the construction of new roads and pipelines, and can aid the spread of invasive species. Plague is a potential threat to Gunnison's Prairie Dog colonies (The Nature Conservancy 2008c).

Assessed Conservation Target: Rare Plants and Plant Communities

The San Miguel and Lower Dolores River Project Area has numerous rare plants and plant communities that were identified in either the Southern Rocky Mountains (Neely et al. 2001) or Colorado Plateau (Tuhy et al. 2002) ERPs. The San Miguel and Lower Dolores River Project Area includes the San Miguel River watershed and the Dolores River watershed below McPhee Reservoir. The CAP completed in 2005 identified oil and gas as a high threat to rare plants and plant communities.



Objective for Rare Plants and Plant Communities: *Ensure that oil and gas roads and well-pads do not occur within rare plant or plant communities.*

Progress Assessment: We have not completely met this goal as four of 218 (1.8%) rare plant occurrences have oil and gas wells within their extent. None of the 39 rare or imperiled plant communities have active or permitted oil and gas wells.

These rare plants and plant communities occur on both public and private lands. Many rare plant occurrences cross public and private lands. Approximately 97% of the plants are on public lands (with 125 of the 218 only on public lands) and half occur on private lands (with seven only on private lands). For plant communities, approximately one quarter are on private lands (with three of the 39 only on private lands), and 78% only occur on public lands.



Main Takeaways for Rare Plants and Plant Communities

Of wells that were permitted or drilled, the resource management plan controlling the leasing of oil and gas was approved in 1984 and amended in 1991 (Bureau of Land Management 1984, 1991). The BLM Resource Management Plan amendment shows that most of the area has low potential for oil and gas. Many special status plants on public lands and with public minerals are protected by No Surface Occupancy (NSO) stipulations within Area of Critical Environmental Concern. In addition, a special status plant species NSO was added in the amendment in response to comments from U.S. Fish and Wildlife Service (Bureau of Land Management 1991).

When the CAP was completed, TNC Colorado had on-the-ground staff who worked closely with BLM staff on cross boundary land management and planning issues. Restructuring of this position along with restructuring of TNC Colorado's energy staff resulted in less capacity

to work on local oil and gas issues in southwest Colorado. Therefore, it was difficult to assess whether TNC Colorado had any impact in protection of these plants and plant communities. Recent BLM planning documents from other regions of Colorado have created stipulations that protect rare species when areas are being leased for oil and gas. This region of the state has a very old Resource Management Plan which does not have these stipulations. Because of the attention rare plants receive from Colorado BLM, this objective does not seem to warrant continued attention in the short term. When the next BLM Resource Management Plan is created, TNC and other conservation groups, such as CNHP, should evaluate whether it is a priority to encourage the continued protection of these rare plants and rare plant communities. As most of the occurrences are on public lands, this strategy will protect most of the biodiversity.

Upper Yampa River Project Area



The Upper Yampa River CAP was completed in 2004 with partners including CPW, Natural Resources Conservation Service (NRCS), and Routt County (The Nature Conservancy 2004). Below is a summary of that planning effort.

The Upper Yampa River Project Area is a headwaters region of the Colorado River Basin in northwestern Colorado. Within the state, the Yampa River represents one of the last rivers where nature dictates water flow dynamics, and along the river, cottonwood gallery forests wind through the Yampa Valley in a lush ribbon of green riparian vegetation and irrigated hay meadows. The surrounding uplands are comprised of largely intact spruce-fir forests and aspen groves, which grade into large sagebrush flats and gambel oak shrublands at lower elevations. These vast expanses of sagebrush and gambel oak shrublands provide critical habitat for Greater Sage-Grouse and Columbian Sharp-tailed Grouse. The Upper Yampa River Project Area contains many rare and imperiled wildlife species, as well as three vegetation communities that are considered globally rare (The Nature Conservancy 2004).

The conservation targets for the Upper Yampa River Conservation Area were identified in the CAP as:

Rare Animals

- Boreal Toad (*Anaxyrus boreas boreas*)
- Sandhill Crane (*Antigone canadensis*)
- Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*)
- Greater Sage-Grouse (*Centrocercus urophasianus*)
- Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Animal Community

- Native Fish Community

Rare Plant Community

- Box Elder-Narrowleaf Cottonwood/Red-osier Dogwood Riparian Forest
- Pacific Willow Slough
- Red-osier Dogwood Riparian Shrubland

Ecological Systems

- Montane/Subalpine Uplands and Riparian System
- Mixed Montane Shrubland
- Lower Montane Riparian System

Although a majority of the upper watershed of the Yampa River is managed by the USFS and BLM, there are several threats that put many species and ecological systems at risk on private and public lands. These threats and the level of threat were determined by interviews with land managers, ERP information, and personal observations. The top threat to the Upper Yampa River Project Area in 2004 was determined to be home development on private lands (The Nature Conservancy 2004).

Assessed Conservation Target: Greater Sage-Grouse

Greater Sage-Grouse was a conservation target in both the Southern Rocky Mountains (Neely et al. 2001) and Wyoming Basins (Sochi et al. 2013) ERPs.

Having experienced range-wide declines because of habitat loss and degradation (Schroeder et al. 1999), the Greater Sage-Grouse was a candidate for listing under the Endangered Species Act in 2010, but an ongoing, collaborative federal, state and private lands effort to protect habitat has led to the species being removed from consideration for listing (U.S. Fish and Wildlife Service 2015). A high density cluster of breeding grouse occurs in the Upper Yampa River Project Area (Doherty et al. 2010). Additional information about the Greater Sage-Grouse can be found in the North Platte Headwaters Project Area section.



Objective for Greater Sage-Grouse: Protect 50% (approximately 20,000 acres) of critical privately-owned Sage-grouse habitat.

Progress Assessment: In the Upper Yampa River Project Area, 25,555 acres of Greater Sage-Grouse habitat on private lands has been protected, surpassing the objective of 20,000 acres (Table 8; Figure 8). Conservation easements by TNC Colorado and CPW represent the majority of this protection (20,230 acres; 79%) and are enough to meet the objective in isolation.

The remainder of the protection is primarily provided by conservation easements held by other organizations. In addition, 41,000 acres of grouse habitat are on public lands.

Note that recent data sets suggest that the Upper Yampa River Project Area contains many more acres of grouse habitat, 140,000 acres rather than 40,000 acres originally mapped in the Upper Yampa River Project Area than the dataset we used originally.

Table 8. Acres of critical Greater Sage-Grouse habitat protected on private lands in the Upper Yampa Project Area. Acres are reported by ownership and protection mechanism. Critical habitat was defined using preliminary priority habitat from Colorado Parks and Wildlife.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>
CRWCD	CPW Fee	40
Private	CE	2,981
Private	CPW CE	10,477
Private	CPW EOU	2,295
Private	EOU	6
Private	TNC CE	9,753
TNC	Fee	3
Total		25,555
Percent of Objective		128

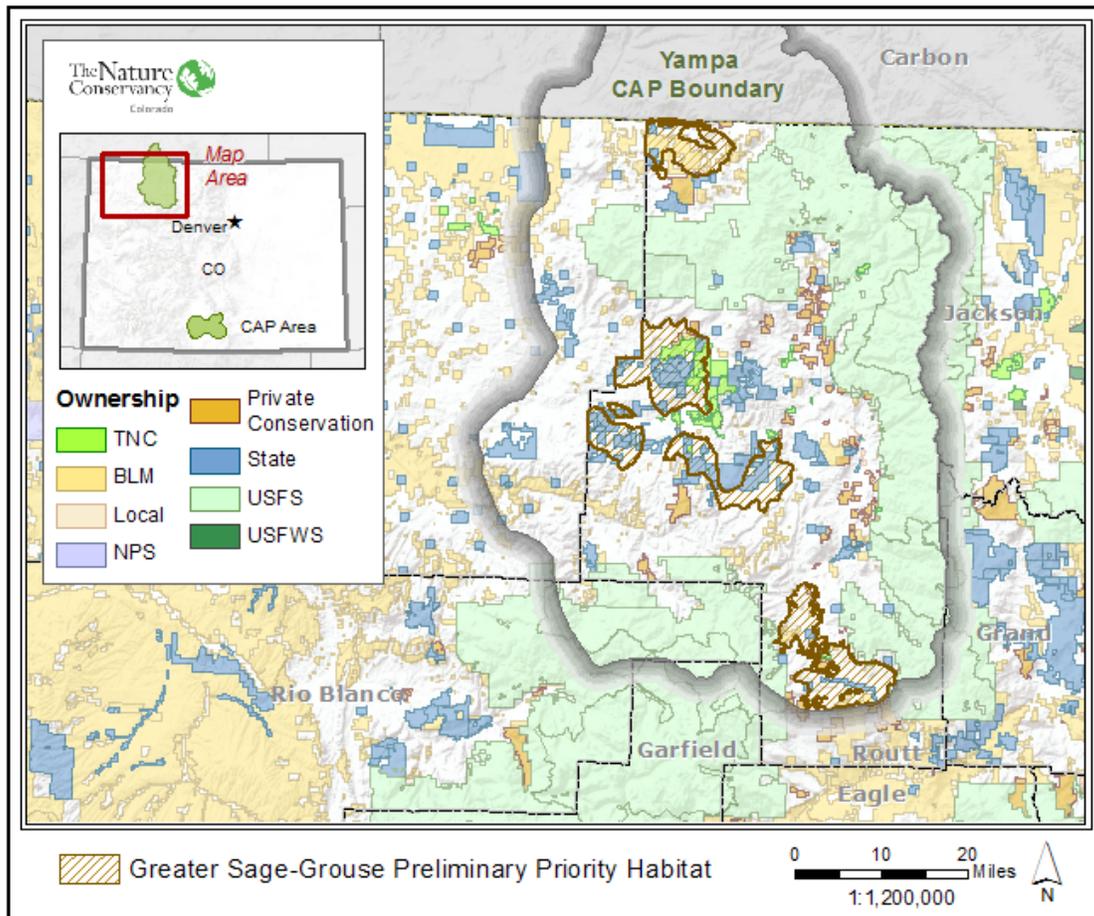


Figure 8. Protected lands by ownership and critical habitat for Greater Sage-Grouse in the Upper Yampa River Project Area. Critical habitat was defined using preliminary priority habitat from Colorado Parks and Wildlife.

Main Takeaways for Greater Sage-Grouse

Recent studies have shown the importance of northwestern Colorado to rangewide efforts to assure the well-being of the Sage-Grouse (Doherty et al. 2010). These studies lead TNC Colorado’s Land Protection Team to prioritize its work on protecting Greater Sage-Grouse and sagebrush shrubland habitat in northwestern Colorado (The Nature Conservancy 2014). During the last ten years, several agencies including CPW and NRCS prioritized Greater Sage-Grouse land protection partially in response to its consideration for listing under the Endangered Species Act. With this additional funding available, several land trusts, including the TNC Colorado, were able to place easements on critical grouse habitat.

Recent analysis (The Nature Conservancy 2014) based on percentage of breeding birds across their entire range determined that Greater Sage-Grouse in the Yampa Valley (both upper and lower) continues to be a high priority for land protection because of especially high population concentrations in these areas (Doherty et al. 2010). Because of the confirmed importance of Greater Sage-Grouse, the Land Protection Team will continue to focus on protection of Greater Sage-Grouse critical habitat. In the Upper Yampa River Project Area, the grouse habitat is mostly on private lands. In conjunction with the Science Team, the Land Protection Team should set another short-term objective and regularly assess TNC Colorado’s protection efforts as well as those of other land trusts.

Assessed Conservation Target: Riparian Areas

The riparian areas in Upper Yampa Project Area especially within Morgan Bottom were conservation targets in the Southern Rocky Mountains ERP (Neely et al. 2001). The CAP completed in 2005 identified home development as a very high threat and developed the below objective to counter that threat.

Riparian areas are what brought TNC Colorado to the Yampa Valley. They are still the core of our preserves within Morgan Bottom. The Elk and Yampa River contains riparian areas that are home to globally rare plant communities. These forests support many wildlife species including Bald Eagle (*Haliaeetus leucocephalus*) and Yellow-billed Cuckoo (*Coccyzus americanus*). CNHP identified Hayden and Morgan Bottoms, approximately 16 miles along the Yampa River, as important for their riparian and wetland values (Culver and Sanderson 1996). The globally rare box elder-narrowleaf cottonwood/red osier dogwood riparian forest is restricted to the Yampa and White River Basins of northwestern Colorado, and it is best developed along the Yampa River for approximately 30 miles, between Craig and Milner. Morgan Bottom contains a number of high quality stands of box elder-narrowleaf cottonwood/red-osier dogwood riparian forest. Associated shrubs

within the riparian forests include thinleaf alder (*Alnus tenuifolia*), Pacific willow (*Salix lucida ssp. caudata*), and hawthorn (*Crataegus rivularis*) (Culver and Sanderson 1996).

Objective for Riparian Areas: By 2009, protect 65% or additional 4400 acres of key lower montane riparian areas that are privately owned along the Elk River and the main stem Yampa, from the Elk confluence to Hayden.

Progress Assessment: Of the total 3,015 acres of riparian habitat mapped, 36% is protected, falling short of the 65% objective (Table 9; Figure 9). TNC Colorado owned lands and conservation easements provide 614 acres (57%) of protected acres with other conservation easements accounting for the remaining protected lands. Note that our data set indicates a total acreage (3,015 acres) of riparian habitat less than originally mapped when the objective was set (7,300 acres). In part, this could be due to the fact that the best currently available data set does not cover the entire length of the Yampa and Elk Rivers (Appendix 2). For this reason, we chose to focus on the percent protected rather than the acreage protected for this assessment.

Table 9. Protected acres of riparian habitat on private lands in the Upper Yampa River Project Area. Acres are reported by ownership and protection mechanism.

<i>Ownership</i>	<i>Protection Mechanism</i>	<i>Acres</i>
Private	CE	453
Private	CPW CE	5
TNC	CE	341
TNC	Fee	273
Total Acres Protected		1072
Percent Protected		36
Percent Protected Objective		65

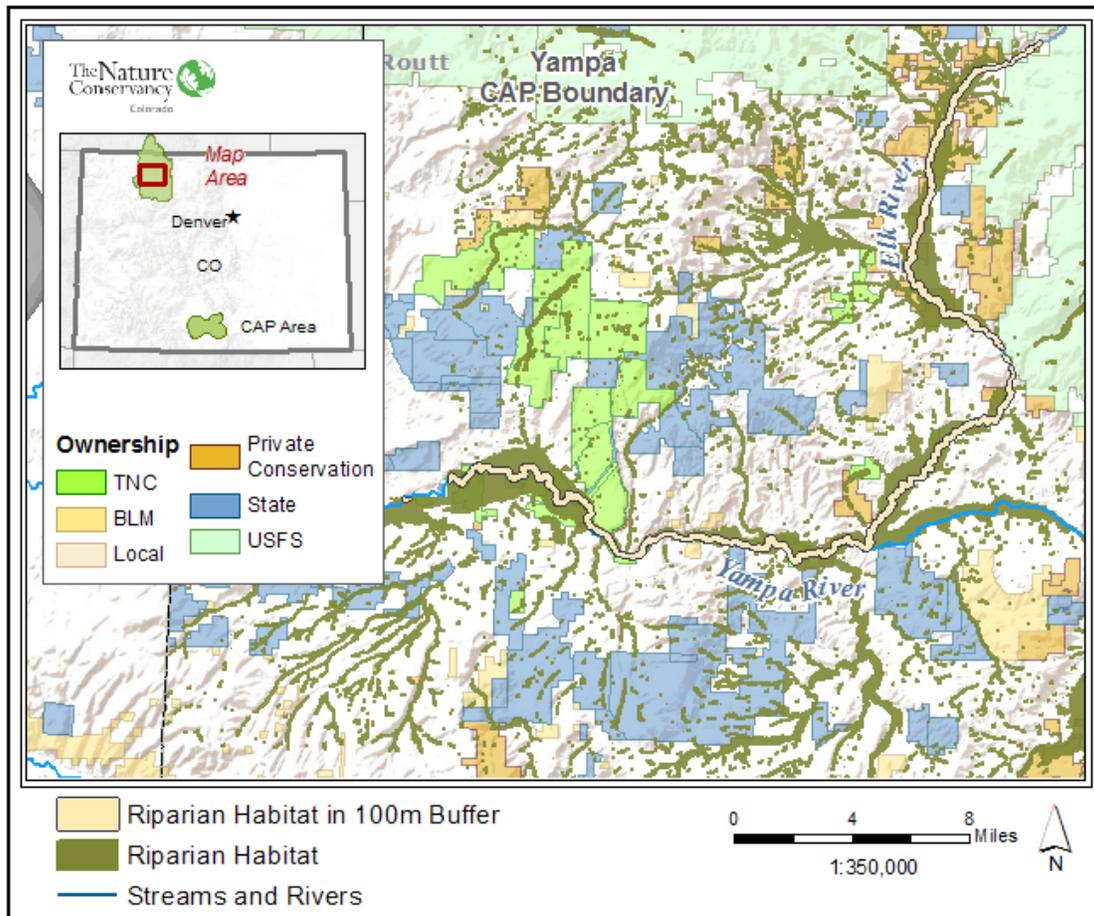


Figure 9. Protected lands by ownership and riparian habitat within Upper Yampa Project Area.

Main Takeaways for Riparian Areas

Several reasons account for not meeting the objective. When the ambitious objective was set, we had not looked at parcel data, therefore did not have a sense of the number of transactions required to meet the objective. Riparian parcels are much smaller and more expensive to protect when compared to upland parcels, so many more transactions at a higher cost are needed to meet the acreage objective. Also during the last ten years, Greater Sage-Grouse became a higher priority for land protection based on new research showing the importance of this conservation area. Riparian areas are still a focus for land protection based on recent assessments (The Nature Conservancy 2014), but this work is being done more opportunistically rather than proactively as riparian areas are a lower priority than Greater Sage-Grouse.

Morgan Bottom remains a hotspot for riparian plant communities, and significant progress remains to be made toward protecting the globally rare riparian areas on private lands within the Upper Yampa River Project Area. Consequently, the Land Protection Team should continue to seek protection for Yampa and Elk River riparian areas, but if staff time or conservation dollars are limited, resources should be spent on Greater Sage-Grouse habitat first. An ideal situation to pursue is where Greater Sage-Grouse and riparian lands can be protected in one deal. Currently and for the near term in northwestern Colorado, the priority for land protection should continue to be focused on Greater Sage-Grouse habitat.

Conclusions: Key Insights for Conservation Planning & Implementation



This Assessment reports the current status of progress toward land protection and other objectives set by CAP planning processes completed approximately a decade ago. Over this time, we have learned much and responded to growing threats and increased complexity in needed conservation actions. Monitoring progress towards objectives plays a suite of fundamental roles in applied conservation and management (Lyons et al. 2008). Through this Assessment, we learned that some conservation objectives have been or are nearly achieved whereas substantial work remains to achieve other objectives. Where objectives set ten years ago continue to be priorities for TNC Colorado, the Lands Team can now focus on those objectives where conservation progress has lagged. This Assessment and the recommendations below can be used to:

1. inform TNC Colorado's approach to Conservation by Design 2.0 and the Shared Conservation Agenda
2. provide clarification and recommend future use of existing ERPs and CAPs
3. recommend adapting strategies to make them climate smart
4. and set a foundation for our next revision of our strategic plan

Throughout this Assessment, we identified long-standing and newly developed standards that can improve future conservation planning efforts. In reviewing our past efforts, we were able to develop recommendations from key insights into contextual factors that influenced objective achievement:

1. Defining clear, specific, measurable objectives is essential for focusing our work and being able to assess progress toward those objectives.

For much of our work on lands (and also arguably forests and water) we have measurable metrics in terms of acres or miles we want to protect or restore. However, we are often not explicit about what we intend to achieve with those acres and miles. Having clearly stated, measurable outcomes for people and nature are essential to knowing if we are achieving conservation success. Re-assessment of our desired outcomes, as well as the nature and scale of our metrics, is warranted—especially in light of the recently completed Global Situation Analysis and the emerging Shared Conservation Agenda.

We were unable to assess progress towards many of the objectives listed in the CAPs (Appendix 1). Some objectives did not unambiguously identify what to assess. Other objectives suffered from a lack of available

data to assess progress towards the objective. To address these issues, we recommend following best practices when setting objectives: specifically, the objective should (1) unambiguously identify the conservation target to be measured, (2) specify a measurable attribute or indicator, (3) give a desired direction and magnitude of change, and (4) clearly identify the area and time frame over which the objective is to be achieved (Elzinga et al. 1998). Clear and measurable objectives are needed to assess progress towards conservation objectives, maintain accountability, and to learn from and improve upon past conservation efforts. Reaching a consensus on clear, measurable objectives is not easy in a partnership setting, but by setting them collectively, more organizations and agencies share a common vision and work together to meet the objectives.

people and nature against our Strategic Plan progress (The Nature Conservancy 2015a), which would provide programmatic decisions about focus, staffing, and allocation of resources.

By more regularly assessing progress and the priorities set in our planning documents, we can more effectively integrate new scientific information into our strategies. For example, the findings of Doherty et al. (2010) drew attention to the range-wide importance of the Upper Yampa River Project Area for the Greater Sage-Grouse. Since the development of the CAPs, there has been an unexpected and large boom in oil and gas development in the state that has important consequences for many of the plans' conservation targets, including Greater Sage-Grouse. Policy, regulation, economics, and scientific knowledge all responded strongly to this boom.



2. Frequently monitor progress towards conservation objectives throughout the lifespan of the plan rather than waiting to the end of a plan's time frame.

To be the most effective, our conservation planning and strategies need to be responsive to changes in information and threats. As stated previously, the Assessment project represents a concerted and comprehensive effort to assess progress towards conservation objectives now that the 10-year window for achievement has elapsed. During this ten-year window, regular assessment of progress would have allowed conservation strategies and tactics to be more quickly adapted as threats change, and would encourage staff to focus more on objectives that are lagging. Our current quarterly reporting through the Strategic Plan Dashboard represents a good step in the direction of regular assessment. Reassessing on an annual basis would allow us to assess outcomes for

Conservation outcomes would benefit from a shorter initial planning period, with normalized, regular and frequent adaptive use of conservation planning tools to maintain progress toward existing objectives while also addressing and adapting to emerging challenges and opportunities, changing resources, and the latest scientific information.

3. Conservation by Design 2.0 is a well-considered approach to effective conservation planning, and we should apply this approach more systematically in the future at TNC Colorado when new strategies are considered.

Recently, TNC unveiled the latest update to Conservation by Design (CbD 2.0), our collaborative and science-based framework for conservation planning (The Nature Conservancy 2015b), referred to as CbD 2.0. The CAP methodology shares many elements of

this framework. CbD 2.0 was designed to respond to the current situation in which conservation must better account for human populations and associated demands for energy, food, and other resources that continue to grow and climate that continues to change. This new approach addresses the increasing complexity of our work with an emphasis on systems thinking. As we move into the Shared Conservation Agenda, including incorporating people and climate to a higher degree into our work, TNC Colorado should begin using some or all of CbD 2.0 guidelines to re-assess current conservation strategies.

4. All future conservation goals and objectives should consider climate change and explicit goals should be created for climate specific strategies—Natural Climate Solutions and climate adaptation.

We have recognized the importance of planning with climate in mind, and we are beginning a process for doing

6. In the future, when large changes in staffing and geographic focus occur, we recommend re-visiting existing conservation objectives and their subsequent feasibility.

For example, the nation and state experienced a severe economic recession in 2008 that led to reduced staff and funding for conservation efforts. Partly in response to the recession, TNC Colorado removed on-the-ground, community-based staff from some project areas assessed in the Assessment. The lack of a consistent, on-the-ground presence in these areas and the “ownership” of the CAP by individual conservation staff members is likely a significant reason why some objectives were not met. When such changes are made, we recommend systematically addressing the question of if and how we need to replace our presence to achieve conservation outcomes, clearly designate a new lead conservation staff member responsible for implementing the plan, or possibly enlist partners who can support us in that project area to achieve conservation goals.



so across all of our strategies. We anticipate taking a broad view of climate-smart planning and incorporating key elements of CbD 2.0 into this planning effort.

5. Human well-being outcomes should be determined for conservation strategies and linked to conservation outcomes as appropriate.

The recent analysis by TNC’s Office of the Chief Scientist (Fargione et al. 2016) illustrates the need to meet human needs in order to succeed with conservation. This thesis is a fundamental basis for the emerging Shared Conservation Agenda. We need to identify outcomes for people in a way that also advances outcomes for nature.

7. TNC Colorado should continue to create and work toward conservation objectives with partners so that we can leverage our strengths to larger results.

This assessment demonstrated the key role that partners played in achieving conservation objectives, especially in (but not limited to) areas where we no longer have a strong on-the-ground presence. For example, the North Platte Headwaters, Chico Basin, and San Miguel and Lower Dolores River Project Areas had on-the-ground community-based conservation staff when the CAP was completed and objectives set. Objectives are developed based on conservation needs and the capacity and feasibility to achieve them. Many local land trusts

expanded capacity and expertise in several project areas we assessed, and that is one reason why progress was made toward CAP objectives.

8. TNC Colorado's Science Team and conservation component leads should be jointly responsible for providing new staff, as part of their orientation to the organization, and existing staff, as part of their professional development and active management, with access to foundational data, methods, tools, documents, and decisions that focus and prioritize our conservation objectives. In the future, our conservation plans should be living and dynamic tools familiar to all team members.

In order for conservation staff to “own” conservation outcomes, they need to have a meaningful understanding of the desired outcomes. CbD 2.0 guidelines indicate the need for science staff and conservation staff to jointly develop conservation goals. We believe this is

good practice and recommend growing further the collaboration between science and conservation staff in setting goals and adjusting them over time. During the implementation of the CAPs, TNC Colorado has experienced considerable turnover in and reduction of staff, and TNC planning methodologies have changed in ways that have created ambiguity among staff about standard planning procedures. TNC Colorado must reduce this ambiguity by clearly communicating with and training staff in the chapter's planning regime, and what it expects of all staff in regard to it. It is critical that conservation staff understand the broader context for their work in order to focus them on priority conservation outcomes. Greater conservation staff involvement in the management and creation of conservation plans is also likely to both increase their job satisfaction and their ability to communicate the importance of TNC Colorado's work to external audiences.



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Appendix I

Table 1-1. List of land protection and management objectives from Conservation Action Plans developed for 11 landscapes in or overlapping Colorado. Objective status indicates whether an objective was assessed by the Conservation Progress Assessment (CPA) project and, if an objective was not assessed, provides the reason for its exclusion. Comments are provided to further specify data needs or possible avenues for objective assessment by future projects.

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Arickaree River	By 2008, limit non-native plant species abundance to no greater than current levels for Canada thistle, reduce Russian olive & tamarisk to minor levels, eradicate A-list species upon detection.	Data unavailable	Colorado Department of Agriculture is a potential source of GIS data on noxious weeds; current data from department does not provide comprehensive coverage by species or spatially.
	By 2014, increase wetland vegetation and tallgrass structure in the riparian area on 2 downstream perennial reaches.	Data unavailable	
	By 2014, maintain Greater Prairie Chicken habitat quantity, and number of lek sites by keeping fragmentation and habitat loss below critical thresholds.	Insufficient time	Data available for TNC's Fox Ranch and surrounding area from Colorado Parks and Wildlife.
	By 2014, maintain source populations of declining grassland birds.	Data unavailable	Lack of count data and lack of evidence suggesting that these areas serve as source populations.
Chico Basin	By 2015, permanently protect/conservate at least 300,000 acres in a functional prairie landscape—at least 80,000 shortgrass, 70,000 sandsage, 30,000 midgrass, 12,000 arid shrublands, approximately 100 miles of stream and 5,000 acres greasewood with associated wetlands—at least 240 playas.	Assessed by CPA	
	By 2015, ensure 10,000 acres of prairie dog complexes exist in Chico Basin and are connected throughout the Chico Basin area.	Insufficient time	Colorado Parks and Wildlife working to create a GIS map representing black-tailed prairie dog colonies and has indicated a willingness to share these data. GIS product was not completed in time for this report.
	By 2015, if the toll road or any other major highway is allowed within the Chico Basin, minimize fragmentation and maximize permanent protection to biodiversity.	Plans for toll road have not materialized	
	By 2015, eliminate the impacts of the proposed toll road in the Chico Basin.	Plans for toll road have not materialized	

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Great Sand Dunes	By 2015, more than 3,000 bison are roaming freely across at least 125,000 acres.	Insufficient time	Information available, but there was insufficient time to incorporate it into the report.
	By 2015, a genetically pure bison heard exists within the Great Sand Dunes area.	Insufficient time	Information available from USGS Kathryn Schoenecker, but there was insufficient time to incorporate it into the report.
	By 2010, restore amphibian community.	Data unavailable	
	By 2015, cooperative integrated weed management maintains or reduces weed distribution.	Data unavailable	Colorado Department of Agriculture is a potential source of GIS data on noxious weeds; current data from department does not provide comprehensive coverage by species or spatially.
	By 2015, elk and bison are managed within ecological carrying capacity.	Insufficient time	Kate Schoenecker (USGS) has conducted research into carrying capacity of the area. The complexity of the carrying capacity topic put this outside the scope of the CPA project.
	By 2015, maintain or improve variability in stabilized sand dune vegetation and persistence of sage sparrows.	Insufficient time	Evaluate potential use of eBird or other publicly available data to address persistence of sage sparrows. Duke Philips, TNC lessee, potentially has applicable vegetation data.
	By 2015, current recreational use and future projections will support biodiversity.	Data unavailable	Planning by federal agencies has been slower than anticipated so final management plans are not yet available to assess.
	By 2015, integrated science-based management occurs across the entire Great Sand Dunes Conservation Area.	Data unavailable	Planning by federal agencies has been slower than anticipated so final management plans are not yet available to assess.

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Greater Pawnee Prairie	By 2015, permanently protect 300,000 acres of shortgrass prairie, chalk bluffs and riparian areas in functional blocks.	Assessed by CPA	
	By 2015, shift mountain plover nesting from farm ground to rangeland; in long term want 30-40% to be heavily grazed structure—short shortgrass.	Data unavailable	CPW and Bird Conservancy of the Rockies may have some of this data, but it is not comprehensive across the landscape. Vegetation information is not available.
	By 2025, restore Black-footed Ferrets as an experimental population.	Data unavailable	To address this objective, TNC will need to determine whether this objective is still a high priority for US Forest Service and US Fish and Wildlife Service.
	Improve management, demonstrate the impact and values of shortgrass management.	Insufficient time	To address this objective, one approach could be to update the Conservation Management Status data produced by TNC Colorado approximately a decade ago.
Gunnison Basin	By 2015, permanently protect/conserves (by conservation easement or public land management planning) at least 15,000 additional acres of critical Gunnison Sage-Grouse habitat.	Assessed by CPA	
	By 2015, apply management actions needed to restore a least 20% (40,000 acres) of critical grouse nesting habitat.	Data unavailable	There is a lack of spatial data on the location and success of nesting habitat restoration efforts conducted by CPW and others.
	By 2015, apply management actions needed to restore an additional 20,000 acres of sagebrush shrublands.	Data unavailable	There is a lack of spatial data on location and success of restoration efforts.

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Laramie Foothills	By 2015, protect 100 miles of riparian and Preble's Meadow Jumping Mouse habitat.	Assessed by CPA	
	By 2015, permanently protect key areas of private ponderosa pine woodlands, montane foothill cliffs and canyon, mixed grass prairie, and riparian habitat as well as all remaining high quality pinyon-juniper woodlands.	Unclear objective	An uncertain definition of key areas prevented assessment.
	By 2015, ensure proper management is being implemented to protect species and ecological systems on public lands, especially within foothill shrublands and pinyon-juniper woodlands.	Insufficient time	To address this objective, one approach is to update the Conservation Management Status data produced by TNC Colorado approximately a decade ago.
	By 2015, reduce impact of motor-powered and uncontrolled recreational use within priority National Forest lands.	Insufficient time	To address this objective, TNC would need to determine whether the US Forest Service planning and management sufficiently addresses recreational impacts.
	By 2015, control the extent of priority invasive species to maintain the existing condition of ecological systems.	Data unavailable	Colorado Department of Agriculture is a potential source of GIS data on noxious weeds; current data from department does not provide comprehensive coverage by species or spatially.

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Lower Yampa River	By 2015, conserve at least 3 separate white-tailed prairie dog complexes of at least 5000 active acres each (20,000 acres total in each complex).	Data unavailable	Colorado Parks and Wildlife has data that might allow occupancy on protected lands to be determined for White-tailed Prairie Dogs, but these data do not allow the area of prairie dog colonies to be assessed.
	By 2015, remove high threats (new oil and gas pads, roads, and subdevelopment) from critical High Country Moffat West sage grouse habitat.	Insufficient time	To address this objective, TNC would need to determine whether Bureau of Land Management planning process. In addition, new planning adequately addresses oil and gas impacts for Sage-Grouse have been developed that should also be assessed to whether they will meet this objective.
	By 2015, remove threats (OHV, oil and gas, roads, pads) to all G1 and G2 rare plant occurrences.	Insufficient time	To address this objective, TNC would need to determine whether Bureau of Land Management planning process dealt with use of OHV's in rare plant habitat.
	By 2015, improve activity level management/monitoring of rare plants in Little Snake Field Office and throughout Lower Yampa Conservation Area.	Insufficient time	To address this objective, TNC would need to determine whether Bureau of Land Management planning process dealt with management and conservation of rare plants across the Lower Yampa Conservation Area.
	By 2015, improve High Country Moffat West Sage-Grouse population to 1200 level. By 2010, stabilize High Country Moffat West sage grouse population.	Insufficient time	To address this objective, TNC would need to determine whether Bureau of Land Management planning process will protect Sage-Grouse. In addition, new planning processes for sage grouse have been developed that should also be assessed to whether they will meet this objective.

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
North Platte	By 2015, all known occurrences (approximately 500 acres) of the globally rare plant (Phacelia) occurrences are protected.	Assessed by CPA	
	By 2015, 50,000 acres of private critical grouse habitat permanently protected from subdevelopment and oil and gas threats in functional landscapes.	Assessed by CPA	
	By 2015, permanently protect a core white-tailed prairie dog complex of at least 5000 acres (of the 50,000 acres).	Data unavailable	Colorado Parks and Wildlife has data that might allow occupancy on protected lands to be determined for white-tailed prairie dogs, but these data do not allow the area of prairie dog colonies to be assessed.
	By 2015, all critical grouse habitat on public lands have management prescriptions that minimize fragmentation and maximize restoration potential.	Insufficient time	
	Through 2015, protect integrity of North Park Sand Dunes by keeping motorized vehicles off East Dunes and containing and/or reducing motorized use on North Dunes.	Insufficient time	
San Miguel/ Lower Dolores River Project	By 2015, protect at least two viable Gunnison's prairie dog colonies.	Data unavailable	Colorado Parks and Wildlife has data that might allow occupancy on protected lands to be determined for Gunnison's prairie dogs, but these data do not enable viability to be determined.
	By 2015, protect key areas and implement management plans that conserve regional biodiversity.	Unclear objective	Uncertain definition of key areas prevented assessment.
	By 2009, eradicate any populations that are found of "A" ranked species on the Colorado Noxious Weed list, such as purple loosestrife.	Insufficient time	Colorado Department of Agriculture has noxious weeds GIS data for this landscape, and these data can be used in future assessments.
	By 2015, ensure that oil and gas roads and well-pads do not occur within rare plant or plant communities. Where oil and gas development does occur, minimize impacts to biodiversity.	Assessed by CPA	

<i>Project Area</i>	<i>Objective</i>	<i>Status</i>	<i>Comments</i>
Upper Purgatoire River	By 2014, create a habitat reserve for Gunnison's prairie dog with at least 3000 acres of protected habitat with individual colonies not separated by more than 2.5 miles.	Data unavailable	Colorado Parks and Wildlife has data that might allow occupancy on protected lands to be determined for Gunnison's prairie dogs, but these data are not suitable for determining acreage or distance between colonies.
	By 2014, protect key parcels from subdevelopment and fragmentation.	Unclear objective	Uncertain definition of key areas prevented assessment.
Upper Yampa River	By 2009, protect 50% (approximately 20,000 acres) of West Routt critical private sage grouse habitat.	Assessed by CPA	
	By 2009, protect 50% of the feeding areas for staging cranes.	Insufficient time	Staging areas can be digitized from state recovery plan for assessment in the future.
	By 2009, protect 65% or additional 4400 acres of key lower montane riparian areas that are privately owned along the Elk River and the main stem Yampa, from the Elk confluence to Hayden.	Assessed by CPA	
	By 2009, apply management actions needed to restore 10% of critical sage grouse habitat in the South and West Routt areas.	Data unavailable	There is a lack of spatial data on the location and success of habitat restoration efforts by CPW and others.
	By 2014, apply management actions needed to restore 25% of critical sage grouse habitat in the South and West Routt areas.	Data unavailable	There is a lack of spatial data on the location and success of habitat restoration efforts by CPW and others.
	By 2009, eradicate meadow knapweed and purple loosestrife (Colorado A list), tamarisk, Russian olive, and leafy spurge (upstream of Hayden), and prevent reestablishment.	Insufficient time	Colorado Department of Agriculture has noxious weeds GIS data for this landscape, and these data can be used in future assessments.
	Through 2014, minimize the impact that oil/gas roads and pads have on critical sage grouse habitat.	Insufficient time	To address this objective, TNC would need to determine whether Bureau of Land Management planning process will protect Sage-grouse. In addition, new planning processes for sage grouse have been developed that should also be assessed to whether they will meet this objective.

Appendix 2

METHODS FOR CONSERVATION PROGRESS ASSESSMENT

For all objectives, we assessed progress towards achievement by overlaying spatial layers representing conservation targets and protected areas within seven project areas: Chico Basin, Greater Pawnee Prairie, Gunnison Basin, Laramie Foothills, North Platte, San Miguel/Dolores, and Upper Yampa River. We then quantified the area of overlap between conservation targets and protected lands owned and managed by different conservation organizations and management agencies. All spatial analyses were executed in ArcMap 10.2.2 (ESRI, Redlands, CA). Below, we describe the spatial layers for protected lands and conservation targets.

Protected Lands

To capture changes over time in conservation progress, we represented protected lands using different vintages of the Colorado Ownership, Management, and Protection (COMaP) spatial data layer (<https://comap.cnhp.colostate.edu/>; Accessed Oct. 2016). COMaP is statewide, iterative, and provides attribute information detailing the ownership and management of protected lands. Since 2004, there have been 10 versions of COMaP, with the most recent version containing over 28,000 entries from over 300 different data contributors. For our analyses, we used COMaP v5, released in 2006, and COMaP v10, released in 2016. This 10-year period approximately captures the timeframe over which most CAP conservation objectives were to be achieved.

An inspection of COMaP data layers revealed that TNC Colorado fee and conservation easements lands were not up to date at the time of the layer's release. Consequently, we updated these records in both COMaP v5 and v10 with internal TNC Colorado spatial data before proceeding with spatial overlays.

Chico Basin Conservation Targets

We represented terrestrial habitats using a vegetation map produced by the Southwest Regional GAP

Analysis Project (SWReGAP; <http://swregap.nmsu.edu/>; Accessed Sept. 2014). Using data from 1999-2001, the SWReGAP layer maps natural and semi-natural vegetation classes with the majority of classes at the system level of Nature Serve's Ecological System Concept (Comer et al. 2003). We elected to use this layer for our progress assessment as TNC Colorado planners used it to set CAP conservation targets for terrestrial habitats. We crosswalked SWReGAP covers to those specifically mentioned in the Objective 1 for the Chico Basin (Table 2-1).

To represent aquatic systems within Chico Basin, two data sets were used. Streams and rivers were extracted from the fine-scale resolution (1:24,000) National Hydrography Dataset Data Model 2.2 (NHD; <ftp://nhdftp.usgs.gov>; Accessed Nov. 2014). NHD provides national maps of water drainage systems and is intended for general mapping and network analyses of movement within hydrological systems. To map playas, we used spatial data from the Playa Lakes Joint Venture's Playa Decision Support System (DSS; <http://pljv.org>; Accessed Sept. 2016). The Playa DSS aims to inform decisions by stakeholders regarding what playa need to be protected from development and what playas can be restored.

Table 2-1. Crosswalk between SWReGAP vegetation classes and Chico Basin terrestrial habitat classes.

<i>SWReGAP</i>	<i>Chico Basin Habitat Class</i>
Inter-Mountain Basins Mixed Salt Desert Scrub	Arid Shrubland
Rocky Mountain Lower Montane-Foothill Shrubland	Arid Shrubland
Inter-Mountain Basins Greasewood Flat	Greasewood
Western Great Plains Foothill and Piedmont Grassland	Midgrass
Western Great Plains Sandhill Shrubland	Sandsage
Western Great Plains Shortgrass Prairie	Shortgrass

Greater Pawnee Prairie Conservation Targets

Using the SWReGAP layer, we mapped shortgrass prairie, chalk bluffs, and riparian areas using the Western Great Plains Shortgrass Prairie, Western Great Plains Cliff and Outcrop, and Western Great Plains Riparian Woodland and Shrubland classes, respectively.

Gunnison Basin Conservation Targets

We used publicly available data from CPW to map critical habitat for the Gunnison's Sage-Grouse (*Centrocercus minimus*; <http://www.arcgis.com/>; Accessed Aug. 2016). In critical habitat, we included important nesting and brood rearing areas and areas that support 90% of individuals during winter time extremes of snowpack or minimum temperatures.

Laramie Foothills Conservation Targets

Colorado Parks and Wildlife makes publicly available a spatial layer representing the occupied range for the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*; <http://www.arcgis.com/>; Accessed Aug. 2016). The occupied range was digitized by CPW employees. We identified streams and rivers from the fine-scale NHD spatial layer that fell within the mouse's occupied range.

North Platte Headwaters Conservations Targets

Occurrences for *Phacelia formosula* were taken from the Colorado Natural Heritage Program's (CNHP) Level 1 Element Occurrence (EO) data layer (Colorado Natural Heritage Program 2016). CNHP maps EOs for species or communities that are globally rare (G1-G3) or globally common but state rare (S1-S2) according to Nature Serve's conservation status ranks (Master 2012). We acknowledge that surveys for EOs may be more complete on public rather than privately owned lands.

We identified critical Greater Sage-Grouse (*Centrocercus urophasianus*) habitat via CPW's publicly available Preliminary Priority Habitat and Preliminary General Habitat spatial layer (<http://www.arcgis.com/>; Accessed Aug. 2016). From this layer, we extracted 'critical' habitat as preliminary priority habitat defined as "...areas of high probability of use (summer or winter, or breeding models) within a 4-mile buffer around leks that have been active within the last 10 years."

San Miguel/Dolores Conservation Targets

We extracted rare plant communities and species from CNHP's Level 1 EO layer. We represented active and permitted oil and gas wells using spatial data from the Colorado Oil and Gas Conservation Commission (<http://cogcc.state.co.us/>; Accessed Sept. 2016). We removed wells known to be in place before the conservation action was completed.

Upper Yampa River Conservation Targets

CPW makes available riparian habitat spatial data layers based on 1:24,000 high altitude color infrared large format camera and NAPP photography (<http://www.arcgis.com/>; Accessed Oct. 2016). We used streams and rivers from medium resolution (1:100,000) NHD Model 2.1 <ftp://nhdftp.usgs.gov>; Accessed Nov. 2015) to map the Elk River and the Yampa River from the confluence with the Elk River to the town of Hayden. We used the medium resolution NHD because a finer spatial resolution is not needed to identify large rivers. CPW lacked riparian data for segments of the Elk and Yampa Rivers, totaling 14-km, but the missing segments represented only 15.5% of the 90-km total river length. We identified riparian habitat as areas occurring within 100 m of either river.

We defined and mapped critical habitat for the Greater Sage-Grouse in the same manner as for the North Platte Conservation Targets.

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