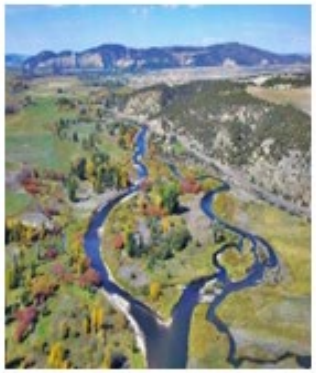
COLORADO PARKS & WILDLIFE

Colorado River Basin Management Plan

JANUARY 2019



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COLORADO RIVER BASIN
AQUATIC WILDLIFE MANAGEMENT PERSONNEL AND LOCATIONS

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This plan is a product of the collaboration of many individuals interested in the management of aquatic wildlife in the Colorado River basin. Colorado Parks Wildlife (CPW) wishes to acknowledge the contribution of the following people in this effort:

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3/6/20
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EXECUTIVE SUMMARY

The purpose of this management plan is to provide generalized management guidance and recommendations for lakes and streams within the Colorado River Basin in western Colorado. The plan will also serve as a reference for Colorado Parks and Wildlife (CPW) biologists and administrators, federal and state resource managers, and other interested parties.

The Colorado River Basin is located in west central Colorado and the drainage area encompasses 9,816 square miles within Colorado (Figure 1). The basin boundary on the east is the Continental Divide, the Colorado River drainage basin on the south, and the White River drainage basin on the north. State borders define the west boundary for purposes of this plan. The Colorado River originates in the headwater areas of Rocky Mountain National Park and flows westward, exiting the state west of Grand Junction. For the development of this plan, the basin has been divided into three major Analysis Units (AU) based on hydrological units: the Upper Colorado River AU, the Middle Colorado River AU, and the Lower Colorado River AU. The Upper Colorado River AU includes four Fish Management Units (FMUs): Rocky Mountain National Park, CR01; Granby, CR02; Blue River, CR03; and Kremmling, CR04. The Middle Colorado River AU contains five FMUs: Castle Peak, CR05; Eagle River, CR06; Fryingpan River, CR07; Roaring Fork River, CR08; and Crystal River, CR09. The Lower Colorado River AU contains four FMUs: Rifle, CR10; Roan-Parachute Creek, CR11; Plateau Creek, CR12; and Grand Junction, CR13 (Table 1, Figure 1).

Table 1. Hydrological Unit and Fish Management (FMU) composition of the three major Colorado River Basin Analysis Units (AU).

Analysis Units					
Upper Colorado River		**Middle Colorado River**		**Lower Colorado River**	
Hydrological Unit	**FMU**	**Hydrological Unit**	**FMU**	**Hydrological Unit**	**FMU**
Rocky Mountain National Park	CR01	Castle Peak	CR05	Rifle	CR10
Granby	CR02	Eagle River	CR06	Roan-Parachute Creek	CR11
Blue River	CR03	Fryingpan River	CR07	Plateau Creek	CR12
Kremmling	CR04	Roaring Fork River	CR08	Grand Junction	CR13
		Crystal River	CR09		

Aquatic resources and fisheries within these drainages range from high mountain wilderness area lakes and perennial coldwater streams to larger rivers and coldwater reservoirs, to the warmwater reaches of the lower Colorado River, and ephemeral streams and ponds created by spring snowmelt and runoff. Each AU contains significant aquatic resources. The mountainous portions of the basin in the Upper Colorado River AU contain 66.2% of the lake habitat area and 28.4% of the stream habitat area. The middle elevation, high desert plateau of the middle Colorado River AU contains 16.5% of the lake habitat area and 34.8% of the stream habitat area. Within the Lower Colorado River basin, which includes mountain and desert plateau landscapes, 17.3% of the lake habitat area and 36.8% of the stream habitat area occurs (Table 2).

Table 2. Percentage of total Colorado River Basin lake and stream habitat by Analysis Unit (AU).

	Lake Surface Area acres (ac)	Percent	Lake Count	Percent	Stream miles (mi)	Percent	Stream Count	Percent
Upper AU	20,240.3	66.2	234	17.7	2,454.4	28.4	489	32.5
Middle AU	5,033.1	16.5	376	28.4	2,642.1	34.8	575	38.2
Lower AU	5,296.3	17.3	712	53.9	2,792.2	36.8	441	29.3
Totals:	**30,569.7**	**100**	**1,322**	**100**	**7,588.7**	**100**	**1,505**	**100**

Within the Colorado River Basin, there are a total of 1,322 lakes and 1,505 streams, each accounting for 30,569.7 surface acres (ac) and 7,588.7 stream miles (mi), respectively (Table 2). Of the 1,322 standing waters, 651 lakes totaling 27,254.2 ac are managed by state, federal or private entities. Of the 1,505 flowing waters, 1,369 stream segments totaling 7,211.3 mi. There are also 671 standing water resources totaling 3,315.5 ac and 136 flowing water resources totaling 377.4 mi that are not managed. In this plan, streams and lakes are categorized into one of 36 management categories based on the primary aquatic management strategy for each water (Table 3). These categories are grouped into fourteen broad management classifications including: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, Coldwater Sportfish Special Regulations, High Lakes, Native Cutthroat, Native Non-Salmonid, Non-Fish Native Conservation, Non-Managed, Rocky Mountain National Park (RMNP) Managed, Warmwater Sportfish Intensive, Warmwater Sportfish Optimum, Wild Trout, Wild Trout Special Regulations, and Wild Warmwater.

*Table 3. **FISHERY MANAGEMENT CLASSIFICATION CATEGORIES***

NATIVE AQUATIC SPECIES CONSERVATION MANAGEMENT - The primary purpose of management for this category is the recovery, conservation, protection, or enhancement of native aquatic species other than fish.

101 Aquatic species conservation lakes
102 Aquatic species conservation streams

These categories are for streams or lakes that are typically wet and hold native aquatic species other than fish.

103 Amphibian conservation wetland

This category is for wetlands often adjacent to existing coded streams or reservoirs that have received or may receive Boreal Toad transplants.

NATIVE FISH CONSERVATION MANAGEMENT - The primary purpose of management for this category is the recovery, conservation, protection, or enhancement of native fish species.

201 Native cutthroat recovery/conservation lakes
202 Native cutthroat recovery/conservation streams

These two categories are for waters considered native cutthroat trout "conservation/recovery waters", where the genetically acceptable cutthroat sub-species is present, or is planned for introduction (and documented in a recovery or conservation plan). If the water provides potential cutthroat habitat (including natural reproduction) but has not been specifically identified for a conservation/recovery restoration, then it should be included in 301 or 302.

203 Native fish conservation lakes
204 Native fish conservation streams

These two categories are for waters managed for conservation and recovery of native fish species other than cutthroats (plains fishes, Bluehead or Flannelmouth suckers, Roundtail Chub, etc).

WILD SPORTFISH MANAGEMENT – This category includes fish populations that take advantage of natural productivity to sustain the fishery and associated recreational angling. Both native and nonnative trout species can be managed. Stocking can occur to replenish populations in case of a natural catastrophe, a reclamation project, to enhance population genetics, or to provide species diversity by establishing a self-sustaining secondary wild trout fishery. Special regulation waters are supported entirely by natural reproduction of salmonids and are primarily managed for quality-sized fish through the use of special harvest restrictions. Warmwater lakes and streams are waters that provide a warmwater recreational sport fishery supported entirely by natural reproduction and are not stocked.

301 Salmonid recreation lakes

This category is for waters with confirmed successful and adequate natural salmonid reproduction (other than conservation native cutthroat trout – Cat 201) and no fish are stocked to maintain management objectives. This category also includes waters stocked to restore a wild rainbow fishery.

302 Salmonid recreation streams

This category is for waters with confirmed successful and adequate natural salmonid reproduction (other than conservation native cutthroat trout – Cat 202) and no fish are stocked. This category also includes waters stocked to restore a wild rainbow fishery.

303 Salmonid special regulation streams

This category is for waters supported entirely by natural reproduction of salmonids and primarily managed for quality-sized fish through the use of special harvest restrictions.

304 Warmwater lakes
305 Warmwater streams

These two categories are for waters that provide a warmwater recreational sport fishery supported entirely by natural reproduction and are not stocked.

OPTIMUM SPORTFISH MANAGEMENT – This category includes fish populations that are maintained using hatchery produced fry, fingerlings, or subcatchables to take advantage of the natural productivity of waters. Native trout and native warmwater species have higher priority than nonnative species. Special regulations may be applied.

401 Coldwater high lakes

This category is for waters characterized as high elevation (>7000') lakes having walk-in access, insufficient natural reproduction, and that are stocked with fry/fingerlings. These are not conservation/recovery lakes for native cutthroat (Cat 201) although native cutthroat can be stocked.

402 Coldwater lakes < 100 acres
403 Coldwater lakes 100-500 acres
404 Coldwater lakes > 500 acres

These categories are for waters located in coldwater habitat and that are regularly stocked with fry/fingerling/subcatchable salmonids (but not catchables) for purposes of maintaining an adequate fishery and typically have road (drive-to) access.

405 Coldwater streams

This category is for waters regularly stocked with fry/fingerling/subcatchable salmonids (but not catchables) as the primary management strategy to maintain an adequate recreational fishery. If the recreational sport fishery is sustained primarily by wild trout (other than native cutthroat) through natural reproduction, then see Cat 302.

406 Coldwater special regulation stocked streams

This category is for waters managed similar to those streams under Cat 405 but management is for quality-sized trout through the use of restrictive harvest regulations.

407 Warmwater lakes < 100 acres
408 Warmwater lakes 100-500 acres
409 Warmwater lakes > 500 acres

These categories are for waters that rely on natural reproduction and/or are stocked with warmwater species and have a primary management for a warmwater species put-grow-take fishery. These lakes may also be stocked with catchable trout stocked only seasonally and do not contribute to the majority of fishing recreation or angler catch.

410 Special Use warmwater lakes

This category is for waters that provide a trophy or unique-species warmwater fishery (tiger muskie, northern pike, sauger, etc) as the primary fishery objective (management intent and angler use) and stocked with fry/fingerling or subcatchable warmwater species. Catchable trout may be stocked in these waters, but only as a limited fishery secondary to the trophy/unique experience.

INTENSIVE SPORTFISH MANAGEMENT – This category includes fish populations that are maintained using both subcatchable and catchable sized (mixed) stockings of coldwater and warmwater species to provide angling recreation in waters that lack productivity yet have suitable water quality to support fish populations. Special regulations may be applied. Big fish lakes utilize a put-grow-take management scheme to produce larger quality-sized trout. Warmwater categories are used for warmwater fisheries where the recreational fishery (recreation days and catch) is largely dependent upon the stocking of catchable trout. Other warmwater sport species may exist through natural reproduction or stocking, but their contribution to the fishery is low.

501 Coldwater catchable lakes < 30 acres
502 Coldwater catchable lakes > 30 acres

These categories are for waters with fisheries that depend entirely on stocking of catchable trout. Other fry/fingerling/subcatchable salmonid species are not stocked. Some wild trout may be present, but their contribution to the fishery is secondary and minor.

503 Coldwater mixed stocking lakes < 100 acres
504 Coldwater mixed stocking lakes 100-500 acres
505 Coldwater mixed stocking lakes > 500 acres

These categories are for waters where both stocked catchables and fry/fingerlings/subcatchables generally contribute equally to the fishery. Wild trout may be present but are an incidental component of the fishery.

506 Coldwater mixed stocking big fish lakes

This category is for waters with large quality-sized trout maintained through a put-grow-take strategy using stocked fry/fingerling or catchable salmonid.

507 Coldwater mixed stocking streams

This category is for waters dependent on stocking a combination of fry/fingerling/subcatchable and catchable salmonids to maintain an adequate fishery. Wild trout may be present but their contribution to the recreational fishery is secondary or minimal.

508 Warmwater mixed stocking lakes < 100 acres
509 Warmwater mixed stocking lakes 100-500 acres
510 Warmwater mixed stocking lakes > 500 acres

These categories are for warmwater fisheries where the recreational fishery (recreation days and catch) is largely dependent upon the stocking of catchable trout. Other warmwater sport species may exist through natural reproduction or stocking, but their contribution to the fishery is low.

ADMINISTRATIVE MANAGEMENT - The non-managed waters category is a wide grouping of waters with varying attributes. Some waters are intermittent or seasonal, or have chemical, physical or biological attributes that are inimical to aquatic life. Some waters are not actively managed because it could cause conflicts with specific objectives for fish management objectives elsewhere. For example, waters that connect directly to cutthroat trout habitat are not managed for other trout species although they may provide suitable habitat. Other waters are privately owned and may be closed to public use. Some waters are placed in this category because we are not presently managing them or because the water does not provide habitat suitable for fisheries management. Assignment to this category does not mean that future fisheries management is not an option, nor does it mean that regulations and statutes protecting nongame aquatic wildlife do not apply. National Park Waters fall within the jurisdiction of Rocky Mountain National Park (RMNP) and are outside of CPW management.

600 Dry/Intermittent streams

This category is for waters that are nearly always dry, except for brief periods of run-off or precipitation events. Habitat would not normally be considered aquatic, and fish or other aquatic life does not typically survive on a year-round basis.

700 Private / Closed lakes

This category is for waters that may be used for limited fish management purposes but are privately owned or otherwise closed to the public. Examples include brood or salvage lakes (stripers, Sauger, bass, panfish, etc), lakes that are sometimes stocked for special fishing events, or perhaps private/closed lakes that are utilized for a fish research project.

800 Degraded waters

This category is for waters where the fishery is being limited or is nonexistent due to water quality, water quantity, or other habitat degradation. In some situations CPW or other agencies may be working to resolve limiting factor issues and restore these fisheries.

900 National Park Waters

This category is for waters falling within the jurisdiction of Rocky Mountain National Park, Colorado Monument, or Dinosaur National Monument. They are outside of CPW management but are not sufficiently covered under codes 600, 700, or 800.

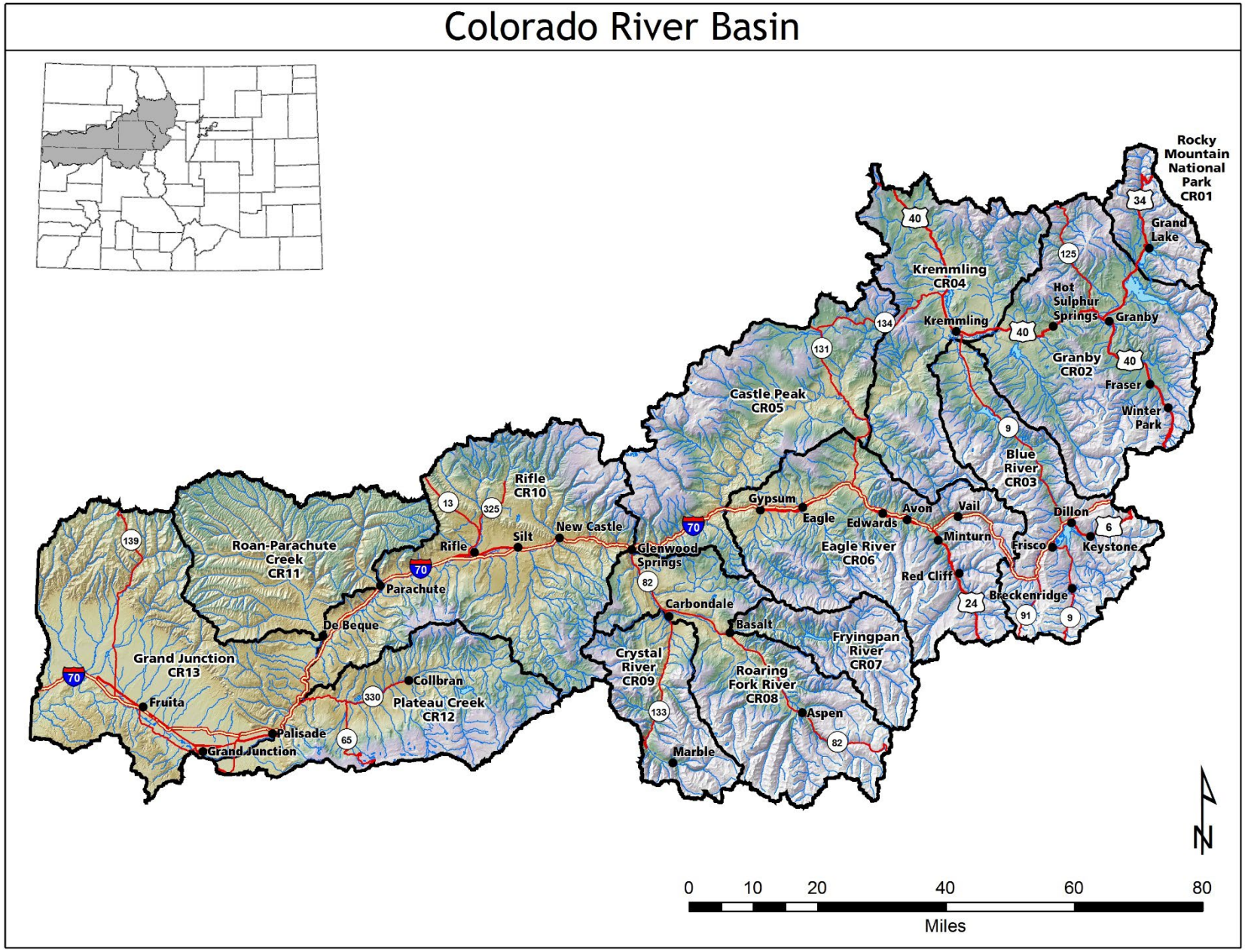

Figure 1. Map of the Colorado River Basin showing the State of Colorado locator frame and Fish Management Unit (FMU) designations.

INTRODUCTION

PURPOSE AND OBJECTIVES

This plan focuses on management perspectives and recommended actions for the aquatic resources and wildlife species managed by CPW in the Colorado River Basin under Colorado Revised Statutes, Title 33, Article 1, Section 101(1-3), and Article 2, Section 102, where aquatic wildlife is defined as "fish, amphibians, reptiles, mollusks and crustaceans". By legislative declaration within these articles, "it is . . . the policy to protect and encourage full development of absolute and conditional water rights created under state law. . ." (CRS 33-1-101 #3); and "it is the policy of this state to manage all non-game wildlife, recognizing the private property rights of individual owners" (CRS 33-2-102). Wildlife management on private property is clearly guided by statute, and it is the intent of this plan to implement the strategies herein on private property only with the approval and cooperation of the property holder. The objectives of this plan are to:

- Describe the physical fishery and aquatic resources in the basin subject to management by CPW.
- Discuss policies, agreements and issues that are influencing the management of these resources.
- Describe fishery management for specific waters and aquatic wildlife species located within the basin via management categories.
- Describe preferred fishery and conservation management recommendations for the basin and activities that are being, or will be undertaken, to achieve agency goals and agreements.
- Provide a reference and guide for fishery recreation management and aquatic resource conservation by CPW biologists, federal and state resource managers, and interested public and private agencies and individuals.

GUIDANCE FROM CPW POLICIES, REGULATIONS, AND PLANS

CPW policies, regulations, and plans influence basin management strategies and recommendations. All of the recommended strategies and options serve to promote one or more objectives within these major guidance documents. These documents include:

1) CPW 2015 Strategic Plan: This plan is founded on a series of management principles and agency goals approved by the Colorado Parks and Wildlife Commission. The following Strategic Plan goals are particularly influential as guidance for this basin management plan:

    - **Goal 1: Conserve wildlife and habitat to ensure healthy sustainable populations and ecosystems.**
        - Objective A: Manage sustainable populations of game and nongame species to support fishing, hunting, trapping, and wildlife viewing opportunities.
        - Objective B: Preserve and enhance diverse habitat.
        - Objective C: Manage and monitor species of greatest conservation need while working with partners to maintain viable populations.

- Objective D: Protect and enhance water resources for fish and wildlife populations.
- Objective E: Conduct research and monitoring to inform management decisions.

- **Goal 6: Connect people to Colorado's outdoors**.
  - Objective A: Broaden the access and variety of recreation opportunities available to Coloradans and visitors.
  - Objective B: Provide facilities, infrastructure, and access to support opportunities for premier outdoor recreation experiences.

2) CPW Regulations: Chapter 1 (Fishing), Chapter 10 (Nongame), Chapter 0 (Species and Health Management). Chapter 1 specifically describes definitions inherently involved with aquatic wildlife management and regulations pertaining to: season dates and hours; license requirements; manner of take for aquatic wildlife; statewide daily bag and possession limits; special seasons, and special conditions and restrictions; fishing contests; release of tagged fish; and all special regulation waters within Colorado. Chapter 10 regulations designate and describe specific management, protection, and/or conservation of non-game, threatened and endangered wildlife. Chapter 0 defines rules governing the possession, import, transport and release of aquatic wildlife; and sets forth regulations pertaining to aquatic animal diseases, testing, and disease and facility management.

3) Colorado River Cutthroat Trout Conservation Strategy (2006): This document outlines goals and strategies for increasing the distribution of the species, protecting existing and restored populations, restoring degraded populations, and conservation planning across the species' range. Individual waters in the Colorado River Basin will be identified for restoration and conservation planning activities, and efforts will be made to secure viable, pure populations to meet plan recovery goals.

4) Upper Colorado River Endangered Fish Recovery Plan: This is the Upper Colorado River Endangered Fish Recovery Program's step-down action plan for recovering four federally-listed fish species, the Colorado Pikeminnow, Razorback Sucker, Humpback Chub and Bonytail, while accommodating water development in Colorado. Actions are specified in several broad categories; most relevant for CPW fisheries management are habitat improvement, endangered fish propagation and stocking, and nonnative fish control.

5) Range-wide Conservation Strategy for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker: This multi-state plan outlines goals and strategies to ensure the persistence and stability of these species, and thereby avoid potential federal ESA listing, by increasing their abundance and distribution, enhancing and maintaining habitat, controlling threats, and additional measures.

6) Boreal Toad Conservation Strategy/Recovery Plan for Colorado: As an endangered species in Colorado, the Boreal Toad and related habitats are the focus of an approved state recovery plan and interagency conservation team. Most important to this plan is consideration of the aquatic sites used by adult toads for breeding and by tadpoles and toadlets as nursery habitats.

SUMMARY OF FISHERY MANAGEMENT CLASSIFICATION CATEGORIES

For the purpose of this document, only the primary management category of each water is used to calculate pie charts for Analysis Units and FMUs (Figure 2, etc.). Any given water could have more than one use or function resulting in additional categorical uses or functions of secondary importance. For example, a water may have a primary category of 700 (private, closed) but also function as an aquatic species conservation lake or aquatic species conservation stream (Category 101 or 102). In this document, secondary management classifications are acknowledged but not discussed to minimize factors that would complicate classification analysis.

Native Aquatic Species Conservation Management (101, 102, 103)

Those aquatic resources primarily managed to aid in the recovery, conservation, protection, or enhancement of native aquatic species including native amphibians, for example the boreal toad.

Native Fish Conservation Management (201, 202, 203, 204)

Conservation and recovery of federally listed fish species such as the Colorado Pikeminnow, Humpback Chub, Razorback Sucker and Bonytail, as part of the Upper Colorado River Endangered Fishes Recovery Program (Program), are emphasized within designated critical habitat of the Colorado River Basin. Critical habitat for the Colorado Pikeminnow and Razorback Sucker includes the Colorado River and its 100-year floodplain beginning at the Colorado River bridge at Exit 90 north off Interstate 70. Colorado Pikeminnow habitat extends downstream through Lake Powell, but Razorback Sucker critical listed habitat ends at Westwater Canyon in Utah. The Gunnison River and its 100-year floodplain from the Colorado River confluence upstream to the confluence with the Uncompahgre River at Delta is also included as designated critical habitat for Colorado Pikeminnow and Razorback Sucker. Within Colorado, critical habitat for the Humpback Chub and Bonytail begins on the Colorado River, including its 100-year floodplain, at Black Rocks and extends downstream to Fish Ford River, Utah. Non-native fish removal efforts are conducted annually by Program partners, including CPW, and can be expected to continue into the future in the Colorado River Basin in an effort to aid in the recovery of the aforementioned species. Fish stocking criteria are established in the Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (1996, revised 2009) agreed to by the Program partners, and restrict the stocking of nonnative warmwater fish species into locations where their escapement into other waters is unlikely.

Colorado River Cutthroat Trout conservation management is the primary management focus for 130 stream segments totaling 832.7 mi and for 28 lakes totaling 270.2 ac. These waters contain genetically pure or nearly pure populations, or are being actively considered for future conservation efforts. These lakes or streams may have special fishing regulations prohibiting harvest, if needed, to protect native cutthroat trout populations. Most cutthroat conservation populations are located in high-elevation headwater streams and lakes, many of which are isolated from nonnative fish species by natural or man-made fish migration barriers. An additional 219 high elevation lakes totaling 2153.2 ac (averaging 9.8 ac each) are managed to provide Colorado River Cutthroat Trout recreational angling opportunities through fixed-wing or horse pack stocking of fingerling fish. These waters are not currently managed to meet primary conservation objectives, but may be

considered for restoration actions in the future. High lakes (> 7,000 feet in elevation) are listed in the Optimum Sportfish Management (401) category.

Wild Sportfish Management (301, 302, 303, 304, 305)

These aquatic resources are managed to provide sportfishing opportunities in waters with sufficient productivity and natural reproduction to support self-sustaining wild trout populations. Most of these resources are based on nonnative Brook, Brown, or Rainbow Trout populations, but may also be based on native cutthroat trout populations. There are 1,264 total waters in this classification with 234 lakes totaling 1,644.7 ac and 1,030 stream segments totaling 4,962.1 mi. Waters in this classification represent about 65% of the total stream mi and 5.4% of the total lake ac in the Colorado River Basin. Four of these stream segments are managed with special regulations to limit harvest and to maintain and enhance the quality of those fisheries.

Some resources in this classification are back-country remote streams which receive light to moderate fishing pressure and are managed with standard fishing regulations. Some resources are extremely popular destination fisheries with both rural and urban character that require special regulations to maintain population robustness. Unless fish populations are impacted by stochastic events that require restocking of trout, angling opportunity is primarily supported by natural reproduction.

Optimum Sportfish Management (401, 402, 403, 404, 405, 406, 407, 408, 409, 410)

Angling opportunity in these waters is managed through the stocking of primarily subcatchable fish. Most waters in this classification have limited natural reproduction and require periodic stocking to maintain fish populations. These waters generally exhibit good productivity to allow stocked subcatchable fish to grow to a sufficient size for catch and/or harvest. This is often referred to as “put and grow” stocking management. There are 67 total waters in this classification with 20 lakes totaling 2,589.3 ac and 47 stream segments totaling 311.3 mi. In the Colorado River Basin, 8.5% of lake acres and 4.1% of stream miles are currently managed as Optimum Sportfish waters.

Angling recreation at most high lakes has historically been maintained through the stocking of fingerling brook, rainbow or cutthroat trout by fixed-wing aircraft, helicopter or horse packing. Many high elevation lakes were not stocked after 1996 due to whirling disease concerns in the hatchery system. Since 2001, most high lake stocking schedules have been converted to native Colorado River Cutthroat Trout fingerlings. The primary purpose of these plants is to maintain angling recreational opportunity, although future conservation activities may be considered at lakes that are capable of supporting self-sustained Colorado River Cutthroat Trout populations. High lake management strategies depend, in part, upon the lake’s ability to sustain naturally reproducing wild trout and its capabilities for providing fishing recreation. High lakes in the Optimum Sportfish Management in Stocked Waters category have demonstrated the capacity to support quality fisheries through the stocking of subcatchable trout, but generally have poor natural reproductive capacity. CPW recognizes the importance of these waters in maintaining cultural and historic uses, tourism and related business, as well as the potential for habitat damage with increased human activity around high lakes.

Although warmwater fishing recreation opportunity is limited by the physical resources available in the basin, recommendations have been made to maintain and enhance warmwater fishing within the constraints afforded by the Procedures of Stocking Nonnative Fish Species in the Upper Colorado River Basin (1996, revised 2009). Typically, these opportunities are correlated with the Upper Colorado River Endangered Fish Recovery Program efforts.

Intensive Sportfish Management (501, 502, 503, 504, 505, 506, 507, 508, 509, 510)

These aquatic resources are managed primarily to support recreational angling opportunity through the stocking of catchable trout. Typically, these waters receive heavy fishing pressure, are easily accessible, have good public facilities, and do not naturally provide favorable conditions for the fish growth needed to maintain acceptable sportfishing opportunity. In addition to catchable trout, these waters may also be stocked with subcatchable trout and warmwater species. Aquatic resources in this category are generally managed with standard regulations that allow the use of bait.

Warmwater ponds and reservoirs can be seasonally stocked with trout in spring and fall when water temperatures are suitable for trout. Sixty-six (66.1) percent of Colorado River Basin lake acres are managed as Intensive Management coldwater fisheries (84 lakes totaling 20,215.9 ac) while an additional 0.06% of lake acres are intensively managed warmwater fisheries (1 lake totaling 19.8 ac). There are no streams in the Colorado River Basin managed intensively for warmwater species.

Non-Management (600, 700, 800, 900)

Waters in this category are not currently managed for sportfish or for native species conservation purposes, but may be important habitats for other aquatic and terrestrial species. Many of these aquatic habitats support non-game fish, amphibians, reptiles, mollusks and crustaceans. Streams in this category are often very small or are wet and flowing only during snow-pack driven spring runoff and during summer rainstorms.

There are 136 streams in the Administrative Management categories in the Colorado River Basin representing 377.4 mi of flowing water resource, or less than 5% of the basin stream mileage. There are 671 lakes in this category representing 3,315.5 ac, or 10.9% of the total standing water basin resource. It is likely that some of the waters listed in this category lack inventory information due to their size, accessibility, ownership, or seasonality. Biologist annual work plans include options to perform inventory work on non-managed waters, and as inventory work is completed, waters will be moved into the appropriate management categories. Some private waters are managed cooperatively with the State to protect connected aquatic resources that are potentially impacted by management activities.

There are seven additional streams representing 32.9 mi and 24 lakes representing 221.1 ac that are managed by Rocky Mountain National Park (RMNP). Among these waters are significant cutthroat trout resources, such as Bench and Nanita Lakes, managed to support wild populations of Colorado River Cutthroat Trout and serve as genetic refugia. CPW biologists obtain permission from RMNP managers for periodic feral spawn takes at Nanita Lake to maintain genetic refuge broodstock operations at CPW hatcheries, and to support CPW's West Slope fixed-wing cutthroat trout stocking operations.

AQUATIC RESOURCE CLASSIFICATION SUMMARY OF ALL WATERS IN THE COLORADO RIVER BASIN

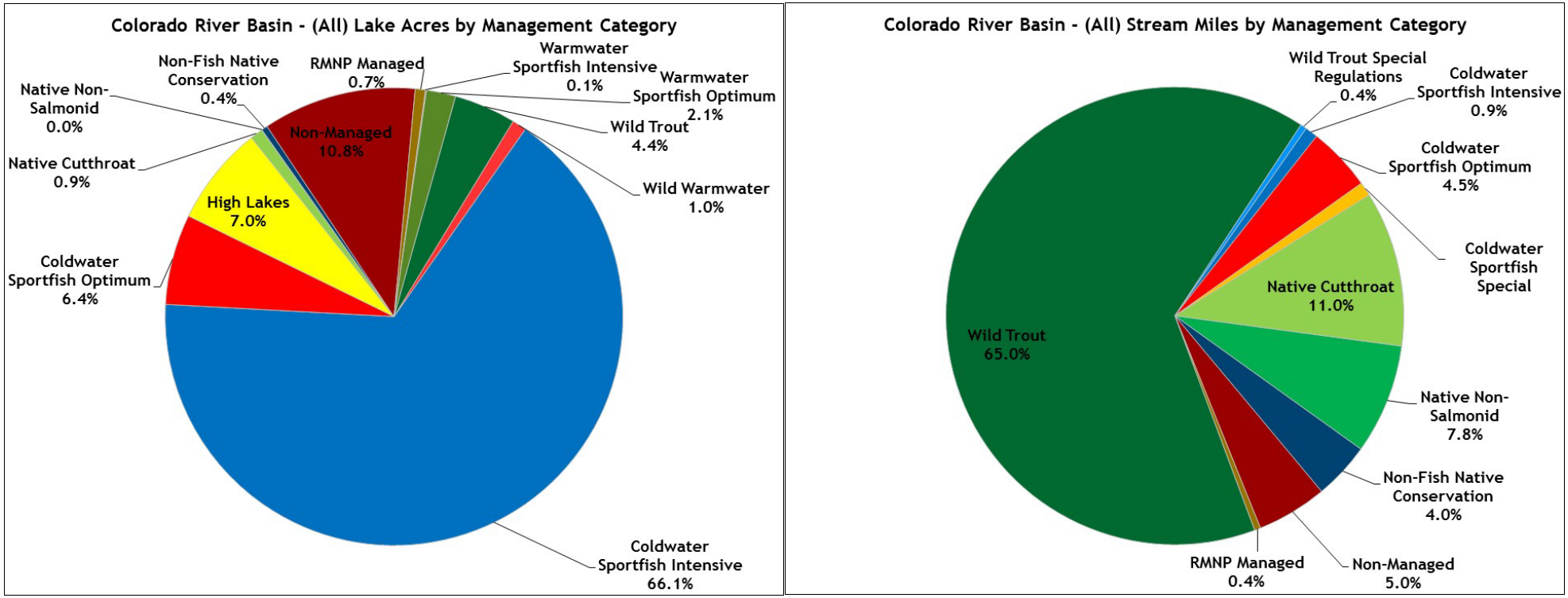

Figure 2. Aquatic resource classification of fishery resources in the Colorado River Basin based on number of waters in each category.

COLORADO RIVER BASIN MANAGEMENT PLAN

CPW PERSONNEL BY FISH MANAGEMENT UNITS

UPPER COLORADO RIVER BASIN Fish Management Units	MIDDLE COLORADO RIVER BASIN Fish Management Units	LOWER COLORADO RIVER BASIN Fish Management Units
Rocky Mountain National Park - CR01	Castle Peak - CR05	Rifle - CR10
Granby - CR02	Eagle River - CR06	Roan-Parachute Creek - CR11
Blue River - CR03	Fryingpan River - CR07	Plateau Creek - CR12
Kremmling - CR04	Roaring Fork River - CR08	Grand Junction CR13
	Crystal River - CR09	

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UPPER COLORADO RIVER BASIN ANALYSIS UNIT SUMMARY

Fish Management Units
Rocky Mountain National Park - CR01
Granby - CR02
Blue River - CR03
Kremmling - CR04

The Upper Colorado River Basin Analysis Unit (AU) encompasses 2,652 square mi in the upper Colorado River Basin, with the majority of the waters found in this AU representing coldwater lake and stream habitats in headwater drainages. There are no waters categorized as warmwater fisheries in this AU. To organize waters within the upper basin for this planning effort, the entire geographical area has been separated into four Fish Management Units (FMUs), which subdivide the AU area based on geographical characteristics. Waters within each FMU are further partitioned into CPW statewide water management categories. The four FMUs in the upper basin are: Rocky Mountain National Park - CR01 (198.2 sq mi); Granby - CR02 (999.7 sq mi); Blue River - CR03 (682.8 sq mi); and Kremmling - CR04 (771.4 sq mi).

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (44%), aspen dominated deciduous forest (4.6%), grassland/herbaceous (11.4%), agriculture (1.6%), shrubland (24.4%), perennial ice/snow (4.0%), barren land (5%), and woody wetlands (2.4%). Land ownership includes the U.S. Forest Service (USFS) (44.1%), USFS Wilderness (12%), private (21%), local government (0.3%), State of Colorado (4%), U.S. Bureau of Land Management (BLM) (9.4%), and private conservation lands (3%). Other non-governmental organizations, and additional Federal and State owned lands comprise 2% of land ownership in this AU.

Approximately 56% of the upper Colorado River Basin AU is owned by the USFS (11.9% wilderness, 44.1% other USFS land). Recreational use allowed includes fishing, hunting, camping, cross-country skiing, backcountry skiing, mountain biking and hiking; USFS lands are also managed to support livestock grazing, logging activities, gas and oil exploration, and other specialized uses.

This unit contains 234 lakes and reservoirs totaling 20,240 ac, and 489 stream segments totaling 2,154 mi. Standing water resources include waters in eight classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, RMNP Managed, and Wild Trout (Figure 3). Stream resources include waters in nine classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, Coldwater Sportfish Special Regulations, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, RMNP Managed, Wild Trout, and Wild Trout Special Regulations (Figure 3).

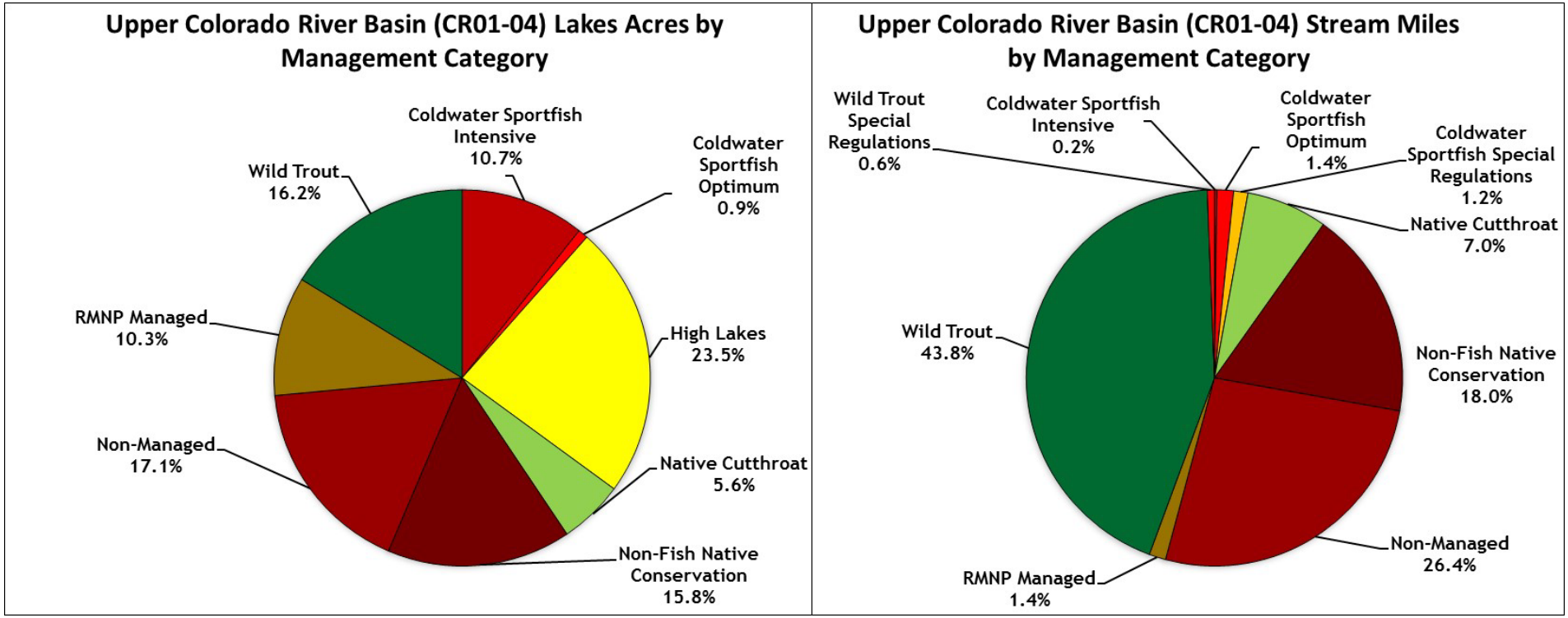

Figure 3. Summary of lakes and streams classification statistics for the four FMUs that comprise the Upper Colorado River Basin based on acres/miles.

UPPER COLORADO RIVER BASIN
Rocky Mountain National Park Fish Management Unit - CR01

Overview

This FMU includes waters west of the Continental Divide found in Rocky Mountain National Park (RMNP) and waters immediately outside RMNP which drain into the North Fork of the Colorado River (Figure 4). Major drainages include the headwaters of the Colorado River, and tributaries that feed Grand Lake (North and East Inlets). This unit contains 34 lakes and reservoirs totaling 2091 acres, and 28 stream segments totaling 142 miles. Lake resources include waters in six classifications: Coldwater Sportfish Intensive, High Lakes, Non-Fish Native Conservation, RMNP Managed, Non-Managed, and Wild Trout (Figure 5). Stream resources include waters in four classifications: Coldwater Sportfish Optimum, Non-Managed, RMNP Managed, and Wild Trout (Figure 5).

Because the National Park Service manages RMNP waters with assistance from the U. S. Fish and Wildlife Service, CPW involvement is limited. Eggs are collected periodically from the Lake Nanita population of Colorado River Cutthroat Trout to provide for CPW broodstock and restoration of native cutthroat trout populations in the Colorado River drainage.

One known Boreal Toad population is present in this management unit and is found within RMNP boundaries. The National Park Service monitors this population and shares data to CPW through the Boreal Toad Recovery Team. Reports of Boreal Toads in areas outside of RMNP in this management unit are limited. Wood Frog have also been detected in RMNP, but their current distribution is unknown.

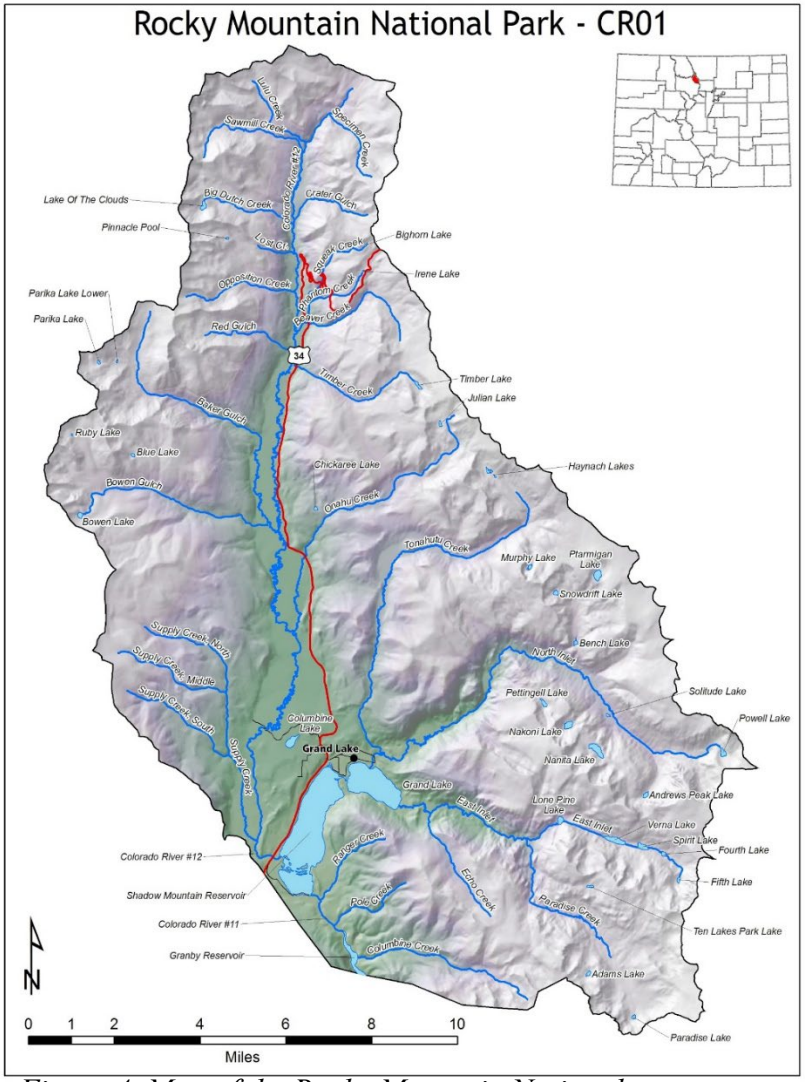

Figure 4. Map of the Rocky Mountain National Park FMU - CR01.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (52.3%), aspen dominated deciduous forest (0.1%), grassland/herbaceous (8.0%), shrubland (8.5%), open water (1.6%), perennial ice/snow (15%), woody wetlands (2.1%), and mixed forest (0.01%) (Figure 6). Land ownership includes the U.S. Forest Service (USFS) (10.5%), USFS Wilderness (9.4%), private (4.7%), U.S. Bureau of Land Management (BLM) (0.06%), National Park Service (NPS) (75.2%) and private conservation lands (0.07%) (Figure 6).

Recommended Management Strategies/Options

Sportfish Management

- Seek opportunities to collaborate with RMNP staff to formulate management strategies that will serve both agencies' mandates while continuing to allow CPW spawntakes of Colorado River Cutthroat Trout stocks at Nanita Lake and in other RMNP waters as needed. Continue to cooperate with RMNP on stream and lake management projects directed towards increasing the number of viable Colorado River Cutthroat Trout populations.
- Manage Grand Lake to provide lake trout sport fishing while preserving an acceptable catch rate for other salmonid species.
- Cooperate with the U.S. Forest Service (USFS) to manage Shadow Mountain Reservoir for brown and rainbow trout and kokanee, and with Northern Water to coordinate reservoir discharge flows during kokanee spawntake periods. Cooperate with USFS and Northern Water to address reservoir aquatic vegetation issues that may impact sportfishing resources by providing alternate solutions or techniques to resolve issues of public concern.
- Avoid the stocking of fish that are not specific pathogen free (Bacterial Kidney Disease, Whirling Disease, etc.), and stock genetically and strain appropriate cutthroat trout in suitable waters.

Native Species Management

- Continue to search for cutthroat trout population restoration opportunities; cooperate with RMNP to establish additional populations under conditions of dual management prerogative.
- Cooperate with RMNP staff to inventory waters within RMNP that may be of interest to CPW as needed; offer assistance to RMNP staff for other aquatic inventory needs. Seek permission to cooperatively inventory Colorado River Cutthroat Trout within RMNP boundaries.
- Continue to manage Colorado River Cutthroat Trout within the constraints outlined by the Colorado River Cutthroat Trout Conservation Strategy (2006).
- Baker Gulch and Parika Lake both lie within the Never Summer Wilderness Area outside RMNP. Baker Gulch is diverted into the Grand River Ditch (when it is in operation) and ultimately, via a trans-mountain diversion, into Long Draw Reservoir in the Poudre River drainage. Parika Lake contains a self-sustaining brook trout fishery and Baker Gulch contains a conservation population of blue-lineage Colorado River Cutthroat Trout. A settlement agreement in 2017 involving the operation of Long Draw Reservoir includes provisions to reclaim Baker Gulch as part of a large-scale, multi-phased purple-lineage cutthroat trout restoration project. The time frame for implementation of this project is currently unknown but it is anticipated that the USFS will be the lead agency, and may request CPW fish control and restocking assistance.
- Continue to cooperate with RMNP staff through the Boreal Toad Recovery Team to monitor known Boreal Toad breeding sites with RMNP boundaries. Support survey and/or reintroduction efforts for Boreal Toad as needed.
- Identify Wood Frog populations in cooperation with RMNP.

Nonnative Species Management

- There are no nonnative species management concerns in this FMU at this time.

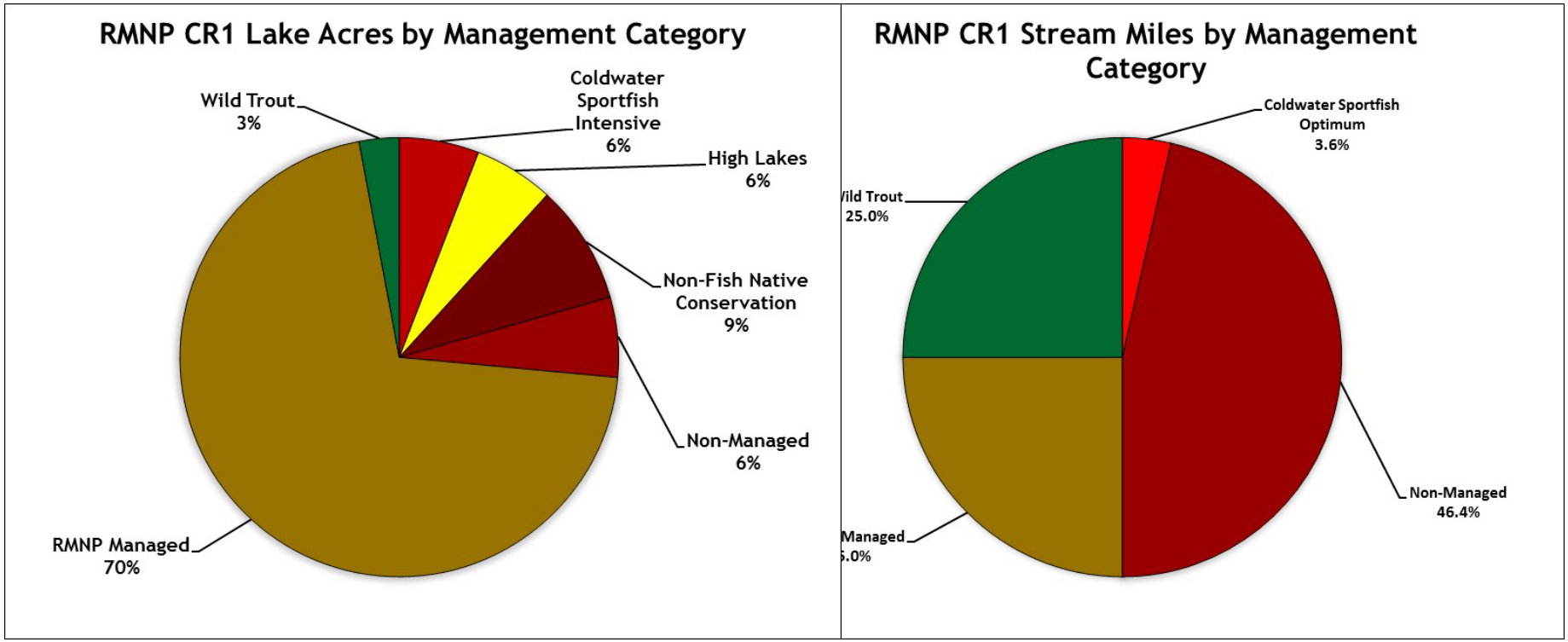

Figure 5. Summary of lake and stream classification statistics for the Rocky Mountain National Park (RMNP) FMU - CR01.

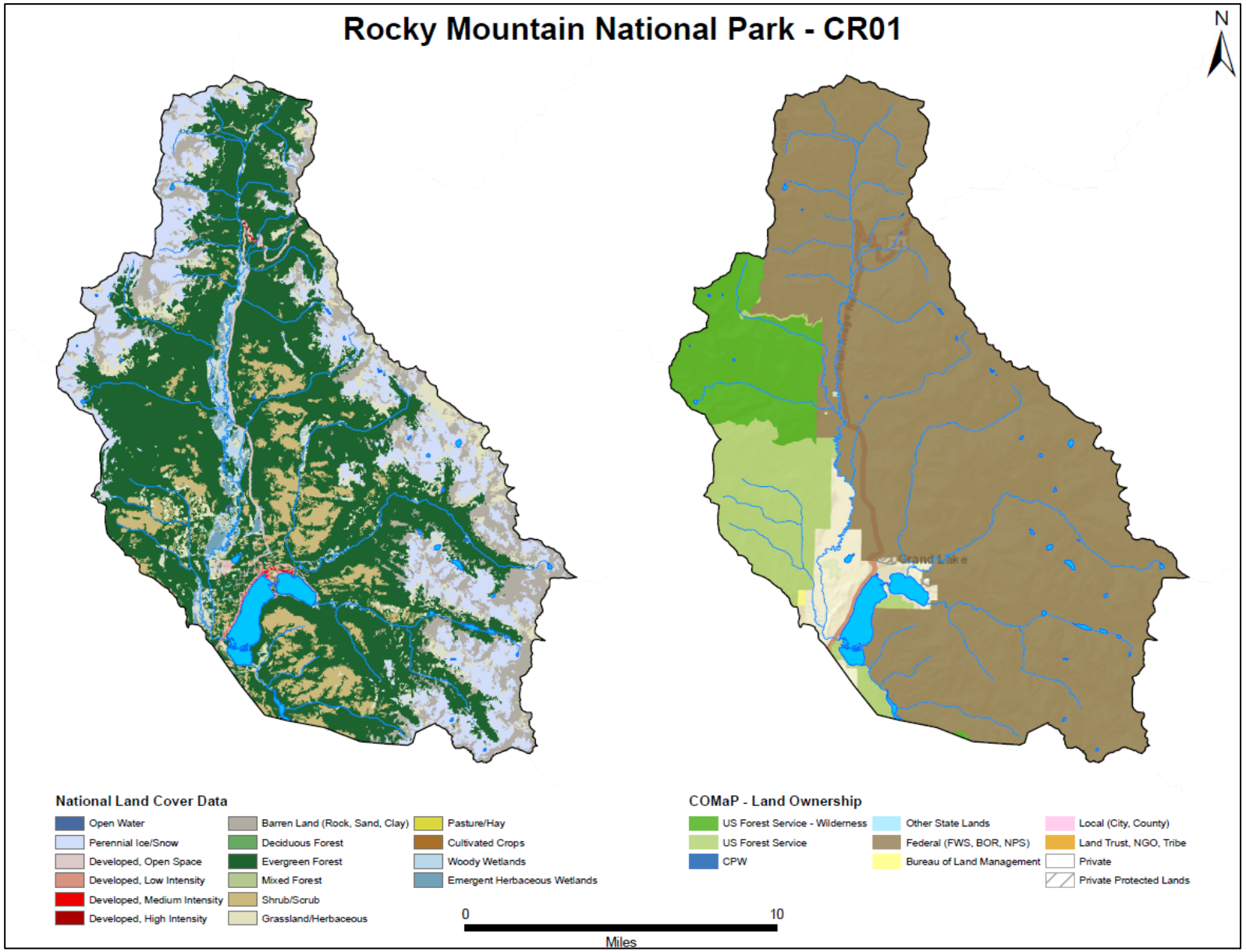

Figure 6. Land cover and ownership for the Rocky Mountain National Park FMU – CR01.

UPPER COLORADO RIVER BASIN
CR02 Granby Fish Management Unit

Overview

This 999.7 square mi FMU encompasses the upper Colorado River above Kremmling on the south side of the Colorado River and upstream from Troublesome Creek on the north (Figure 7). This unit includes 9,477.3 ac of standing water distributed among 55 lakes, and 822 mi of flowing water found in 177 streams. Major rivers include the Colorado, Williams Fork, and Fraser, while 94% of the lentic habitat is found in Granby Reservoir, Williams Fork Reservoir, Shadow Mountain Reservoir, Grand Lake, and Willow Creek Reservoir. Lake resources include waters in seven classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, and Wild Trout (Figure 8). Stream resources include waters in six classifications: Coldwater Sportfish Special Regulations, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, Wild Trout, and Wild Trout Special Regulations (Figure 8).

Twelve lakes (9066.8 ac) in the unit are managed intensively with stocked fish, and are dominated by the five reservoirs mentioned above. Six stream sections (44 mi) are stocked with whirling disease resistant hybrid Colorado River Rainbow Trout fingerlings to reestablish the historic rainbow fishery in the upper Colorado River that was impacted by heavy whirling disease infection. This once naturally reproducing feral population was established in the Colorado River in the 1940s and performs particularly well in regulated rivers around the state. The Colorado River from the confluence with the Fraser River to Troublesome Creek is recognized by the CPWC as a Gold Medal fishery.

With restrictions in stocking brought about by whirling disease, 36 high lakes (339 ac) went unstocked from 1994-2000 and were managed as wild trout fisheries by default. Most of

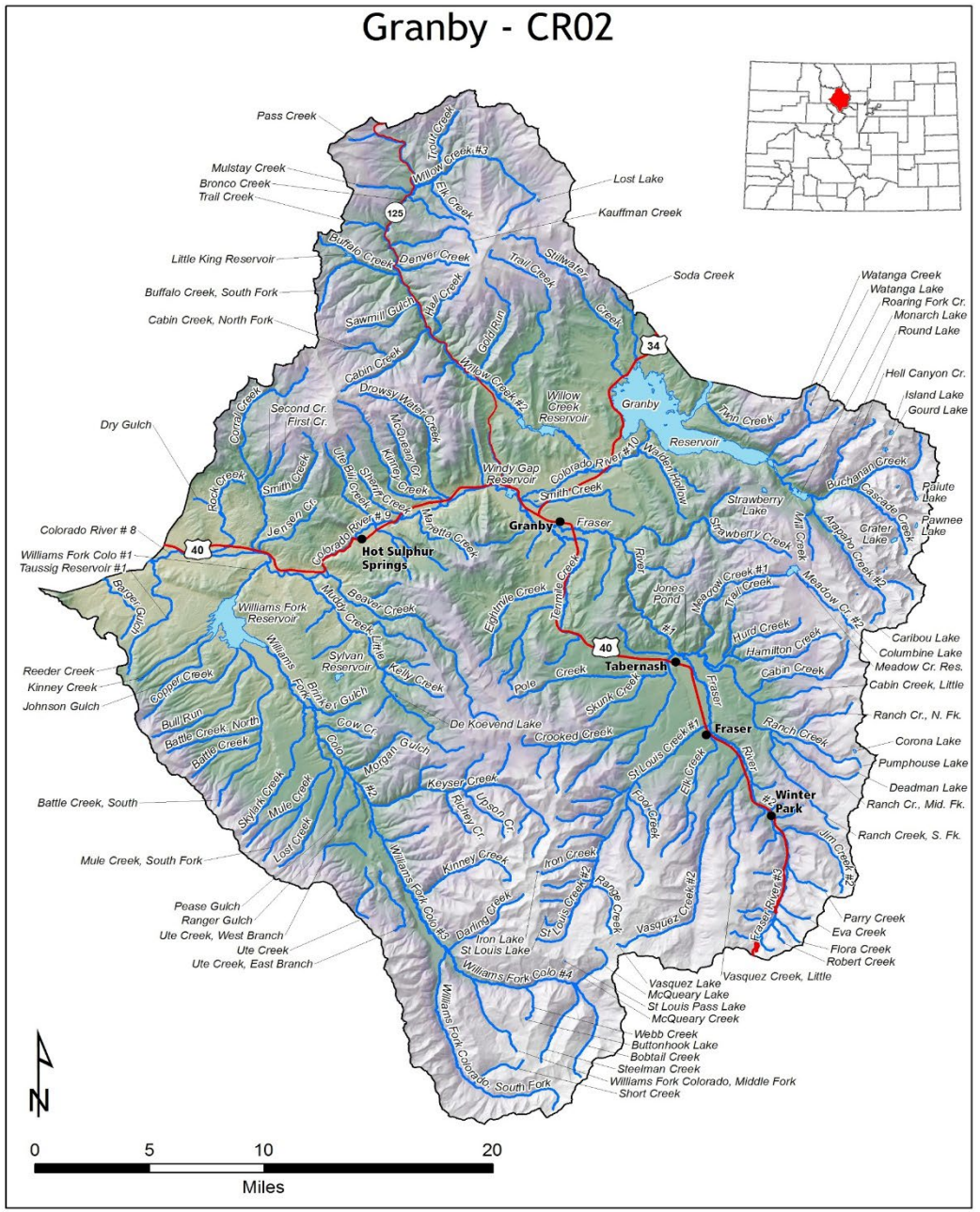

Figure 7. Map of the Granby FMU - CR02.

these waters have been returned to the Colorado River Cutthroat Trout fixed-wing stocking schedule. Those lakes that support natural recruitment will remain unstocked unless the population is eliminated by winter kill or some other calamity. In addition, 88 stream reaches (510 mi) are managed for wild trout, several of which (Arapahoe Creek, Baker Gulch, Buchanan Creek, McQueary Creek, Watanga Creek, and Wheeler Basin) contain Colorado River Cutthroat Trout.

Fourteen streams (68.1 mi) are managed for native Colorado River Cutthroat Trout recovery and conservation. Many streams contain competing Brook Trout, as well. Efforts to reduce competition by removing Brook Trout captured by repeated electrofishing sessions from Bobtail, Steelman, South Fork Ranch, and Trail creeks are in place and are being evaluated for effectiveness. This list will be expanded to include others if electrofishing removal techniques are deemed a viable approach for reducing competition.

Eight Boreal Toad populations near tributaries to the Fraser River and the upper Williams Fork River are actively monitored. However, only two populations are considered active breeding populations. Four populations have experienced population declines likely due to chytrid fungus (*Batrachochytrium dendrobatidis*). Efforts to improve breeding habitat for Boreal Toads in and around the Pole Creek drainage were completed in 2001.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (48.4%), aspen dominated deciduous forest (2.1%), grassland/herbaceous (8.8%), shrubland (25.5%), open water (1.5%), perennial ice/snow (4.6%), and woody wetlands (2.4%) (Figure 9). Land ownership includes the U.S. Forest Service (USFS) (50.8%), USFS Wilderness (10.5%), private (22.1%), U.S. Bureau of Land Management (BLM) (10.2%), National Park Service (NPS) (1%), State of Colorado (2.6%) and private conservation lands (1.7%) (Figure 9).

Recommended Management Strategies/Options

Sportfish Management

- See current CPW online fishery management reports for Granby, Shadow Mountain, Williams Fork, and Meadow Creek reservoirs, and the Colorado and Fraser rivers for updated management considerations and actions. Management reports are available at: https://cpw.state.co.us/thingstodo/Pages/FisherySurveySummaries.aspx
- Maintain intensive stocking with catchable Rainbow Trout in Williams Fork Reservoir, Granby Reservoir, Shadow Mountain Reservoir, Grand Lake, Willow Creek Reservoir, Fraser Kids Pond, Fraser Lions Club Pond, Granby City Pond, Breeze Pond, and Meadow Creek Reservoir. Evaluate the performance of these stocking efforts.
- Maintain optimum stocking with subcatchable trout in Williams Fork Reservoir, Granby Reservoir, Shadow Mountain Reservoir, Grand Lake, and Willow Creek Reservoir. Evaluate the performance of these stocking efforts.
- Maintain optimum stocking with Kokanee Salmon in Williams Fork Reservoir, Granby Reservoir, and Shadow Mountain Reservoir. Continue Kokanee Salmon spawning operations at Williams Fork and Granby reservoirs. Evaluate the Kokanee Salmon population in Williams Fork Reservoir with respect to the impact of gill lice.
- Manage Bobtail Creek, Cabin Creek, Cub Creek, Hamilton Creek, Jim Creek #2, Kelly Creek, Kinney Creek, McQueary Creek, Little Muddy Creek, North Fork of Ranch Creek, South Fork Ranch Creek, Middle Fork Ranch Creek, Roaring Fork Creek, Steelman Creek, Thunderbolt Creek, Little Vasquez Creek, and South Fork of Little Vasquez Creek, and Trail Creek for Colorado River Cutthroat Trout conservation.
- Continue surveys and genetic purity testing for Colorado River Cutthroat Trout populations.

- Continue to stock whirling disease-resistant Rainbow Trout fry or fingerlings as available in Colorado, Williams Fork and Fraser rivers in order to establish whirling disease-resistant genetics.
- There are multiple interagency cooperative management processes occurring in this GMU which are an outgrowth of mitigation and enhancement plans connected to proposed water project expansions. CPW is an active participant in all of these to date, including the Grand Lake Clarity NEPA process, Learning By Doing, the Upper Colorado River Headwaters Project, and the Grand County Stream Management Plan. Numerous documents associated with these efforts describe current monitoring and management strategies, and can be found on proponent websites.
- Extremely low river flows in dry years are presumed to have a detrimental effect in this FMU, including complete dewatering of several streams in the Williams Fork River Basin, very low flow releases from Williams Fork Reservoir, and downstream of Windy Gap Reservoir on the Colorado River.
- Evaluate opportunities for screening or modification of diversion structures throughout the FMU to enable fish passage and eliminate entrainment where possible.
- Explore options for increased angler access.

Native Species Management

- Evaluate and continue Brook Trout control methods in Bobtail, Steelman, South Fork Ranch creeks, and other Colorado River Cutthroat Trout recovery and conservation creeks, as necessary.
- Continue work with Denver Water and the USFS to permanently secure cutthroat trout populations in Bobtail and Steelman creeks. Pursue the opportunity to reclaim McQueary Lake and Creek and replicate Bobtail and Steelman creek cutthroat trout populations within that drainage.
- Explore options with land management agencies and other entities to install fish barriers to protect Colorado River Cutthroat Trout populations from nonnative trout invasions.
- Monitor the population status of nine known populations of Boreal Toads. Continue surveying efforts to locate additional populations and continue to monitor disease status of existing populations.

Nonnative Species Management

- There are no nonnative species management concerns in this FMU at this time.

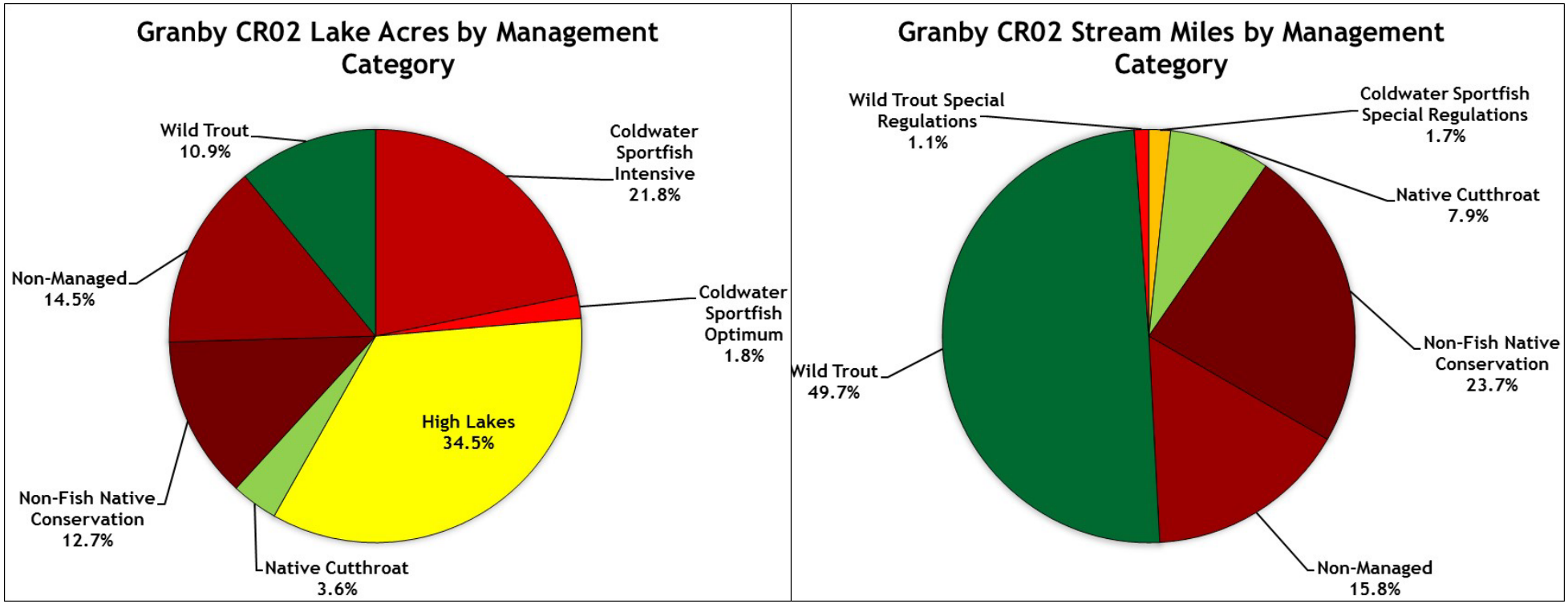

Figure 8. Summary of lake and stream classification statistics for the Granby FMU (CR02).

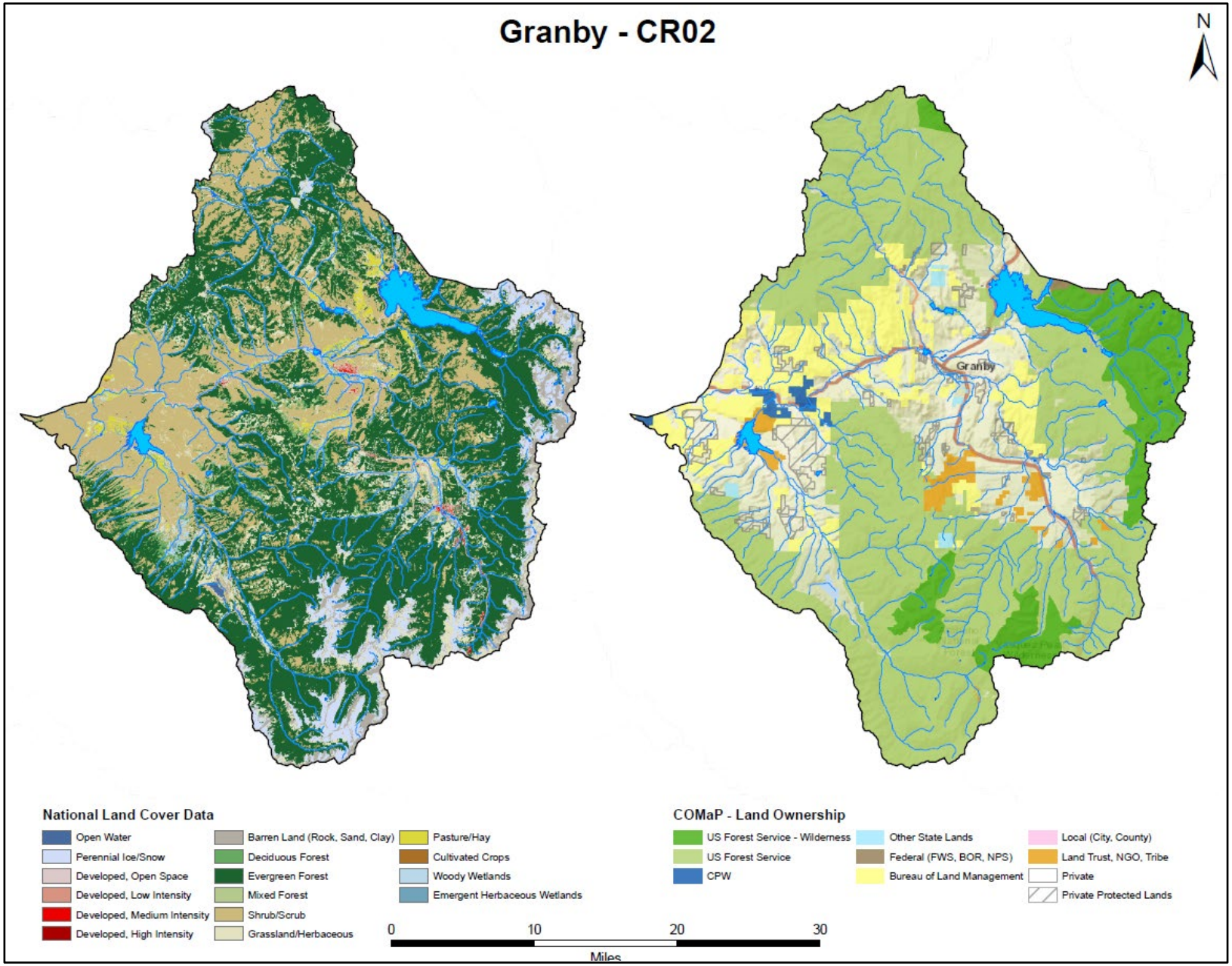

Figure 9. Land cover and ownership for the Granby FMU - CR02.

UPPER COLORADO RIVER BASIN
Blue River Fish Management Unit - CR03

Overview

This FMU includes the Blue River, which drains the Tenmile and Gore ranges to the west, and the Continental Divide and Williams Fork Mountains to the east (Figure 10). Flowing from Hoosier Pass south of Breckenridge north to Kremmling and the confluence with the Colorado River, this unit covers 685 square mi and contains all tributaries to the Blue River. It includes 103 lakes (6,409 ac) and 158 stream segments (582 mi). Prominent waters include Dillon Reservoir (3,000 ac) and Green Mountain Reservoir (2,125 ac), and the Blue River (52 mi) which is managed with special regulations to preserve wild trout. Lake resources include waters in six classifications: Coldwater Sportfish Intensive, High Lakes, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, and Wild Trout (Figure 11). Stream resources include waters in seven classifications: Coldwater Sportfish Special Regulations, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, Wild Trout, Coldwater Sportfish Intensive, and Coldwater Sportfish Optimum (Figure 11).

Eight lakes are managed intensively with stocked trout (5,433 ac) including Dillon and Green Mountain reservoirs. Nineteen lakes (142 ac) and 54 streams reaches (240 mi) are managed for wild trout. Many high lakes are stocked in every other year as fish are available. A small number of high lakes are surveyed annually and the stocking rates adjusted as needed. Some alpine lakes support natural reproduction and thus do not require stocking. Most of those lakes are managed as cutthroat trout conservation waters; eleven lakes and 12 streams are managed for native Colorado River Cutthroat Trout recovery and conservation in this fish management unit.

In 2016, CPW staff recommended that the Colorado Parks and Wildlife Commission (CPWC) remove Gold Medal designation on the Blue River from the town limits of

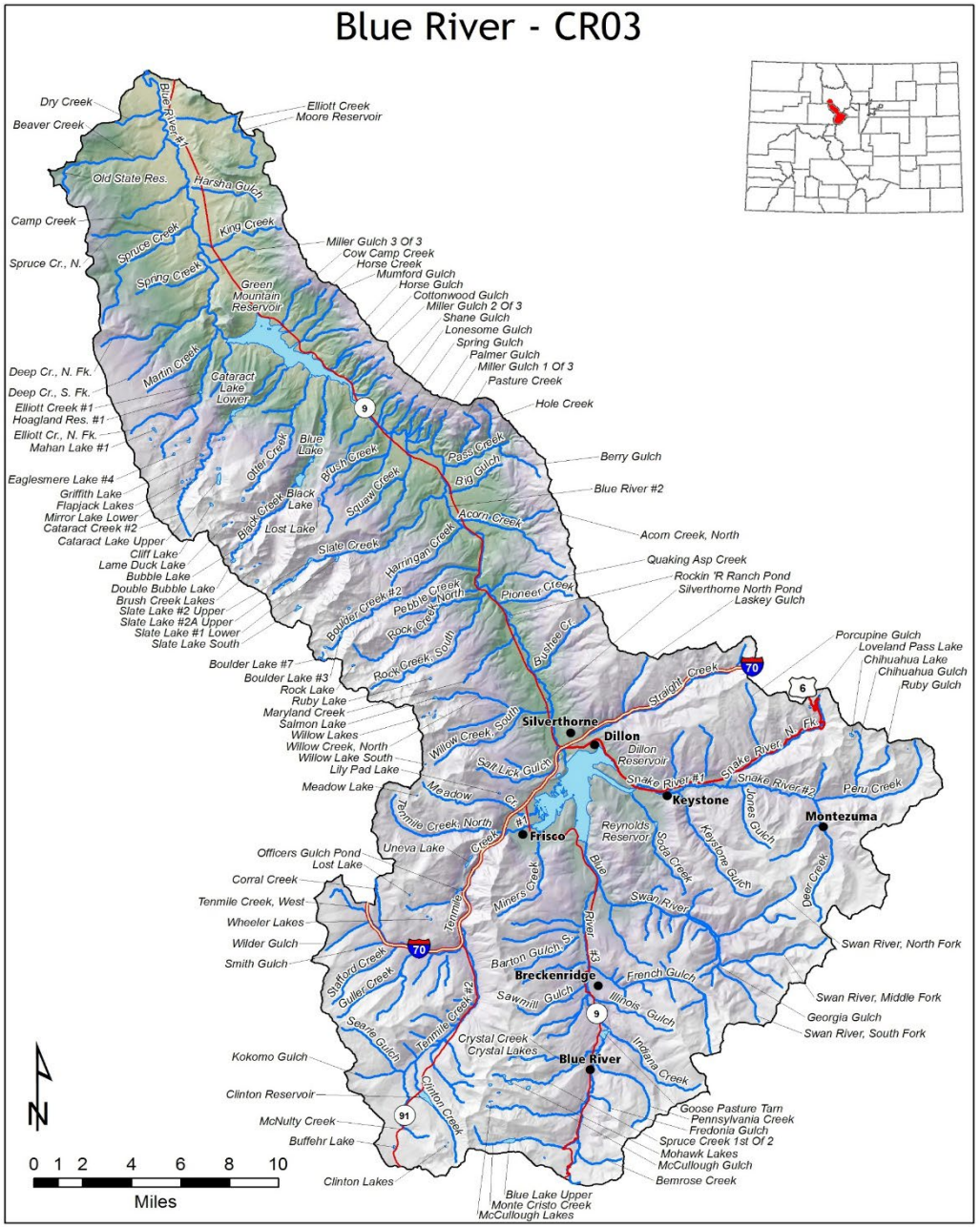

Figure 10. Map of the Blue River FMU - CR03.

Silverthorne downstream to Green Mountain Reservoir. Multiple population surveys repeated over several years and in different seasons all revealed that the trout population in that reach does not meet minimum Gold Medal criteria. The CPWC removed the designation and this action precipitated the formation of the Blue River Enhancement Workgroup (BREW), a collaborative partnership including personnel representing CPW, USFS, Summit County, Town of Silverthorne, fly shop owners, landowners, and other interested parties. The goal of BREW is to identify as precisely as possible limiting factors of this fishery and design strategies to address those factors. The Blue River from Dillon Reservoir dam to Hamilton Creek road bridge, and from the Green Mountain Reservoir dam to the confluence with the Colorado River remain Gold Medal waters as designated by the CPWC.

Nine Boreal Toad breeding sites are known within this management unit. Six of these sites are regularly monitored by CPW or USFS personnel. The remaining three have been inactive for more than three years and are monitored intermittently. Boreal Toads in the Straight Creek drainage routinely breed in sediment retention ponds created by the Colorado Department of Transportation (CDOT) to entrap road sand from I-70. At the request of CDOT, CPW developed a list of Best Management Practices (BMP) for managing the sediment retention ponds to minimize disturbance to the Boreal Toad population in the Straight Creek drainage. The BMPs include consultation with CPW prior to maintenance, identifying acceptable time periods for retention pond maintenance, and describing appropriate disinfection of maintenance equipment.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (42%), aspen dominated deciduous forest (4.3%), grassland/herbaceous (18%), shrubland (14%), open water (1%), perennial ice/snow (4%), woody wetlands (2%), and barren land (10%) (Figure 12). Land ownership includes the U.S. Forest Service (USFS) (50%), USFS Wilderness (22%), private (21%), U.S. Bureau of Land Management (BLM) (2.7%), and private conservation lands (2.8%) (Figure 12).

Recommended Management Strategies/Options

Sportfish Management

- See current CPW online fishery management reports for Dillon Reservoir, Blue River, and Green Mountain Reservoir for updated management considerations and actions. Management reports are available at https://cpw.state.co.us/thingstodo/Pages/FisherySurveySummaries.aspx
- Maintain intensive stocking of catchable Rainbow Trout in Breckenridge Reservoir, Copper Mountain Pond, Dillon Reservoir, Trent Pond, and Walmart Pond.
- Historical stocking of Arctic Char in Dillon Reservoir has created a significant naturally reproducing population of fish capable of feeding on *Mysis diluviana*. Combined with the stocking of subcatchable Rainbow Trout, this management strategy could exploit the mysid population and have a significant and beneficial effect on the ability of Dillon Reservoir to support a salmonid recreational fishery. The effects and success of this management strategy are being evaluated and adjusted to achieve the best outcome for the recreational salmonid fishery. In the meantime, continue with optimum stocking of subcatchable Rainbow Trout.
- Explore options for increased angler access.
- Monitor Gold Medal status of Blue River.
- Evaluate intensive stocking of Rainbow Trout in Dillon Reservoir and in the Blue River upstream of Green Mountain Reservoir.
- Continue to cultivate partnerships and explore opportunities to increase and improve watershed health and sportfish habitat.

Native Species Management

- Search for and pursue opportunities for native cutthroat trout reintroduction.
- Manage Clinton Reservoir for Colorado River Cutthroat Trout conservation.
- Continue surveys and genetic purity testing for Colorado River Cutthroat Trout populations, as possible.
- An agreement was finalized in April of 2018 between CPW and the Blue Valley Ranch (BVR) to attempt the building of a cutthroat trout brood stock of cutthroats native to the Blue River watershed in Old State Reservoir, an isolated impoundment on BVR. In cooperation with BVR, CPW plans to replicate one of the genetically pure cutthroat populations within the Blue River watershed in Old State Reservoir in order to serve as a conservation refuge and potential brood stock for future reintroduction projects. Development of this brood stock will be instrumental in future watershed cutthroat conservation efforts.
- Evaluate fisheries in Martin, Elliot, Deep, and Spruce creeks.
- Manage Clinton Creek, Corral Creek, French Creek, Meadow Creek, Spruce Creek, Laskey Gulch, Frey Gulch, and the North Fork of the Swan River for Colorado River Cutthroat Trout conservation.
- Monitor the status of known Boreal Toad populations and continue surveys to identify new populations.
- Continue coordination with CDOT on Straight Creek retention pond maintenance to minimize disturbance to Boreal Toads.
- Coordination with the USFS regarding ski area expansions and operations should continue to protect Boreal Toad populations and minimize disturbances near Arapahoe Basin, Keystone and Breckenridge ski resorts.

Water Quality Concerns

- The impacts of extensive unreclaimed mining effluents in the Blue River headwaters are restricting reproduction, survival and growth of fish populations in certain watersheds. Participate in work groups such as the Snake River Task Force and Blue River Watershed Group that are pursuing water quality improvement projects.
- Assess influence of recently altered and reduced flow regimes from Dillon Reservoir on downstream fish populations, as well as diversions from the Goose Pasture Tarn by the town of Breckenridge.
- Although Straight Creek water is entirely appropriated, mechanisms to ensure that water continues to flow should be explored as it supports both a fishery and a Boreal Toad breeding population. Coordination with CDOT should continue to allow for sand retention ponds to be properly maintained while minimizing disturbance to Boreal Toads.

Nonnative Species Management

- Routine sampling efforts discovered an illegal introduction of Northern Pike in Green Mountain Reservoir in 2012. An angler harvest incentive was put into effect in 2016, providing funding to be paid to anglers presenting harvested Green Mountain northern pike to the Heeney Marina. This incentive has resulted in the harvest of more than 100 northern pike and has proved to be an effective method of removing nonnative fish.

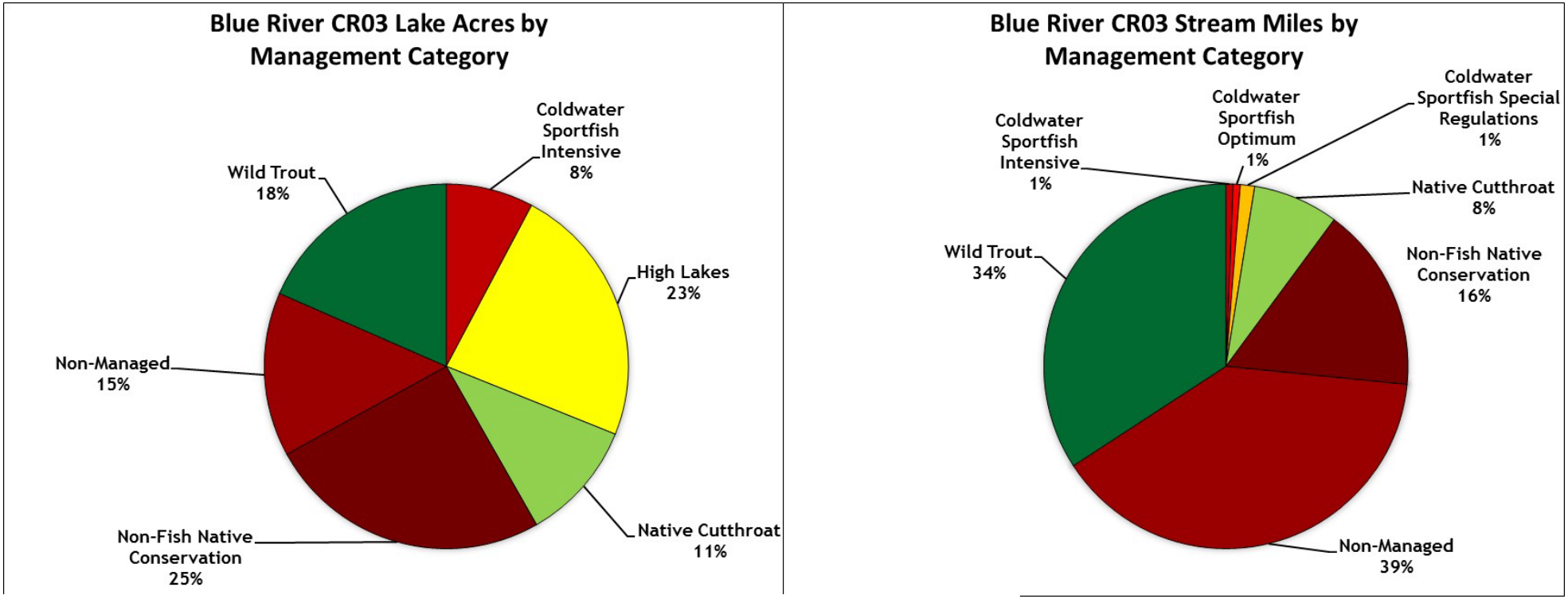

Figure 11. Summary of lake and stream classification statistics for the Blue River FMU - CR03.

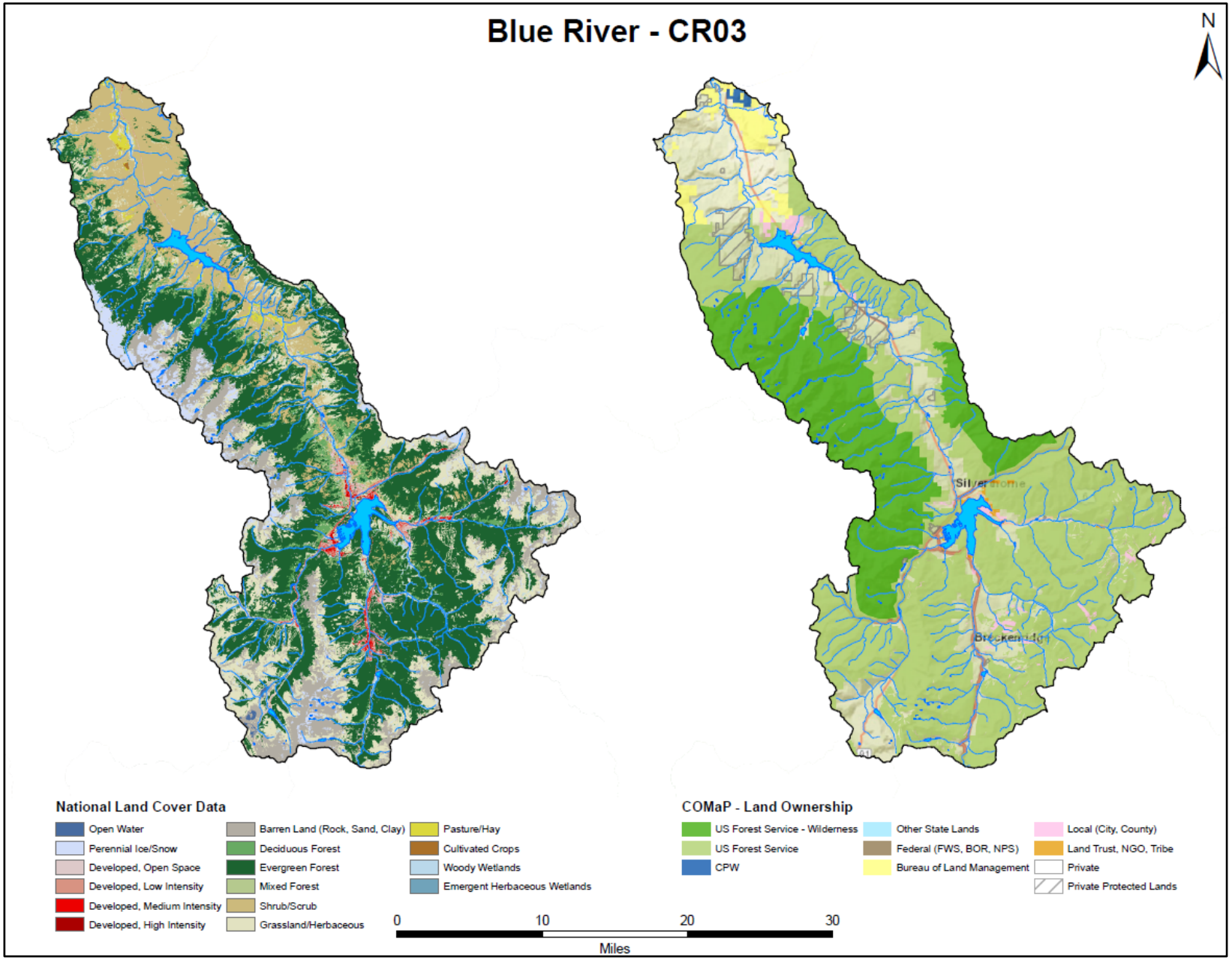

Figure 12. Land cover and ownership for the Blue River FMU - CR03.

Upper Colorado River Basin

Water Quality Concerns

- The impacts of extensive unreclaimed mining effluents in the Blue River headwaters are restricting reproduction, survival and growth of fish populations in certain watersheds. Participate in work groups such as the Snake River Task Force and Blue River Watershed Group that are pursuing water quality improvement projects.
- Assess influence of recently altered and reduced flow regimes from Dillon Reservoir on downstream fish populations, as well as diversions from the Goose Pasture Tarn by the town of Breckenridge.
- Although Straight Creek water is entirely appropriated, mechanisms to ensure that water continues to flow should be explored as it supports both a fishery and a Boreal Toad breeding population. Coordination with CDOT should continue to allow for sand retention ponds to be properly maintained while minimizing disturbance to Boreal Toads.

Nonnative Species Management

- Routine sampling efforts discovered an illegal introduction of Northern Pike in Green Mountain Reservoir in 2012. An angler harvest incentive was put into effect in 2016, providing funding to be paid to anglers presenting harvested Green Mountain northern pike to the Heeney Marina. This incentive has resulted in the harvest of more than 100 northern pike and has proved to be an effective method of removing nonnative fish.

Mike Porras
CPW NW Region PIO
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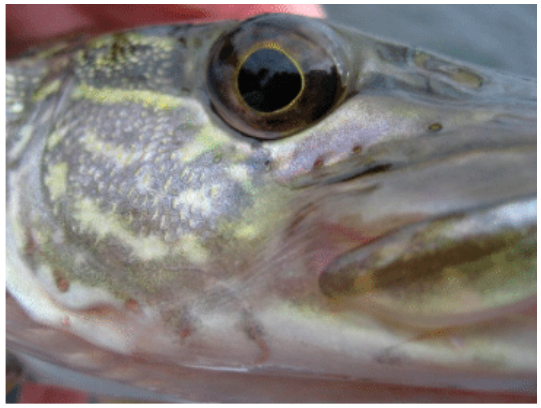


Twenty dollar reward for each northern pike caught at Green Mountain Reservoir

UPPER COLORADO RIVER BASIN
Kremmling Fish Management Unit - CR04

Overview

This FMU encompasses the Colorado River and its tributaries from State Bridge upstream to Troublesome Creek above Kremmling, encompassing an area of 778 square mi (Figure 13). Major drainages that feed the mainstem Colorado River include Troublesome Creek, Muddy Creek, the Blue River (a separate FMU), Sheephorn Creek, and Blacktail Creek. This unit contains 42 lakes (2,263 ac) and 126 stream segments (609 mi). Only three major lakes (Dumont Lake, Red Dirt Reservoir, and Wolford Mountain Reservoir) occur in this FMU, and all are managed intensively with stocked trout (1,545 ac). The Colorado River from Gore Canyon (Canyon Creek) downstream to Rock Creek (FMU CR05) was designated Gold Medal water in 2016 by the CPWC, and supports a popular float fishery with a large amount of commercial use. Lake resources include waters in six classifications: Coldwater Sportfish Optimum, High Lakes, Non-Fish Native Conservation, Non-Managed, Wild Trout, and Coldwater Sportfish Intensive (Figure 14). Stream resources include waters in seven classifications: Coldwater Sportfish Special Regulations, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, Wild Trout, Wild Trout Special Regulations, and Coldwater Sportfish Optimum (Figure 14).

Twelve lakes in the unit are managed for wild trout (79 ac), as are 65 stream reaches (389 mi). Currently, no lakes are managed for native Colorado River Cutthroat Trout conservation. Eight streams are managed for native trout. Some of the streams being managed for wild trout show historic records of Colorado River Cutthroat Trout (East Fork of Troublesome Creek and Diamond Creek), and will be evaluated as potential recovery waters. Fifteen lakes are not managed because they are private or do not over-winter fish. Twenty-six streams are not managed, although 38 streams flow perennially.

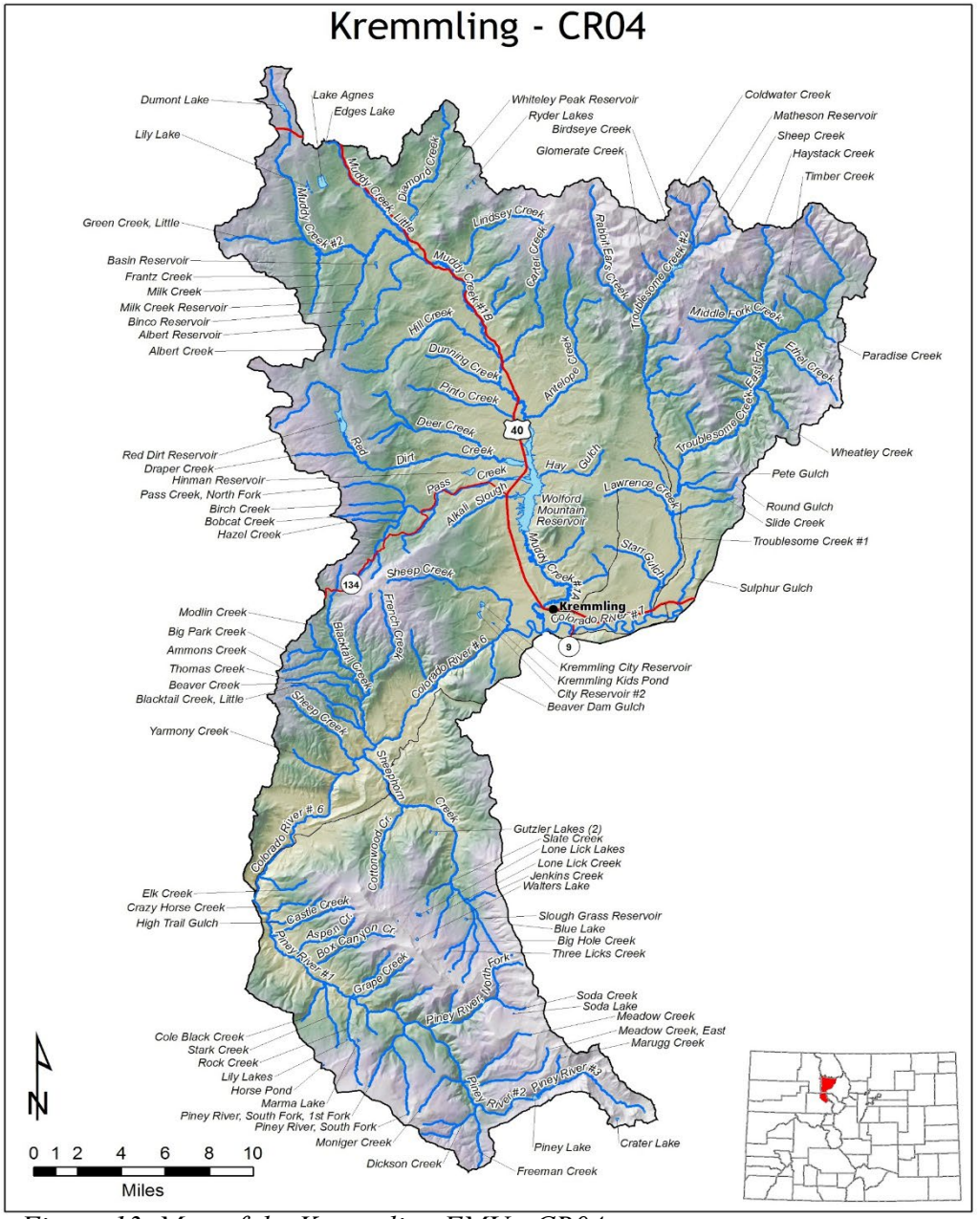


Figure 13. Map of the Kremmling FMU - CR04.

One Boreal Toad population is known in this management unit.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (36%), aspen dominated deciduous forest (9%), grassland/herbaceous (10%), shrubland (36%), and woody wetlands (2%) (Figure 15). Land ownership includes the U.S. Forest Service (USFS) (39%), USFS Wilderness (6%), private (24%), U.S. Bureau of Land Management (BLM) (17%), and State of Colorado (10%) (Figure 15).

Recommended Management Strategies/Options

Sportfish Management

- See current CPW online fishery management reports for Wolford Mountain Reservoir, the Colorado River Near Radium, and Red Dirt Reservoir for updated management considerations and actions. Management reports are available at: https://cpw.state.co.us/thingstodo/Pages/FisherySurveySummaries.aspx
- Dumont Lake, near the East Summit of Rabbit Ears Pass, is a put-and-take fishery managed with annual plants of catchable Rainbow Trout. CPW conducted a pre-stocking gillnet survey of the lake in 2011 and found no overwinter survival of the Rainbow Trout stocked in 2010. However, 2010-11 was a particularly heavy winter and overwinter fish survival may be possible there in milder years. Regardless, the lake will still be managed with catchable rainbows.
- Red Dirt Reservoir is a highly productive irrigation reservoir with a robust population of Fathead Minnow and a self-sustaining Brook Trout population which can produce fish in excess of 12". CPW gillnet surveys were conducted in 2011, 2015 and 2018. Whirling disease resistant x Harrison Lake Rainbow Trout fingerlings were stocked there for the first time in 2013. The 2015 and 2018 gillnet surveys revealed excellent growth and survival of these fingerling plants. Based on this information, the stocking of catchable Rainbow Trout was discontinued, and from 2014 onward, only 3" fingerling Rainbow Trout have been stocked. The Silver Creek fire of 2018 burned the immediate area of Red Dirt Reservoir and much of the watershed flowing into it; at the time of this plan, it is not known what effect this will have on the fishery there.
- Muddy Creek downstream from Wolford Reservoir is a highly unique fishery for the FMU. CPW electrofishing surveys in 2009, 2011, and 2012 revealed a Brown Trout fishery that is sparse but of high average size, as well as a productive Rainbow Trout fishery. Whirling disease resistant x Colorado River Rainbow Trout fingerlings were stocked from 2010 to 2015 to attempt to establish a self-sustaining population of whirling disease resistant rainbows. Bluehead Suckers have been collected here, as well as White Sucker x Flannelmouth Sucker hybrids.
- Evaluate fish habitat improvement options on Muddy Creek downstream of Wolford Mountain Reservoir.
- Explore options for increased angler access.
- Continue to cultivate partnerships and explore opportunities to increase and improve watershed health and sportfish habitat.

Native Species Management

- Manage Antelope Creek, Big Hole Creek, Carter Creek, Little Green Creek, North Fork of Little Green Creek, East Meadow Creek, Cottonwood Creek, and Three Licks Creek for cutthroat trout conservation.
- Explore opportunities for cutthroat trout expansion/reintroduction in the Sheephorn Creek watershed.

- Continue surveys and genetic purity testing for Colorado River Cutthroat Trout populations.
- Evaluate Colorado River Cutthroat Trout populations in Antelope, Troublesome and Carter creeks.
- Determine distribution of Roundtail Chub, Flannelmouth Sucker and Bluehead Sucker in the mainstem Colorado River and tributaries.
- Continue monitoring the Boreal Toad population in the Piney River drainage. Survey additional areas for new populations.

Nonnative Species Management

- Hybridization of native Bluehead and Flannelmouth suckers with nonnative suckers (White and Longnose) is a growing concern. An illegal introduction of Northern Pike occurred in Wolford Mountain Reservoir and CPW has worked to control their proliferation there. Illicit introduction of nonnative species is a recognized peril that continues to persist despite heavy advertisement of penalties for illegal fish movement. Invasion of predatory nonnative fish into native and sportfish habitat confounds management objectives and instigates expensive remediation projects. The Colorado River Water Conservation District (owner of Wolford Mountain Reservoir) voluntarily operates an angler award program incentivizing the removal of northern pike from Wolford Mountain Reservoir, which has proved to be very popular with anglers. When encountered, remove illicitly introduced nonnative predators and isolate any occupied habitat if removal is unsuccessful.


Bluehead sucker


Flannelmouth sucker

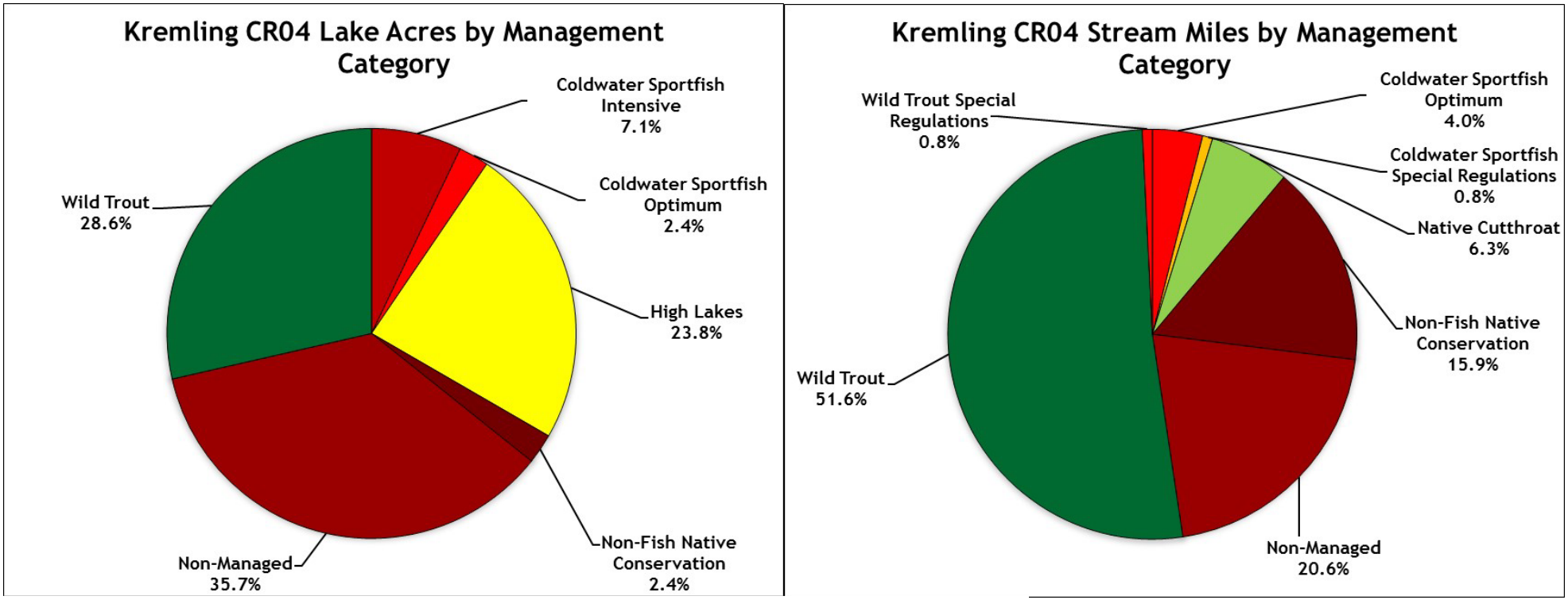


Figure 14. Summary of lake and stream classification statistics for the Kremmling FMU - CR04.

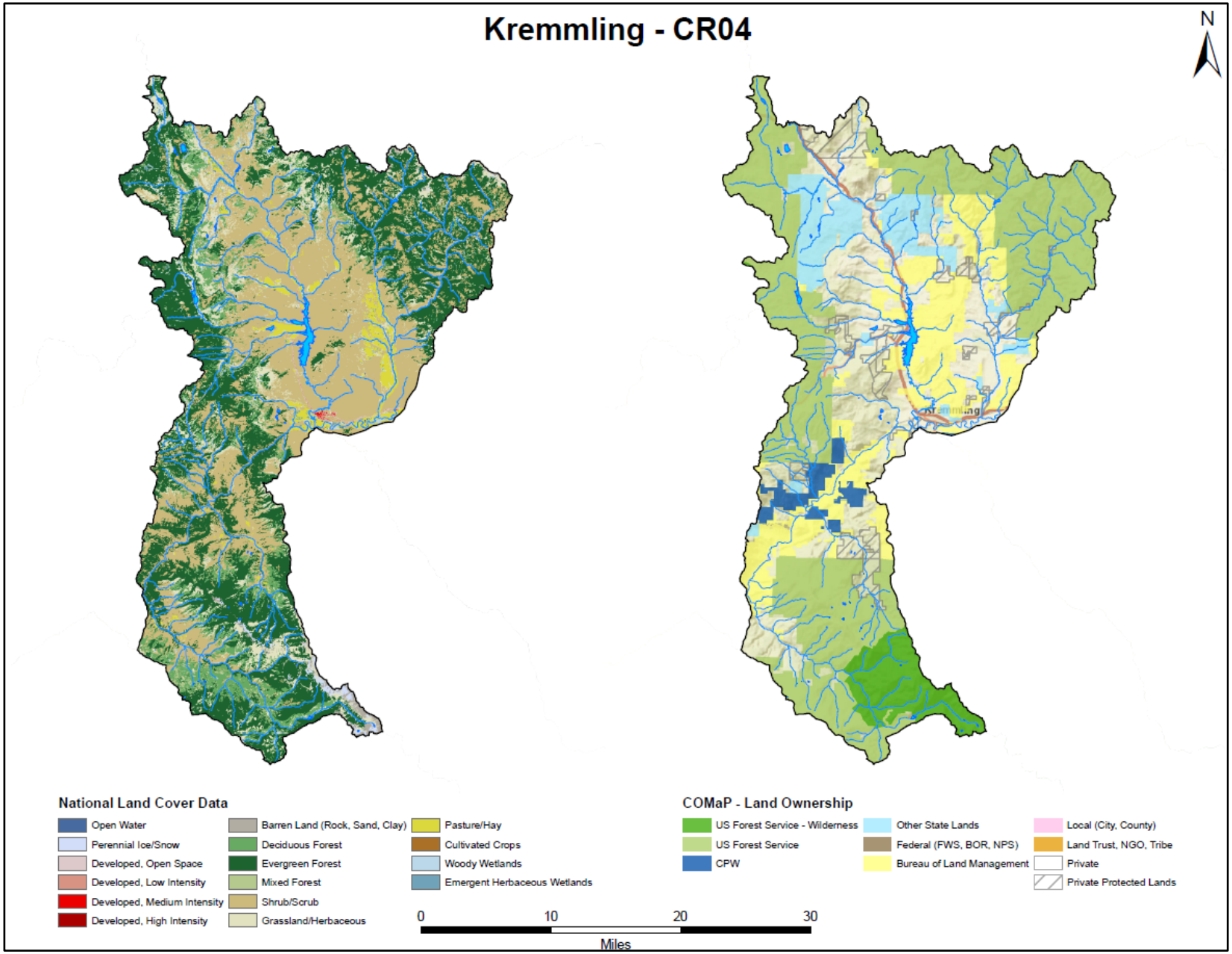


Figure 15. Land cover and ownership for the Kremmling FMU - CR04.

MIDDLE COLORADO RIVER BASIN ANALYSIS UNIT SUMMARY

Fish Management Units
Castle Peak - CR05
Eagle River - CR06
Fryingpan River - CR07
Roaring Fork River - CR08
Crystal River - CR09

The Middle Colorado River Basin Analysis Unit (AU) encompasses 3,358 square mi in the upper Colorado River Basin with the majority of the waters found in this unit representing coldwater lake and stream habitats in headwater drainages. The lower elevation streams begin to transition in temperature, gradient, and water quality as they flow westward towards the Colorado/Utah state line. There are no waters categorized as warmwater fisheries in this AU. To organize waters within the upper basin for this planning effort, the entire geographical area has been separated into the five Fish Management Units (FMUs), which subdivide the area based on hydrological characteristics. Waters within each FMU are further partitioned into CPW statewide water management categories. The five FMUs in the upper basin are Castle Peak - CR05 (931.4 sq mi); Eagle River - CR06 (972.1 sq mi); Fryingpan River - CR07 (289.5 sq mi); Roaring Fork River - CR08 (802.7 sq mi); and Crystal River - CR09 (362.2 sq mi).

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (33.2%), aspen dominated deciduous forest (21.4%), grassland/herbaceous (14.2%), agriculture (1.7%), shrubland (18.4%), and mixed forest (1.9%). Land ownership includes the U.S. Forest Service (USFS) (38.4%), USFS Wilderness (22.5%), private (19.7%), local government (0.4%), State of Colorado (0.5%), U.S. Bureau of Land Management (BLM) (15.6%), and private conservation lands (2.3%). Other non-governmental organizations, and additional Federal and State owned lands comprise 0.6% of land ownership in this AU.

Approximately 61% of the Middle Colorado River Basin AU is owned by the USFS (23% wilderness, 38% other USFS land). Recreational use allowed includes fishing, hunting, camping, cross-country skiing, backcountry skiing, mountain biking and hiking; USFS lands are also managed to support livestock grazing, logging activities, gas and oil exploration, as well as other specialized uses.

This unit contains 376 lakes and reservoirs totaling 5,033.1 ac, and 575 stream segments totaling 2,642.1 mi. Standing water resources include waters in six classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Managed and Wild Trout (Figure 16). Stream resources include waters in six classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, and Wild Trout (Figure 16).

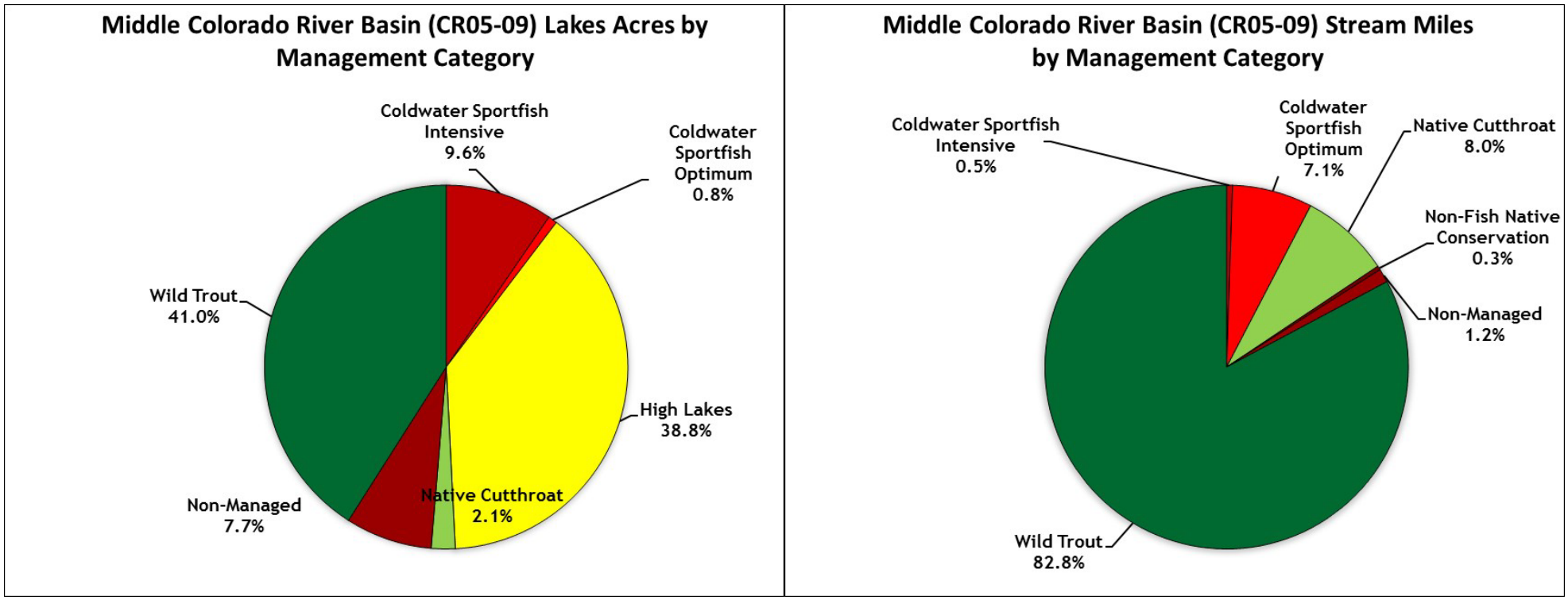


Figure 16. Summary of lake and stream classification statistics for the five FMUs that comprise the Middle Colorado River Basin based on acres/miles.

MIDDLE COLORADO RIVER BASIN
Castle Peak Fish Management Unit - CR05

Overview

This FMU includes the Colorado River and its tributaries from the confluence with Canyon Creek upstream to and including the Piney River and the southern Flat Tops, but does not include the Eagle or Roaring Fork watersheds (Figure 17). This unit contains 86 lakes and reservoirs totaling 1,136.4 ac, and 124 stream segments totaling 687.4 mi. Standing water resources include waters in five classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Non-Managed, and Wild Trout (Figure 18). Stream resources include waters in six classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, and Wild Trout (Figure 18).

Two distinctly different stream habitats are found in this FMU: the Colorado River mainstem and its tributaries that provide varying water quality contributions. In low gradient river reaches, waters move slowly and can warm significantly; these reaches often contain native suckers and Roundtail Chub, and act as a nursery for juvenile Mountain Whitefish and trout. These river reaches provide the previously mentioned species habitat to feed and grow with reduced predation by less abundant adult trout. Throughout the FMU, the mainstem Colorado River can experience significant seasonal sediment loading during snowmelt or summer monsoonal rain events that mobilize upland sediment into rivers and streams. Some rain events flush mountain sides and have caused fish kills in miles of river. Many of the Flat Tops tributaries are limestone streams with significant groundwater interchange and temperature moderation, providing good to excellent water quality. These limestone streams provide important spawning and rearing habitat for Colorado River salmonid populations. The Glenwood area tributaries are protected by closures to fishing in their lower ½ mile reaches to protect large adult trout and Mountain Whitefish susceptible to angler harvest during spring and fall spawning. Upstream of fish passage barriers that prevent invasion to non-native trout, some streams continue to support native Colorado River Cutthroat Trout. Mountain Whitefish, Brown, Rainbow, and Brook Trout

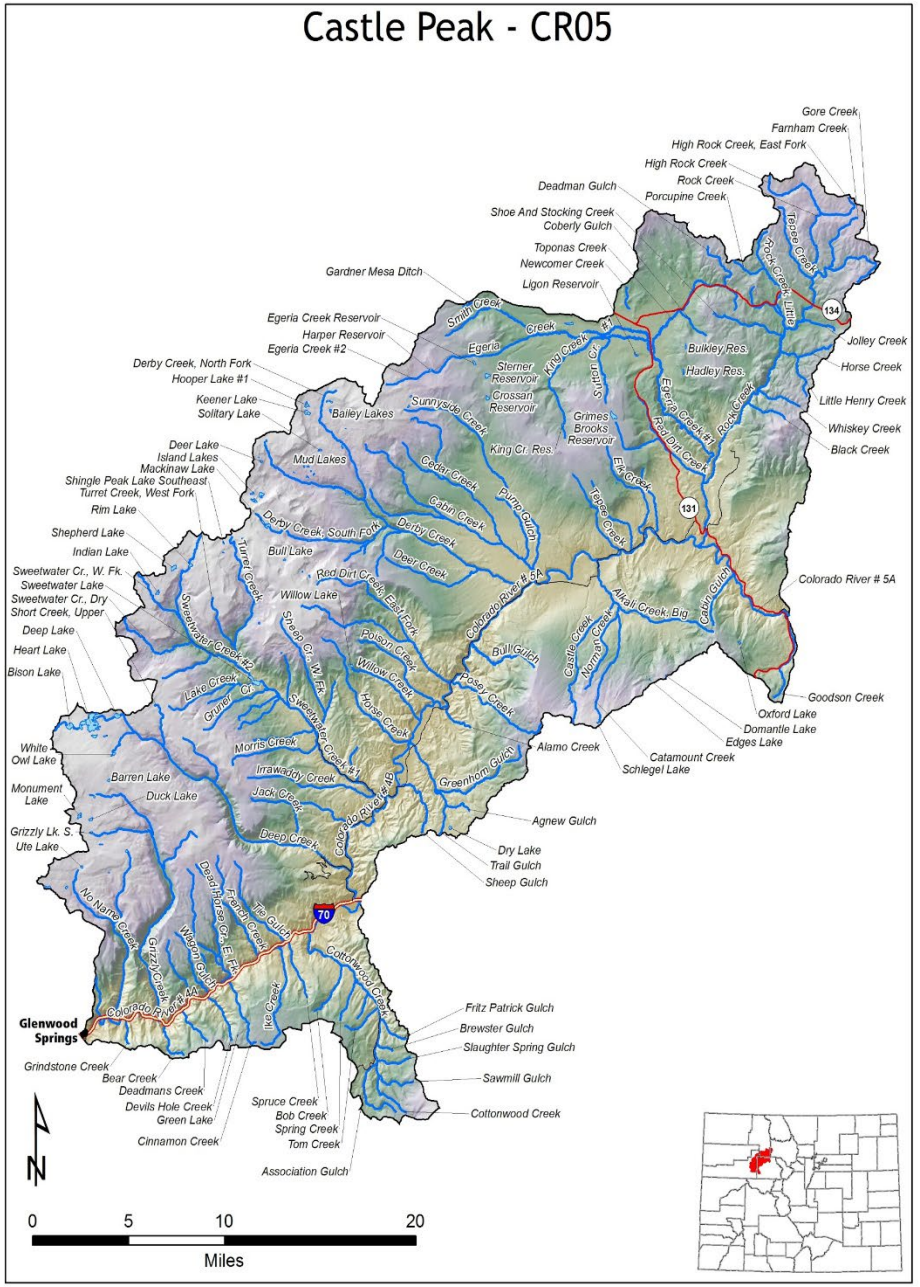


Figure 17. Map of the Castle Peak FMU - CR05

are the common species in streams and rivers in this FMU. The Colorado River is also whirling disease positive and, along with high sediment loads, Rainbow Trout reproduction and recruitment is limited in the mainstem and its tributaries. Whirling disease resistant rainbow trout are utilized to increase recruitment success of feral produced rainbows in the river. The upper most portion of the Colorado River in this FMU to the confluence with Rock Creek is designated by the CPWC as a Gold Medal fishery.

Forty-four lakes in this FMU are managed for wild trout populations and not normally stocked. Twenty-five high lakes provide walk-in fishing for trout and may be stocked. Most of the numerous lakes on the Flat Tops winterkill at unpredictable intervals. Periodic stocking of the waters less prone to winterkill is essential and with this stocking provide excellent angling opportunities. Many of the Flat Top lakes are only accessible by high clearance vehicles and provide a uniquely remote angling experience. One lake offers drive-to fishing where subcatchable-sized trout are stocked to provide a fish population where trout exploit the natural productivity of the water to grow to a catchable size. There are six lakes that offer drive-to fishing where a combination of subcatchable and catchable trout are stocked, and ten lakes are in the non-managed category. Notably, the former Colorado state record lake trout came from Deep Lake.

No known Boreal Toad populations exist in this unit although records indicate possible historic occupation in the Flat Tops region. Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (30%), aspen dominated deciduous forest (18%), grassland/herbaceous (17%), shrubland (28%), woody wetlands (1%), and mixed forest (2%) (Figure 19). Land ownership includes the U.S. Forest Service (USFS) (36%), USFS Wilderness (8%), private (21%), U.S. Bureau of Land Management (BLM) (30%), and private conservation lands (4%) (Figure 19).

Recommended Management Strategies/Options

Sportfish Management

- Monitor fishing pressure, and identify areas of increased and high fishing pressure.
- Maintain angler access and explore options to increase access.
- Stock only whirling disease negative trout.
- Stock catchable trout in Deep, Heart, and Sweetwater lakes, and Supply Basin Reservoir #1.
- Stock tiger trout in Heart Lake to provide angling opportunities for unique, alternative species.
- Stock recreational cutthroat trout into high elevation lakes that fail to support native conservation populations, but can regularly overwinter fish.
- Continually evaluate proposed instream projects for natural channel functionality, and encourage repairing old and noncompliant structures that do not conform to these standards. Discourage instream projects that do not support fish passage of all resident species and life stages or degrade existing fish habitat.
- Work with stakeholder groups that can provide water and other resources to support fish habitat, including monitoring diversion operations at Shoshone Hydroelectric Plant, supporting calls and use for the full water right and any challenges that may impact flows downstream of the outlet of the hydropower plant, especially in the winter.

Native Species Management

- Assess genetic purity of cutthroat trout populations as needed.
- Manage all cutthroat conservation waters (15 streams) to protect those populations, as necessary.
- Stock Flat Tops lakes by fixed-wing aircraft with fingerling Colorado River Cutthroat Trout.
- Identify tributaries that support Colorado River native species life histories.
- Describe the distribution of Roundtail Chub, Flannelmouth Sucker, and Bluehead Sucker populations in the mainstem Colorado River and tributaries.
- Continue surveys in the Flat Tops to look for Boreal Toad breeding sites. Evaluate habitat for potential reintroduction of Boreal Toads.

Nonnative Species Management

- Hybridization of native Bluehead and Flannelmouth suckers with nonnative suckers (White and Longnose) is a growing concern. Illicit introduction of nonnative species is a recognized peril that continues to persist despite heavy advertisement of penalties for illegal fish movement. Invasion of predatory nonnative fish into native and sportfish habitat confounds management objectives and sometimes instigates expensive remediation projects. When encountered, remove illicitly introduced nonnative predators and isolate any occupied habitat if removal is unsuccessful.

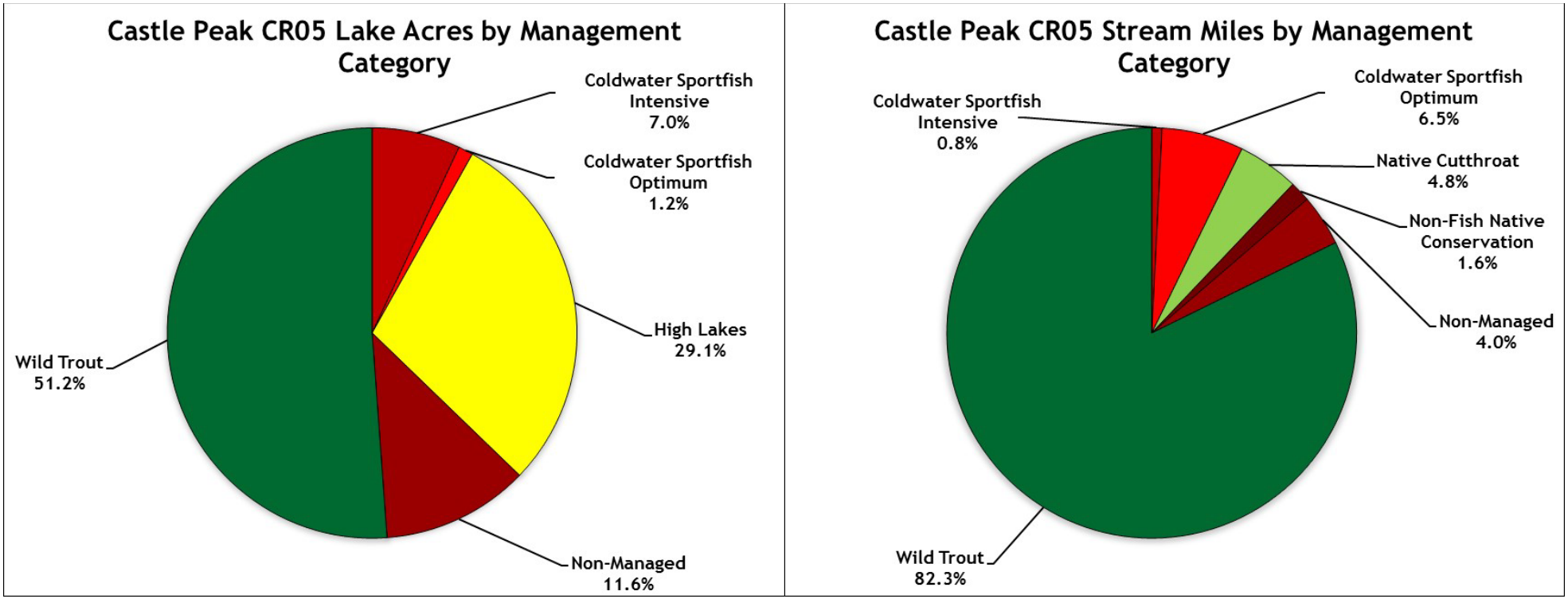


Figure 18. Summary of lake and stream classification statistics for the Castle Peak FMU - CR05.

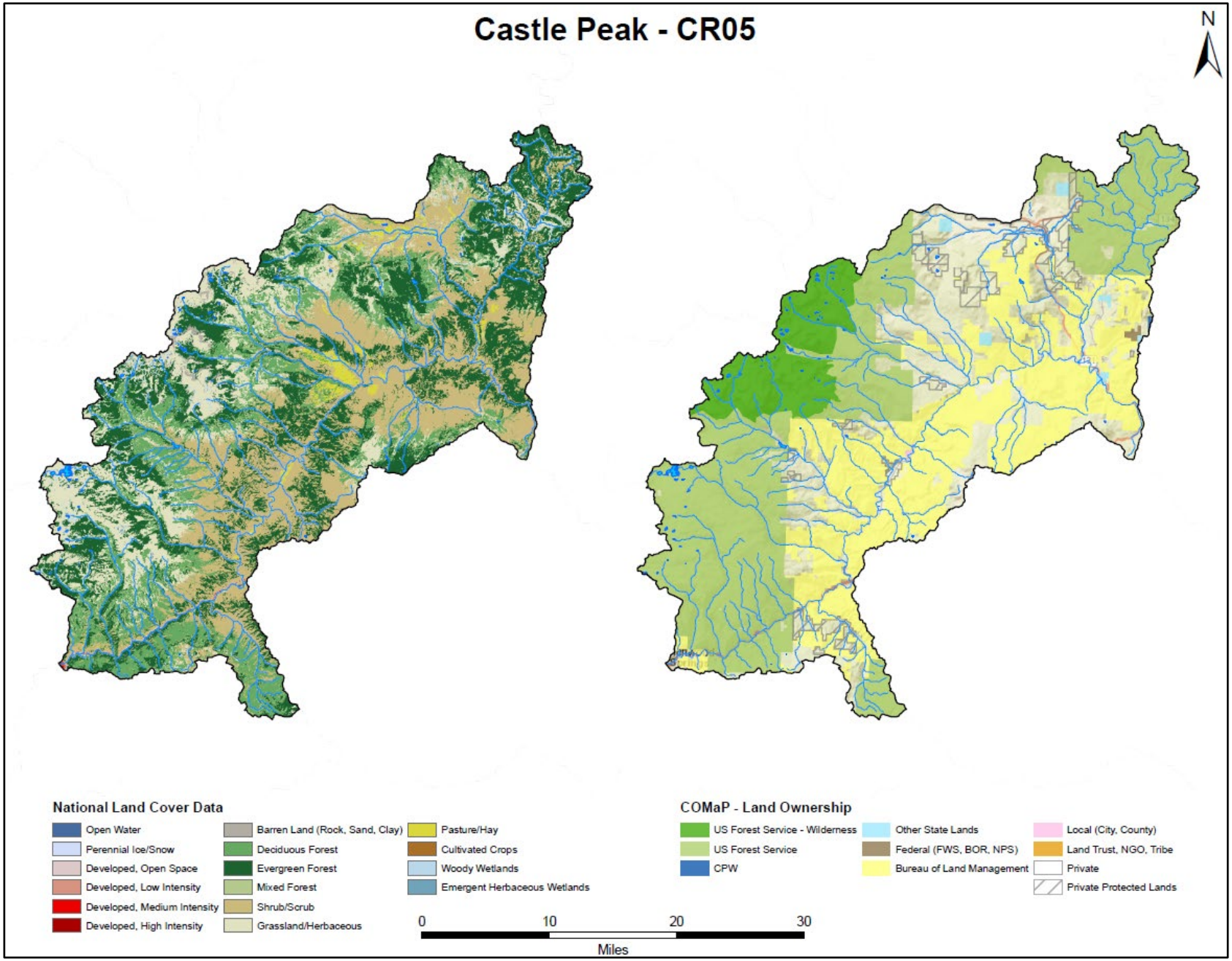


Figure 19. Land cover and ownership for the Castle Peak FMU - CR05.

MIDDLE COLORADO RIVER BASIN

Eagle River Fish Management Unit - CR06

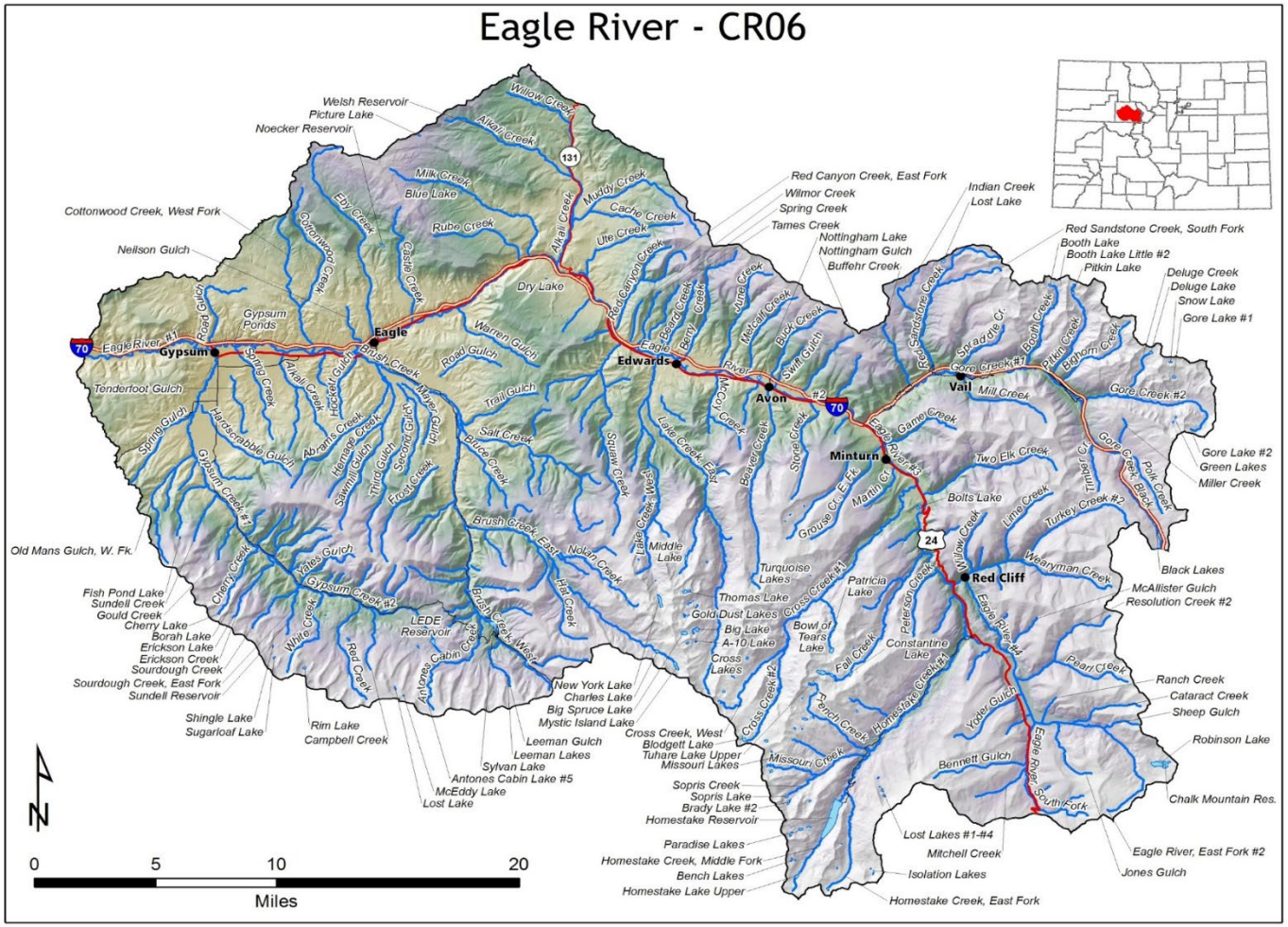


Figure 20. Map of the Eagle River FMU

Overview

The Eagle River FMU is 971 square mi in area and is comprised of the Eagle River mainstem and its tributaries (Figure 20). Interstate 70 parallels the stream corridor of Gore Creek from Vail Pass to the Eagle River downstream of Minturn, and eventually the confluence with the Colorado River at the western edge of the FMU. This unit has 147 lakes, totaling 1,426 ac, and 198 streams across 797 stream mi. Standing water resources include waters in six classifications: Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Managed, Wild Trout, and Coldwater Sportfish Intensive (Figure 21). Stream resources include waters in four classifications: Coldwater Sportfish Optimum, Native Cutthroat, Wild Trout, and Coldwater Sportfish Intensive (Figure 21).

The Eagle River Valley has experienced ongoing and expanding development that significantly impacts streams since the time miners arrived to the area in the late 1800s. In the headwaters of the Eagle River, the renowned 10th Mountain Division Training Center, Camp Hale, was constructed in the 1940s by channelizing the Eagle River to a straight homogenous stream with minimal fish habitat quality. On-going attempts to restore the channel to a more ecologically productive and natural condition continue while trying to balance other interests to preserve the military legacy, maintain multi-use recreational endeavors, and protect future water development and trans-basin diversions in the same area. Downstream near Minturn, mining that began in the late 1800s continued on through the 1980s, contributing significant

heavy metal pollutants that periodically caused extensive fish kills in the middle Eagle River throughout the 20th century. The Eagle Mine upstream of Minturn has been designated a Superfund Site and clean-up has led to some recovery of the Eagle River Brown Trout fishery; although, metal intolerant Rainbow Trout and sculpin remain absent in the river upstream of the confluence with Gore Creek. Ever-expanding urban development along the I-70 corridor has also impaired water quality in Gore Creek and the Eagle River, resulting in river reaches being listed on Colorado's 303d List of Impaired Waters for Aquatic Life, Sediment, and Temperature. Temperature and low river flows have been correlated to furunculosis-related fish kills on the Eagle. Sediment from naturally erosive uplands east of Castle Peak limits Brown Trout recruitment, and whirling disease limits Rainbow Trout recruitment in the mainstem Eagle, which is managed as a coldwater stream with whirling disease resistant strains of subcatchable Rainbow Trout. Though on the impaired waters list, the lower one mile of Gore Creek through East Vail is classified by the CPWC as a Gold Medal trout fishery, as the creek sustains an adequate number of quality trout. Including the mainstem Eagle River and Gore Creek, there are 161 wild trout streams (572 mi), 16 native cutthroat streams, and 21 streams stocked with subcatchable trout.

Lakes in the Eagle River FMU fall primarily into two categories: urban ponds and high elevation lakes, with a few notable exceptions. Urban ponds in the towns of Avon, Edwards, and Eagle are managed as put-and-take trout fisheries, where a generous number of catchable or brood trout are stocked for the enjoyment of anglers. Gypsum Ponds in the State Wildlife Area along I-70 is managed for catchable trout. Ongoing efforts to address illicit introductions of warmwater fish are confounding efforts to manage the ponds as a legitimate warmwater fishery; remediation efforts to thwart escapement of predatory invasive fish are on-going. There are five lakes that offer drive-to fishing where a combination of subcatchable and catchable trout are stocked. Most of the 88 lakes that provide walk-in fishing for trout are high elevation or wilderness lakes. They include 46 lakes that are managed for wild trout and not normally stocked, while the remaining may be stocked periodically and likely by air with fingerling cutthroat trout. Notable lakes also include Black Lakes on Vail Pass that are routinely stocked with large catchable trout by the Eagle River Water District, and Homestake Reservoir near Camp Hale, a large secluded lake with wild Lake Trout and cutthroat trout that can be exploited only by boats that are hand-powered or with an electric motor. Sylvan Lake in the State Park with the same name is a historic fishing resort that boasts a robust trout fishery sustained by wild Brook trout and stocked catchable Rainbow and cutthroat Trout.

Native Flannelmouth and Bluehead suckers occupy reaches of the lower Eagle River. Distribution of these species and their use of tributaries within this FMU is unknown.

Five Boreal Toad breeding sites are monitored in this FMU.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (38%), aspen dominated deciduous forest (18%), grassland/herbaceous (12%), shrubland (20%), woody wetlands (1%), and mixed forest (2%) (Figure 22). Land ownership includes the U.S. Forest Service (USFS) (44%), USFS Wilderness (19%), private (18%), U.S. Bureau of Land Management (BLM) (17%), and private conservation lands (1%) (Figure 22).

Recommended Management Strategies/Options

Sportfish Management

- Monitor fishing pressure, and identify areas of increased and high fishing pressure.
- Maintain current public angler access, and pursue or support opportunities to increase access.
- Stock only whirling disease negative trout.
- Stock whirling disease resistant trout in waters confirmed positive for the parasite.
- Stock subcatchable whirling disease resistant trout in the Eagle River to encourage re-establishment of wild Rainbow Trout.
- Stock recreational cutthroat trout into high elevation waters that fail to support native conservation populations, and lakes that can regularly overwinter fish.
- Stock catchable trout into LEDE Reservoir, Sylvan Lake, Nottingham Lake, Wilmor Pond, Berry Creek Pond, Eagle Children's Pond, Camp Hale, and Gypsum Ponds.
- Manage the Gold Medal reach of Gore Creek for quality trout.
- Continue monitoring the Eagle River fishery in correlation to remediation efforts at the Eagle Mine Superfund site.
- Look for opportunities to improve or enhance habitat along the Gypsum Ponds State Wildlife Area, as well as other reaches of the Eagle River. Continually evaluate proposed instream projects for natural channel functionality, and encourage repairing old and noncompliant structures that do not conform to these standards. Discourage instream projects that do not support fish passage of all resident species and life stages.
- Work with stakeholder groups that can provide water and other resources to support fish habitat.

Native Species Management

- Assess genetic characteristics of cutthroat trout populations. Continue search for unknown or unrecognized remnant populations.
- Identify and develop opportunities to reintroduce and expand the unique indigenous cutthroat lineage in the Eagle watershed, including protection of flows in Abrams Creek. Pursue reclamation potential in Salt Creek and Berry Creek for reintroduction of indigenous cutthroat.
- Stock recreational and sportfish with consideration to proximity and potential connectivity with cutthroat conservation populations.
- Describe distribution of Flannelmouth Sucker and Bluehead Sucker populations in the Eagle River and tributaries.
- Continue monitoring of Boreal Toad populations. Conduct additional surveys to locate new populations. Identify locations for potential reintroduction of Boreal Toads.

Nonnative Species Management

- Remove nonnative suckers (White and Longnose) when handling them, and discourage invasion and escapement of nonnative suckers where possible. Illicit introductions of nonnative warmwater fish persists in ponds and reservoirs in the Eagle River watershed despite public education campaigns and penalties for illegal fish movement. Invasion of predatory nonnative fish into native and sportfish habitat confounds management objectives and sometimes instigates expensive remediation projects. When encountered, remove illicitly introduced nonnative predators and isolate any occupied habitat if removal is unsuccessful.

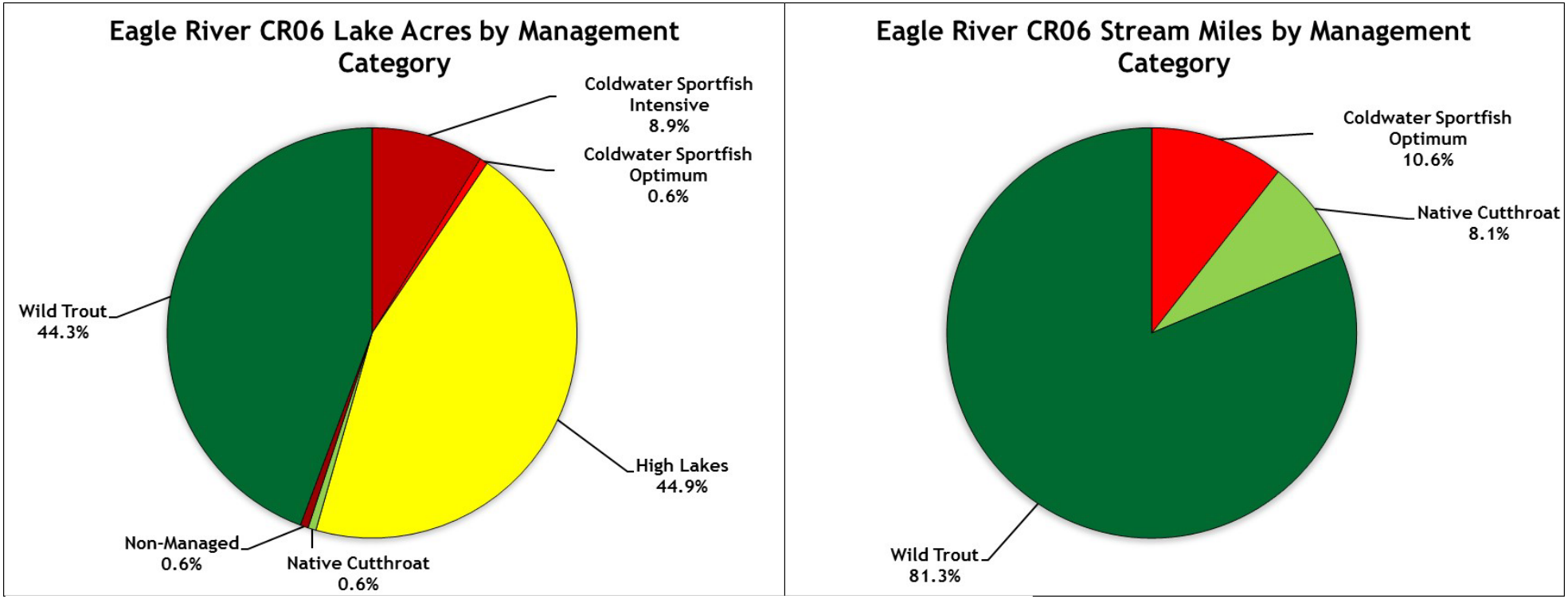


Figure 21. Summary of lake and stream classification statistics for the Eagle River FMU - CR06.

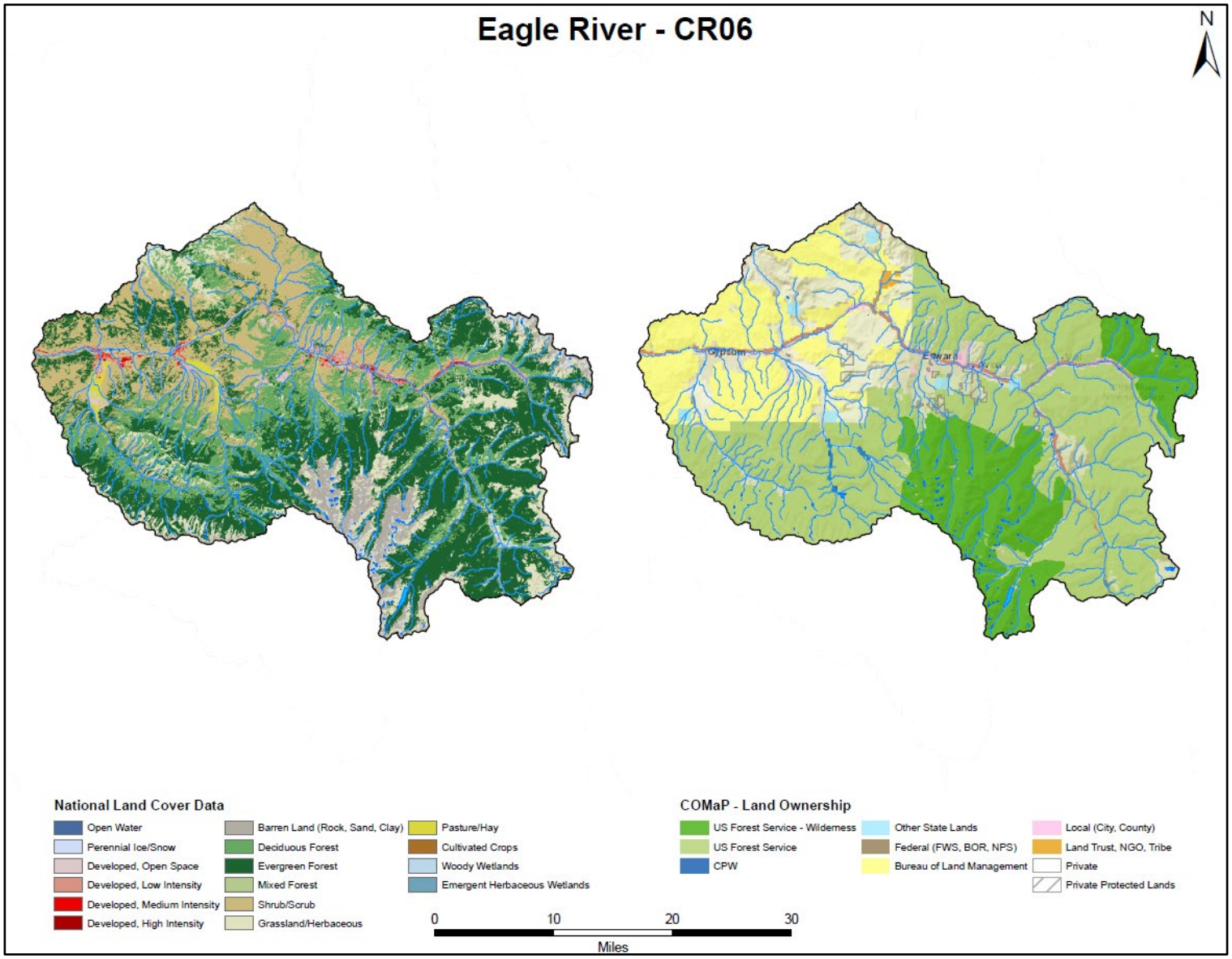


Figure 22. Land cover and ownership for the Eagle River FMU - CR06.

MIDDLE COLORADO RIVER BASIN

Fryingpan River Fish Management Unit - CR07

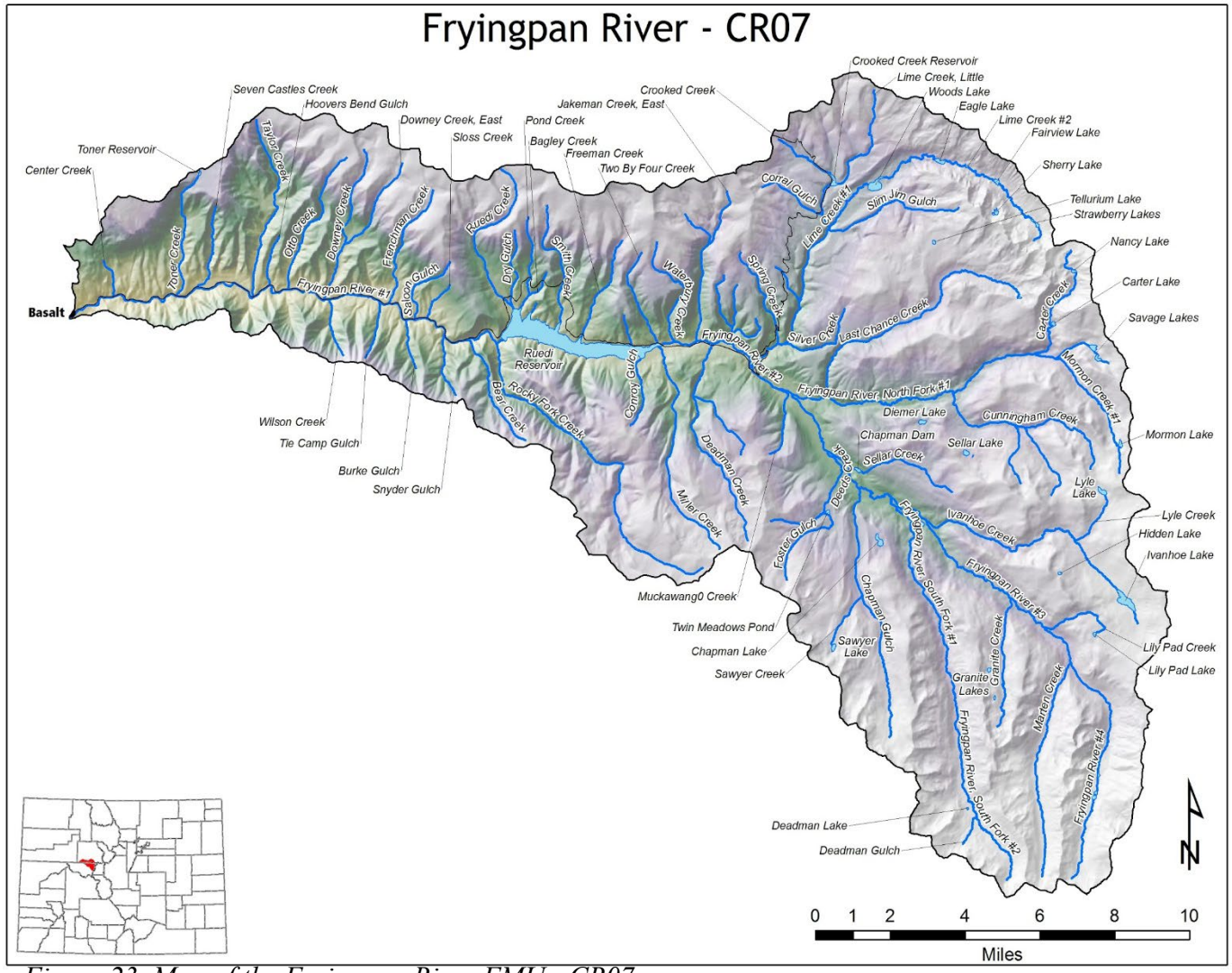


Figure 23. Map of the Fryingpan River FMU - CR07.

Overview

The Fryingpan River FMU has an area of 287 square miles and includes the Fryingpan River and its tributaries (Figure 23). This unit has 33 lakes, totaling 1,444 ac, and 75 streams across 240 stream mi. Standing water resources include waters in six classifications: Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Managed, Wild Trout, and Coldwater Sportfish Intensive (Figure 24). Stream resources include waters in three classifications: Native Cutthroat, Wild Trout, and Coldwater Sportfish Optimum (Figure 24).

The Fryingpan River mainstem and its tributaries are sustained primarily by wild reproducing trout. The headwater forks of the river are dominated by Brook Trout and Brown Trout, and the lower river is characterized by Brown Trout and Rainbow Trout. The Fryingpan downstream of Ruedi Reservoir to its confluence with the Roaring Fork River is designated by the CPWC as a Gold Medal fishery, renowned for its trophy trout fishery fueled by the *Mysis* shrimp contribution that escape through

Ruedi Dam. Trout reproduction is also influenced by the cold bottom-release waters of Ruedi Reservoir that delay fall-spawning and likely limit successful egg incubation throughout the year, especially near the dam. Rainbow reproduction is further impacted by the presence of the whirling disease parasite and the triactinomyxons (TAMs) appear to be primarily produced in off-channel agricultural ponds stocked with trout. On-going state involvement in the management of Brook Trout in adjacent ranch ponds helps reduce the production of TAMs, a subsequent source of whirling disease to the river. Stocking of whirling disease resistant trout is increasing recruitment success of wild produced rainbows in the river. The popular catch-and-release ethic of many fly-anglers has necessitated an encouraged harvest of Brown Trout <10 inches to help alleviate stunting, which is evident in fish survey estimates in some reaches of 1,000 Brown Trout per acre with few trout reaching quality size (>14 inches) due to overpopulation.

There are 18 lakes that provide walk-in fishing for trout in the Fryingpan River FMU. Many of these waters are high elevation or wilderness lakes that may be stocked by airplane with cutthroat fingerlings. Five of these lakes are managed for wild trout populations and are not normally stocked. Four lakes offer drive-to fishing where a combination of subcatchable and catchable trout are stocked. The best known is Ruedi Reservoir where *Mysis* were stocked in the 1970s in an attempt to develop the trophy Lake Trout - Kokanee Salmon- *Mysis* foodweb discovered in a renowned Canadian lake. Unfortunately, through time it was understood that the characteristics of that lake are unique and Colorado's reservoirs are not conducive to developing the same trophy characteristics. Thus, Ruedi's fishery today is managed with put-and-take Rainbow Trout. Angler catch rates at Ruedi are also sustained by a fair population of Lake Trout with some lunkers reaching over 30 pounds. Lake Trout predate on Kokanee Salmon, suppressing abundance and thwarting efforts to develop a productive Kokanee Salmon spawning operation on Lime Creek. The illicit introduction of Yellow Perch and presence of *Mysis* shrimp have also consternated efforts to maintain an adequate Kokanee Salmon stock as they compete for food resources. Chapman Reservoir is another popular lake, as much for its reliable catchable rainbow fishing as its recreational float boating and campground. One lake is in the non-managed category.

Two Boreal Toad breeding sites exist within this FMU. However, numerous sightings of individual toads have occurred in areas not adjacent to known populations.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (46%), aspen dominated deciduous forest (19%), grassland/herbaceous (15%), barren land (9%), shrubland (6%), woody wetlands (1%), and mixed forest (2%) (Figure 25). Land ownership includes the U.S. Forest Service (USFS) (61%), USFS Wilderness (32%), private (5%), and State of Colorado (1%) (Figure 25).

Recommended Management Strategies/Options

Sportfish Management

- Monitor fishing pressure, and identify areas of increased and high fishing pressure.
- Maintain current public angler access, and pursue or support opportunities to increase access.
- Stock only whirling disease negative trout.
- Stock catchable trout in Ruedi Reservoir and Chapman Dam.

- Stock subcatchable whirling disease resistant trout in the lower Fryingpan River to encourage re-establishment of wild produced Rainbow Trout.
- Manage the Gold Medal reach of the Fryingpan River to exceed Gold Medal criteria for quality trout throughout the lower river and for trophy trout immediately downstream of Ruedi.
- Maintain the kokanee spawning run from Ruedi up into Lime Creek by imprinting kokanee fry in Lime Creek.

- Pursue and continue projects that can reduce sources of whirling disease in the Fryingpan River (e.g., Cap K Ranch Brook Trout control and Little Lime Creek reclamation). Investigate any new ideas regarding biofilters to remove TAMs in the water column.
- Stock recreational cutthroat trout into high elevation waters that fail to support native conservation populations, and lakes that can regularly overwinter fish.
- Continually evaluate private project proposals for natural channel functionality, and encourage repairing old and noncompliant structures that do not conform to these standards. Discourage instream projects that do not support fish passage of all resident species and life stages or degrade existing fish habitat.
- Work with stakeholder groups that can provide water and other resources to support fish habitat in all reaches, including evaluating reservoir releases that may impact wading and fishability of the lower Fryingpan River.

Native Species Management

- Assess genetic characteristics of cutthroat trout populations. Continue search for unknown or unrecognized remnant populations.
- Identify and develop opportunities to reintroduce and expand the unique indigenous cutthroat lineage in the Fryingpan watershed, including reintroduction of indigenous cutthroat to Little Lime Creek following fish barrier construction and reclamation. Re-evaluate reclamation potential of Cunningham Creek and improvement upon completion of a constructed fish barrier.
- Stock recreational cutthroat trout and sportfish with consideration to proximity and potential connectivity with cutthroat conservation populations.
- Two Boreal Toad breeding sites exist within this FMU. However, numerous sightings of individual toads have occurred in areas not adjacent to known populations. Continue monitoring of Boreal Toad breeding populations. Conduct surveys to locate additional populations and evaluate habitat for potential reintroductions.

Nonnative Species Management

- Illicit introductions of nonnative warmwater fish have occurred with yellow perch in Ruedi despite public education campaigns and penalties for illegal fish movement. Invasion of predatory nonnative fish into native and sportfish habitat confounds management objectives and sometimes instigates expensive remediation projects. When encountered, remove illicitly introduced nonnative predators - anglers are encouraged to keep all perch caught in Ruedi. Hybridization of native Bluehead and Flannelmouth suckers with invasive nonnative suckers (White and Longnose) is an issue downstream in the lower Roaring Fork River. Remove nonnative suckers when handling them, and discourage invasion and escapement of nonnative suckers where possible.

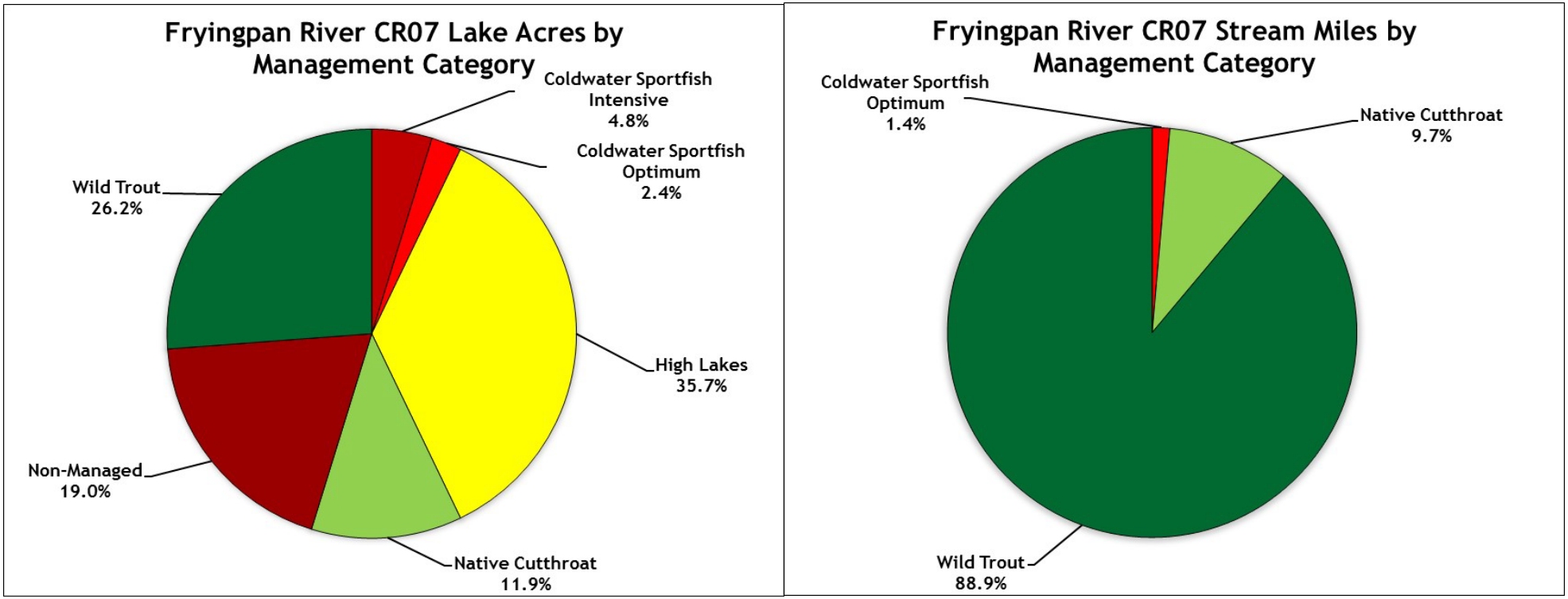


Figure 24. Summary of lake and stream classification statistics for the Fryingpan River FMU - CR07.

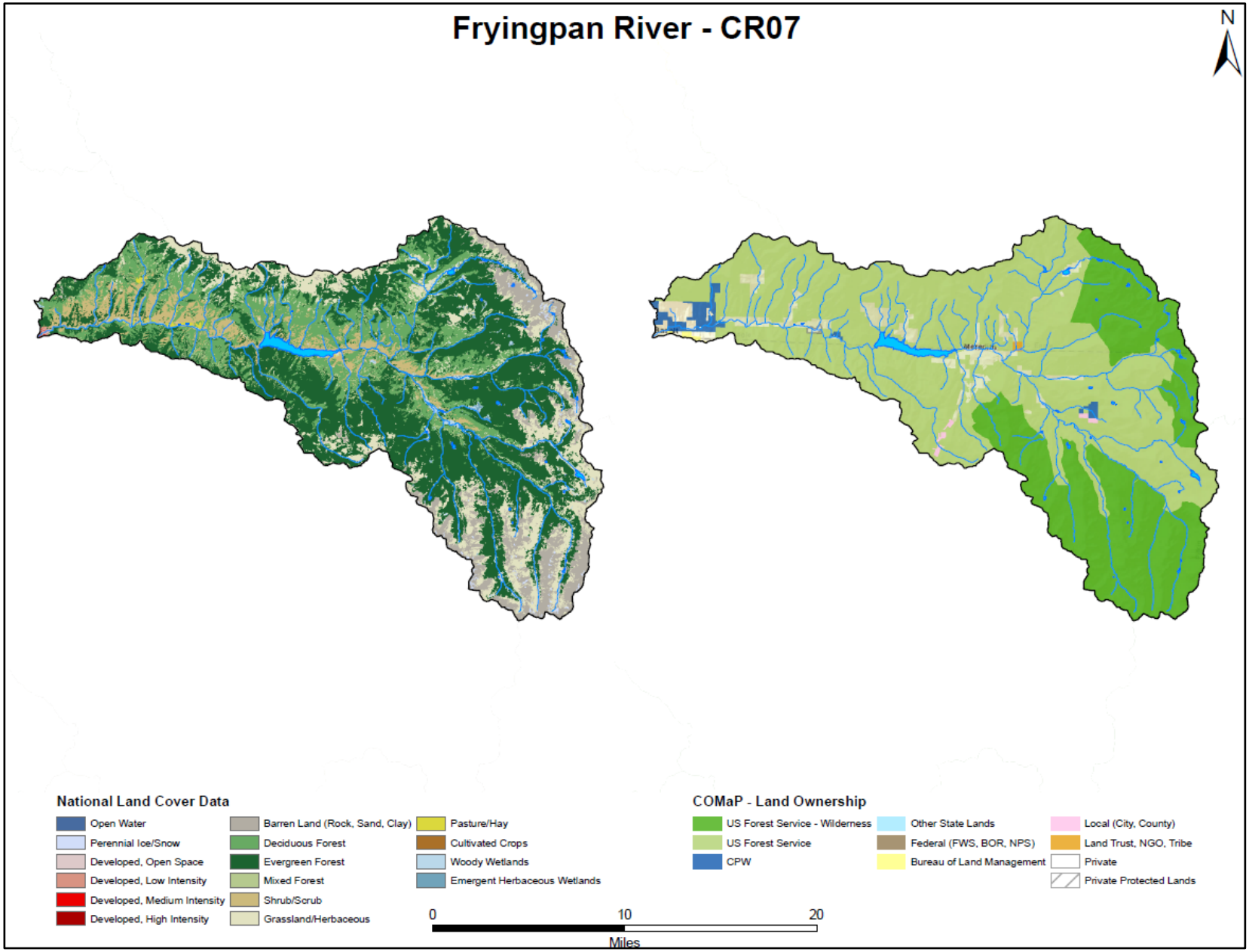


Figure 25. Land cover and ownership for the Fryingpan River FMU - CR07.

MIDDLE COLORADO RIVER BASIN

Roaring Fork River Fish Management Unit - CR08

Overview

The Roaring Fork River FMU includes the mainstem Roaring Fork River and tributaries other than the Fryingpan and Crystal Rivers (Figure 26). The Roaring Fork River flows mostly through a glacial outwash plain with three evident glacial terraces. This glacial/alluvial substrate in the riverbed exhibits very high porosity and permeability with very low cohesion, contributing high substrate turnover and an actively changing river channel form. Riparian vegetation is integral to binding the alluvium to provide bank stability and reduce channel movement. The FMU is 796 square mi and contains 51 lakes, totaling 745 ac, and 120 streams across 565 stream mi. The mainstem Roaring Fork River is a designated Gold Medal trout water by the CPWC for its abundant Quality Trout and high trout biomass from its confluence with the Fryingpan River downstream to the Colorado River. Standing water resources include waters in five classifications: Coldwater Sportfish Intensive, High Lakes, Native Cutthroat, Non-Managed, and Wild Trout. Stream resources include waters in four classifications: Native Cutthroat, Non-Managed, Wild Trout, and Coldwater Sportfish Optimum (Figure 27). Private land

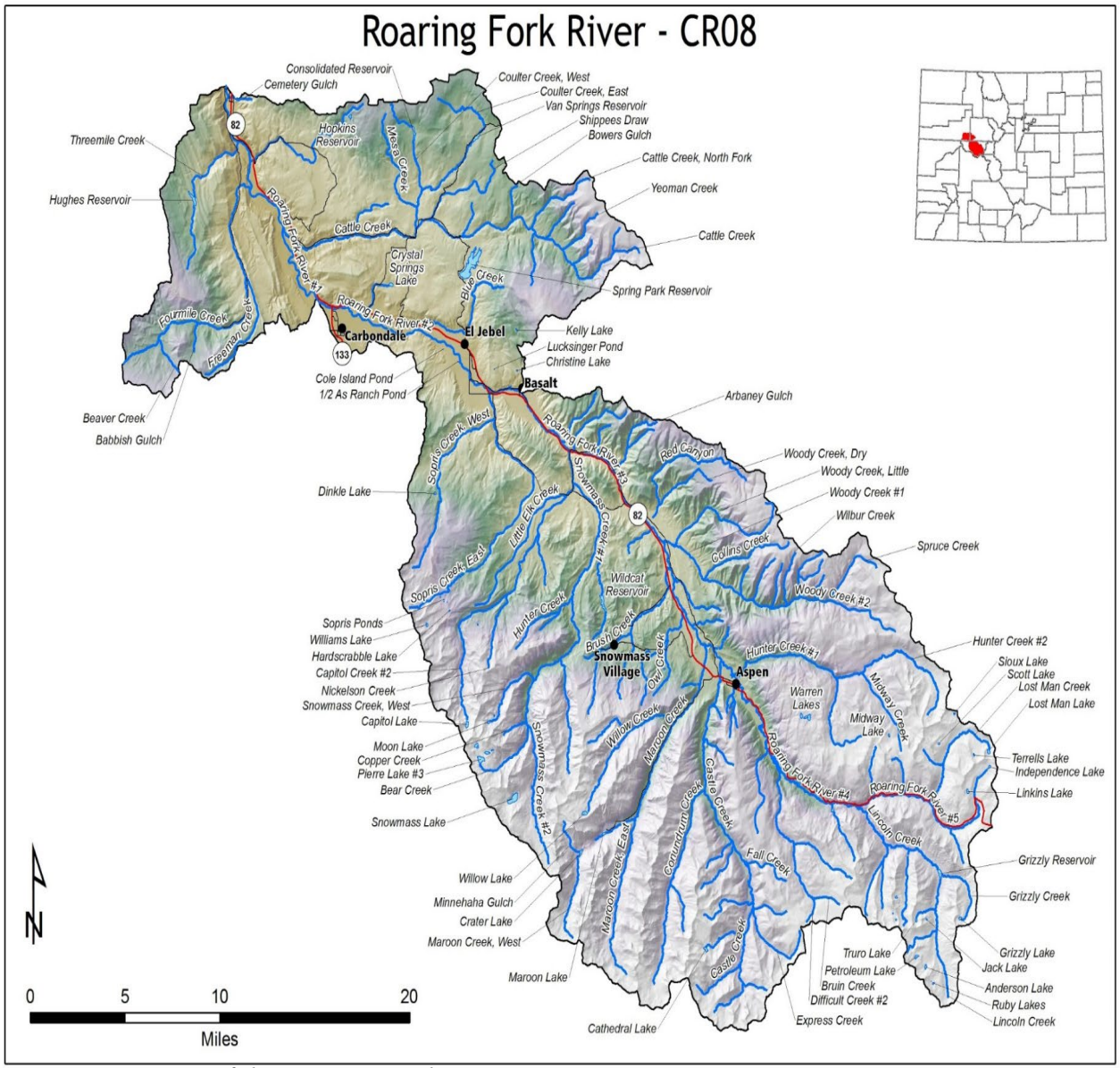


Figure 26. Map of the Roaring Fork River FMU - CR08.

dominates the river corridor along the mainstem Roaring Fork from Aspen downstream, limiting public access to the channel to float boating. Drift boating is incredibly popular with anglers particularly from Basalt downstream, as it allows access to otherwise-unreachable habitat. Since 2010, there has been a notable increase in the number of commercial fly fishing outfitters, which may warrant consideration of limited permits like those along the Gold Medal waters of the Arkansas River in the Arkansas Headwaters Recreation Area (AHRA).

Wild Rainbow Trout production is limited in the Roaring Fork River. Whirling disease is present and significantly impacts successful recruitment of wild Rainbow Trout. Even without the impacts of whirling disease, the lack of spawning/rearing habitat represents a bottleneck for rainbows. Sediment contributed by Brush Creek, Sopris Creek, and the Crystal River effectively smothers the eggs of spring-spawning trout species (rainbows and cutthroats). Rainbow Trout make up approximately 20 - 30% of the trout population with supplemental stocking of subcatchable rainbows; without supplementation of subcatchables, Rainbow Trout relative abundance is reduced to <10%. Threemile and Fourmile creeks are tributaries utilized by trout in the fall and the spring for spawning. CPW regulations close the lower ½ mile of the streams to fishing during spring and fall spawning periods, but development and water diversions can further limit available habitat in these streams by creating fish passage barriers or drying up the stream entirely. Currently, whirling disease resistant trout are stocked into the river to encourage re-establishment of wild Rainbow Trout. Large Mountain Whitefish add to the angling opportunities from Marble downstream. Though in recent years, a decline in Mountain Whitefish has been documented and may relate to stressors from sediment events associated with summer monsoonal rains, low flows and high summer water temperatures, and increasingly heavy fishing pressure in the lower Roaring Fork River.

Expanding urban development in the river corridor from Aspen to Glenwood exhibits the typical effects of increased impervious surfaces and reduction of surface-aquifer recharge due to loss of irrigation, as ranches are subdivided into housing developments. During low summer flows, algal blooms develop in the warmer water with the increased nutrients from municipal and agricultural inputs. In extremely dry summers, water temperatures can exceed 70 degrees Fahrenheit and concerns about angling impacts have led to initiating voluntary fishing closures to fishing until colder temperatures resume with monsoonal rain patterns, cool fall weather, or more available water. Late summer river flows in the Roaring Fork are often augmented by water releases from Ruedi Reservoir due to calls on the river by the Upper Colorado River Recovery Program for the benefit of Colorado River threatened/endangered fishes.

In this FMU, there are ten lakes managed for wild trout populations. These lakes are not normally stocked. Twenty-six lakes provide walk-in fishing for trout and may be stocked with recreational cutthroat. Drive-to fishing opportunities exist in Maroon, Grizzly, and Lost Man lakes where a combination of subcatchable and catchable trout are stocked, and Old Pond is stocked exclusively for kids' fishing.

Eight Boreal Toad breeding sites are present in this FMU. Two of these sites are on private land and landowners have allowed access for monitoring. Chytrid fungus (*Batrachochytrium dendrobatidis*) has been detected in several of these populations, and likely contributed to the decline of Boreal Toad populations in the Conundrum and Snowmass Creek drainages. In addition, chytrid fungus was recently detected in a population on private property along the Roaring Fork River. Spread of chytrid fungus to other populations within this FMU is of high concern. Several Boreal Toad breeding sites exist in the Lincoln Creek drainage downstream of Grizzly Reservoir. Water release operations from Grizzly Reservoir may alter breeding habitat for Boreal Toads in this area on an annual basis. In 2007, construction of a pond near Grizzly Reservoir provided additional breeding habitat for Boreal Toads.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (27%), aspen dominated deciduous forest (27%), barren land (9%), grassland/herbaceous (13%), shrubland (14%), and mixed forest (2%) (Figure 28). Land ownership includes the U.S. Forest Service (USFS) (26%), USFS Wilderness (34%), private (29%), State of Colorado (1%), U.S. Bureau of Land Management (BLM) (7%), and private conservation lands (2.6%) (Figure 28).

Recommended Management Strategies/Options

Sportfish Management

- Monitor fishing pressure, and identify areas of increased and high fishing pressure. Evaluate need for managing commercial angling through use of CPW boat ramps.
- Maintain current public angler access, and pursue or support opportunities to increase access.
- Identify improvements to two boat ramps on the Roaring Fork to improve access.
- Stock only whirling disease negative trout.
- Stock catchable trout in Lost Man and Grizzly reservoirs, Rodeo Pond, Maroon Lake, and Old Pond.
- Stock subcatchable whirling disease resistant trout and brood fish (when surplus is available) in the Roaring Fork River to encourage re-establishment of wild Rainbow Trout.
- Stock recreational cutthroat trout into high elevation waters that fail to support native conservation populations, and lakes that can regularly overwinter fish.
- Manage the Gold Medal reach of Roaring Fork River for trophy trout.
- Address and support efforts to improve water quality or mediate emergent issues; specifically, acid mine drainage from Ruby Mine and improving municipal water treatment.
- Continually evaluate proposed private projects for natural channel functionality, and encourage repairing old and noncompliant structures that do not conform to these standards. Discourage instream projects that do not support fish passage of all resident species and life stages or degrade existing fish habitat.
- Work with stakeholder groups that can provide water and other resources to support fish habitat in all reaches, including evaluating reservoir releases that can best utilize fish mitigation water available in the upper Roaring Fork diversion system.

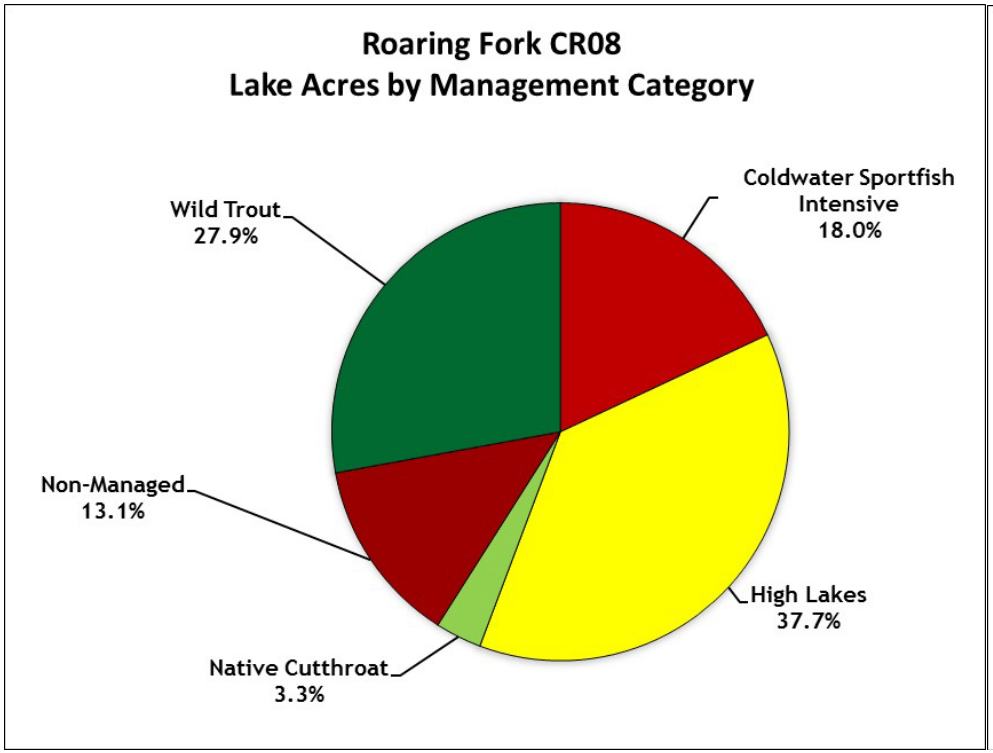
Native Species Management

- Assess genetic characteristics of cutthroat trout populations. Continue to search for unknown or unrecognized remnant populations.
- Identify and develop opportunities to reintroduce and expand the unique indigenous cutthroat lineage in the Roaring Fork watershed, including reclamation of Hallum Lake and development of a potential broodstock for cutthroat from Hunter Creek. Continue evaluation of Hunter Creek for large scale reclamation, and reinvasion by upstream unique lineage of indigenous cutthroat trout.
- Stock recreational cutthroat trout and sportfish with consideration to proximity and potential connectivity with cutthroat conservation populations.
- Identify upstream distribution of Flannelmouth and Bluehead suckers. Identify tributaries important to the life histories of Flannelmouth and Bluehead suckers.
- Continue monitoring of Boreal Toad breeding sites including annual testing of populations for chytrid fungus (*Batrachochytrium dendrobatidis*) infections. Survey for additional populations. Identify habitat for potential reintroductions. Collaborate with water owners for release of water from Grizzly Reservoir to minimize impact to Boreal Toad breeding habitat in the Lincoln Creek drainage.

Work with municipalities, pesticide applicators and consultants to minimize chytrid fungus transfer through proper disinfection practices. Coordinate with USFS regarding ski area expansions and operations to protect Boreal Toad populations and minimize disturbances near ski areas.

Nonnative Species Management

- Hybridization of native Bluehead and Flannelmouth suckers with invasive nonnative suckers (White and Longnose) is an issue in the lower Roaring Fork River. When handling nonnative suckers, remove them, and discourage invasion and escapement of nonnative suckers where possible. Illicit introductions of nonnative warmwater fish persist throughout the Roaring Fork River watershed despite public education campaigns and penalties for illegal fish movement. Invasion of predatory nonnative fish into native and sportfish habitat confounds management objectives and sometimes instigates expensive remediation projects.



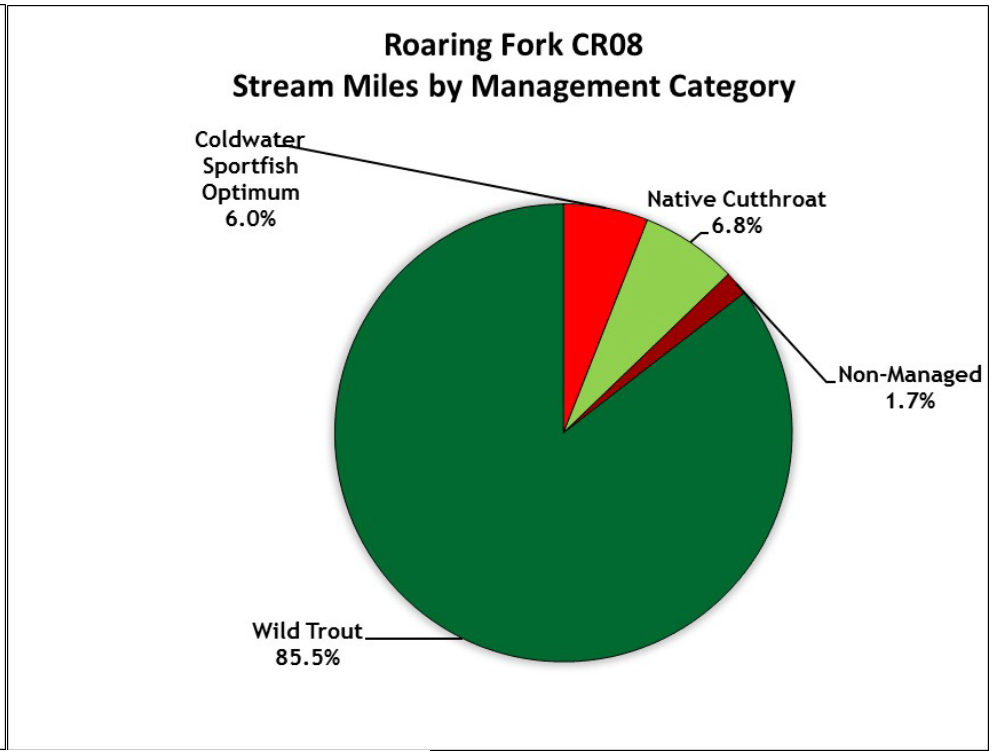


Figure 27. Summary of lake and stream classification statistics for the Roaring Fork River FMU - CR08.

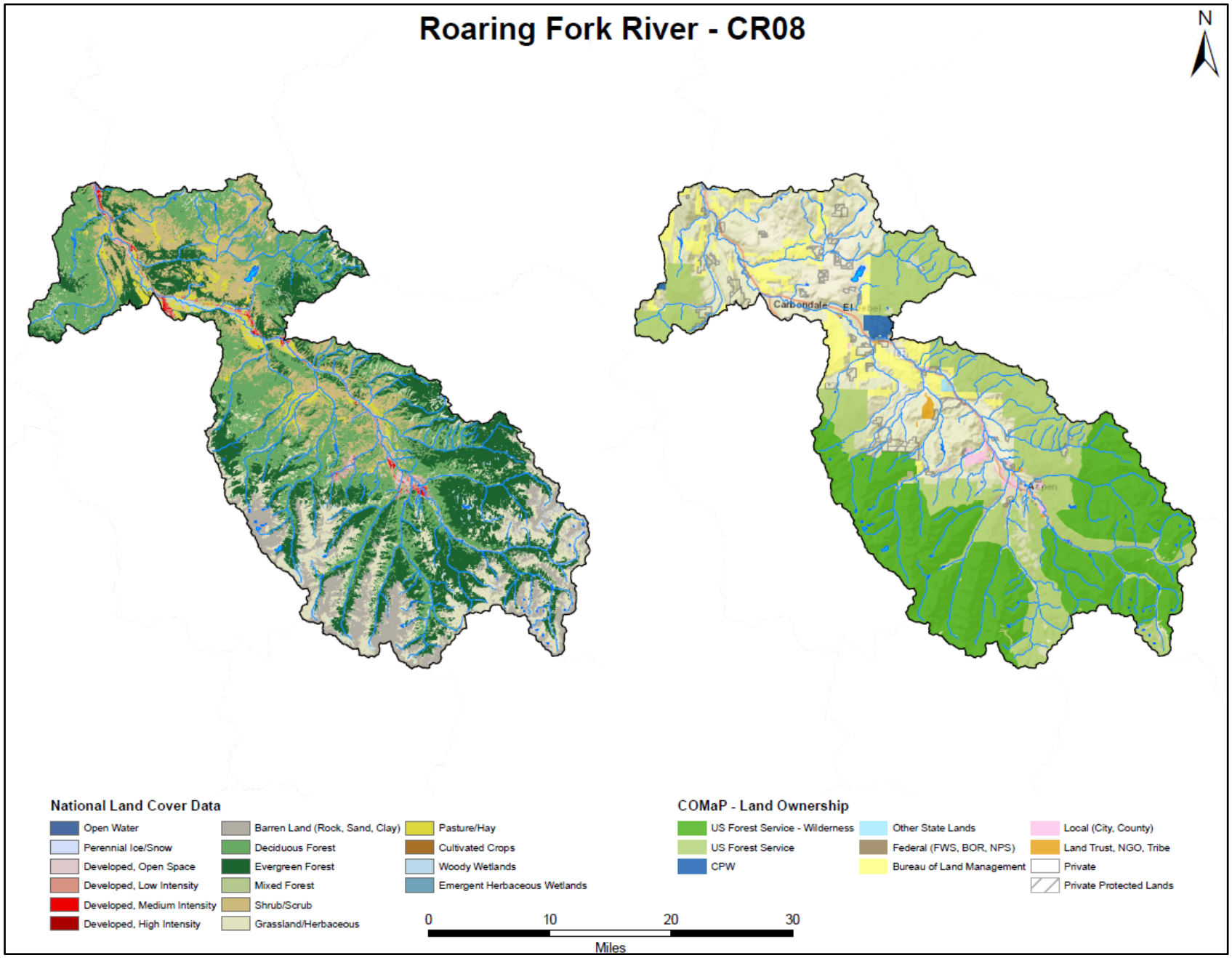


Figure 28. Land cover and ownership for Roaring Fork River FMU

MIDDLE COLORADO RIVER BASIN
Crystal River Fish Management Unit - CR09

Overview

The Crystal River FMU is approximately 367 square mi (Figure 29). The watershed is primarily north facing and in a narrow valley with mountainous ridges that shorten the growing season and keeps water temperatures lower. This unit has 29 lakes totaling 179 surface ac, and 64 streams across 286 stream mi. Standing water resources include waters in four classifications: Coldwater Sportfish Intensive, High Lakes, Non-Managed, and Wild Trout (Figure 30). Stream resources include waters in four classifications: Coldwater Sportfish Optimum, Native Cutthroat, Wild Trout, and Coldwater Sportfish Intensive (Figure 30).

Many tributaries in this FMU drain clastic sediments (e. g., Morrison formation marine shales) causing a high sediment loading during run-off and monsoonal rains. In particular, naturally erosive upland soils and historic mining disturbances in the Coal Creek watershed create regular and significant impacts to water quality. Reclamation work and reworking the landscape using biochar has attempted to mitigate these impacts by reducing the amount of disturbed sediments. Much of the Crystal's floodplain has been modified or removed by the construction of Hwy 133 and the Colorado-Yule Railroad. This has resulted in a loss of spawning and rearing habitat for fish, and removed the riparian corridor that can contribute to invertebrate food inputs. Significant water diversions begin approximately one mile downstream of Avalanche Creek, dewatering the river downstream to the Roaring Fork almost entirely in very dry summers. Voluntary fishing closures have been instituted to reduce stress on fish by anglers in years when flows have dropped below 10 cfs at Carbondale.

Due to the natural and anthropogenic limitations particularly on suitable trout habitat in the river, the Crystal is managed with subcatchable and catchable trout to enhance fishing opportunity. Public access is relatively abundant along

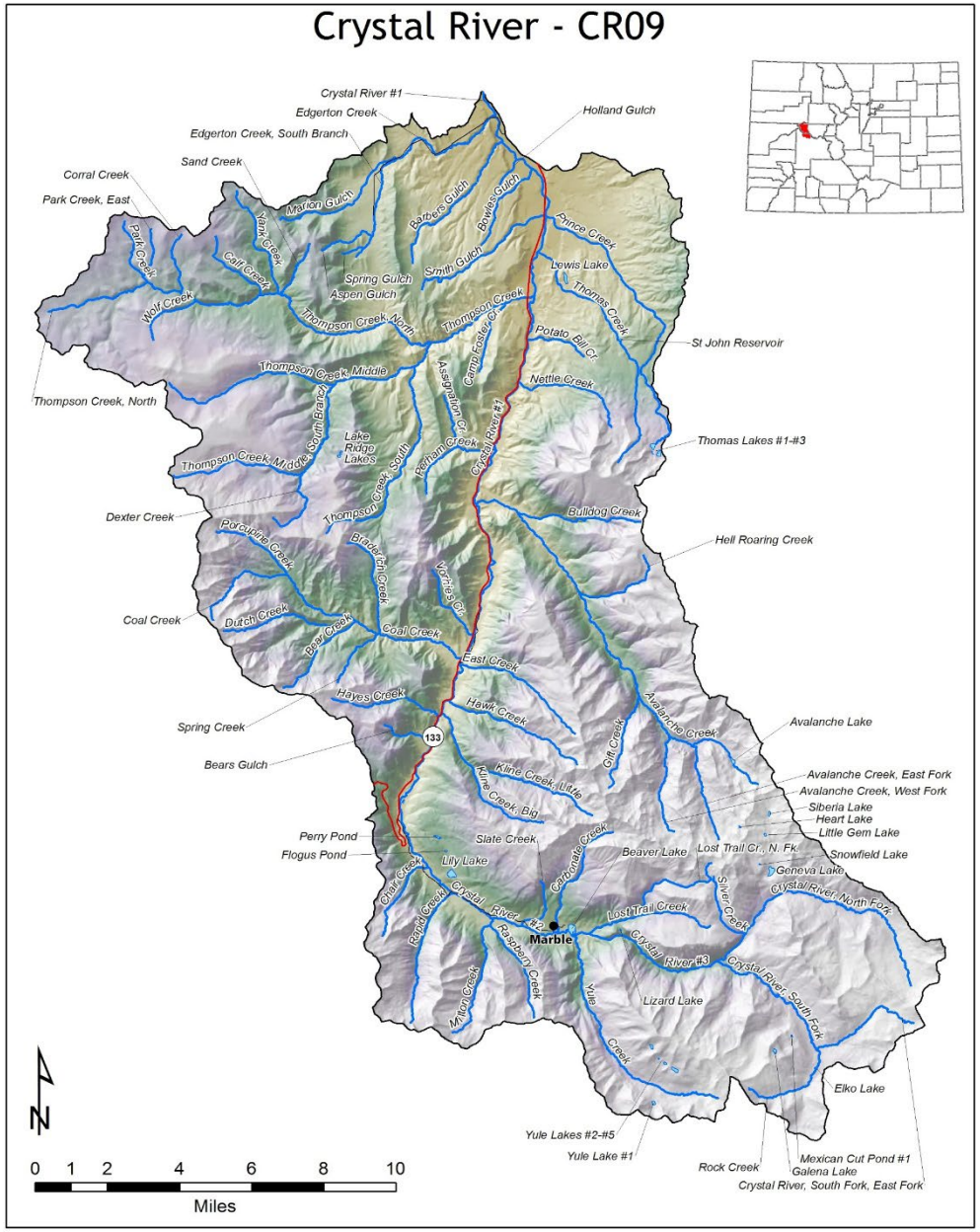


Figure 29. Map of the Crystal River FMU - CR09.

highways and roads that parallel the Crystal River. Whirling disease has been detected in this river, and it is stocked with whirling disease resistant trout to reduce parasitic load and increase wild Rainbow Trout reproductive success. Headwater and many tributary streams contain a mix of wild Brook Trout and recreational cutthroat trout. Mountain Whitefish add to the angling opportunities from Marble downstream.

In this FMU, 15 lakes are managed for wild trout populations and are not normally stocked. Twelve high elevation lakes provide walk-in fishing for trout and may be stocked with recreational cutthroat trout. There is one lake that offers drive-to fishing where a combination of subcatchable and catchable trout are stocked.

No Boreal Toad populations are known to exist in this management area.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (32%), aspen dominated deciduous forest (30%), grassland/herbaceous (14%), shrubland (7%), woody wetlands (3%), and mixed forest (3%) (Figure 31). Land ownership includes the U.S. Forest Service (USFS) (41%), USFS Wilderness (35%), private (12%), U.S. Bureau of Land Management (BLM) (7%), and private conservation lands (3%) (Figure 31).

Recommended Management Strategies/Options

Sportfish Management

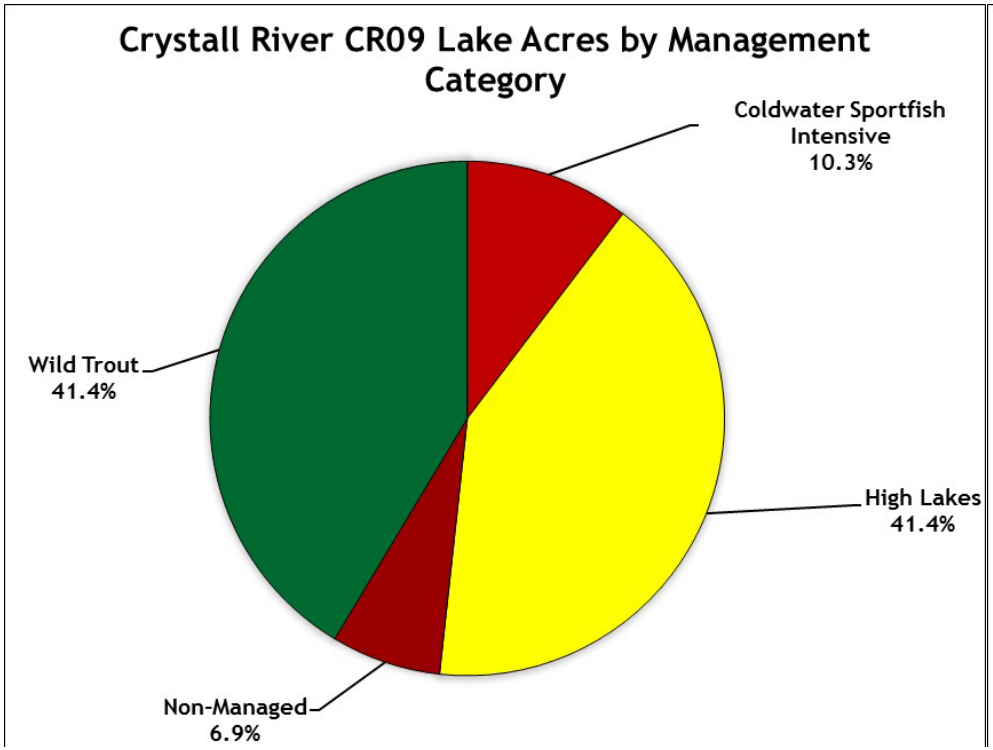
- Monitor fishing pressure, and identify areas of increased and high fishing pressure.
- Maintain current public angler access, and pursue or support opportunities to increase access.
- Stock only whirling disease negative trout.
- Stock catchable trout in Beaver, Island, and McKee lakes.
- Stock subcatchable and catchable whirling disease resistant trout in the Crystal River.
- Stock recreational cutthroat trout into high elevation waters that fail to support native conservation populations, and lakes that can regularly overwinter fish.
- Address and support efforts to improve water quality or mediate any issues that appear. Remediation efforts by Mined Land Reclamation and the USFS in Coal Basin are being implemented to attempt to reduce the amount and frequency of sediment input to the Crystal River.
- Continually evaluate proposed projects for natural channel functionality, and support efforts to renovate diversion structures to function more efficiently with lowered maintenance (e.g., replace “sugar dykes”). Discourage instream projects that do not support fish passage of all resident species and life stages or degrade existing fish habitat. Include partnering on habitat projects that can best utilize water available in the lower Crystal during low flow periods, particularly in the summer. Consider improvements to the river channel along the CPW Crystal River Hatchery property.
- Work with stakeholder groups that can provide water and other resources to support fish habitat in all reaches.

Native Species Management

- Assess genetic characteristics of cutthroat trout populations. Continue search for unknown or unrecognized remnant populations.
- Identify and develop opportunities to reintroduce and expand the unique indigenous cutthroat lineage in the Crystal watershed.
- Stock recreational cutthroat trout and sportfish with consideration to proximity and potential connectivity with cutthroat conservation populations.
- While no Boreal Toad populations are known to exist in this FMU, the close proximity to other drainages with known populations warrants continued survey efforts to locate populations or identify potential habitat for future reintroductions.

Nonnative Species Management

- Hybridization of native Bluehead and Flannelmouth suckers with invasive nonnative suckers (White and Longnose) is an issue in the lower Roaring Fork River. Remove nonnative suckers when handling them, and discourage invasion and escapement of nonnative suckers where possible. Illicit introductions of nonnative warmwater fish persist, but have yet to impact waters in the Crystal River watershed. Invasion of predatory nonnative fish into native and sportfish habitat may confound management objectives, and instigate expensive remediation projects. When encountered, remove illicitly introduced nonnative predators.



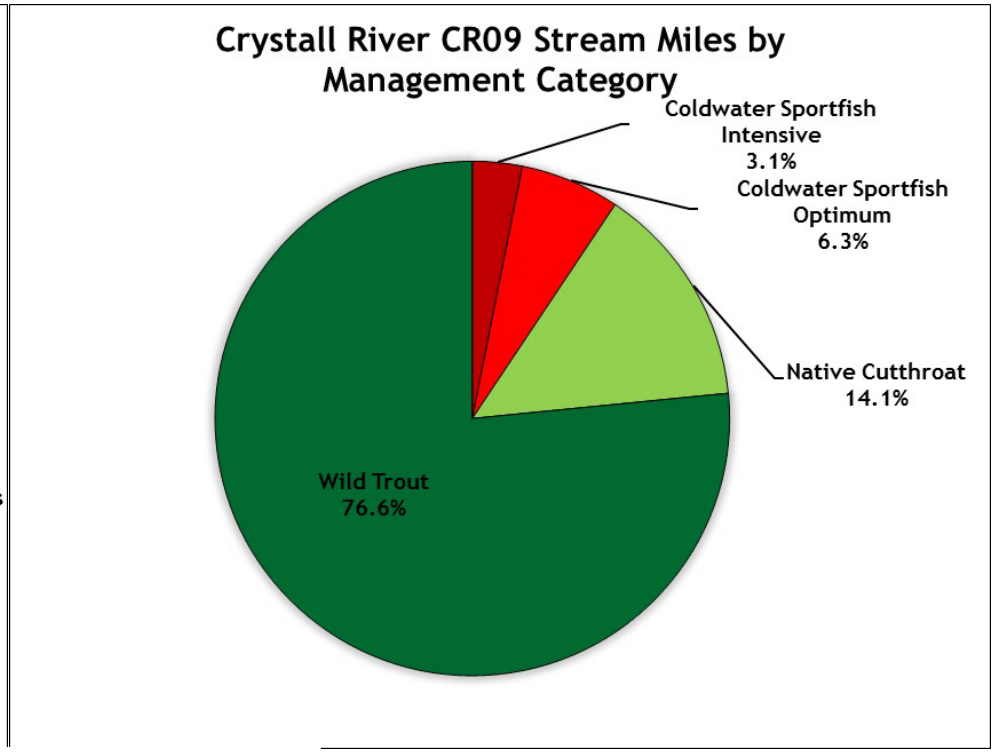


Figure 30. Summary of lake and stream classification statistics for the Crystal River FMU - CR09

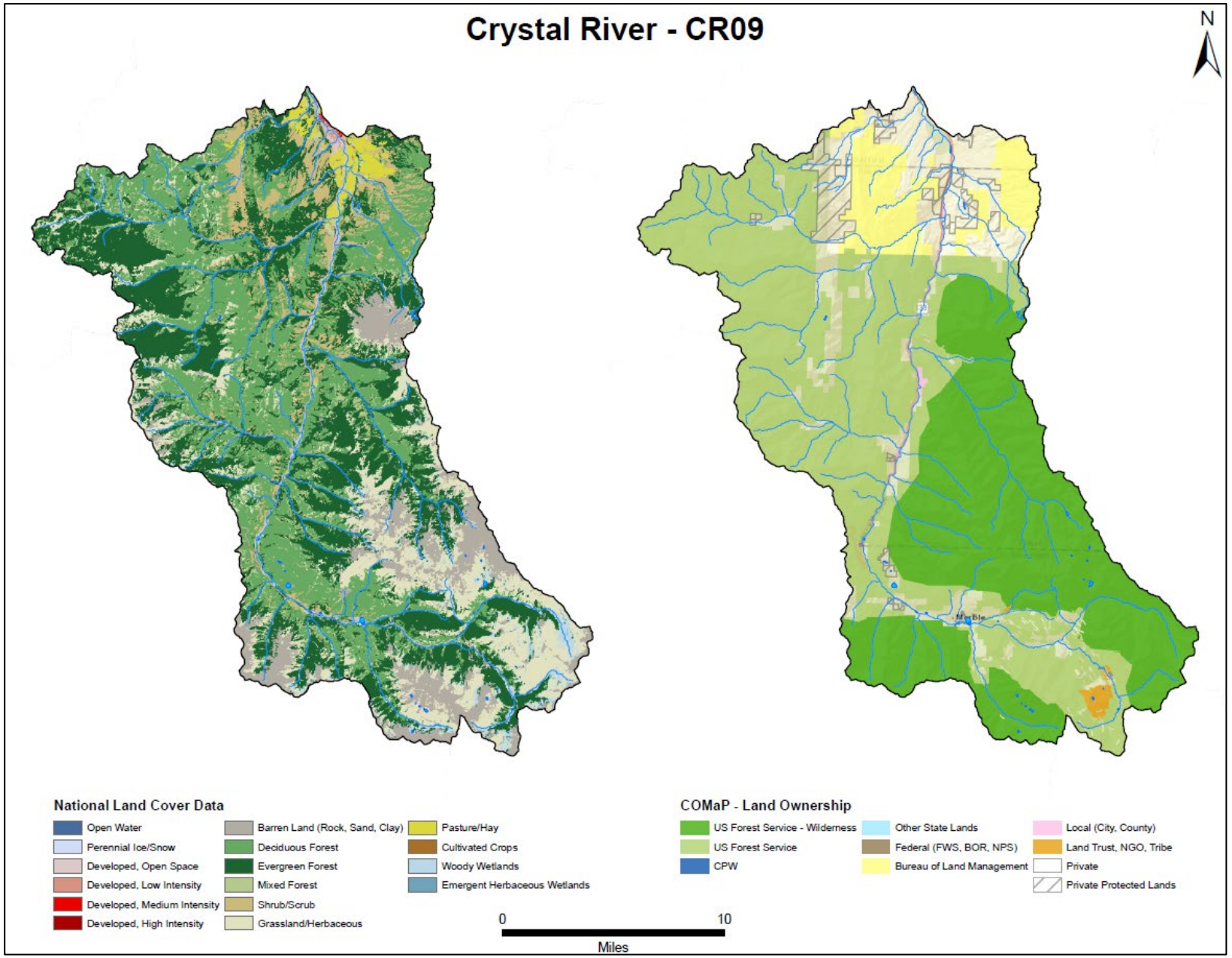


Figure 31. Land cover and ownership for the Crystal River FMU - CR09.

LOWER COLORADO RIVER BASIN ANALYSIS UNIT SUMMARY

Fish Management Units
Rifle – CR10
Roan-Parachute Creek – CR11
Plateau Creek – CR12
Grand Junction – CR13

The Lower Colorado River Basin Analysis Unit (AU) encompasses 3,806 square mi in the lower Colorado River Basin, which are highly diverse with waters ranging from coldwater sportfish intensive to wild warmwater. The lower elevation streams are transitional as they flow westward towards the Colorado/Utah state line. There are 12 standing waters categorized as warmwater fisheries and 47 flowing waters categorized as Native Non-Salmonid waters in this AU. To organize waters within the upper basin for this planning effort, the entire geographical area has been separated into the four Fish Management Units (FMUs), which subdivide the area based on hydrological characteristics. Waters within each FMU are further partitioned into CPW statewide water management categories. The four FMUs in the upper basin are Rifle - CR10 (1,216.8 sq mi); Roan-Parachute Creek - CR11 (708.2 sq mi); Plateau Creek - CR12 (681.8 sq mi); and Grand Junction - CR13 (1,191.1 sq mi).

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (27.4%), aspen dominated deciduous forest (21.0%), grassland/herbaceous (3.4%), agriculture (5.9%), shrubland (34.7%), and mixed forest (1.1%). Land ownership includes the U.S. Forest Service (USFS) (18.3%), private (34.7%), local government (0.07%), State of Colorado (1.0%), U.S. Bureau of Land Management (BLM) (40.6%), BLM Wilderness (2.4%) and private conservation lands (1.8%). Other non-governmental organizations, and additional Federal and State owned lands comprise 1.2% of land ownership in this AU.

Approximately 61.3% of the Lower Colorado River Basin AU is owned by the BLM and USFS. Recreational use includes fishing, hunting, camping, cross-country skiing, backcountry skiing, mountain biking and hiking. These federal lands are also managed to support livestock grazing, logging activities, gas and oil exploration and production, as well as other specialized uses.

This unit contains 712 lakes and reservoirs totaling 5,296.3 ac, and 441 stream segments totaling 2,792.2 mi. Standing water resources include waters in eleven classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Native Non-Salmonid, Non-Fish Native Conservation, Non-Managed, Warmwater Sportfish Intensive, Warmwater Sportfish Optimum, Wild Trout, and Wild Warmwater (Figure 32). Stream resources include waters in six classifications: Coldwater Sportfish Optimum, Native Cutthroat, Native Non-Salmonid, Non-Fish Native Conservation, Wild Trout, and Wild Trout Special Regulations (Figure 32).

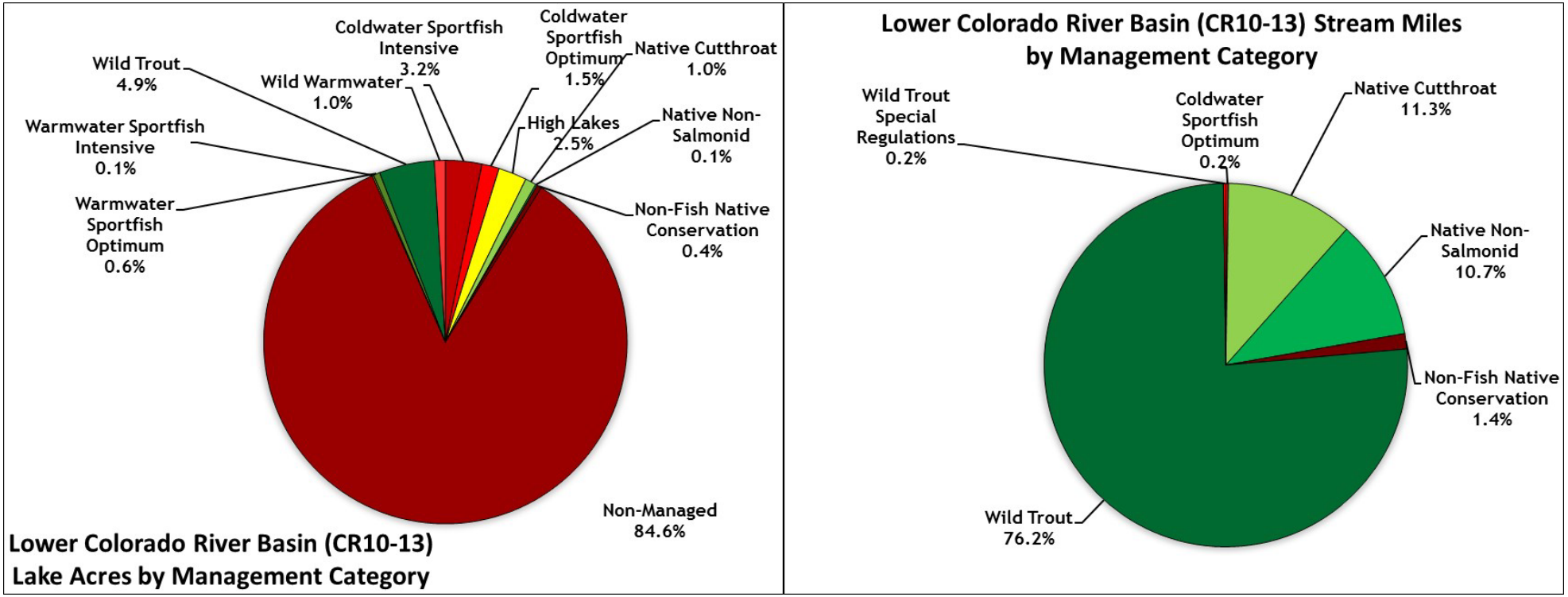


Figure 32. Summary of lake and stream classification statistics for the four FMUs that comprise the Lower Colorado River Basin based on acres/miles.

LOWER COLORADO RIVER BASIN
Rifle Fish Management Unit - CR10

Overview

The Rifle FMU is located around and near Rifle, Colorado (Figure 33). The west boundary is the Roan – Parachute Creek FMU. The drainages of Government Creek, Rifle Creek, and Elk Creek form the north side of the unit. The east side of the FMU consists of the drainages of South Canyon Creek, Garfield Creek, and Divide Creek. The south side of the unit includes the north flowing drainages of Battlement Mesa. This FMU encompasses 1,217 square mi, including 182 lakes and reservoirs totaling 1,120.6 ac and 153 stream segments across 878.1 mi. Standing water resources include waters in eight classifications: Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Fish Native Conservation, Non-Managed, Warmwater Sportfish Optimum, Wild Trout, and Coldwater Sportfish Intensive (Figure 34). Stream resources include waters in four classifications: Native Cutthroat, Native Non-Salmonid, Wild Trout, and Coldwater Sportfish Optimum (Figure 34).

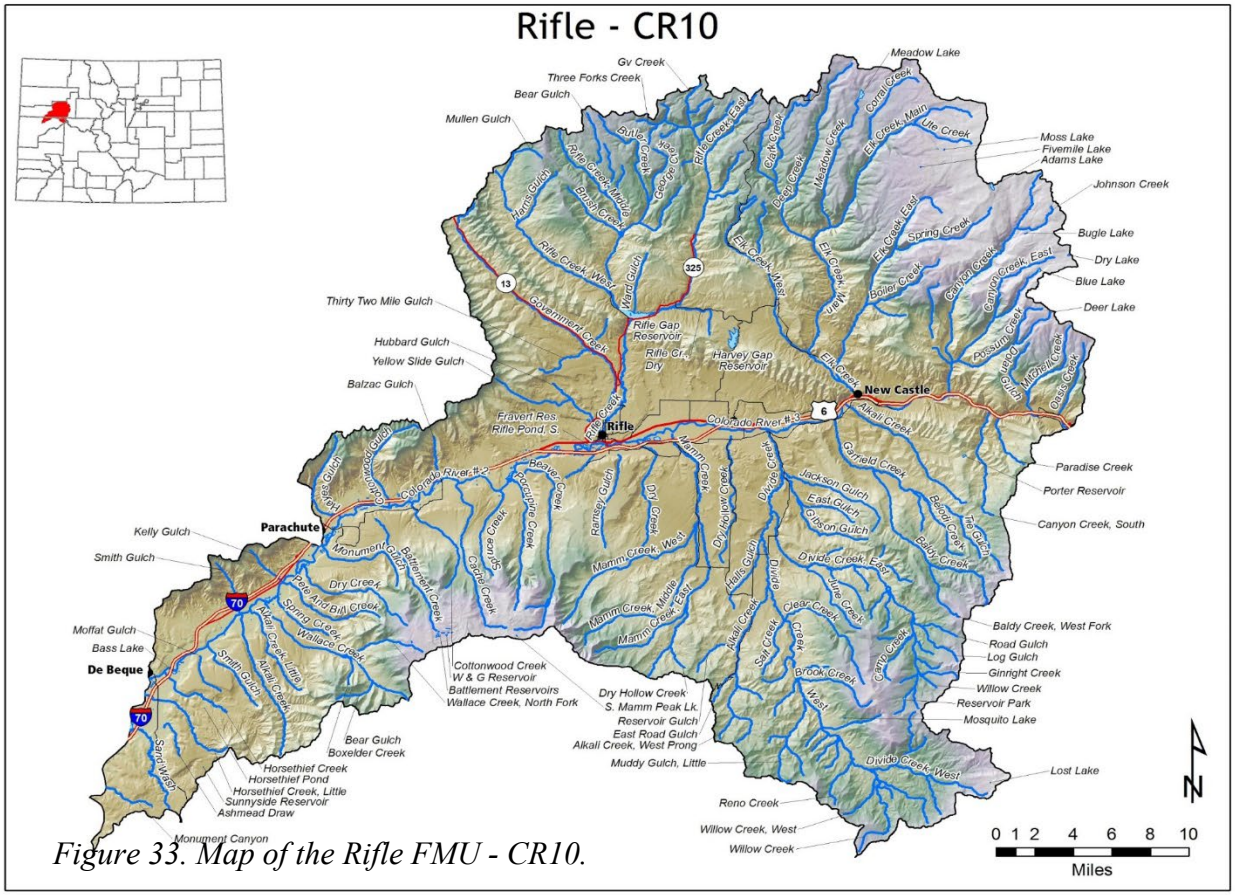


Figure 33. Map of the Rifle FMU - CR10.

The majority of lakes and reservoirs in this FMU are small private ponds in the floodplain of the Colorado River. The largest reservoirs in this FMU are Rifle Gap Reservoir (290 surface acres, at capacity) and Harvey Gap Reservoir (201 surface acres, at capacity). See the Sportfish Management section for more detail on the management of these waters.

The longest stream in this FMU is the Colorado River (64.4 miles). Other major stream systems in the FMU include West Divide Creek (28.72 miles), Main Elk Creek (20.8 miles), East Divide Creek (19.5 miles), Government Creek (18.8 miles), East Rifle Creek (17.6 miles), and Garfield Creek (15.3 miles). The Colorado River and its 100-year floodplain downstream of Rifle, Colorado, is designated critical habitat for endangered Colorado River fish species. Razorback Sucker and Bonytail are stocked in the mainstem Colorado River

within the critical habitat designation. CPW regulates private fish stocking on the western slope of Colorado to ensure approved fish species are stocked and that escapement of stocked fish is not likely based on conditions at the stocking applicant's waterbody (including location relative to the 100-year floodplain, presence of a berm, and screening of all potentially fish-passable inlets and outlets).

No Boreal Toad populations are known to occur in this FMU.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (28.2%), aspen dominated deciduous forest (30%), grassland/herbaceous (6.4%), shrubland (22.8%), barren land (1.3%), woody wetlands (1.2%), and mixed forest (1.8%) (Figure 35). Land ownership includes the U.S. Forest Service (USFS) (32.5%), U.S. Bureau of Land Management (BLM) (28.5%), State of Colorado (1.9%), and private conservation lands (2.2%) (Figure 35).

Recommended Management Strategies/Options

Sportfish Management

- Continue intensive stocking of catchable Rainbow Trout in Rifle Gap Reservoir, Harvey Gap Reservoir, Rifle Rest Area Pond, and Parachute Pond.
- Manage the Colorado River from the stateline upstream to Rifle for endangered/native fish, and the Colorado River upstream of Rifle for trout and native fish. Salmonid species currently inhabiting the Colorado River upstream of Rifle in this fish management unit are Brown Trout, Rainbow Trout, and Mountain Whitefish. Continue to stock subcatchable-sized trout as appropriate to maintain the fishery.
- Manage five Battlement Creek reservoirs and their Battlement Creek tributaries for Colorado River Cutthroat Trout.
- Evaluate public fishing access opportunities to the Colorado River from Rifle to Glenwood Springs and identify public access areas. Determine if more areas can be opened to public access and pursue access agreements, if possible.

- Several Ponds in the Rifle FMU (Alder Park Pond, Parachute Pond, Meadow Lake, and South Rifle Pond) are managed using a Coldwater Sportfish Intensive strategy in which catchable Rainbow Trout are stocked annually. Buds Lake, Bugle Lake, Dry Lake, Mosquito Lake, and Wheeler Lake are all managed as wild trout lakes which are not stocked, meaning these waters rely solely upon natural reproduction and recruitment. Continue to manage these waters using current management strategies.
- Adams Lake, Lost Lake, South Mamm Peak Lake, and Blue Lake (classified as High Lakes), and Battlement Reservoir #1, Battlement Reservoir #3, Battlement Reservoir #7, 96 Ranch Pond, and W&G Reservoir (classified as Native Cutthroat lakes) are stocked with fingerling Colorado River Cutthroat Trout every other year for conservation purposes and to provide angling opportunities. Continue to manage these waters using current management strategies.
- CPW is currently working with the USFS to place a water measurement flume downstream of Battlement Reservoir #2. This work, scheduled for the fall of 2018, will allow for the potential of increased cutthroat trout habitat in Battlement reservoirs #1 and #3.
- CPW partnered with Trout Unlimited and landowners to create a fish passage channel on Elk Creek at the Ware and Hinds Ditch diversion structure near the town of New Castle. Fishery survey data and anecdotal observations of fish attempting to move past the

diversion structure indicate that Elk Creek serves as a major spawning tributary for spring-spawning Rainbow Trout and fall-spawning Brown Trout from the Colorado River. Improving fish passage at this location is expected to expand the distance spawning trout can move up the tributary which will increase access to spawning sites and is expected to benefit trout populations in both Elk Creek and the mainstem Colorado River. CPW will continue monitoring the success of the fish passage channel through periodic surveys on Elk Creek.

- The Colorado River throughout the Rifle FMU, particularly in the upper end of the FMU, is renowned for its trout fishing. In addition to resident populations of Brown Trout and Rainbow Trout, CPW supplements the river between the upper extent of the FMU and the town of Silt with Rainbow Trout. As was the case with many of the waters in Colorado, Rainbow Trout populations declined in the Colorado River beginning in the 1990s when whirling disease was first introduced into the system. CPW stocks whirling disease resistant trout now to allow for recruitment of Rainbow Trout in the system despite the presence of this disease. The New Castle to Silt stretch of the Colorado River is particularly well known for its Brown Trout and Rainbow Trout fishing, and provides some of the best float fishing opportunities in the area.

Rifle Gap Reservoir

- Two of the most popular recreational fisheries in the Rifle FMU are Rifle Gap Reservoir and Harvey Gap Reservoir, both of which are located in the Rifle State Park Complex, which is managed by CPW. Rifle Gap Reservoir is a very well-known fishery for anglers and provides fishing opportunities for Rainbow Trout, Brown Trout, Yellow Perch, Black Crappie, Walleye, Northern Pike, and Smallmouth Bass. A Lake Management Plan, which is intended to set the course for future management of the fishery, was completed for Rifle Gap Reservoir in 2015. Under this approved Lake Management Plan, CPW is able to manage for and stock Rainbow Trout, Black Crappie, Yellow Perch (if needed), and triploid (sterile) Walleye. Prior to the approval of this Lake Management Plan, CPW was only able to stock trout in Rifle Gap. As part of the approved Lake Management Plan, CPW also agreed to take steps to disadvantage nonnative species in the reservoir that are deemed non-compatible with recovery goals for native fish species in the upper Colorado River Basin. These steps include the use of unlimited bag and possession limits for both Northern Pike and Smallmouth Bass in the reservoir, removing Smallmouth Bass and Northern Pike when encountered during biennial standardized surveys, and conducting a three-year project in which gravid female Walleye are actively removed from the reservoir during the spawning season using gill nets along the dam. Colorado State University will be utilizing samples taken from lethally-removed Walleye for additional research into diet and growth of Walleye in Rifle Gap. Non-lethal samples may also be taken from other Walleye which are not lethally removed but are encountered during the removal efforts and standardized surveys conducted on the reservoir. More details regarding the Lake Management Plan including species-specific goals and objectives can be found in the Lake Management plan at: http://cpw.state.co.us/Documents/Fishing/RifleGapResMgmtPlan.pdf.
- An additional component of the management of Rifle Gap Reservoir, which triggered approval of the stocking of nonnative, non-salmonid fish species in the reservoir, was the installation of a fish screen in Rifle Creek downstream of Rifle Gap Reservoir in 2013. This fish screen is an anti-escapement device intended to preclude escapement of nonnative fish species from Rifle Gap into Rifle Creek where these fish could ultimately get to endangered fish Critical Habitat in the Colorado River. The fish screen in Rifle Creek is a large concrete structure which forces all of the flow of Rifle Creek through two Coanda screens, which filter out 90% of all solids that are at least 1.0 mm in diameter and filter out all solids that are at least 2.0 mm in diameter. The operation and

maintenance of this screen is a time-consuming effort that is conducted by CPW's Rifle Gap State Park personnel. The cleaning and maintenance of this screen involves routine (typically daily) visits to the screen to clean the screen and document and remove all fish entrained in the screen. As of December of 2017, a total of 412 nonnative, non-salmonid fish have been entrained in the screen, including 126 Northern Pike, 79 Smallmouth Bass, and 23 Walleye during the first five years of its operation. An additional component of monitoring the effectiveness of the screen is annual fishery surveys of Rifle Creek conducted by CPW in the fall using a single pass method with bank electrofishing gear. These data gathered from Rifle Creek demonstrate nonnative fish (e.g. Northern Pike, Smallmouth Bass, etc.) that have escaped from the reservoir have not been collected in Rifle Creek downstream of the fish screen. These data, combined with entrainment data from the screen, provide evidence that the screen is very effective at precluding escapement of nonnative fish from Rifle Gap Reservoir into downstream native fish habitat in the Colorado River.

Harvey Gap Reservoir

- Harvey Gap is managed for warmwater fishing opportunities through the regular stocking of Bluegill, Largemouth Bass, Black Crappie, Tiger Muskie, and Channel Catfish. Yellow Perch are also present in the reservoir and are a highly desirable species for anglers. In addition to the stocking of warmwater fish species, CPW annually stocks catchable Rainbow Trout in the spring and the fall to provide additional trout fishing opportunities. Other species in the reservoir, which CPW is not managing for, include Northern Pike and Smallmouth Bass; CPW encourages anglers to catch and keep as many of these fish as possible as there are no bag and possession limits in place. CPW has been successfully stocking Tiger Muskie (a minimum of 16" in length) in Harvey Gap Reservoir from 2013 through 2018 (with the exception of 2017 due to the reservoir draw down) to provide a unique angling opportunity. CPW is able to stock cool-warmwater fish species in Harvey Gap Reservoir that are compatible with native species downstream despite the presence of an anti-escapement device because water leaving Harvey Gap Reservoir does not have a connection to the Colorado River or any of its tributaries.

- The reservoir was drawn down substantially by Silt Water Conservancy District for much of 2017 to allow for an inspection of the reservoir's outlet. Due to the potential risk of a portion of the fishery being lost while the reservoir was drawn down, CPW instituted a public fish salvage regulation on the lake in which bag and possession limits were removed for all fish species. The salvage regulation was subsequently removed once the reservoir started to refill. Preliminary data gathered by CPW and conversations with anglers suggest that all of the fish species present in the reservoir prior to the drawdown were still present following the draw down. Anecdotally, anglers reported excellent ice fishing at Harvey Gap Reservoir following the drawdown, which further demonstrates the persistence of the fishery throughout the drawdown of the reservoir. A standardized survey will be conducted on the reservoir in the fall of 2019 to further evaluate the effects of the draw down on the fishery.

- One of the major limiting factors for Harvey Gap Reservoir is the lack of structure in the lake, which likely limits the recruitment of smaller-bodied fish species (i.e. Black Crappie, Bluegill, Yellow Perch) in the reservoir. In 2018, CPW partnered with Silt Water Conservancy District and local anglers to deploy 25 artificial tree structures in the reservoir.

Native Species Management

- The Rifle FMU is a transitional zone in which the fishery shifts from warmer water fish species, including native fish, to a coldwater trout-dominated stream. Although native Colorado River species are present in the Rifle FMU, much of the native fish management in the Rifle FMU focuses on eliminating potential for escapement of predatory nonnative fish species (e.g. Northern Pike and Smallmouth Bass) from lakes and reservoirs in the FMU. Specifically, CPW maintains and monitors the effectiveness of the Rifle Creek screen at precluding escapement of nonnative fish from Rifle Gap Reservoir, and also maintains an anti-escapement device and actively removes Northern Pike at a private pond in the FMU that reconnects to the Colorado River during high water events. CPW leads nonnative fish control efforts on the Colorado River in this FMU to reduce the abundance of competing, hybridizing and/or predatory nonnative fish that negatively affect native species.
- Boreal Toads have not been found in this unit although potential habitat exists in the higher elevation areas of Battlement Mesa and in the Flattops area north of Rifle, Silt, and New Castle. The Battlement Creek area has been surveyed for Boreal Toads.
- Continue annual inventory work for suitable waters for re-introduction of Colorado River Cutthroat Trout.
- Continue to monitor and conduct native fish surveys on the Colorado River in the FMU to evaluate long-term trends in native species abundance.
- Identify tributaries important to Roundtail Chub, Flannelmouth Sucker, and Bluehead Sucker.
- Collaborate with USFWS on stocking, monitoring, and conservation needs of Colorado Pikeminnow, Razorback Sucker, and Bonytail.

Nonnative Species Management

- The Rifle FMU is a transitional zone in which the fishery shifts from warmer water fish species, including native fish, to a coldwater trout-dominated stream. Although native Colorado River species are present in the Rifle FMU, much of the native fish management in the Rifle FMU focuses on eliminating potential for escapement of predatory nonnative fish species (e.g. Northern Pike and Smallmouth Bass) from lakes and reservoirs in the FMU. Specifically, CPW maintains and monitors the effectiveness of the Rifle Creek screen at precluding escapement of nonnative fish from Rifle Gap Reservoir, and also maintains an anti-escapement device and actively removes Northern Pike at a private pond in the FMU that reconnects to the Colorado River during high water events. CPW leads nonnative fish control efforts on the Colorado River in this FMU to reduce the abundance of competing, hybridizing and/or predatory nonnative fish that negatively affect native species. Continue to utilize these actions to suppress detrimental nonnative fish in the FMU.

Rifle Gap Reservoir

- Hybridization of native Bluehead and Flannelmouth suckers with invasive nonnative suckers (White and Longnose) is an issue in this FMU. Nonnative sucker species should be removed when encountered. Escapement of non-native suckers from impoundments and ditches should be controlled or minimized when feasible.

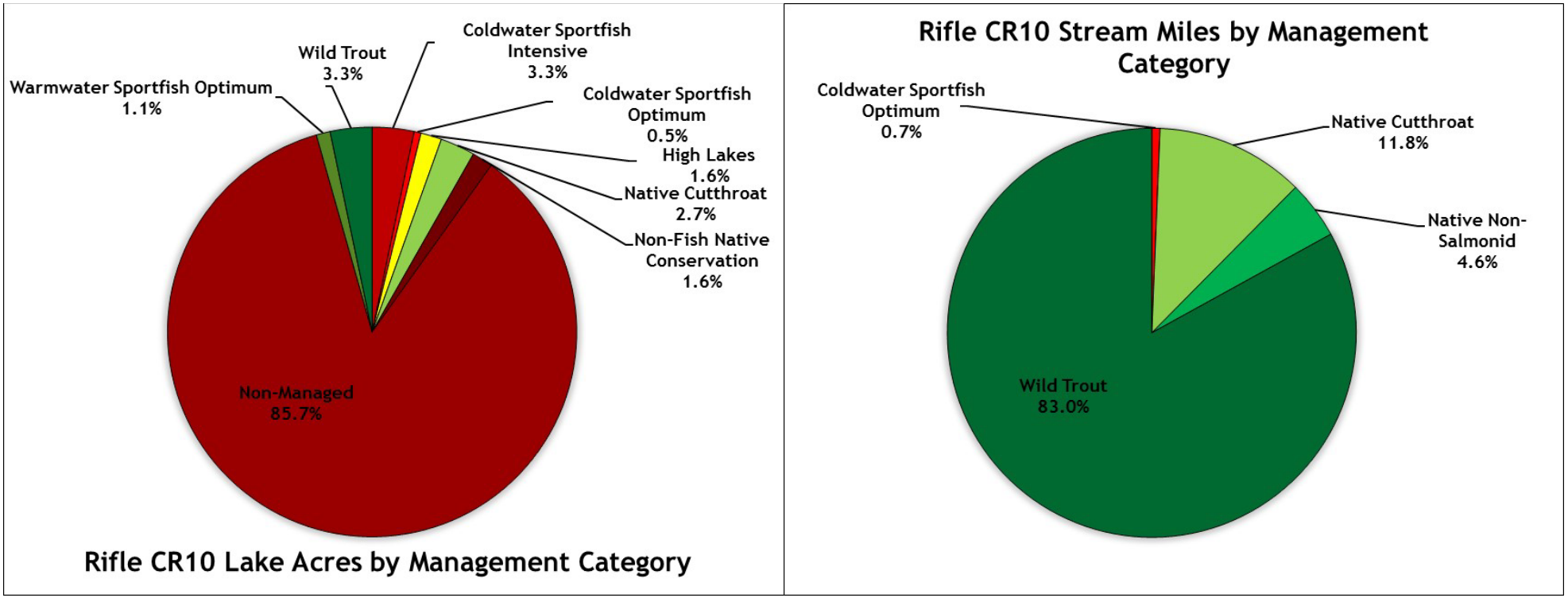


Figure 34. Summary of lake and stream classification statistics for the Rifle FMU (CR10).

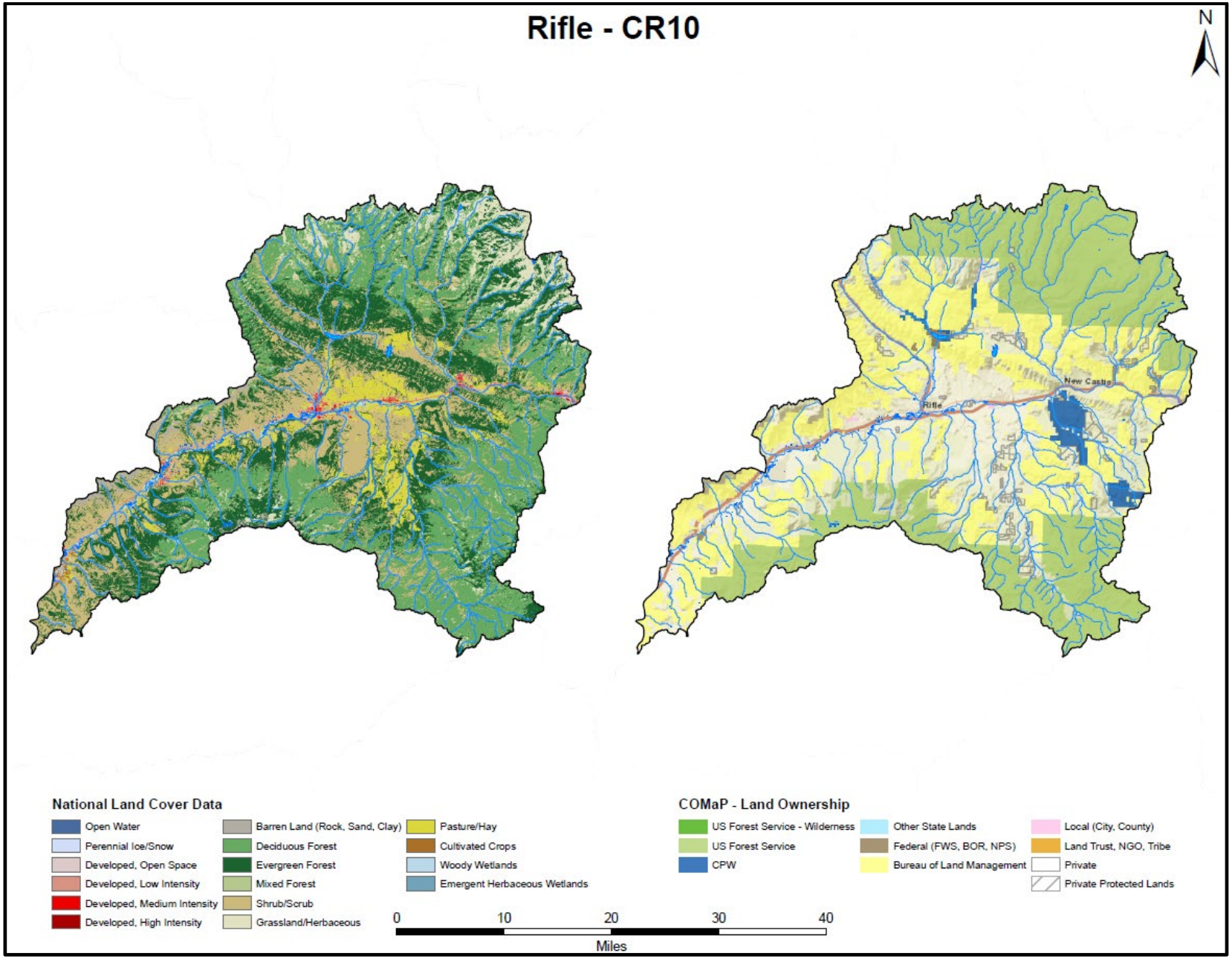


Figure 35. Land cover and ownership for the Rifle FMU - CR10.

LOWER COLORADO RIVER BASIN

Roan-Parachute Creek Fish Management Unit - CR11

Overview

The Roan-Parachute Creek FMU includes the entire drainages of Roan Creek and Parachute Creek (Figure 36). The western and southern boundary of the Roan-Parachute Creek FMU is the Grand Junction FMU. The Roan Plateau, with all waters in the Roan and Parachute creek drainages is on the north and east sides of the unit. The Colorado River and its floodplain are not in the unit. This FMU encompasses 708 square mi, with three lakes and 80 stream segments totaling 452.1 mi. Standing water resources include waters in two classifications: Native Cutthroat and Non-Managed (Figure 37). Stream resources include waters in two classifications: Native Cutthroat and Wild Trout (Figure 37). All stocking efforts conducted by CPW in this FMU are for the conservation of Colorado River Cutthroat Trout and includes relatively recent stocking events in Brush Creek, Carr Creek, East Fork Parachute Creek, Roan Creek, and Trapper Creek.

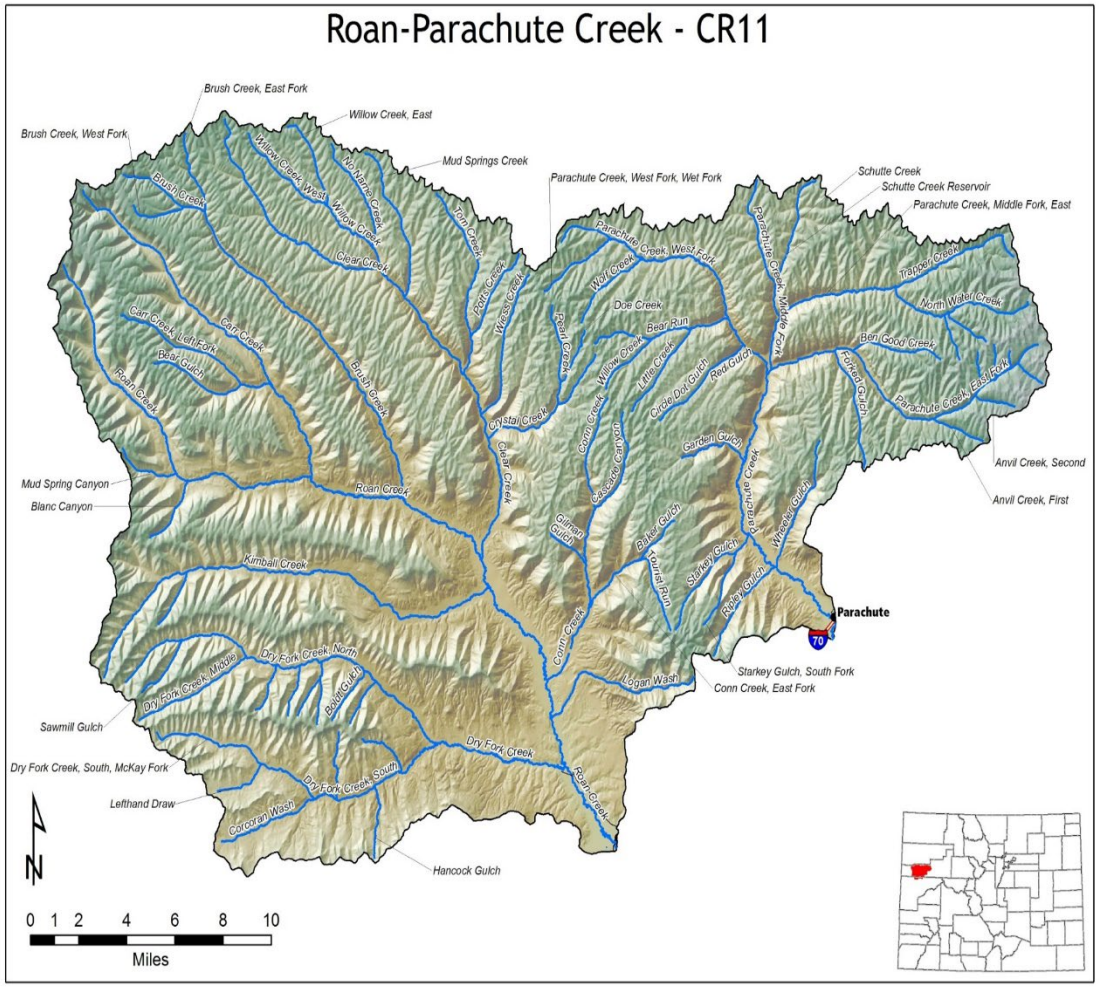


Figure 36. Map of the Roan-Parachute Creek FMU

No Boreal Toad populations are known to occur in this FMU.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (27.6%), aspen dominated deciduous forest (22.2%), barren land (6.5%), pasture/hay (1.5%), grassland/herbaceous (1.5%) (Figure 38). Land ownership includes the U.S. Forest Service (USFS) (57.4%), U.S. Bureau of Land Management (BLM) (41%), and private conservation lands (1.1%) (Figure 38).

Recommended Management Strategies/Options

Sportfish Management

- Nonnative sportfish management in the Roan-Parachute Creek FMU consists solely of relying upon natural reproduction of trout in streams. Many of these waters provide good opportunities to catch resident fish which are sustained by natural reproduction and do not require stocking by CPW. Numerous cutthroat trout fisheries (discussed more in section below) also offer anglers outstanding opportunities for the area's native fish in scenic settings, particularly on the Roan Plateau. The Colorado River Cutthroat Trout streams in this FMU are primarily managed using catch and release regulations for cutthroat trout and restricting terminal tackle to flies and lures only.
- Continue to oversee permitting of stocking of private waters according to the processes set forth in the Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (1996, revised 2009).

Native Species Management

- The East Fork of Parachute Creek on the Roan Plateau was successfully reclaimed for Colorado River Cutthroat Trout through a large chemical treatment project in 2014 conducted by CPW and the BLM. Nonnative Brook Trout were successfully eradicated from the upper four miles of the drainage, including tributary streams, using the piscicide rotenone in the fall of 2014. The project stretched downstream to a man-made fish barrier which was constructed in 2013. This treated area was subsequently stocked with green-lineage Colorado River Cutthroat Trout in 2015. Phase 2 of the project, conducted in 2018, involved treatment of the remaining five miles of stream from the man-made barrier downstream to the lower terminus of the project which is a large natural waterfall. Green-lineage Colorado River Cutthroat Trout will be stocked in this lower portion of the drainage once it is confirmed that all Brook Trout have been successfully removed from the drainage.

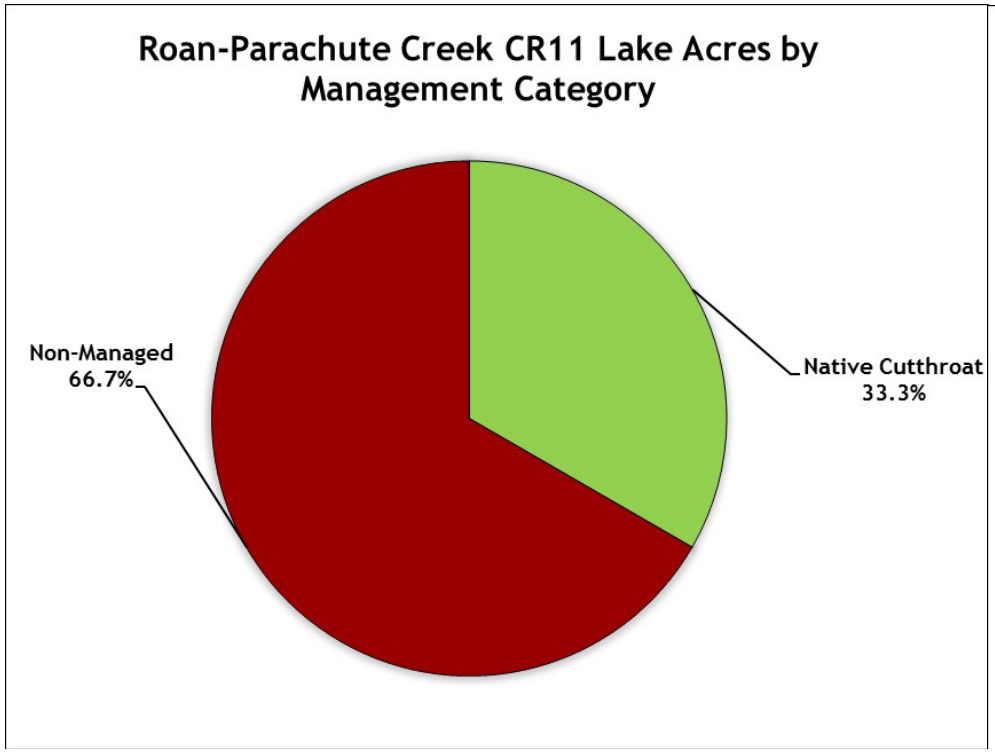
- CPW, in cooperation with the BLM, conducted annual mechanical removal efforts of nonnative Brook Trout and Rainbow Trout between 2013-2017 in a 1.8-mile stretch of Roan Creek near Blanc Canyon. This area has been identified as a high-density area of nonnative salmonids in Roan Creek. Annual removal efforts using a single pass with backpack electrofishing units are intended to reduce the likelihood of upstream migration of nonnative fish to the upper stretches of Roan Creek, which contain green-lineage Colorado River Cutthroat Trout. A wild spawntake operation for green-lineage Colorado River Cutthroat Trout was held regularly in Roan Creek up until 2014 when the spawning operation was suspended due to Rainbow Trout introgression in some individuals and the presence of bacterial kidney disease, which is a restricted pathogen in CPW's hatcheries. Future work should focus on the continued mechanical removal efforts of nonnative fish on Roan Creek both at the spawning operation site and at the 1.8-mile stretch downstream of the spawning site to provide a buffer area between nonnative fish in the lower reaches of Roan Creek and the site of the spawning operation. CPW should continue to explore options for long-term control of nonnative fish in Roan Creek, as well as options to protect the upper reaches of Roan Creek from nonnative fish (i.e. a fish barrier). The green-lineage Colorado River Cutthroat Trout population in upper Roan Creek should be monitored closely to monitor population density, and to also determine if the prevalence of Rainbow Trout and introgressed cutthroat trout is increasing. The headwaters of Carr Creek, Left Fork Carr Creek, and Brush Creek, which are all tributaries of Roan Creek, are also Colorado River Cutthroat Trout Conservation Populations.

- The Roan Plateau serves as a local stronghold for Colorado River Cutthroat Trout. In addition to East Fork Parachute Creek (discussed above), Northwater Creek, Trapper Creek, and the East Middle Fork of Parachute Creek, all of which originate on the Roan Plateau, are designated as Conservation Populations for Colorado River Cutthroat Trout. These streams should continue to be surveyed periodically to monitor population trends. Additionally, the East Middle Fork of Parachute Creek should continue to be surveyed regularly on private property downstream of the natural waterfall to continue to monitor water quality and cutthroat trout population trends. CPW is committed to the regular monitoring of East Middle Fork Parachute Creek as part of a Memorandum of Understanding between CPW and the current landowner (Caerus Oil and Gas LLC) to evaluate extraction operations in the area that may influence Colorado River Cutthroat Trout populations.
- Preliminary data and anecdotal evidence suggest that Roan Creek and Parachute Creek are seasonally utilized by native fish species from the Colorado River, including Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub. CPW is exploring options to evaluate the specific movements of native fish in Parachute Creek (e.g. numbers of fish seasonally moving through creek, species composition, timing of movements, geographical extent of movements, etc.). Although specific details of this potential project are not available at this time, the approach of this potential project could involve the use of submersible passive integrated transponder (PIT) tag antennas.
- Boreal Toads are not known to occur in this unit, and probably only the highest areas on the Roan Plateau would fall within their minimum habitat elevation of 8,000'. The unit was surveyed for aquatic mollusks and a report of findings is on file in the Grand Junction CPW Office.
- Continue annual inventory work to locate suitable waters for re-introduction of Colorado River Cutthroat Trout.
- Continue to manage upper Roan Creek, Carr Creek, Left Fork Carr Creek, Brush Creek, East Fork Brush Creek, Northwater Creek, Trapper Creek, East Fork Parachute Creek, and East Middle Fork of Parachute Creek for Colorado River Cutthroat Trout. Survey regularly to monitor population trends. Continue to manage using restrictive harvest and method of take restrictions.

Nonnative Species Management

- CPW, in cooperation with the BLM, conducted annual mechanical removal efforts of nonnative Brook Trout and Rainbow Trout between 2013-2017 in a 1.8-mile stretch of Roan Creek near Blanc Canyon. This area has been identified as a high-density area of nonnative salmonids in Roan Creek. Annual removal efforts using a single pass with backpack electrofishing units are intended to reduce the likelihood of upstream migration of nonnative fish to the upper stretches of Roan Creek, which contain green-lineage Colorado River Cutthroat Trout. A wild spawntake operation for green-lineage Colorado River Cutthroat Trout was held regularly in Roan Creek up until 2014 when the spawning operation was suspended due to Rainbow Trout introgression in some individuals and the presence of bacterial kidney disease, which is a restricted pathogen in CPW's hatcheries. Future work should focus on the continued mechanical removal efforts of nonnative fish on Roan Creek both at the spawning operation site and at the 1.8-mile stretch downstream of the spawning site to provide a buffer area between nonnative fish in the lower reaches of Roan Creek and the site of the spawning operation. CPW should continue to explore options for long-term control of nonnative fish in Roan Creek, as well as options to protect the upper reaches of Roan Creek from nonnative fish (i.e. a fish barrier). The green-lineage Colorado River Cutthroat Trout population in upper Roan Creek should be monitored closely to monitor population density, and to also determine if the prevalence of Rainbow Trout and introgressed cutthroat trout is increasing. The headwaters of Carr Creek, Left Fork Carr Creek, and Brush Creek, which are all tributaries of Roan Creek, are also Colorado River Cutthroat Trout Conservation Populations.

- Continue to look for opportunities to suppress nonnative fish species to benefit native cutthroat trout, including cutthroat trout conservation opportunities through the removal of nonnative trout during chemical reclamation projects.
- Hybridization of native Bluehead and Flannelmouth suckers with invasive nonnative suckers (White and Longnose) is an issue in this FMU. Nonnative sucker species should be removed when encountered. Escapement of nonnative suckers from impoundments and ditches should be controlled or minimized when feasible.



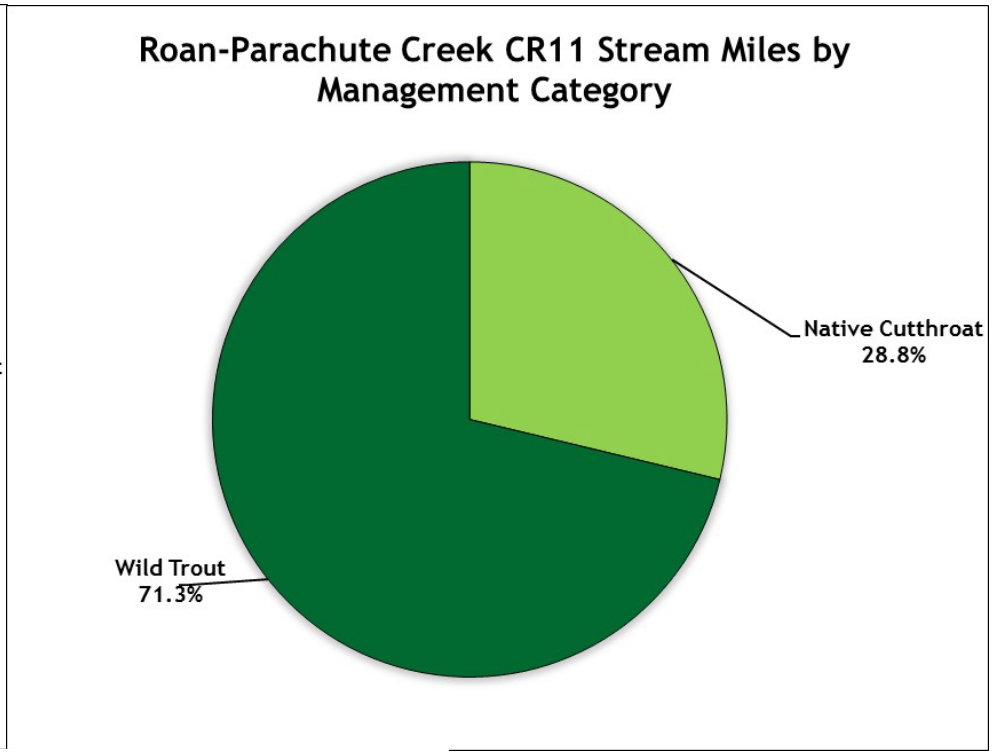


Figure 37. Summary of lake and stream classification statistics for the Roan-Parachute Creek FMU (CR11).

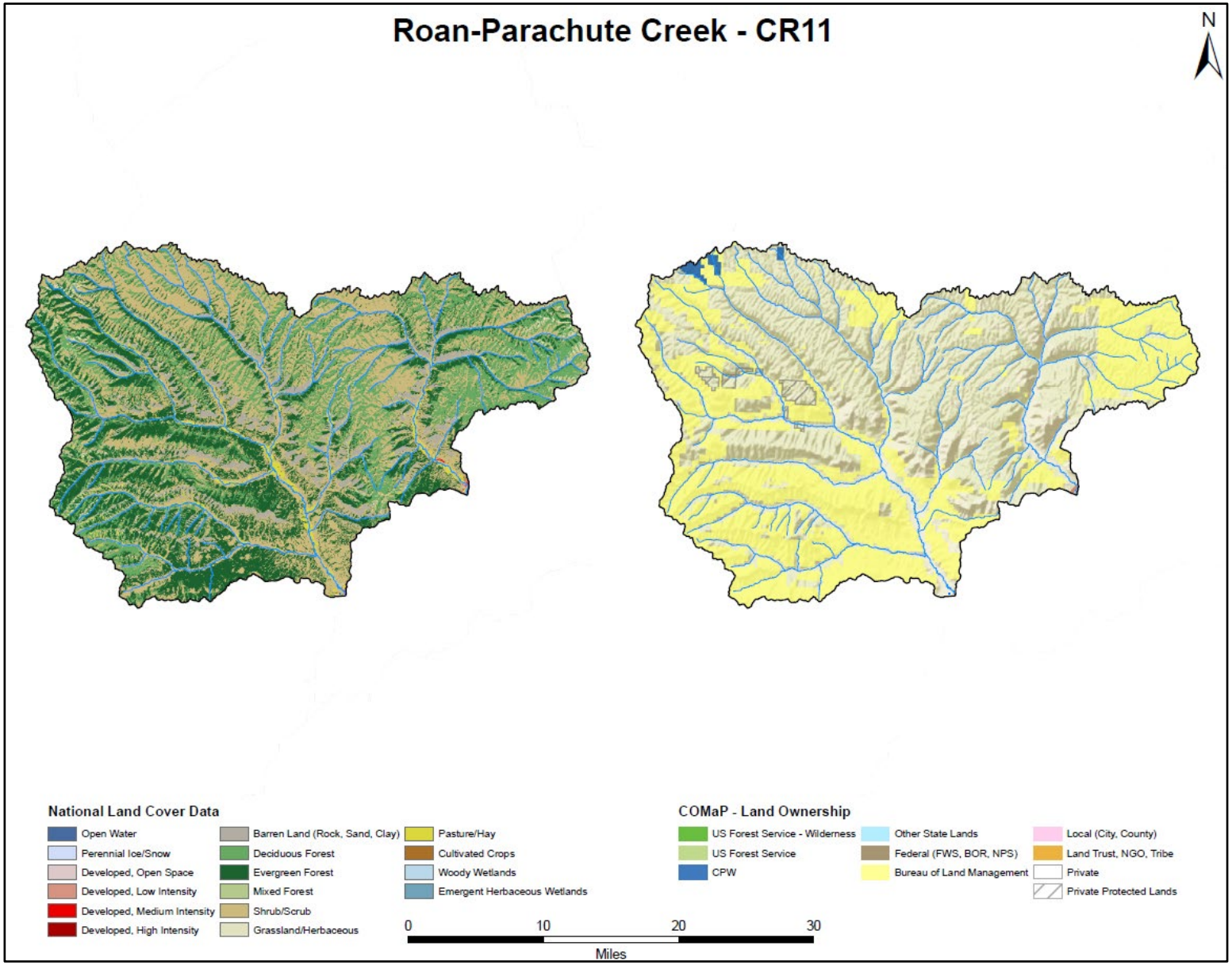


Figure 38. Land cover and ownership for the Roan-Parachute Creek FMU - CR11.

LOWER COLORADO RIVER BASIN

Plateau Creek Fish Management Unit - CR12

Overview

The Plateau Creek FMU includes the entire drainage of Plateau Creek and several drainages on the northwest side of Grand Mesa near Palisade, Colorado (Figure 39). The west boundary of the FMU is the floodplain of the Colorado River. The south-flowing drainages off Battlement Mesa are the north side of the FMU. The headwater streams of Buzzard Creek form the eastern boundary. All north flowing drainages off the Grand Mesa form the southern side of the FMU. This FMU encompasses 682 square mi, including 122 lakes and reservoirs totaling 2,763.8 ac, and 105 stream segments across 562.5 mi. Standing water resources include waters in seven classifications: Coldwater Sportfish Intensive, Coldwater Sportfish Optimum, High Lakes, Native Cutthroat, Non-Managed, Wild Trout, and Wild Warmwater (Figure 40). Stream resources include waters in four classifications: Native Cutthroat, Native Non-Salmonid, Wild Trout, and Wild Trout Special Regulations (Figure 40).

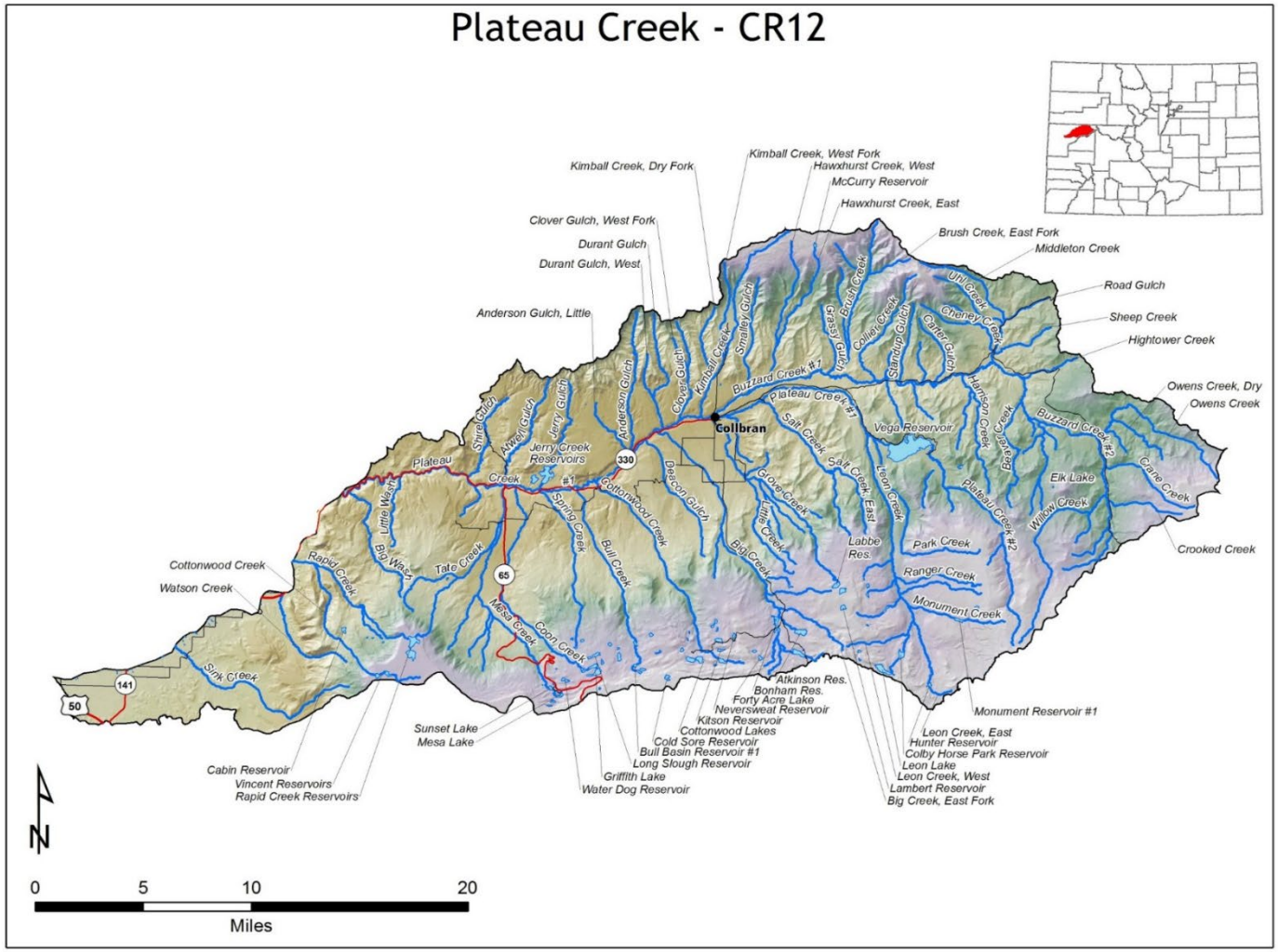


Figure 39. Map of the Plateau Creek FMU - CR12.

The majority of the standing water acreage in this FMU is in lakes and ponds on the Grand Mesa, a very popular area for trout anglers (see the Sportfish Management section for more details). The longest streams in this FMU are Plateau Creek (48.2 miles), Buzzard Creek (37.4 miles), Big Creek (23.5 miles), Leon Creek (20.9 miles), and Cottonwood Creek (12.1 miles). The Colorado River and its 100-year floodplain in the Plateau Creek FMU are designated critical habitat for endangered Colorado River fish species. CPW regulates private fish

stocking on the western slope of Colorado to ensure approved fish species are stocked and that escapement of stocked fish is not likely based on conditions at the stocking applicant's waterbody (including location relative to the 100-year floodplain, presence of a berm, and screening of all potentially fish-passable inlets and outlets).

One population of Boreal Toad is present in this FMU.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (28.5%), aspen dominated deciduous forest (32.1%), grassland/herbaceous (5.2%), shrubland (20.4%), woody wetlands (1.5%), cultivated crops (1.2%), and mixed forest (2.6%) (Figure 41). Land ownership includes the U.S. Forest Service (USFS) (44.2%), private (34%), U.S. Bureau of Land Management (BLM) (16.2%), and private conservation lands (4.1%) (Figure 41).

Recommended Management Strategies/Options

Sportfish Management

- Continue intensive stocking of catchable Rainbow Trout at Beaver Lake, Glacier Springs Retention Pond, Jumbo Reservoir, Mesa Lake, Sunset Lake, Cottonwood Lake #1, Cottonwood Lake #4, Neversweat Reservoir, Big Meadows Reservoir, Cottonwood Lake #1, Kitson Reservoir, and Water Dog Reservoir.
- Continue periodic stocking of Tiger Trout in Cottonwood Lake #4, Cottonwood Lake #1, Big Meadows Reservoir, Main Griffith Lake, and Neversweat Reservoir. Continue regularly scheduled surveys of these waters to evaluate Tiger Trout stocking rates and response of Fathead Minnow populations. Continue to evaluate other suitable waters for Tiger Trout stocking.
- Continue to stock Arctic Grayling periodically at Kitson Reservoir and Bonham Reservoir. Monitor populations periodically through standardized fish surveys.
- Continue to stock subcatchable Brook Trout in De Camp Reservoir. Use standardized surveys to monitor fishery periodically and stock with conservative numbers of Brook Trout, as needed, to supplement the resident population.
- Continue annual stocking of subcatchable Snake River Cutthroat Trout and Rainbow Trout in Vega Reservoir. Continue to survey the fishery regularly to assess long-term impacts of establishment of Fathead Minnow. Use fishery survey data to evaluate stocking rates of subcatchable trout.

- Continue biennial stocking of cutthroat trout fingerlings at Atkinson Reservoir, Bull Basin Reservoir #1, Bull Creek Reservoir #1, Bull Creek Reservoir #2, Bull Creek Reservoir #3, Colby Horse Park Reservoir, Finney Cut Lake #1, Finney Cut Lake #2, Kenny Creek Reservoir, Leon Lake, Lily Lake, Lost Lake, Rock Lake, Monument Reservoir #1, and Big Creek Reservoir #1. Periodically monitor fisheries to assess stocking rates. Assess stocking strategy at Big Creek Reservoir #1 to determine if stocked fish are recruiting to a catchable size despite the presence of whirling disease.
- Continue to manage Colorado River Cutthroat Trout populations and, where feasible, work to address threats to long-term persistence. In particular, conservation and monitoring efforts should be focused on East and West Brush Creek as these streams still contain relatively genetically-pure Colorado River Cutthroat Trout.

- Jerry Creek Reservoir #1 and Jerry Creek Reservoir #2, located approximately nine miles west of Collbran, provide a unique fishing opportunity for Largemouth Bass and Bluegill. These reservoirs are managed as a municipal water supply by Ute Water Conservancy District. Due to their status as a municipal water supply, fishing at the reservoirs is limited to artificial flies and lures, and all fish caught must be returned to the water immediately. Fishing is permitted from shore and from float tubes with chest high waders only; no water contact is allowed. These reservoirs were first opened to public fishing in 1999 as part of an easement between Ute Water Conservancy District and CPW. Jerry Creek Reservoir #1 is well-known locally for producing a good number of large Bluegill, including the occasional Bluegill in the 10 to 12 inch range. CPW partnered with Ute Water Conservancy District in 2015, 2016, and 2017 for an unlimited harvest event on Bluegill in Jerry Creek Reservoir #1 to reduce Bluegill density. A reduction of Bluegill numbers was desirable to reduce the amount of fish lost in the spring during an annual die-off event (presumably driven by density-dependent factors), and to increase the size potential of Bluegill in the reservoir by allowing the remaining fish to have less competition for resources in the lake. Over the first three years of the event, a total of 4,609 Bluegill were harvested. Average size of fish increased throughout the first three years of this event, which suggests this event is successfully increasing the size of Bluegill in Jerry Creek #1. Furthermore, Ute Water Conservancy District removed 1,560 dead Bluegill during the die-off in the spring of 2015, compared to 422 Bluegill in 2016 and, most recently, 75 Bluegill in 2017. This dramatic decrease in the significance of these die-off events correlates well with the timing of these harvest events. CPW plans to continue the annual event to continue to control Bluegill numbers in Jerry Creek Reservoir #1 and to evaluate other measures that may be utilized to accomplish the same objectives. The fishery at Jerry Creek Reservoir #1 should be monitored through periodic standardized surveys by CPW to determine if Bluegill abundance declines to a point in which the unlimited harvest event should be temporarily suspended. Catch of Bluegill during these standardized surveys should be monitored closely because these lakes rely upon natural reproduction and recruitment as CPW is not able to stock these waters. Jerry Creek Reservoir #1 is well known for its Bluegill fishery, while Jerry Creek Reservoir #2 is less fished but known for its Largemouth Bass fishery. CPW will continue to periodically survey these fisheries and conduct an annual harvest event in partnership with Ute Water as long as data suggest that the event is necessary.
- The majority of CPW's sportfish management in the Plateau Creek FMU consists of management of coldwater lakes, ponds, and reservoirs on the Grand Mesa. Fishing on the Grand Mesa is a big draw for people visiting the area and management of these sport fisheries is economically vital to the local communities near the Grand Mesa, which benefit from the seasonal influx of visitors primarily during the summer and fall. Several waters which seasonally receive heavy fishing pressure are managed using an intensive stocking strategy in which catchable Rainbow Trout are stocked regularly, including: Beaver Lake, Glacier Springs Retention Pond, Jumbo Reservoir, Mesa Lake, Sunset Lake, and Water Dog Reservoir. Although a fraction of the stocked fish survive through the winter at these waters, the lakes are functionally managed as put-and-take fisheries in which the vast majority of fish caught by anglers are from recent stockings of Rainbow Trout. These lakes also contain small resident populations of Brook Trout (Jumbo Reservoir, Beaver Lake, Glacier Springs Retention Pond, Mesa Lake, Sunset Lake) and Brown Trout (Beaver Lake, Sunset Lake); although these fish are often more difficult to catch than stocked Rainbow Trout, they offer anglers a chance to catch a variety of fish, including the occasional large Brown Trout, at these waters. An additional consideration that influences stocking rates of catchable Rainbow Trout is that all of these waters, except for Water Dog Reservoir, receive a fair amount of ice fishing pressure, as they are typically easily accessible from Highway 65 in the winter. These waters are all managed using standard regulations.
- A number of waters are stocked with catchable Rainbow Trout, in addition to being stocked periodically with other fish species such as Tiger Trout, Splake, Arctic Grayling, and Colorado River Cutthroat Trout. Predatory Tiger Trout were stocked in lakes on the

Grand Mesa beginning in 2013 to help suppress Fathead Minnow populations, which are now found in a number of popular sport fisheries, and provide angling opportunities for a unique fish species, Tiger Trout, that can grow very large. Cottonwood Lake #4 is managed through the intensive stocking of catchable Rainbow Trout and was also stocked with subcatchable Tiger Trout from 2014-2016. As of the most recent fisheries survey in 2016, Tiger Trout had established well in the reservoir. Anglers report catching them occasionally although, anecdotally, they seem to be harder to catch than stocked catchable Rainbow Trout. Big Meadows Reservoir and Cottonwood Lake #1 have also been stocked with subcatchable Tiger Trout. Subsequent surveys and conversations with anglers indicate that Tiger Trout have successfully established in both waters and make up a portion of fish caught by anglers. Both Big Meadows Reservoir and Cottonwood Lake #1 also have resident populations of Brook Trout, which are infrequently supplemented with stocking of subcatchable fish. Subcatchable Splake are stocked in Big Meadows Reservoir periodically to help control the White Sucker population. Kitson Reservoir is annually stocked with catchable Rainbow Trout, and is also occasionally stocked with Arctic Grayling to provide additional angling opportunities. Kitson Reservoir also has a resident Brook Trout population with the occasional catch of a large Brook Trout. Neversweat Reservoir is primarily managed using an intensive strategy involving annual stocking of catchable Rainbow Trout. Neversweat is known for being very productive, which can produce large fish despite the heavy fishing pressure throughout the summer. Neversweat also has occasional winterkill events in which a large number of fish die due to anoxic conditions stimulated by its productive nature and shallow water depth. Neversweat Reservoir also has an abundant Fathead Minnow population; so CPW plans to stock subcatchable Tiger Trout in 2018 to help control the population and to provide additional angling opportunities for large fish.

- Several waters on the Grand Mesa are managed through the stocking of exclusively subcatchable fish; this management strategy is typically used at waters with lower fishing pressure. The majority of these waters are recreational fisheries managed for cutthroat trout angling through the periodic stocking of cutthroat trout fingerlings, which in many cases are stocked by fixed-wing planes due to lack of access. These put-and-grow cutthroat trout fisheries on the Grand Mesa include Atkinson Reservoir, Bull Basin Reservoir #1, Bull Creek Reservoir #1, Bull Creek Reservoir #2, Bull Creek Reservoir #3, Colby Horse Park Reservoir, Finney Cut Lake #1, Finney Cut Lake #2, Kenny Creek Reservoir, Leon Lake, Lily Lake, Lost Lake, Rock Lake, Monument Reservoir #1, and Big Creek Reservoir #1. These reservoirs are surveyed periodically to evaluate fish abundance and body condition to help inform and adjust stocking rates, as needed. De Camp Reservoir is a small lake that is managed for Brook Trout; Brook Trout are periodically stocked to supplement the resident population. Although catch rates are often slow at De Camp Reservoir, this water is known as a good location to catch large Brook Trout. Forty Acre Lake was historically stocked every other year with subcatchable cutthroat trout. However, cutthroat trout were sampled infrequently during recent fishery surveys, likely as a result of the well-established Brook Trout population. CPW is re-evaluating cutthroat trout stocking in Forty Acre Lake, which is still expected to provide outstanding fishing opportunities for good-sized Brook Trout. Bonham Reservoir is a heavily fished, popular fishery which is stocked regularly with fingerling Arctic Grayling and Cutthroat Trout; fingerling Brown Trout are stocked periodically. White Sucker made up over 89% of all fish caught during the last fishery survey in 2015. The overabundance of White Sucker in Bonham is likely the major limiting factor to the potential of the trout fishery. Cottonwood Lake #2 is a recently developed fishery which CPW first stocked in 2013. The lake is currently being managed through the annual stocking of subcatchable cutbow trout. The most recent survey of Cottonwood Lake #2 in 2017 showed that these stocking events were successful and that there are good densities of plump fish. Cottonwood Lake #5 is periodically stocked with subcatchable Brown Trout and cutthroat trout, and is known for producing some good-sized Brown Trout. Silver Lake is managed through the regular stocking of subcatchable Arctic Grayling and

subcatchable cutthroat trout. To further protect these waters from overharvest and reduce angling mortality, many of these waters (i.e. Bull Basin Reservoir #1, Bull Creek Reservoir #1, Bull Creek Reservoir #2, and Silver Lake) are managed using special regulations, which limit the bag limit and/or restrict angling methods.

- The Griffith Lakes (Main Griffith Lake, West Griffith Lake, and Middle Griffith Lake) are reservoirs which receive light to moderate fishing pressure and are accessible only by foot. Historically, CPW managed Griffith lakes through the periodic stocking of primarily cutthroat trout. However, despite continued stocking, catch rates of trout during standardized fishery surveys declined until 2012 when only Fathead Minnow were detected in surveys conducted at all three lakes. CPW started stocking the lakes with Tiger Trout in 2013 to help control Fathead Minnow populations. Unfortunately, despite the annual stocking of Tiger Trout between 2014 and 2016, Tiger Trout were never detected in fishery surveys in West Griffith or Middle Griffith during fishery surveys in 2015 and 2016. However, Tiger Trout were documented in consecutive surveys on Main Griffith Lake between 2015 and 2017, including a fish over five pounds. CPW will continue to manage Main Griffith Lake for Tiger Trout to control the Fathead Minnow population and to give anglers an opportunity to catch very large Tiger Trout. CPW will continue to monitor the status of West Griffith Lake and Middle Griffith Lake; however, stocking will not occur if the water quality issues associated with the Fathead Minnow invasion continue to occur.
- Vega Reservoir, located 10 miles east of Collbran, is the largest reservoir (857 ac) in the Plateau Creek FMU. Vega is a productive lake that is managed through the annual stocking of fingerling Snake River Cutthroat Trout, Rainbow Trout, and occasionally Colorado River Cutthroat Trout. These fingerling fish grow to a catchable size rapidly and are well known for their plump bodies and red fillets. Vega is a destination fishing location throughout much of the year and is also very popular for ice fishing. Fathead Minnows were recently documented for the first time in Vega and have rapidly become very established. It is possible that Fathead Minnow provide some benefit to the trout fishery, in particular the larger trout, as a forage species. However, it is also possible that survival and/or growth of stocked fingerling trout is negatively affected through competition for resources or displacement of trout by Fathead Minnow. Vega should continue to be surveyed regularly to monitor the status of the trout fishery, and to monitor the longer-term effects of the establishment of Fathead Minnow.
- A total of 29 lakes in this FMU are considered Salmonid Recreation Lakes which means these waters are not stocked. These lakes rely upon natural reproduction to sustain the fishery or lack sufficient habitat quality to justify stocking of fish. Continue to monitor these lakes and determine if stocking is necessary.

Native Species Management

- CPW periodically surveys the lowest 5.5 miles of Plateau Creek (near the Colorado River confluence) which contain native Bluehead Sucker, Flannelmouth Sucker, and Roundtail Chub. Nonnative fish species found in Plateau Creek include Green Sunfish, Black Bullhead, White Sucker, Hybrid Sucker, and the occasional Largemouth Bass. Opportunistic removal of these nonnative species should continue during standardized surveys of the creek. The creek should continue to be monitored regularly to determine long-term trends in native fish distribution and density.
- The Colorado River in the Plateau Creek FMU is being managed for the recovery and conservation of native, non-salmonid fish species. CPW periodically conducts mark-recapture surveys through the Colorado River in this FMU to monitor trends in 3 species (Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker) populations. The U. S. Fish and Wildlife Service (USFWS) has primary jurisdiction in the management of federally-listed fish species in this FMU.

- CPW periodically monitors a recently-discovered population of Boreal Toad located in Buzzard Creek. This population of Boreal Toad is relatively unique in that it has continued to persist despite the presence of chytrid fungus (*Batrachochytrium dendrobatidis*). This population is being evaluated as a potential source of toads for other areas, partially due to their ability to persist despite the presence of chytrid fungus.
- Nine streams in the Plateau Creek FMU are classified as Native Cutthroat Recovery/Conservation Streams, including East Fork and West Fork of Big Creek, Bird Creek, Brush Creek (including East Fork and West Fork), Buzzard Creek #2, Collier Creek, and Coon Creek. One standing water, Cabin Reservoir, is managed as a Native Cutthroat/Conservation Lake. The East Fork and Middle Fork of Big Creek were last surveyed by CPW in 2012. Recent data show that challenges facing these cutthroat trout populations include introgression with Rainbow Trout in addition to the presence of competing nonnative salmonids including Brook Trout and Brown Trout in Middle Fork Big Creek. The drainage is also positive for whirling disease, which likely limits recruitment of native cutthroat trout in the drainage, and threatens the outlook for long-term persistence of native cutthroat trout in this drainage. Bird Creek and Buzzard Creek #2 have Brook Trout and Yellowstone Cutthroat Trout present, and fairly low densities of slightly introgressed (90-99% pure) native cutthroat trout. Cutthroat trout populations in these two drainages were negatively affected by the severe drought in 2002. East and West Brush Creek contain modest densities of Colorado River Cutthroat Trout. The biggest threat to these cutthroat trout populations in Brush Creek is the nearby presence of Rainbow Trout, which threatens the long-term genetic integrity of these populations. Recent data gathered in Coon Creek and Collier Creek suggest that the Colorado River Cutthroat Trout populations are no longer present.
- Continue research efforts to monitor populations of native species (i.e. Bluehead Sucker, Flannelmouth Sucker, and Roundtail Chub) in Plateau Creek, Buzzard Creek, and the Colorado River.

Nonnative Species Management

- Continue to lead nonnative fish control efforts in this FMU to reduce the abundance of competing, hybridizing and/or predatory nonnative fish that negatively affect native species.
- Hybridization of native Bluehead and Flannelmouth Suckers with invasive nonnative suckers (White and Longnose) is an issue in this FMU. Nonnative sucker species should be removed when encountered. Escapement of nonnative suckers from impoundments and ditches should be controlled or minimized when feasible.

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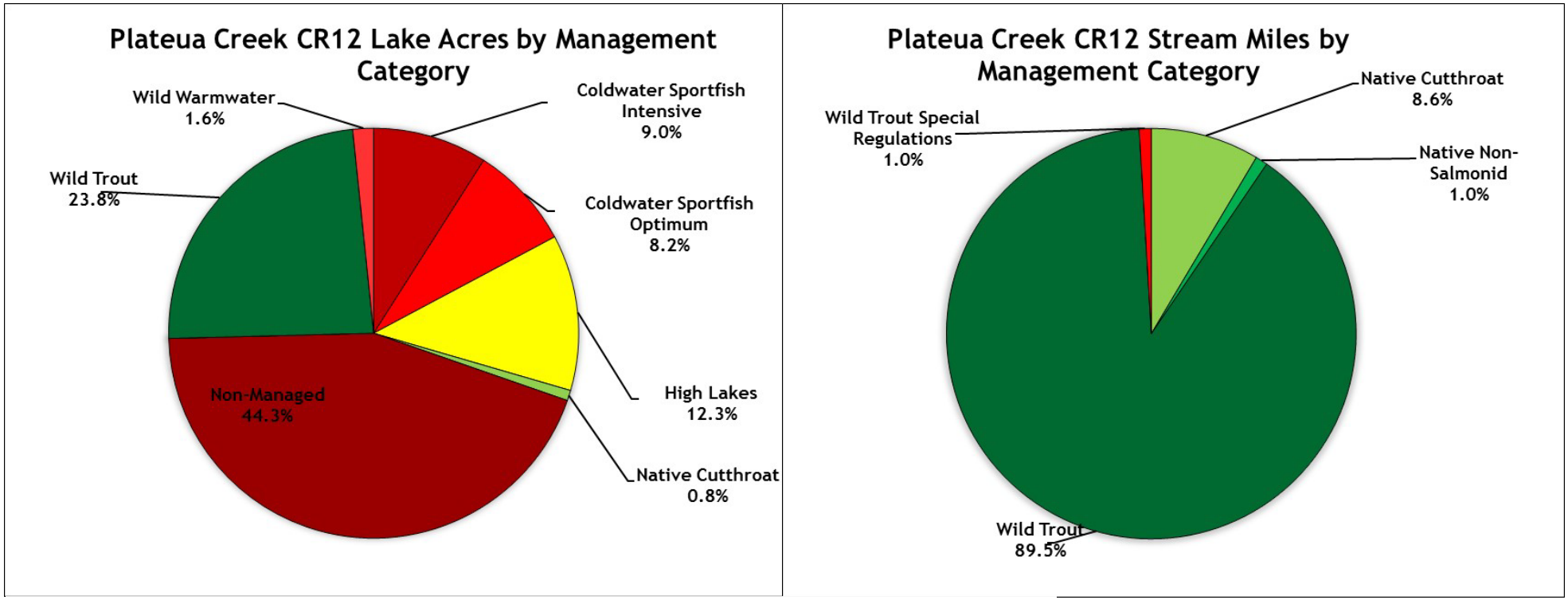

Figure 40. Summary of stream and lake classification statistics for the Plateau Creek FMU - CR12

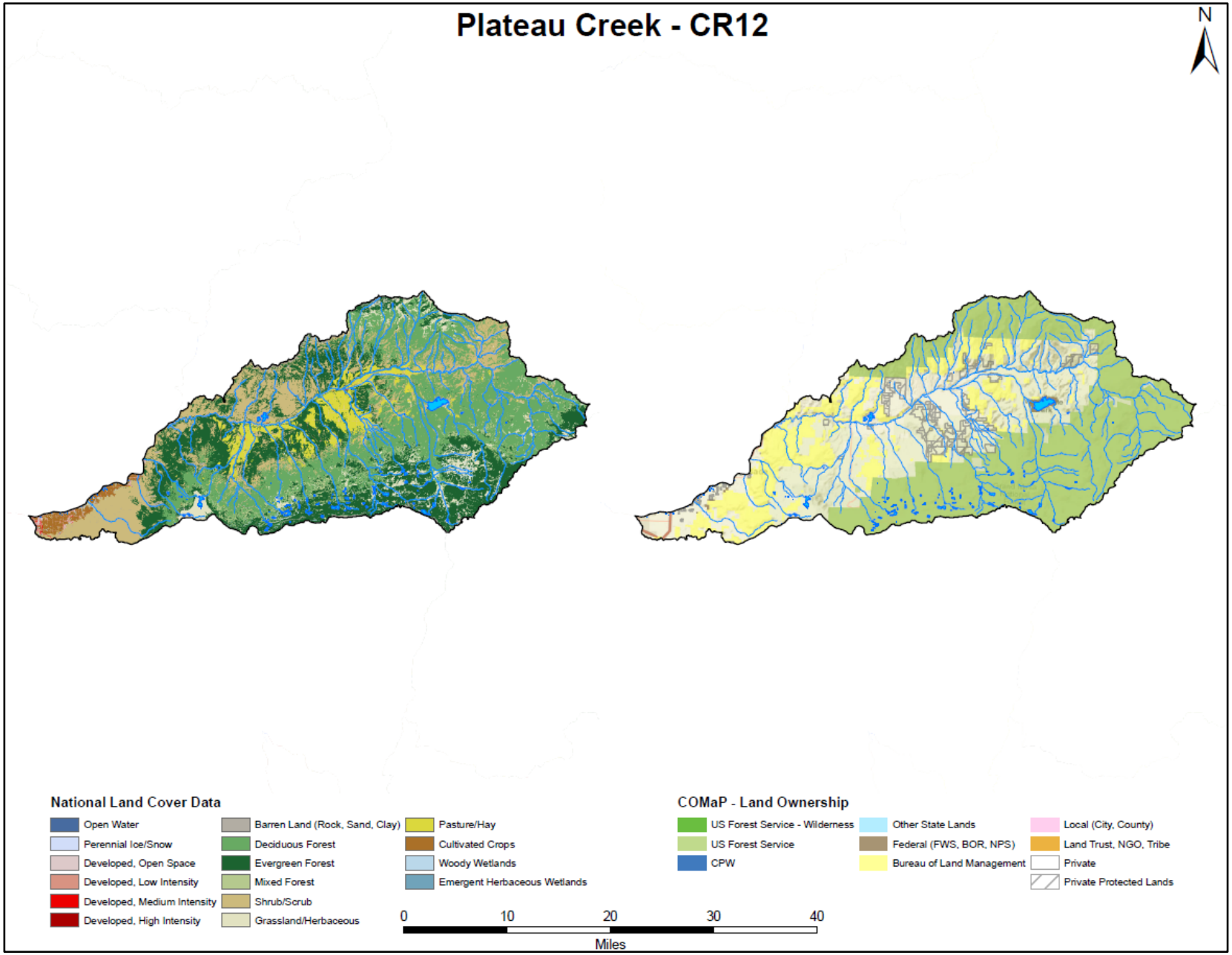

Figure 41. Land cover and ownership for the Plateau Creek FMU - CR12

LOWER COLORADO RIVER BASIN
CR13 Grand Junction Fish Management Unit

Overview

The Grand Junction FMU is located primarily in the Grand Valley of Western Colorado, including the town of Grand Junction (Figure 42). The west boundary of the FMU is the Utah border while the Bookcliffs set the northern boundary; all south flowing waters from the Bookcliffs are included in this FMU. The Colorado River is on the east side of the FMU. The size of the unit is 1,199 square mi, including 405 lakes and reservoirs totaling 1,405.4 ac and 103 stream segments across 899.5 mi. Standing water resources include waters in six classifications: Coldwater Sportfish Intensive, Native Non-Salmonid, Non-Managed, Warmwater Sportfish Intensive, Warmwater Sportfish Optimum, and Wild Warmwater (Figure 44). Stream resources include waters in three classifications: Native Non-Salmonid, Non-Fish Native Conservation, and Wild Trout (Figure 44).

The majority of the standing water acreage in this FMU consists of small ponds (often old gravel pits) that lie in the floodplain of the Colorado River. The longest stream in the FMU is the Colorado River (79.8 mi). The Colorado River and its 100-year floodplain in the Grand Junction FMU is designated critical habitat for endangered Colorado River fish species. CPW regulates private fish stocking on the western slope of Colorado to ensure approved fish species are stocked and that escapement of stocked fish is not likely based on conditions at the stocking applicant's waterbody (including location relative to 100-year floodplain, presence of a berm, and screening of all potentially fish-passable inlets and outlets).

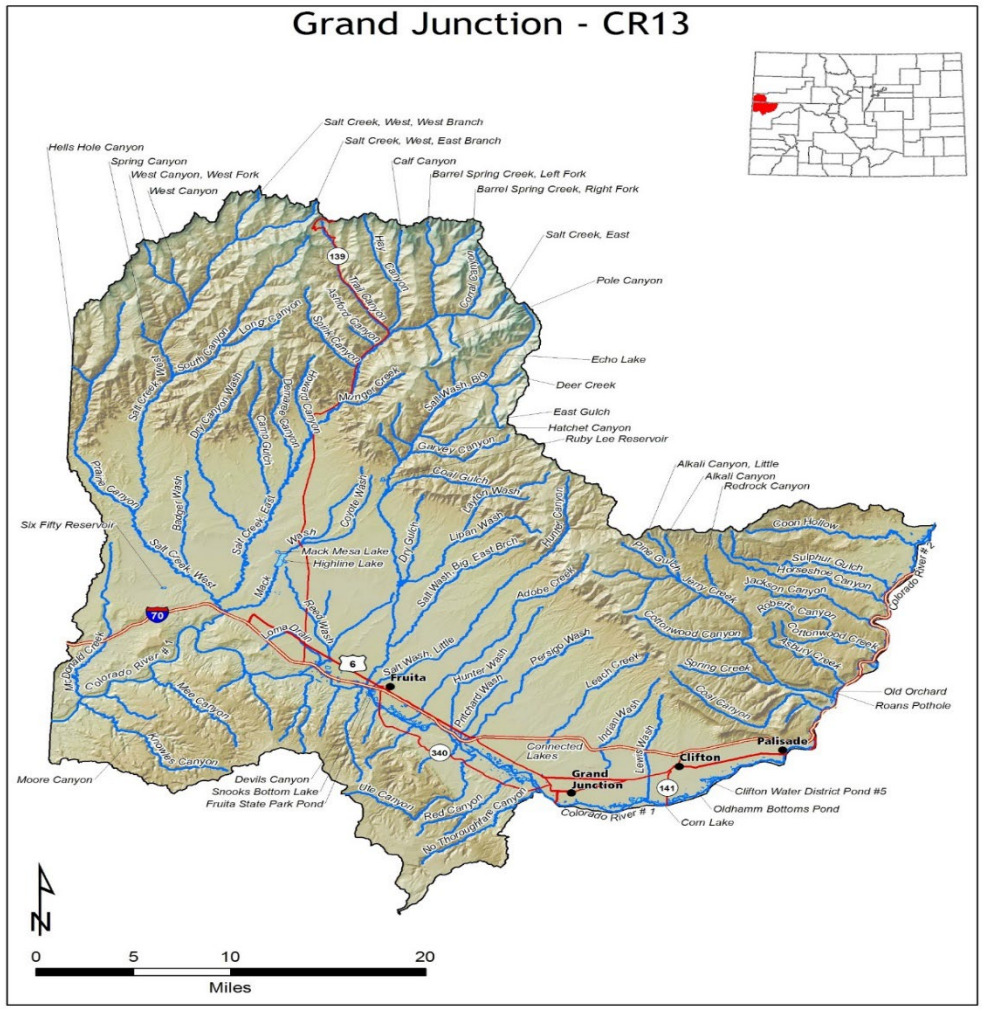

Figure 42. Map of the Grand Junction FMU - CR13.

No Boreal Toad populations are known to occur in this FMU.

Major vegetative cover types include spruce-fir and lodgepole pine dominated evergreen forests (26%), aspen dominated deciduous forest (4.9%), and shrubland (52.5%) (Figure 44). Land ownership includes private (21.8%), U.S. Bureau of Land Management (BLM) (66.3%), BLM Wilderness (7.7%), and National Park Service lands (2.7%) (Figure 43).

Recommended Management Strategies/Options

Sportfish Management

- Continue to manage Connected Lake and Duke Lake for Largemouth Bass and Bluegill using special regulations for Largemouth Bass. Survey both lakes periodically to assess the fishery and evaluate the effectiveness of the special regulations.
- Continue to stock Largemouth Bass and Bluegill in Corn Lake as needed to provide warm water sportfishing opportunities. Survey Corn Lake periodically to evaluate growth and recruitment of stocked warmwater fish.
- Continue to manage Mack Mesa Lake for warmwater fishing opportunities through the stocking of Black Crappie, Bluegill, Channel Catfish, and Largemouth Bass. Survey Mack Mesa periodically to evaluate growth and recruitment of stocked warmwater fish and identify limiting factors.
- Continue to manage Highline Lake, Mack Mesa Lake, Snooks Bottom Lake, Fruita Red Rocks Lake, Corn Lake, West Lake, Roan's Pothole, Old Orchard, and Palisade River Bend Pond as put and take fisheries through the annual stocking of catchable Rainbow Trout in spring and fall when temperatures allow. Utilize spring stocking of broodfish trout when available from hatcheries to generate additional interest in these lower-elevation trout waters and give anglers a chance to catch quality fish.
- Continue to seek out waters that are appropriate for the stocking of warmwater fish to increase opportunities for warmwater anglers. This should be accomplished by reducing chances of escapement at waters currently managed by CPW through berming and or screening to allow increased options for stocking of warmwater fish species. This should also be accomplished by identification and evaluation of waters that are not currently stocked by CPW outside the 100-year floodplain of the Colorado River.
- Most of the lakes and ponds in this FMU are classified as Management Category 700 (Private or Closed Stream/Lake) and are on private land. Although CPW rarely conducts sportfish management in private waters due to lack of public access, CPW is responsible for reviewing non-native fish stocking applications in these private waters to ensure all stocking actions comply with the Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (1996, revised 2009).
- Eight lakes in the unit (Corn Lake, Highline Lake, Roan's Pothole, Old Orchard, Mack Mesa Lake, Palisade River Bend Pond, Snooks Bottom Lake, Fruita Red Rocks Lake, and West Lake) are being managed as put and take fisheries to provide Rainbow Trout fishing opportunities in the spring and fall when water temperatures are cooler. Stocking of catchable Rainbow Trout in Fruita State Park Pond ceased in 2010 due to water quality concerns. Continue to manage these waters using current strategies.
- In addition to the stocking of catchable Rainbow Trout, Mack Mesa, Highline Lake, and Corn Lake are also managed for warmwater fishing opportunities through the stocking of selected warmwater fish species. Continue to manage these waters for warmwater fishing opportunities.
- One of the most popular recreational waters in the Grand Junction FMU is Highline Lake, which provides angling and water sports such as wakeboarding and water skiing. The fishery in Highline Lake is managed as a put and take fishery in which catchable Rainbow Trout are stocked in the spring when water temperatures are cool. Highline Lake is also managed for warmwater fishing opportunities according to the approved Lake Management Plan, by periodic stocking of Largemouth Bass, Bluegill, Channel Catfish, and Black Crappie. Other species found in Highline Lake include Green Sunfish, Yellow Perch, Gizzard Shad, and Smallmouth Bass. Gizzard Shad first appeared in CPW's fall standardized surveys in 2015 when they made up 30% of the sample by number. Gizzard Shad

continued to have the highest abundance of all species during fall surveys in 2016 in which Gizzard Shad made up 48% of the sample and 2017 in which Gizzard Shad made up 30% of the sample. Smallmouth Bass are typically the least prevalent fish species surveyed and typically account for less than 1% of all fish sampled during fall surveys. Highline Lake is known for having an exceptional Largemouth Bass fishery, which can produce the occasional fish in the five to seven pound range. In 1999, a large net was installed in Highline Lake upstream of the spillway to prevent escapement of nonnative fish from Highline Lake into downstream native fish habitat in Salt Creek and the Colorado River. CPW monitors the effectiveness of the net through annual surveys behind the spillway net in the spring prior to the reservoir spilling, and also through in-stream monitoring of Mack Wash at two sites downstream of Highline Lake.

Native Species Management

- The Colorado River in the Grand Junction FMU is managed for the recovery and conservation of native, non-salmonid fish species. CPW periodically conducts mark-recapture surveys through the Grand Valley to monitor trends in 3 species (Roundtail Chub, Flannelmouth Sucker, Bluehead Sucker) populations. The U. S. Fish and Wildlife Service (USFWS) has primary jurisdiction in the management of federally-listed fish species (Colorado Pikeminnow, Humpback Chub, Bonytail, and Razorback Sucker) in this FMU. In addition to native fish surveys, the USFWS also has the lead on nonnative fish control efforts in the Grand Junction FMU on the Colorado River. Bonytail and Razorback Sucker are stocked within this FMU. Continue periodic native fish surveys at historical sampling sites to monitor population trends in the Colorado River within the Grand Junction FMU. Continue to partner with the USFWS in nonnative fish control efforts on the mainstem Colorado River throughout the basin and assist with efforts in the Grand Junction FMU, as needed.
- Salt Creek, a tributary of the Colorado River located near the town of Mack, is used seasonally by native fish species including Colorado Pikeminnow, Bonytail, Razorback Sucker, Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker. In 2015, CPW deployed two circular submersible passive integrated transponder (PIT) tag antennas in the creek to track movement and presence of these native fish species. Discharge in Salt Creek is greatest during the irrigation season of April 1 - November 1 as the stream flow is almost entirely derived from irrigation return water. Due to this, stream flows remain elevated, relatively consistent, and highly turbid throughout the summer rather than dropping after spring runoff. Fish likely are attracted to the continuous summer flows in Salt Creek provided by irrigation releases. The data gathered through this study have documented the seasonal importance of the tributary streams, and have also expanded our knowledge of fish migration throughout the basin (including data showing a Colorado Pikeminnow which had traveled over 100 miles since it had last been encountered in 2005). Continue to operate submersible PIT tag antennas on Salt Creek to further evaluate movement of native fish in this tributary. Identify other tributaries with similar characteristics in the Grand Junction FMU and use submersible PIT tag antennas to determine the seasonal use patterns and movement of fish through these tributaries.
- Continue education efforts to convey the importance of native fish in the Colorado River Basin to anglers and other public stakeholders.
- Boreal Toads are not known to occur in this unit, and probably only the highest areas in the Bookcliffs would fall within their minimum habitat elevation of 8,000 feet.

Nonnative Species Management

- Continue to opportunistically remove competing, hybridizing and/or predatory nonnative fish that negatively affect native species during native fish surveys on the Colorado River and tributaries.
- Continue to monitor and prevent escapement of nonnative fish out of Highline Lake.

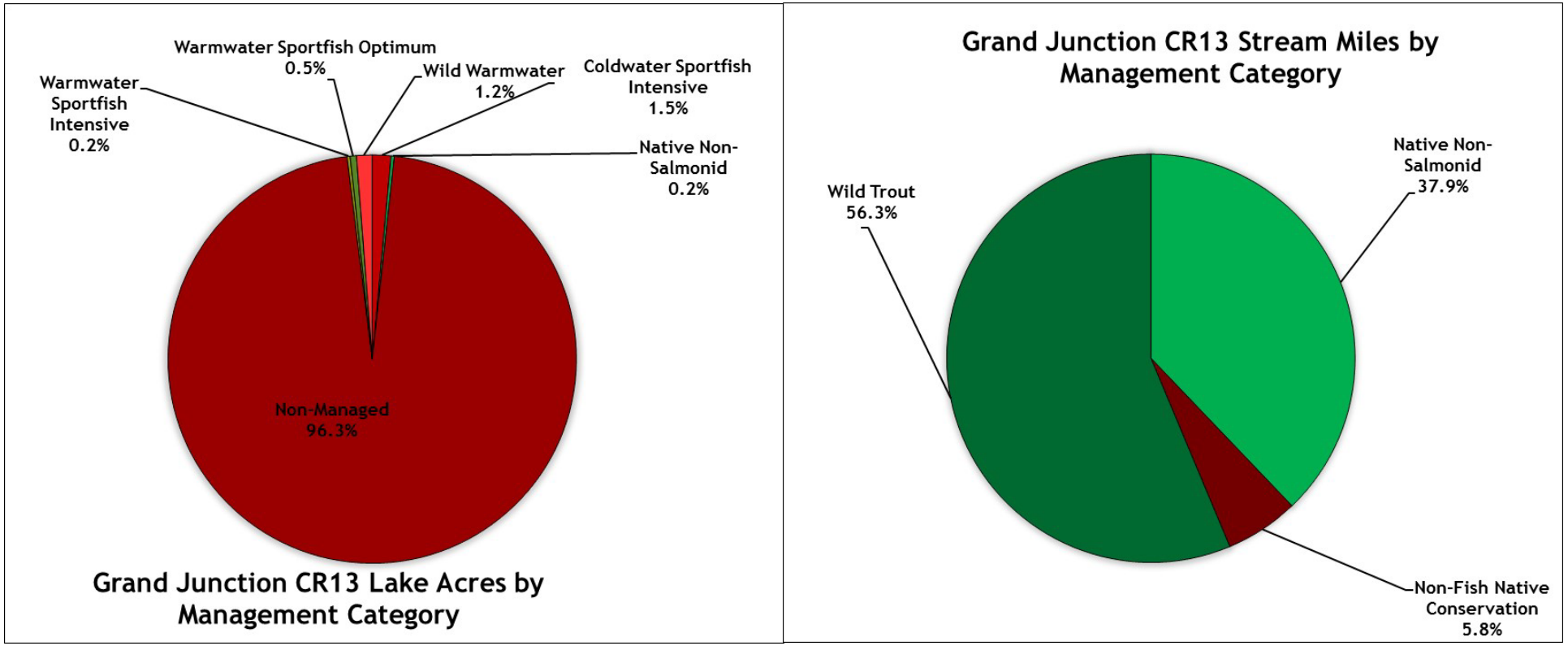

Figure 43. Summary of lake and stream classification statistics for the Grand Junction FMU - CR13.

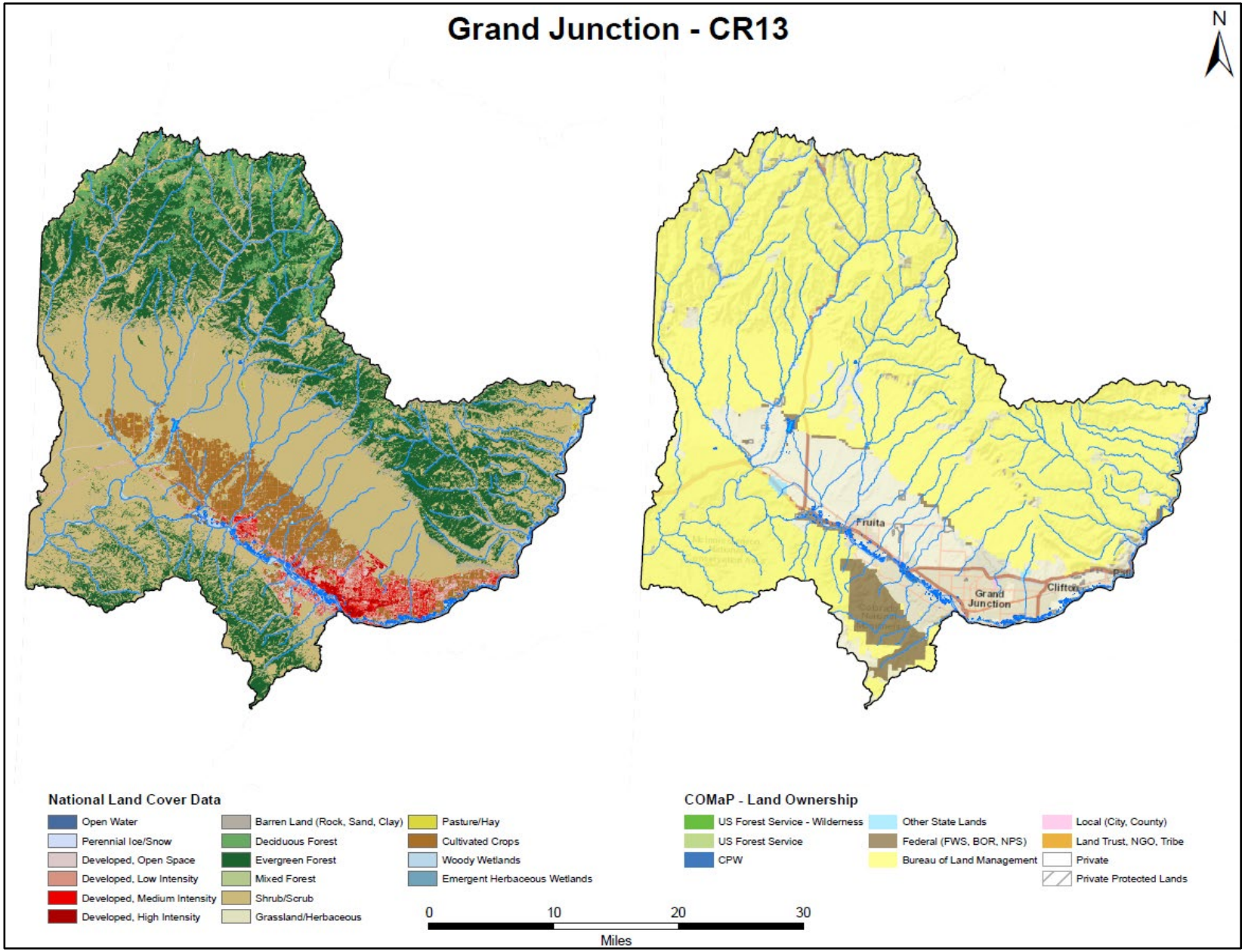

Figure 44. Land cover and ownership for the Grand Junction FMU - CR13.