Platte River Basin

Little Medicine Bow River

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Watershed Description

Six major watersheds were identified for conservation planning purposes under this State Wildlife Action Plan (SWAP) using hydrographic boundaries and fisheries assemblage and management considerations. The watersheds each include one to four sub-regions (4-digit hydrologic unit code [HUC] watersheds). This approach allows the nesting of multiple spatial and temporal scales for planning and prioritizing conservation actions.

The Platte River Basin encompasses two 4-digit HUC watersheds: North Platte and South Platte (Figure 7). Major drainages in the North Platte River basin corresponding to 8-digit HUCs include the Upper North Platte, Pathfinder-Seminoe Reservoir, Medicine Bow, Little Medicine Bow, Sweetwater, Middle North Platte-Casper, Glendo Reservoir, Middle North Platte-Scotts Bluff, Upper Laramie, Lower Laramie, Horse, and a minor piece of Pumpkin basin. In the South Platte, major drainages with portions in Wyoming include Cache la Poudre, Lone Tree-Owl, Crow, Upper Lodgepole, Lower Lodgepole, and Sidney Draw. These watersheds span about one quarter of Wyoming, covering 24,200 square miles in southeastern and central Wyoming's Albany, Carbon, Converse, Fremont, Goshen, Laramie, Natrona, Niobrara and Platte counties. Land ownership is predominantly private (62%). Public land in this basin is managed primarily by the Bureau of Land Management (22%), U.S. Forest Service (9%), and the State of Wyoming (8%).

There are approximately 23,450 miles of streams on the USGS National Hydrography Dataset in the Platte River basin in Wyoming. Major river drainages in the basin include the North Platte, Encampment, Laramie, Sweetwater and Medicine Bow.

Additional information about the basins drainages, geography, geology, land forms, climate, dams, reservoirs and diversions, hydrology, habitat types, land use and classifications are detailed in the 2010 SWAP.

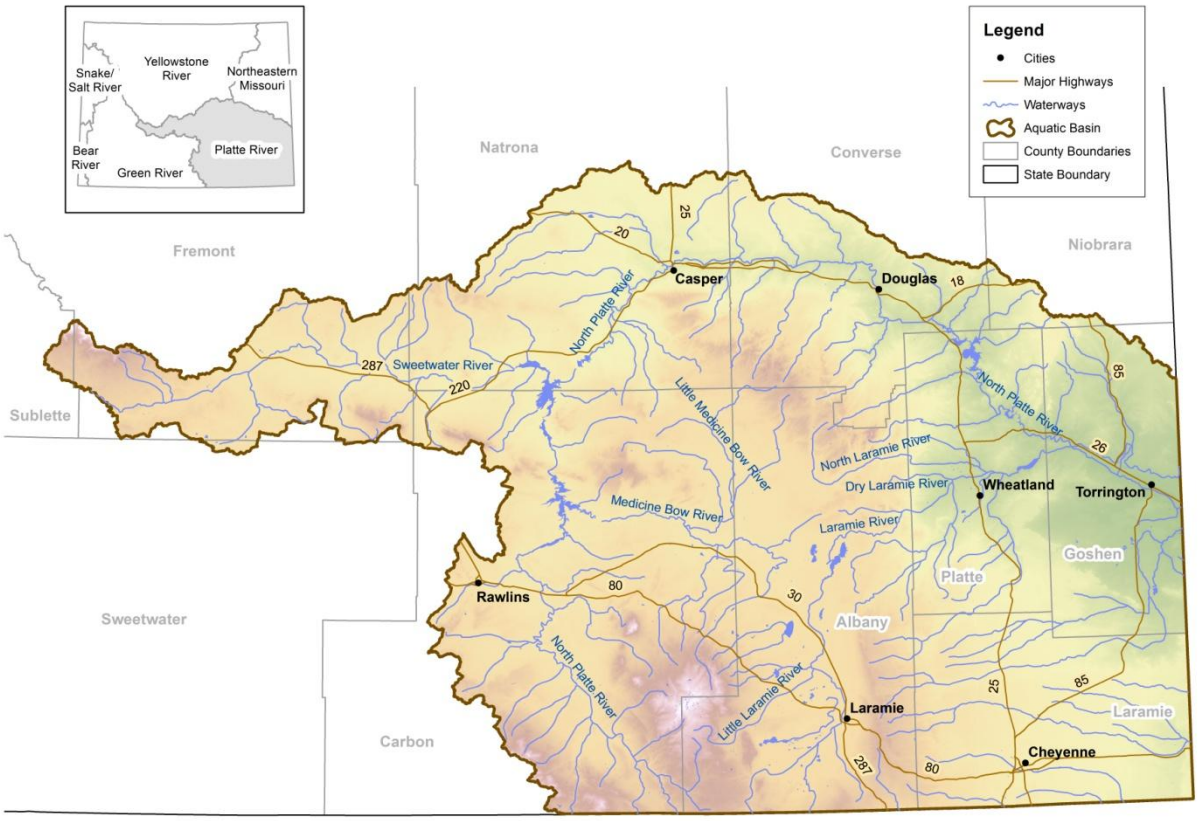

Figure 7. Platte River Basin.

Aquatic Wildlife

Fish

A detailed history of fish collections and surveys in this basin, which began in the mid 19th century is chronicled in the 2010 SWAP. These surveys and collections are the basis for describing the native fish community. The 2010 SWAP also includes a summary of fish introductions to the basin. Most introductions were conducted by the WGFD but others were illegal or inadvertent.

The Platte River Basin has six native game fish and 27 native nongame fish (Table 7). Six of these are believed to be extirpated from the basin (Table 7). A total of 21 game fishes and eight nongame fishes have been introduced to the basin (Table 7). Two game species and 13 nongame species are currently considered SGCN.

Table 7. Fishes present in the Platte River Basin. * denotes Species of Greatest Conservation Need (SGCN). [E] denotes extirpated from the basin.

Native game	Native nongame	Nonnative game	Nonnative nongame
Black Bullhead	Bigmouth Shiner*	Bonneville Cutthroat	Brook Stickleback
Channel Catfish	Brassy Minnow*	Black Crappie	Common Carp
Greenback Cutthroat Trout[E]	Central Stoneroller	Bluegill	Emerald Shiner
	Common Shiner*	Brook Trout	Gizzard Shad
Sauger*[E]	Creek Chub	Brown Trout	Golden Shiner
Shovelnose Sturgeon*[E]	Fathead Minnow	Colorado River Cutthroat	Goldfish
Stonecat	Flathead Chub*	Freshwater Drum	Grass Carp
	Goldeye*[E]	Golden Trout	Spottail Shiner
	Hornyhead Chub*	Grayling	
	Iowa Darter*	Green Sunfish	
	Johnny Darter	Kokanee Salmon	
	Lake Chub	Lake Trout	
	Longnose Dace	Largemouth Bass	
	Longnose Sucker	Pumpkinseed	
	Mountain Sucker	Rainbow Trout	
	Orangethroat Darter*	Smallmouth Bass	
		Snake River Cutthroat	
	Northern Plains Killifish*	Walleye	
		White Crappie	
	Plains Minnow*[E]	Yellow Perch	
	Plains Topminnow*	Yellowstone Cutthroat	
	Quillback		
	Red Shiner		
	River Carpsucker		
	Sand Shiner		
	Shorthead Redhorse		
	Sturgeon Chub*[E]		
	Suckermouth Minnow*		
	White Sucker		

Aquatic Reptiles

Four turtles are known to occur in the North Platte River basin, all of which are considered native species. The Western Painted Turtle, Western Spiny Softshell, and Ornate Box Turtle are SGCN, and the Eastern Snapping Turtle is not. The Western Painted Turtle and Eastern Snapping Turtle are the only species known from the South Platte River basin. The Western Spiny Softshell and Western Painted Turtles have been documented in the basin east of the Laramie Mountains.

The Ornate Box Turtle, a terrestrial turtle, is mentioned in this section with other turtles for convenience. Currently, the only record of this species in Wyoming is a museum specimen collected near Fort Laramie. The range of the Ornate Box Turtle may include the North Platte River basin near the Nebraska state line.

Freshwater Mollusks and Crayfishes

Wyoming is still in the discovery phase in terms of its freshwater bivalve mollusks and gastropods. Although aquatic mollusks are often encountered during invertebrate sampling, few published accounts exist (Beetle 1989,

Henderson 1924, Hoke 1979, Hovingh 2004). The WGFD retains SGCN status for some native bivalve mollusks and many gastropods due to lack of information. However, the WGFD recently completed native mussel surveys statewide, including the Platte River Basin (Mathias 2015).

Two bivalve mussel species are known from the Platte River basin, the Cylindrical Papershell, and Plain Pocketbook. Cylindrical Papershell are known from numerous locations in the basin. Shells of Plain Pocketbook have been documented from several locales in the North Platte drainage and a single live specimen was collected in 2008. Recent efforts to find additional Plain Pocketbook have been unsuccessful.

Most of what is known about species presence and distributions of gastropods in the basin are summarized in Beetle (1989) and Narr (2011). All gastropods in the basin are SGCN due to lack of adequate population and distribution information.

Little information is available on the distribution of Wyoming crayfishes. Four native species (Calico, Devil, Ringed and Virile Crayfish), have been documented in the Platte River basin (Hubert 1988, 2010). Ringed Crayfish are the only species known in the South Platte River basin (Crystal Reservoir). Devil Crayfish are only known from Horse Creek in the North Platte River basin. Calico Crayfish are believed to be the most widespread species in the Platte River basin but displacement by Ringed Crayfish may be occurring. Rusty Crayfish *O. rusticus* was illegally introduced in the basin (Wagonhound Creek). At this time it is unknown whether attempts at eradication have been successful. With the exception of the common Virile Crayfish, all native crayfishes are considered SGCN.

Table 8. Species of Greatest Conservation Need present in the Platte River Basin

Fish
Bigmouth Shiner
Brassy Minnow
Common Shiner
Flathead Chub
Hornyhead Chub
Iowa Darter
Orangethroat Darter
Northern Plains Killifish
Plains Topminnow
Suckermouth Minnow

Reptiles
Ornate Box Turtle
Western Painted Turtle
Western Spiny Softshell

Crustaceans
Calico Crayfish
Devil Crayfish
Ringed Crayfish

Mollusks
Cylindrical Papershell Mussel
Plain Pocketbook Mussel

Identification of Conservation Areas

To address needs SGCN in the Platte River basin, conservation priority areas were identified using a number of available tools (Figure 8). Results from Stewart et al. (2015) guided prioritization, building upon previous inventories and assessments (i.e., Bestgen 2013, Moan et al. 2011, Bear 2006).

Priority areas include drainages where native fish diversity is highest in the basin and includes streams where the density of rare species (e.g., Orangethroat Darter and Hornyhead Chub) are high. Priority waters include the lower mainstem portions of the North Platte and Laramie Rivers as well as Rawhide Creek, Labonte Creek, Lower Horse Creek and Lower Lodgepole Creek.

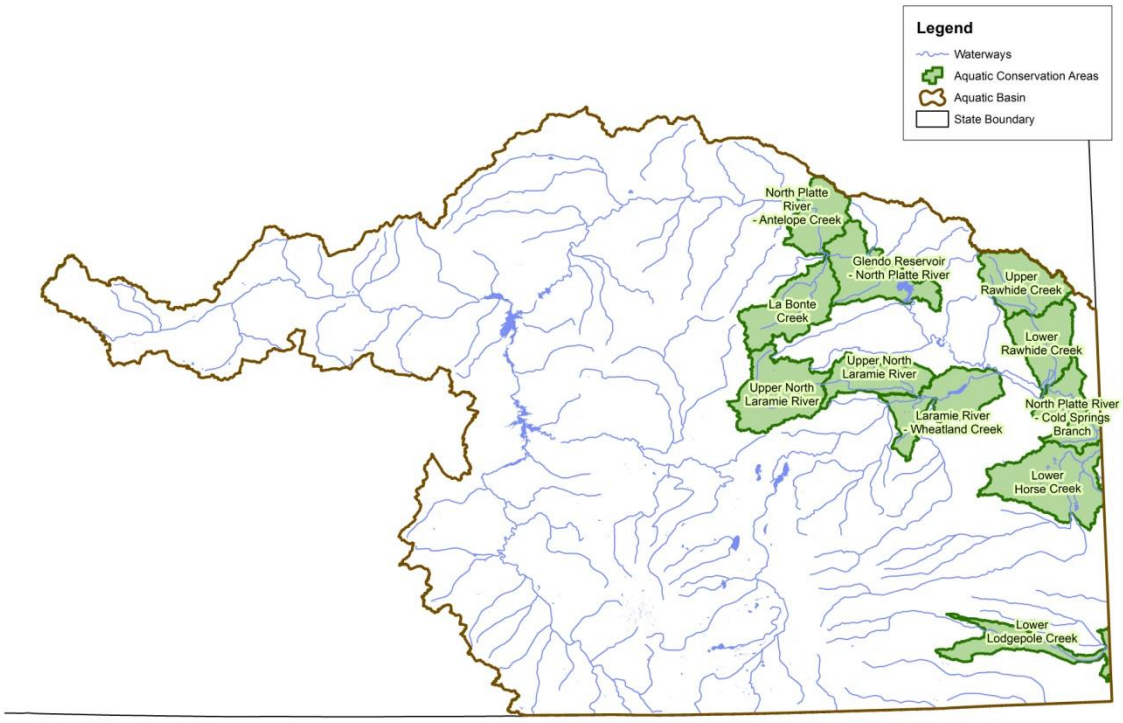

Figure 8. Aquatic Wildlife Conservation Areas in the Platte River Basin.

Priority drainages and habitats have not yet been defined for the conservation of aquatic reptiles, freshwater mollusks, or crayfishes.

Threats

Water development/altered flow regimes – Moderate

Natural flow regimes in stream segments around the state have been altered by human activities including irrigation diversions and water developments for more reliable water supply, hydropower, and flood control. These altered flow regimes are also a consequence of broad-scale changes in land use and management associated with agriculture, grazing, timber harvest, and housing development (see Wyoming Leading Wildlife Conservation Challenges – Disruption of Historic Disturbance Regimes). Lateral and longitudinal hydrologic connectivity and physical access by fish populations to all habitats necessary to complete their life history is limited throughout the drainage. In-channel obstructions and increased dewatering have reduced some populations of native stream fishes.

The need for additional water for human use will intensify in the immediate future, and that trend will be especially evident in the western U.S. This trend has multi-faceted consequences for fish and wildlife and the habitats upon which they depend. In Wyoming, trans-basin water diversions are not uncommon and are likely to be further proposed and pursued. Energy diversification, including hydropower development, may increase as the nation's energy demands rise. Warmer conditions with more erratic precipitation— which some predict for Wyoming's future climate—may heighten the

need for additional water development (water storage) for municipal and agricultural purposes.

The likely trend will be water development projects closer to the delivery point and conveyance via pipelines instead of stream channels. Additional emphasis will likely be placed on lining irrigation ditches and other practices to more efficiently use water for consumptive purposes. The net effect of all such water management practices will be to alter the timing, magnitude, and duration of natural hydrographs and reduce intra- and inter-annual variability in Wyoming's streams and associated riparian corridors (see Wyoming Leading Wildlife Conservation Challenges – Climate Change, and the Riparian habitat chapter).

While water development can threaten native species, some introduced species, including popular sport fisheries, have thrived in the face of water development. The simplification of natural systems by human development tends to favor species with generalized and broad habitat requirements. For example, the walleye fisheries in the North Platte River reservoirs and Boysen Reservoir depend on the consistent deep water and forage production inherent in these man-made water bodies. Stable stream flow releases from dams, with relatively low peak flows and relatively high base flows, perpetuate productive sport fisheries. The famous "Miracle Mile" trout fishery below Kortes Dam and the "Grey Reef" fishery below Alcova Dam are examples.

Invasive species – High

Several aquatic invasive species (AIS) are present in the basin including curly pondweed, rusty crayfish, Asian clam, and brook stickleback. Additional descriptions and definitions of AIS can be found in the WGFD AIS management plan (WGFD 2010).

Curly pondweed was introduced into the United States in the mid 1800's and is now widespread. Curly pondweed reproduces by seed which can be easily transferred in mud or water. It is introduced into new areas through boating, fishing, and water hauling, and as an ornamental plant. New populations continue to be discovered in Wyoming. In the Platte River Basin, it is found in the North Platte River at the Miracle Mile section.

Rusty crayfish are native to the eastern United States and have been introduced into several western states, likely by baitfish introductions. Rusty crayfish out-compete native crayfish and established populations can destroy native plant abundance and diversity (WGFD 2010). Rusty crayfish are currently present in Wagonhound Creek, and tributary to the North Platte River near Douglas, where they were originally documented in 2006. Illegal stocking of the crayfish occurred in 2000, 2002, and 2006 in three ponds in the drainage as forage for sport fisheries. Two of the ponds were drained for repair in 2006, when it is believed crayfish migrated to nearby Wagonhound Creek (WGFD 2010). Chemical eradication of this population has been attempted several times. In 2006 and 2007, water levels in the ponds and creek were lowered and treated. Subsequent monitoring did not document any remaining rusty crayfish in the drainage following treatment. However, the species was again documented in 2012 and the area was subsequently treated. Post-treatment monitoring has not documented rusty crayfish in the lower portions of Wagonhound Creek near the confluence with the North Platte River, or in the mainstem North Platte River.

Asian clams were introduced to the United States intentionally as food or incidentally with the importation of Pacific oyster. They were discovered in 1938 in the Columbia River and are now widespread. Asian clams are spread through bait bucket introductions, accidental introductions with aquaculture species, illegal introductions for food, and through water currents. They can clog pipes at power generation and water supply facilities when shells wash downstream, causing millions of dollars in damage (WGFD 2010). Asian clam are found in the basin in the Laramie River upstream of the town of Laramie to tunnel road, and the North Platte River downstream of Guernsey Reservoir dam.

The brook stickleback has been introduced to many states outside of its native range. Brook stickleback are spread as a result of bait introductions or accidental introductions with aquaculture species. Juvenile fish and fish eggs may be difficult to see and can be moved in standing water in boats and bait buckets. Brook stickleback are widespread in the basin, commonly found in the Lone Tree-Owl, Cache La Poudre, Upper North Platte, Medicine Bow, Little Medicine Bow, Lower Laramie, Pathfinder-Seminoe Reservoir, Middle North Platte-Casper, and Glendo Resevoir drainages.

Other invasive species, such as zebra and quagga mussels and silver carp, are present in neighboring states and potentially very harmful to the aquatic wildlife in the basin. Through outreach and education, watercraft inspections, and monitoring, the harmful impacts of these and other invasive species may be prevented. Watercraft are inspected at key locations entering the basin at Cheyenne, Torrington, Laramie, and at major waters including Glendo, Grayrocks, Granite, Alcova, and Pathfinder reservoirs. Twenty-one (21) waters in the basin are monitored annually to detect the presence of invasive species. These efforts to keep existing species in the basin from spreading to new waters, and other harmful species from entering the basin will continue. These efforts to keep existing species in the basin from spreading to new waters, and other harmful species from entering the basin will continue.

Drought and climate change – Moderate
Climate change may increase air and surface water temperatures, alter the magnitude and seasonality of precipitation and run-off, and shift the reproductive phenology and distribution of plants and animals (Seavy et al. 2009) (see Wyoming Leading Wildlife Conservation Challenges – Climate Change).

Changes in precipitation patterns under various climate change scenarios are predicted to produce peak flows earlier in the yearly cycle and to lower base flows (Barnett et al. 2004). Drought lowers water tables, leading to reduced plant growth and reproduction. Riparian vegetation declines lead to lower bank stability, higher siltation and altered stream habitat quality and quantity. Lower water levels increase water temperatures and reduce the habitat available to fish and other aquatic wildlife. All these conditions can be detrimental to the health and reproductive success of all aquatic wildlife species.

Conservation Initiatives

Department plans and policies
The WGFD's Fish Division has developed basin management plans to guide management across the state. These plans provide background and history of aquatic wildlife management as well as management direction. These plans reference the SWAP and the Strategic Habitat Plan, attempting to incorporate management direction relevant to each basin.

Habitat management efforts are guided by the Strategic Habitat Plan (SHP) that is regularly revised and approved by the Wyoming Game and Fish Commission. The SHP includes five goals: 1) Conserve and manage wildlife habitats that are crucial for maintaining terrestrial and aquatic wildlife populations for the present and future, 2) Enhance, improve, and manage priority wildlife habitats that have been degraded, 3) Increase wildlife-based recreation through habitat enhancements that maintain or increase productivity of wildlife, 4) Increase public awareness of wildlife habitat issues and the critical connection between healthy habitat and abundant wildlife populations, and 5) Promote collaborative habitat management efforts with the general public, conservation partners, private landowners, and land management agencies. Efforts are focused in priority areas in each of the management regions and include crucial areas essential for conservation of important species and communities and enhancement areas, which represent places where work should be conducted to manage or improve wildlife habitat.

In addition to these guiding documents, the WGFD has a number of tools, policies and protocols to protect and enhance native aquatic wildlife. Additional details on environmental commenting, aquatic wildlife stocking and transplant, and disease prevention can be found in the 2010 SWAP.

Interagency plans and agreements
The National Fish Habitat Action Plan (NFHAP) was developed by a coalition of fisheries professionals, state and federal agencies, tribes, foundations, conservation and angling groups, businesses and industries, all determined to reverse the declines of America's fish habitats. The WGFD is involved with three NFHAP partnerships, Great Plains Fish Habitat Partnership, the Western Native Trout Initiative, and the Desert Fishes Habitat Partnership. The Great Plains Fish Habitat Partnership covers much of the Platte River Basin. Additional information on Fish Habitat Partnerships can be found in the 2010 SWAP.

Ongoing and completed conservation actions
Numerous projects have been completed to benefit SGCN in the Platte River basin since the implementation of the 2010 SWAP (previous accomplishments are documented in the 2010 SWAP). Multiple sources of funding have been used to implement projects. Projects have been completed by department personnel and through contracting and granting with research partners. Accomplishments are listed under headings taken from the Recommended Conservation Actions (bold headings) in the 2010 SWAP. While accomplishments are not duplicated under more than one action they commonly address multiple actions. Although this list is not comprehensive of all actions, most of the significant initiatives are summarized below.

Secure and enhance populations and habitats in SGCN priority areas
Following a large wildfire and subsequent debris flows that eliminated almost all fish from the North Laramie River, the WGFD transplanted Hornyhead Chub to stream reaches they previously occupied (WGFD 2015).

Fill remaining data gaps for SGCN distribution.
WGFD biologists inventoried and assessed fish populations and habitats in southeastern Wyoming's prairie streams (Moan et al. 2011). Amongst other findings, numerous refinements were made to range distributions.

WGFD biologists completed surveys for Orangethroat Darter and other non-game native species in Lodgepole Creek. The surveys were successful to remove Orangethroat Darter from the NSSU list (WGFD 2012).

WGFD biologists completed a detailed inventory of fish and aquatic habitat in the Salt Creek drainage near Casper (Cook 2013). In addition to refining known range for several SGCN, the results suggested both positive and negative impacts of a historic diversion and passage barrier.

The WGFD conducted a project to inventory and assess amphibian and reptile populations and habitats in southeastern Wyoming (Snoberger and Walker 2013, 2014). Amongst other findings, Western Painted Turtle and Eastern Snapping Turtle were both documented.

The WGFD funded a project at Colorado State University to better understand the distribution, habitat, and ecology of Hornyhead Chub (Bestgen 2013).

The WGFD funded a research project at the University of Wyoming that determined endocrine disrupting compounds are not impacting fish or recruitment of fish in the Laramie River (Johnson 2014).

Describe the distribution and intactness of aquatic habitats
A diversion structure that is a likely barrier to upstream fish passage was documented on the Sweetwater River near Sweetwater Station in 2015. Bigmouth Shiners, an SGCN, were captured immediately downstream of the structure (WGFD 2016).

WGFD biologists carried out a project in 2014-2015 to determine the impacts of barriers and intermittency on native fish assemblages in Lodgepole and Horse creeks and the Laramie River (Compton and Hogberg *2017*)

Protect relatively intact riparian systems and restore those in proximity to SGCN priority areas
No projects reported.

Increase educational efforts about the ecological, economic, and social values of aquatic SGCN
The WGFD created, produced and disseminated posters detailing the states' native fishes, frogs, toads, snakes and lizards.

Continue aquatic habitat work in the basin
No projects reported.

Explore water management approaches that enhance fish habitat
No projects reported.

Continue building voucher collections for all aquatic wildlife
WGFD biologists collected numerous additional fish voucher specimens since the last SWAP (2010). All vouchers specimens are submitted to the Museum of Southwestern Biology, Albuquerque NM.

Complete the comprehensive survey for freshwater mussels
WGFD completed freshwater mussel distribution surveys in the Platte River drainage (Mathias 2015).

Increase connectivity where appropriate
No projects reported.

Recommended Conservation Actions

Secure, enhance, or establish SGCN populations

Work to reintroduce Sauger to the North Platte River above Glendo Reservoir.

Conduct study to determine most suitable transplant sites for Hornyhead Chub in the basin and conduct trial transplants where possible.

Evaluate the effects of newly introduced nonnative predators on SGCN in the basin.

Inventory, assess, or examine life history requirements of SGCN
Describe the distribution of native nongame fish in the mainstem North Platte River.

Describe the distribution and relative abundance of native fishes in the Sweetwater River drainage.

Survey to fill gaps in knowledge about native mussel distribution as described in Mathias (2015).

Conduct baseline gastropods surveys in the basin and identify needed actions to maintain or restore populations.

Determine the distribution and abundance of Plains Topminnow and Northern Plains Killifish in spring-fed wetland habitats of the Platte River Basin.

Determine if Ornate Box Turtles persist in the Platte River basin.

In the next significant drought cycle, inventory and map intermittency to better describe important habitat refuges in small plains streams.

Determine the distribution and habitat preferences of Johnny, Iowa, and Orangethroat Darters in Lodgepole Creek.

Determine the distribution and abundance of Orangethroat Darter and Suckermouth Minnow in Lower Horse Creek and the Lower Laramie River.

Determine the distribution of Bigmouth Shiner, Brassy Minnow, and Iowa Darter in the lower portions of North Platte River tributaries above Seminoe Reservoir.

Provide passage and reduce entrainment at barriers impacting SGCN
Collect physical measurements and log locations of natural and manmade barriers.

Continue populating the WGFD database to store physical measurements of barriers and record locations.

Work with North Laramie landowners to provide fish passage at North Laramie Canal Division Dam.

Begin to investigate fish passage opportunities at Lower Horse Creek water diversion structures.

Provide passage through Sweetwater River diversion structures within the Bigmouth Shiner's distribution.

Improve aquatic habitat for SGCN
Supply flow or other information to the State Engineer's Office and Water Development Office to facilitate adjudication of instream flow water rights.

Monitor instream flow segments for compliance with approved instream flow levels. Pursue compliance as needed when water is available and in priority.

Protect and/or enhance priority stream segments identified in Horse and Lodgepole creeks and the lower Laramie River as part of the prairie stream intermittency project (Compton and Hogberg *2017*).

Employ water management strategies that improve habitat for SGCN
Identify stream segments where habitat and available flow regimes indicate a need to file instream flow water rights for SGCN. As opportunities are identified, conduct needed studies and file for state-held instream flow water rights.

Identify fish and wildlife mitigation for new reservoirs as they are proposed including instream flow regimes and minimum fishery pools. Ensure that mitigation recommendations are included as conditions in applicable permits.

Increase educational efforts about the ecological, economic, and social values of aquatic SGCN
No actions identified.

Continue building voucher collections for aquatic wildlife
Continue to fill voids in voucher inventory for fish per WGFD protocol (Zafft and Bear 2009).

Build gastropod voucher collection and find permanent repository.

Monitoring

Establish standardized monitoring protocols and locations for native SGCN
Monitor newly established and/or expanded Hornyhead Chub and Sauger populations.

Monitor Hornyhead Chub populations in the Laramie and North Laramie Rivers.

Re-survey a sub-sample of selected sites from Moan et al. (2011), Mathias (2015), and Compton and Hogberg (2017), especially during periods of extended droughts, to establish long-term monitoring sites.

Monitor water quantity and temperature in areas containing important native SGCN populations.

Monitor for the establishment and spread of invasive species.

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