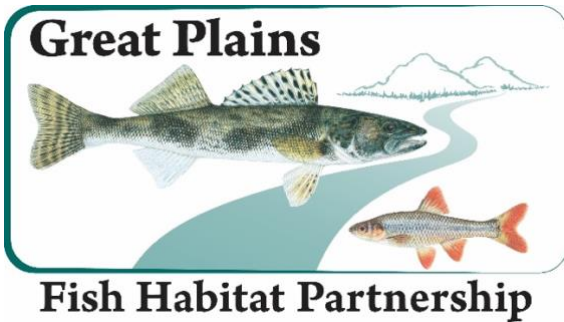




# Framework for Strategic Conservation of Great Plains Fish Habitats

Revised 2020





The Great Plains Fish Habitat Partnership is a member of the National Fish Habitat Partnership.

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## Executive Summary

The Great Plains Fish Habitat Partnership (Great Plains FHP) began in 2007 as a coalition of interests concerned for the future of aquatic communities in the rivers and streams of the Great Plains of north central United States. In question was the status of fish species that rely on unique prairie streams and rivers. The Partnership comprises individuals, groups, and organizations that recognize the values of prairie ecosystems including fish and aquatic species and communities, as well as the people that call the Great Plains home. Out of concern for the loss and degradation of aquatic habitat in the Great Plains, this Partnership is focused on the conservation of remaining high-quality prairie rivers and streams, the restoration of highly degraded habitats where feasible and impactful, and the enhancement of habitats where ecological function can be restored.

Protection, restoration, and enhancement of aquatic habitats involves implementing and monitoring management actions through an adaptive approach in response to what we learn. This approach allows resource managers to restore habitat and assimilate best management practices (BMP) across multiple watershed scales. Another key to success is to develop and inform partners of successful BMP's available to Federal, tribal, State, county, municipal and private land managers for implementation across the Great Plains in order to promote a holistic and scaled approach to conservation for priority watersheds.

The National Fish Habitat Action Plan applies the "partnership" concept through this initiative to collaboratively support aquatic habitat preservation and restoration across the country. Working together to leverage resources for projects of mutual interest locally is fundamental; however, landscape-scaled efforts can result in regional outcomes that add up to improved ecosystem function of the rivers and streams. Through a landscape scale framework; Federal and State agencies, Tribes, conservation groups, local governments, as well as private landowners and businesses can work together. Strategically promoting and conserving the aquatic systems of the Great Plains and their native species in a way that benefits agriculture, industry and communities by sustaining the ecological functions that ensure they last into the future.

Aquatic species of the Great Plains experienced a slow but steady decline in abundance and diversity during the 20<sup>th</sup> century. Much of this loss is attributed directly to the conversion of native prairie to various land uses like agriculture, mining, oil and gas exploration, and urbanization. In areas where ranching and livestock production are the dominant land uses, streams and rivers remain essentially intact with only moderate or local degradation. These moderately impacted systems provide refuge for game and non-game species. As commodity prices fluctuate and equipment and crop technology continue to improve, pressure to develop remaining rivers and associated watersheds increases. As the United States' population continues to increase, the demand for more energy resources and lands for agricultural crops creates increasing conflicts over management and use of natural resources and exacerbates development threats to Great Plains rivers and streams. In the absence of a regional or landscape scale strategy, the watershed condition and management of prairie rivers and their species is largely opportunistic and where issues are addressed, it is generally local. This gradual decline in stream and river condition in the Great Plains has led to an overall decline of fisheries and overarching degradation of aquatic habitat and function.

The Great Plains FHP intends to frame a strategic collaborative landscape scale approach to stream and river conservation that rolls up to landscape-scale conservation outcomes that are resilient in the face of change. This is accomplished by creating a forum to understand and address existing and potential resource conflicts, share and promote conservation values, and foster a collaborative approach to using science and management for the benefit of aquatic habitats and species while promoting responsible use resources into the future.

This updated strategic plan is a result of the compilation of information assembled over the last decade and has updated baseline information on the inventory of resources and species information. The past performance of implementing conservation actions has also provided a realistic understanding of the capabilities of implementing actions to benefit restoration and protection efforts for aquatic habitats.



Missouri River, Sam Stukel

## Impacts to Prairie Rivers

Aquatic systems of the Great Plains are experiencing immediate threats (Table 1) with profound effects on resident fish and other aquatic life.

Table 1. Primary disturbances to stream reaches identified from Through A Fish's Eye (2015) in the Northern Plains States.

Disturbance Type
Fragmentation by dams
Nutrient and sediment pollution
Human population density
Fragmentation from road crossings
Water withdrawals
Urban land use
Agricultural land use
Mines
Impervious surface cover

Generally, threats are categorized as fragmentation, climate change, water quality, water quantity, and invasive species (Table 2). Fragmentation of river habitats has been occurring on prairie rivers for decades with a minimal understanding of how stream m habitat fragmentation and genetic isolation impact species. Connectivity allows access to spawning or life-stage habitats and allows recolonization and redistribution of species following severe droughts and floods. It also allows for genetic mixing of populations thereby promoting stochastic longevity. Habitat is primarily fragmented by presence of dams or culverts. Significant improvements can be made through relatively moderate investments that provide for improved fish movement and promote connectivity among

fish populations while allowing for general use and management.

Agricultural practices can impact water quality when the buffer of riparian corridors between agricultural lands and water systems is not adequate to prevent runoff and protect riparian areas. Direct runoff can contribute excess nutrients and sediment to rivers, impacting downstream fish populations. As land is converted from prairie grassland habitat to cropland, watershed function can be compromised. With the loss of native grassland prairie, disappear, riparian buffers become even more important to maintaining aquatic system health. Riparian buffer zones also prevent sediment inputs. Clean gravels and substrates allow the necessary oxygenation of fish eggs among spawning substrates. As the ratio of riparian buffer to agricultural land and runoff is reduced, pesticide and herbicide concentration increase to harmful levels and sediment loads can overload substrates and reduce available habitat.



Pembina dam before removal in North Dakota

Table 2. Primary Anthropogenic Habitat Stressors on Aquatic Habitats and Species of the Northern Great Plains

Stressor	Examples	Outcome
Fragmentation	Dams, road crossings	Prevents fish movement that could impact spawning, rearing and reduce areas of refugia.
Land Use Change	Land Conversion to intensive agricultural or urban; from grazing to feedlot	Changes can occur to the water levels and flow timing; the sediment load, nutrient discharge, contaminant loading.
Water Diversion	Water withdrawal for irrigation, drinking water, or industrial	Changes to the water levels and flow timing, changes to the natural processes of a river that sustain habitats.
Invasive Species	Zebra mussel, invasive carp, Eurasian watermilfoil	Invasive nature of species can create population level changes within the water body

Livestock production can also affect prairie streams where best management practices, monitoring, and adaptive management to address problems are not employed. Some areas North and South Dakota, Kansas, Nebraska, eastern Colorado, Montana, and Wyoming have extensive herds of cattle. Where cattle have direct access to rivers and streams for extended periods, banks can be degraded, and riparian vegetation destroyed, leading to soil compaction, stream widening and shallowing. This further impacts water quality by increase solar input which results in higher water temperatures and localized degraded water quality (e.g., fecal bacteria and biological oxygen demand)

Energy development, specifically oil and coal bed methane production, is thriving in North Dakota, Montana, and Wyoming. As oil companies increase the distribution and number of wells, contaminants, spills, and encroachment from road development create conditions that threaten riparian areas. Coal bed methane can produce hundreds of barrels of wastewater each day, which, if allowed to go untreated or to re-enter the streams, can potentially contaminate water sources

of prairie streams or by direct input to surface waters.

Another threat to Great Plains aquatic systems are invasive species, particularly aquatic nuisance species (ANS). The Missouri River system is currently battling an invasion of two Asian Carp species: bighead carp and silver carp (Conover et al. 2007). Asian Carp have been shown to have negative effects on native fishes as they deplete resources available to developing fry and juvenile fishes. Also, of concern are zebra mussels, quagga mussel, curly-leaf pondweed, Eurasian milfoil, salt cedar, purple loosestrife, New Zealand mud snail, and viral hemorrhagic septicemia (VHS). The following states within the Great Plains Fish Partnership have ANS management plans: Montana (MT ANS Tech Comm. 2002), Kansas (Goeckler 2005), North Dakota (Schlueter 2005), Iowa (Philips 2006), and South Dakota (Burgess and Bertrand 2008).

The impacts of climate change can vary regionally and locally but may be of concern where more extreme weather events lead to impacted

conditions from floods, drought and fire. According to the US EPA, if current trends continue, warmer temperatures may result in earlier spring snow melts (Changnon et al. 1998), longer growing season, less groundwater and potential for a worsened cycle of drought and fire. Drier, warmer summers combined with increased evaporation rates can also lead to streams dewatering, lowered ground water tables, decreased stream flows, increased water temperatures, and increased conflict for use of limited water resources. Fish in Northern Great Plains streams evolved to survive heat, cold, floods and drought; however, changes in streamflow associated with long-term climate change may render some prairie streams uninhabitable for current fish species (Chase et al., 2016).

## Background

Water and aquatic systems of the western prairies are the lifeblood for natural resource viability, community health, and agricultural sustainability throughout the Great Plains. Prairie streams are a network of waterways comprising unique complexes of habitats and sufficient flows critical to maintain fish and wildlife of the Great Plains. The Great Plains ecosystem generally receives less than 30 inches of rainfall during the year and experiences annual temperature extremes of  $-40^{\circ}$  to  $115^{\circ}$  F. The fish and aquatic species and their vegetative and physical habitats endure conditions ranging from decades of drought to seasons of raging floods and torrents of spring runoff. Species that have persisted in this ecosystem of extremes have adapted to the natural variation in climate and local weather conditions. Part of this adaptation includes the ability to move among connected aquatic systems during extreme or changing conditions through connected systems that provide a pathway to survival. Such a system is generally represented by a complex of diverse and connected habitat types that allow aquatic species to move among

them and take advantage of local differences or refugia during times of change or extreme climatic events.

In recent decades, Great Plains natural aquatic species have declined at an accelerated rate. Studies indicate that nearly 40 percent of the fish species in North America are now in jeopardy with most of them originating in streams and rivers (Beard et al., 2008). In the U.S., 70 species of mussels and 32 species of snails are federally listed as endangered or threatened (USFWS 2005).

Anthropogenic land use changes from agriculture, energy exploration, and urbanization are widespread and increasing in the Great Plains landscape. As such, land and water managers are documenting negative effects on aquatic communities. More information is needed to understand the nature and mechanism of these impacts and a better approach is needed to address aquatic habitat conservation at landscape scale.

Scarcity of water resources on the western prairies, as well as water management and appropriation often lead to conflicts between human and environmental conservation despite their interdependence. A fundamental requirement to the persistence of Great Plains fishes, mussels and other aquatic species is maintaining river flows and some semblance of natural seasonal flow regimes. As the local conditions and regional climatic conditions change, climate projections indicate the likelihood of increased drought and extreme floods in terms of frequency, duration and severity. These conditions can further increase conflicts between people and aquatic species for limited water resources. A balance is needed and a mechanism in place to manage and maintain natural water systems and healthy aquatic habitats that promote sustainability and allow for species and human adaptation to the changes in climate.



The Great Plains FHP emphasizes collaborative problem solving, shared priorities and leveraged opportunities for management. For the collaborative process to work, there must be an emphasis on shared values, good science, and an understanding of basic ecological process and the inter-related nature of human industry and ecological health. With the onset of the technology and information age, residents that live in these rural areas have better access to information on world-wide and local environmental issues than the previous generation, and there are more opportunities to work together across sectors of management and industry towards collaborative solutions.

Land ownership in the Great Plains is largely private compared to other regions in the western United States. Private lands can be more susceptible to economic cycles affecting real estate and natural resource markets. This could lead to periods of increased development and threats to natural habitats when markets emphasize benefits from commercial interests. By creating a partnership among private landowners, industry interests, local governments and natural resource managers, a common strategy can be developed to identify collective resource values and a landscape vision for conservation outcomes that promote persistence of aquatic systems at the appropriate scale to support long-term values as well as sustainable uses.

## **Geographic Scope**

This Partnership encompasses parts or entire watersheds from three large hydrological units (Figure 1). This includes the entire U.S. portion of the Missouri River watershed (509,312 square

miles), a portion of the Souris-Red-Rainy Rivers watershed unit (48,885 square miles), and part of the Arkansas-White-Red Rivers watershed unit (87,047 square miles). Located within the boundary of the Great Plains FHP, there are portions or parts of 22 Level III ecoregions as described by the Commission for Environmental Cooperation (1997).

This Partnership is bounded and overlapped by six fish habitat partnerships:

- Southeast Aquatic Resources Partnership
- Desert Fish Habitat Partnership
- Midwest Glacial Lakes Partnership
- Fishers and Farmers Partnership
- Western Native Trout Initiative
- Reservoir Fisheries Habitat Partnership

Overlapping priorities can be coordinated under the umbrella of the Midwest Landscape Initiative to the extent that is practicable. The Great Plains FHP works with neighboring FHPs to promote a seamless landscape approach. It is a priority of the National Fish Habitat Board that partnerships communicate and coordinate between each other to prevent duplication of efforts and find opportunities where overlapping aquatic habitat issues.

The range of many aquatic species within the Great Plains is wide, often encompassing multiple watersheds. The geographic scope of this partnership fosters and necessitates use of a Strategic Habitat Conservation (SHC) framework (National Ecological Assessment Team 2006) for these species to persist in the face of multiple large-scale stresses to their habitat.



### Great Plains Fish Habitat Partnership

Boundary Map



Figure 1. Geographic Scope of Great Plains Fish Habitat Partnership.

## Shared Vision and Mission

### Vision

We envision a partnership that upholds our shared values for aquatic ecological health and resilient fish, bird and wildlife communities, recreational uses of fishing, hunting, trapping, boating and observation as well as sustaining agriculture as a viable industry and clean and abundant drinking water for communities. Our values include consideration for all sustainable uses that do not further damage and can positively contribute to added preservation, restoration or conservation value of aquatic systems in the Great Plains for all people to enjoy now and into the future.

### Mission

The mission of the Great Plains FHP is to innovatively and strategically work together to conserve aquatic resources of rivers and streams throughout the prairies of the central United States while promoting all sustainable natural, community and industry uses to the extent values are not diminished.

This mission will be accomplished by implementing the goals and objectives set forth by the National Fish Habitat Action Plan through development of regionally specific goals for the Great Plains.

In the near term, this Partnership's purpose is to:

- Develop a forum to share and disseminate best management practices for restoring and enhancing aquatic riverine habitats.
- Through education and outreach; encourage continued protection and prevent further degradation
- Advance and develop focused restoration and enhancement efforts
- Provide a strategy that allows resource managers and landowners to interact

together with a general understanding of individual priorities

- Recognize and promote an appreciation for common and differing viewpoints and issues related to resource management
- Review historical and existing information for applicability to restoring and maintaining aquatic habitats for sustainability
- Consolidate, summarize, make available and disseminate existing and new information to partners and the public to promote partnership vision, values, outcomes, and accomplishments

The long-term purpose of this Partnership is to:

- Achieve measurable improvements in the quality and quantity of prairie rivers and aquatic systems and the integral natural resources that can be sustained and appreciated for future generations

## Governance

### Partners Council Structure

With the development of the Midwest Landscape Initiative (MLI) under the guidance of the Midwest Association of Fish and Wildlife Agencies in 2019, the Great Plains FHP may have the opportunity to align its vision, values, priorities and governance with this broader landscape initiative in an effort to leverage the partnerships. It will be proposed that the Great Plains FHP be accepted as a sub-committee to the Habitat Working Group of the MLI and be considered for operational and organizational alignment under the MLI model. Such alignment will allow for greater leveraging of priorities, outcomes and on the ground effectiveness for both Great Plains FHP and the MLI.

## **Members and Membership**

Currently the Great Plains FHP Partners Council includes up to 20 members; committee seats are selected from willing stakeholder groups (see Appendix I). The current list of stakeholders includes State and Federal natural resource agencies, State and Federal water quality agencies, tribes, and conservation groups. This list is not considered exhaustive. To promote inclusivity in the Great Plains FHP, any parties who share the vision and goals are encouraged to participate.

Representation on the seats at the Partners Council can be rotated amongst the various interests and are allocated among at least four members from each of the five categories of partner groups: State, Tribal, Federal, non-governmental organizations, and public (Figure 2). The term for each seat is a maximum of five years. The Partners Council selects a representative to serve as Chair to provide the leadership and coordination of activities for the Partnership.

Each organizational seat on the Partners Council may have an appointed alternative/representative selected by the organization holding that seat. Each organization holding a seat has the option to designate an alternate and, if necessary, the representative organization can change the person who represents their interests on the Partners Council.

## **Partnership Decision Process**

The Partners Council is the main decision-making body of the Partnership but will work to align organizational and operational structure and outcomes with that of MLI if deemed feasible and will seek integration of vision, goals and leadership to the extent possible. The Partners Council provides leadership, guidance, coordination, and support to the broader Great Plains FHP, as well as providing a forum to discuss, implement, and

promote conservation issues. The Partners Council strives for consensus in decision-making, with the option to work toward informed consent if consensus is not possible.

Two types of decisions acted upon by the Partners Council are: 1) general guidance on the operation of the Partnership and 2) recommendation of priority projects for submission to the National Board of the National Fish Habitat Action Plan. All decisions made by the Partners Council solicit input from MLI, working teams and general membership of the Partnership.

## **Coordination**

The Partners Council meets as needed and feasible. A majority of business is conducted via conference calls, web conferences, and email to minimize cost and time constraints.

The Great Plains FHP Coordinator is the primary contact for the partnership to facilitate information exchange among teams and interested parties and to facilitate and communicate decision-making. One of this position's responsibilities is to serve as the main contact for each funded project including fiscal agreements, project and funding oversight and completion.

## **Working Groups**

The Partnership can delegate certain tasks to ad-hoc working groups. These Working Groups serve in a variety of functions to address certain information or activity needs as needed. These include but are not limited to the following activities: information gathering, outreach, communication, and to address programmatic issues as they arise. Where feasible, these functions can be subsumed under or integrated with MLI working groups or ad-hoc committees. Minutes are kept for all meetings and forwarded to the Partnership Coordinator. The Partnership has

currently identified the need for three ad-hoc working groups whose functions and future status should be aligned with MLI or serve in a stand-alone capacity:

- Science Team
- Planning Team
- Outreach Team

**Science Team.** The Science Team collects, collates, and interprets various resource data from Great Plains partners and utilizes a GIS Great Plains Area spatial database for assimilation of data into the national habitat assessment efforts. Inclusion of fauna surveys (e.g., aquatic GAP analysis) assess current status of fish and mussel species and identify information gaps. Stream restoration project data from previous efforts are collected and compiled into a single coverage. The restoration projects database is compatible with the National Restoration projects database developed by the National Science and Data Committee and is updated annually. Fish species data identified by the Partnership (occurrence, abundance, etc.) is used in development of population targets for the Great Plains. Resource assessments made by the team supports restoration planning and priority setting.

The overall purpose of the Science and Assessment team is to identify physical habitats, as well as biological and economic indicators that can be used as baseline data and tracked to measure effectiveness of actions towards defined population and habitat goals. This may include use of a subset of national program indicators to track alignment with national goals. Assessments provide supporting data and information summaries for use by the Partners Council and the Planning and

Prioritization Team to identify information gaps, future priorities and as feasible, best management practices.

**Planning Team.** The Planning Team develops the Great Plains FHP regional strategy for prioritizing aquatic restoration efforts in the Great Plains to improve riparian health, fish habitat, and fish populations. The team develops methodology and supports implementation of action. This includes promoting strategic investment of dollars on-the-ground, where measurable differences can lead to measurable outcomes. Methodology includes evaluation of geographic and empirical fisheries and habitat data by sub watersheds and ecological and hydrological units. This includes use of existing assessments and data and also and new information learned as ongoing preservation and restoration efforts are implemented.

**Outreach Team.** Outreach Team serves on an ad-hoc basis to strategize and develop methods to generate public and congressional support for fish habitat conservation in the Great Plains and to disseminate information to partners and the public about the program's conservation and economic value. The team created an outreach framework to increase public awareness and the team works collaboratively with contractors, local tourism boards, Chamber of Commerce, and others to increase awareness and informs Great Plains congressional members about Partnership accomplishments activities. This can include local media events, NFHAP project fact sheets, e-newsletters, reports, and visits. This team serves as a liaison to the NFHAP Board and NFHAP Communications Team.

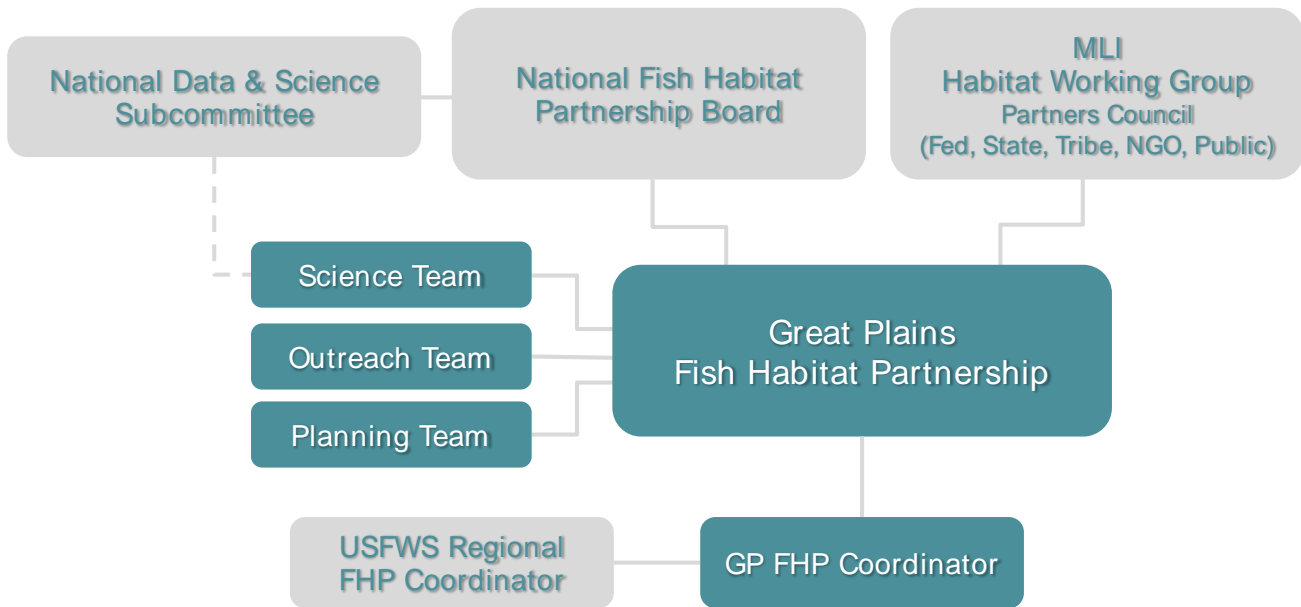


Figure 2. Conceptual Structure of the Great Plains Fish Habitat Partnership and the working teams.

## Resource Assessment

Initial efforts focused on assembling the available information on rivers and streams and aquatic species. Several efforts have contributed to improving our knowledge of the status of the aquatic habitats and species needs within this geography. The Partnership has continued to improve our ability to develop strategies that are focused on high quality habitats. Much of this began with the Midwest Fish Habitat Partnerships effort to develop regional habitat assessments.

In 2010, a regional fish habitat assessment (see Appendix VII) was initiated by five Midwest Fish Habitat Partnerships including: the Driftless Area Restoration Effort, Fishers and Farmers Partnership, Great Lakes Basin Fish Habitat Partnership, Midwest Glacial Lakes Partnership, and Ohio River Basin Fish Habitat Partnership. In addition, the Great Plains FHP and Southeast Aquatic Resources Partnership contributed and received information from this assessment completed in 2012. More than 75 partnering

organizations contributed to this effort in support of the National Fish Habitat Partnership and the national assessment ([ecosystems.usgs.gov/fishhabitat](http://ecosystems.usgs.gov/fishhabitat)). Products of the assessment include map books, geodatabases, and reports for each fish habitat partnership that can be accessed at: <http://www.downstreamstrategies.com/projects>.

The Great Plains Fish Habitat Partnership Habitat Assessment identified five fish guilds to utilize in modeling the effect of landscape stressors. These guilds are the Darter, Madtom, Northern Headwater, Southern Headwater, and Turbid River Guilds. While the initial analysis did not incorporate dams and culverts due to data quality, it is widely recognized that the fragmentation stressor is a significant influence on distribution of aquatic species. The assessment did identify the most influential anthropogenic stressors for these five guilds including percent pasture cover, surface water consumption, row crop land cover, mean baseflow index, network cattle density, and scrub land cover. In conclusion, land use and water

availability are major drivers of where species are or are not able to persist.

About 2015, considerable effort was put into updating the State Wildlife Action Plans for the States located within the partnership. This updated and refined species data also needed to be incorporated into the assessments.

The National Science and Data Committee have developed a methodology to implement an aquatic assessment at the national scale. An updated assessment of the aquatic habitats by the national Science and Data Committee (Crawford et al. 2016) of the Great Plains FHP shows that many of the rivers of the area have a wide range of impairments. The condition of some Ecological Drainage Units is widely variable with some that are relatively pristine while others are severely degraded. Using species status/occurrence/abundance as an indicator of the health of the rivers, a wide range of conditions occurs.

The Wildlife Action Plans for each of the States (see Appendix II) within the Partnership list a wide array of river species and habitats that are in need of extra conservation practices (see Appendix III).

Building upon that previous information, further analysis has refined and incorporated data gaps to build a connection from the models developed from Downstream Strategies and the National Assessment to refine the information to be more relevant at the regional and local scale. These efforts have incorporated and updated species information and barrier data. This exercise optimized where conservation efforts should be focused (see Appendix VI). This information, coupled with ground level information and climate change considerations, was then analyzed and priority watersheds selected by state. These priority watersheds will guide future, more detailed watershed assessments as well as potential project

selections. Please contact the Partnership for a current listing of these priority watersheds.

As information has been assembled, a strategy is developing that is creating an inventory of information valuable to goal setting efforts and for developing implementation strategies to make progress). During the continued development of this Partnership, there will be a need to maintain the database of information to evaluate progress of change related to aquatic habitat quality and aquatic species population status and distribution, land use, riparian condition, water quality, and current threats.

Within the Great Plains, there are 28 federally listed endangered fish, mussel, riparian plants, and amphibian species. An additional 90 fish and mussel species are listed as endangered by State agencies. Amphibians, reliant on healthy aquatic ecosystems, have been documented to be in decline throughout the world (Linder 2003) and one Great Plains amphibian, the Wyoming toad, is listed as a federally endangered species.

An early review of the existing information shows that many of the rivers and their associated species have not been adequately monitored to document biological and ecological trends and status. Without baseline data of species distribution, abundances, and assemblages, a clear understanding of the value and conservation impact of restoration efforts cannot be measured accurately, and implementation of adaptive management is limited (Williams et al. 2007).

The Partnership is focusing future assessments on categories identified in the national Science and Data Committee's report (Beard et al. 2008) to measure the health and status of the watershed. In addition, the Stream Corridor Restoration the Handbook (Fogg et al. 1998) serves as guidance for conservation efforts.

## Goals

The goals are categorized into three separate focus areas: Physical Habitat, Ecological Community and Local Level. The Physical Habitat goals are primarily to address the overall habitat conditions relevant to the priority species' needs. The Ecological community goals are related to those actions to improve the overall function of the systems and the processes that the species rely on for their survival. The Local Level goals primarily focus on ensuring the actions have a local benefit to the users and species.

<b>Physical Habitat Goals (H)</b>	
H1	Identify and Protect intact and functioning watershed systems.
H2	Identify and reconnect, restore and improve fragmented and degraded river, stream, and riparian habitats to ensure ecological function in these systems.
H3	Maintain water quality and quantity and support hydrologic function in Prairie Rivers and upland hydrologic and soil management systems to support fish and other aquatic organisms.
<b>Ecological Community Goals (E)</b>	
E1	<i>Biological Community</i> : Evaluate trends of aquatic species distribution and abundance over time throughout the Great Plains in relation to changing habitat conditions, as part of an adaptive management process of stream structure and function to guide future actions.
E2	<i>Ecological Function</i> : Restore, improve and/or maintain ecological function of river and stream systems that supports fish and other aquatic organisms.
E3	<i>Aquatic Invasive Species (AIS)</i> : Prevent, manage or eradicate, where feasible, AIS that are deemed a threat to the ecological function and biological community of rivers and streams.
<b>Local Level Goals (L)</b>	
L1	Ensure that instream and riparian physical habitat in rivers support fish populations at the local scale and local user's needs.
L2	Identify and work with partners to find mutually beneficial opportunities to improve watershed conditions.
L3	Promote watershed land uses that improve existing water quality and quantity and improve habitats of the aquatic resources of the Great Plains.



## Conservation Strategies

The following strategies and associated actions are methods or approaches that will be applied to conservation priorities to achieve goals. The Strategies are primarily the actions to be conducted to meet the goals. These are categorized into five focus areas; Information (I), Restoration and Protection (R), Flows and Water Quality (W), Partnership Development (P), and Outreach and Education (E).

<b>Strategy 1: Information Gaps (I)</b>	
Ia	Conduct baseline assessments
Ib	Prioritize and identify priorities and common goals
Ic	Identify information gaps
Id	Develop critical science and conduct projects to fill gaps
<b>Strategy 2: Habitat Restoration and Protection activities (R)</b>	
Ra	Establish, share and implement Best Management Practices for land and water management
Rb	Plan, coordination and support conservation measures to restore or protect ecological function (i.e. BMPs, buffers/easements, fish passage, fencing, stream restoration)
Rc	Conduct habitat improvement activities (e.g., removing culverts, erosion control) and other land management improvements
<b>Strategy 3. Conservation or maintenance of flows and water quality (W)</b>	
Wa	Establish instream flows or flow management scenarios
Wb	Promote and implement water quality BMPs
Wc	Coordinate and collaborate to improve water quality and quantity
<b>Strategy 4. Partnerships and Collaboration (P)</b>	
Pa	Follow Collaborative Conservation principles focused on mutual outcomes
Pb	Promote existing partnerships for opportunities to promote outcomes
Pc	Develop new partnerships with private and public organizations to support outcomes
<b>Strategy 5. Outreach, Education and Information Dissemination (O)</b>	
Oa	Develop outreach and information materials
Ob	Create networks for information dissemination among partners
Oc	Ensure delivery of information
Od	Support educational opportunities

## Conservation Targets

These conservation targets will be the subject priority for measuring quantitative outcomes. See Table 3.

- Watersheds (WS)
- Prairie Streams (PS)
- Mid-sized Rivers (MR)
- Riparian Areas (RA)
- Aquatic Community (AC; Fish, mussels and other diverse native species)
- Aquatic Invasive Species (AIS)

## Specific Quantifiable Goals

1. Barrier Assessments:
  - a. Conduct 4 assessments of instream barriers to fish movement
  - b. Create an online database scaled to a minimum HUC 6 watershed
2. Barrier Removal
  - a. Identify and prioritize instream barriers for removal/mitigation in 3 priority watersheds
  - b. Remove 5-10 barriers to restore connectivity and provide fish passage
3. Connectivity
  - a. Reconnect 70-100 miles of fragmented river/stream
4. Restore 10-20 miles of river/stream to condition supporting aquatic community
5. Enhance 20-50 miles of riparian area along river/stream to improve habitat condition
6. Provide or Improve 3 Recreational Opportunities related to aquatic systems and communities in rivers/streams
7. Conduct 8-10 Priority Watershed Analyses (HUC 6)
8. Support completion of at least 2 Species Status Assessments for imperiled fish or aquatic species

Table 3. Goals, Strategies, Targets, and Outputs

Goals	Strategies & Targets	Measurable Outputs
H1 - Intact watersheds	focus on R, W, P; target PS, MR, WS	stream miles, area
H2 - Connect rivers	focus on R, W, P; target PS, MR	barriers removed, upstream miles reconnected, barriers assessed
H3 - Water qual/quant	focus on W, P, O; target PS, MR, WS, RA	threshold parameters
B1 - Species community	focus on I, R, W; target AC	% composition, biodiversity
B2 - Ecological function	focus on I, R, P; target RA, AC	condition
B3 - AIS	focus on I, R, P, O; target AC, AIS	presence, abundance
L1 - Support fish	focus on W, I, R, P, O; target PS, MR, AC	use, population
L2 - Watershed condition	focus on I, R, W, P, O target; PS, MR, RA, AC, ANS	miles, area, biodiversity, integrity
L3 - Uplands	focus on R, P, and O target RA, AC	miles, condition, biodiversity

The Great Plains FHP fully supports the strategies of the NFHAP by remediating the causes of fish populations and habitat declines in prairie rivers and aquatic systems in the Great Plains geography. Using an integrated landscape approach, comprehensive outreach and communication strategies, and involving non-traditional partners, this Partnership combines sound science and collaborative partnerships to restore and protect priority prairie grassland rivers and other aquatic systems.

Identifying shared priorities, developing and using shared science and collaboratively leveraging resources and capacity are paramount to the success of this partnership. To build a successful partnership, trust and a shared vision and goals is vital. The Great Plains FHP creates the context for current work among partners in the region to have meaning at a landscape scale.

Another key to success is building on critical work already underway or completed. To this extent, partners have long worked together to establish an understanding of how to best manage resources to maintain their conservation value. Currently it is beneficial to employ established Best Management Practices (BMPs) for riparian habitat protection and land management practices that promote sustainability of ecological and economical outcomes. Agreeing to and sharing BMPs within the Partnership and with the Public promotes measurable outcomes for resource protection and enlists the public and community of practitioners in practices that can benefit the aquatic resources and sustainability of land function of ecosystems in the Great Plains.

State partners play a significant role as chief stewards of fish and wildlife resources and the lead for establishing land and water management practices. The Great Plains FHP used State Wildlife Action Plans along with priority Federal Trust

species as a basis to determine highest species priorities for 8-digit HUCs across the geographic area. This analysis resulted in the selection of areas considered the highest conservation value due to their pristine nature and opportunity for protection from further threats; those areas in most need of restoration due to existing conditions; or those areas that afford the best opportunity for conservation efforts. The resultant map includes a mosaic of habitats in need of high priority conservation across the geographic area that informs investments by partners and interested collaborators that collectively result in improved watershed health that serves multiple ecosystem values.

In addition, the Science and the Planning Teams will continue development of a prioritization strategy that the Partnership can use for the future selection of the project areas based on species needs, habitat condition, and threats.

Identification of the highest priority areas ensures other agencies and organizations can participate and support local needs and facilitate local awareness for conservation of a particular watershed. Developing a list of projects will further, the concept of collaboration on aquatic habitat conservation by allowing the Partnership members to advocate for local assistance for identified projects.

Due to the high diversity of aquatic species in the Great Plains, there is no single or group of species for focus of this partnership. Multiple types of fishes are of recreational, economic or ecological interest such as sauger, sunfishes, catfishes, buffaloes, and paddlefish, and other species portray an aesthetic or ecological significance; i.e., Neosho madtom, sturgeon and flathead chubs and other cyprinids. The strategies and goals identified by this Framework will attempt to improve the overall conditions for as many species as practical

in those areas that are deemed high priority. In many instances, an improvement or a protection of the aquatic habitats will benefit multiple species.

In areas where private land is involved, willing and voluntary participants are vital to overall success and an important component for implementing any of these strategies. Consistent funding for the Great Plains FHP is crucial to maintain a steady presence and continue to make annual progress towards the goals of the National Fish Habitat Action Plan.

The streams and rivers of the northern prairie region support a wide range of values. Recreational users value fishing, hunting, trapping, canoeing, and wildlife observation. Agricultural groups value water provision for crops, livestock, and farmsteads. Communities of the Great Plains value vital sources of drinking water and tourism. For many of the prairie rivers, the recreational values have not been fully recognized and are sometimes forgotten; however, many generations grew up appreciating the fishing, swimming, canoeing, and hunting along these rivers. In general, the health of the watersheds and the aquatic habitats reflects the health of the land and human communities.

## **Implementation**

The Partnership will develop methodology to share information effectively. Although it will be unlikely that all members of the Partnership will be able to attend all meetings due to funding and travel limitations, one of our goals for communication and decisions is transparency. A philosophy of transparency will help promote creative thinking and collaboration among multiple partners.

There is an expectation that all members of the Partnership will be delegates and carry the message of the National Fish Habitat Action Plan to their local area, help organize the on-the-ground

projects, and facilitate the progress of these projects across the Great Plains. Successful organization and facilitation will require a clear and simple message of the purpose and roles of the Partnership to be shared with those interested in restoring or preserving aquatic habitats. One of the primary roles of the Great Plains FHP is to provide the implementation strategy that will benefit the greatest priority of habitat restoration or protection needs.

Due to the large number of members and interests that may potentially participate in the Partnership, electronic sharing of information is a useful tool to broadly communicate ongoing and future efforts. Communication during implementation will be accomplished through email, regular conference calls, as well as a website to share information and disseminate critical documents and data. Recognizing that everyone does not have internet access, regular newsletters will be sent to any members of the Partnership that prefer paper versions. A website has already been developed to help share information with the public as well as within the participants of the Partnership. However, regular coordination meetings will be necessary to verbally discuss priorities and strategies. Due to our priority of putting available funding toward conservation projects, these meetings will be scheduled on a case by case basis and will try to take advantage of immediate needs and simultaneous gatherings to avoid duplicate travel.

## **Evaluation and Reporting**

The Great Plains FHP will report annually to the National Fish Habitat Board in either written or verbal formats, or both, on the specific project accomplishments for that year and specify plans for the future. The Partnership will also document accomplishments spatially in a GIS database that will link the project aquatic populations, habitats,

and watershed data. As priority projects are completed within each watershed, the Partnership will need to evaluate the success of implementation and re-evaluate the next steps to be more efficient. Adaptive management and constant vigilance on changing conditions on the landscape will be necessary to set and address priorities. As the national Science and Data Committee develop a national scale information base, we will work

closely with this committee to incorporate all relevant information for the Great Plains (Beard et al. 2008).

## Revisions

This strategy was initially developed in 2009 and revised in 2020.



Conducting field work, Sam Stukel

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## Appendix I - Great Plains FHP partial list of potential partners

### State Fish and Wildlife Agencies representatives

- Colorado Division of Wildlife
- Iowa Department of Natural Resources
- Kansas Department of Wildlife and Parks
- Minnesota Department of Natural Resources
- Missouri Department of Conservation
- Montana Fish, Wildlife and Parks
- Nebraska Game and Parks Commission
- North Dakota Game and Fish Department
- South Dakota Game, Fish and Parks
- Wyoming Game and Fish Department

### State Water Quality Agencies

- North Dakota Department of Health

### Native American Tribes

- Assiniboine and Sioux Tribes of Ft. Peck
- Blackfeet Tribe
- Cheyenne River Sioux
- Chippewa Cree of Rocky Boy
- Crow
- Crow Creek Sioux
- Eastern Shoshone
- Flandreau Santee Sioux
- Gros Ventre and Assiniboine Tribes of Ft. Belknap
- Iowa Tribe of Kansas and Nebraska
- Kickapoo Tribe in Kansas
- Lower Brule Sioux
- Northern Arapaho
- Northern Cheyenne
- Oglala Sioux
- Omaha Tribe
- Ponca Tribe of Nebraska
- Prairie Band of Potawatomi of Kansas
- Rosebud Sioux
- Sac and Fox
- Santee Sioux
- Sisseton-Wahpeton Oyate
- Spirit Lake Sioux Tribe
- Standing Rock Sioux
- Three Affiliated Tribes (Mandan, Arikara, Hidatsa)
- Turtle Mountain Band of Chippewa
- Winnebago Tribe of Nebraska
- Yankton Sioux

### Federal Agency Representatives

- U.S. Department of Agriculture
  - Natural Resource Conservation Service
  - U.S. Forest Service
- U.S. Department of Defense
  - U.S. Army Corp of Engineers
- U.S. Department of Interior
  - U.S. Fish and Wildlife Service
  - U.S. Geological Survey
  - Bureau of Reclamation
  - Bureau of Land Management
  - Bureau of Indian Affairs
  - National Park Service
- U.S. Environmental Protection Agency

### Conservation/Science/Academic members

- Livestock / Cattleman Associations
- The Nature Conservancy
- Sportsman Groups
- The Wild Turkey Federation
- World Wildlife Fund
- Izaak Walton League
- American Fisheries Society – NCD
- North American Benthological Society (NABS)
- Ecological Society of America
- River management Society
- MRNRC
- University of Missouri
- South Dakota State University
- Colorado State University
- University of Montana - Bozeman

### At-large Members

- Private Citizens
- County / Township organizations
- Municipalities
- Water districts / Water quality agencies



## Appendix II - State Wildlife Action Plans

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## Appendix III - Great Plains FHP focus fish species and Federal and State status

### State Status Abbreviations

Tier 1-2	Prioritized species (1=highest; 2=lower) are those that are most in need of conservation action in order to sustain or restore their populations.
S <sub>1</sub> -4	Species that are sub-nationally critically impaired (1=highest; 3=lower)
SGCN	Species with the Greatest Conservation Need
SPC	Species of Concern
Level 1-3	Prioritized Species status levels (1=highest; 3=lower) that are in decline and presently receive little or no monetary support or conservation efforts.
End	Endangered
THR	Threatened
Extirpated	Species that ceases to exist in the chosen geographic area of study, though it still exists elsewhere.
NSS <sub>1</sub> -4	Prioritized Native Species Status (1=highest; 4=lower)
NSSU	Prioritized Native Species Status Unknown

Species	State	Federal Status	State Status
American Brook Lamprey	IA, MO		SGCN-THR, S <sub>2</sub>
American Eel	KS, MN, IA		S <sub>2</sub> , SPC, SGCN
Arkansas Darter	CO, KS	Candidate	Tier I, THR-S <sub>2</sub>
Arkansas Saddled Darter	MO		S <sub>2</sub>
Arkansas River Shiner	KS	Threatened	End -S <sub>1</sub>
Banded Darter	KS, IA		S <sub>1</sub> , SGCN
Banded Killifish	SD, IA		S <sub>1</sub> , SGCN
Banded Sculpin	KS		S <sub>1</sub>
Bigmouth Shiner	WY		NSS <sub>4</sub>
Black Buffalo	MN, IA		THR, SGCN
Black Redhorse	KS, IA		S <sub>1</sub> , SGCN-THR
Blacknose Shiner	NE, SD, ND, IA, MO		S <sub>1</sub> , S <sub>1</sub> , Level 3, SGCN-THR, S <sub>2</sub>
Blackside Darter	SD, KS, IA		S <sub>2</sub> , THR -S <sub>1</sub> , SGCN
Blackstripe Topminnow	IA		SGCN
Blue Sucker	MN, MT, ND, NE, SD, IA		SPC, S <sub>2</sub> S <sub>3</sub> , Level 1, S <sub>1</sub> , S <sub>3</sub> , SGCN
Blue Catfish	IA		SGCN
Bluntnose Shiner	MO		S <sub>2</sub> , S <sub>3</sub>
Bluntnose Darter	IA, KS, MN		SGCN-End, S <sub>2</sub> , SPC
Brassy Minnow	CO, KS, WY		Tier I, S <sub>1</sub> , NSS <sub>4</sub>
Brindled Madtom	KS		S <sub>2</sub>
Brook Silverside	IA		SGCN
Brook Stickleback	IA		SGCN
Brown Bullhead	IA, MO		SGCN, S <sub>3</sub>
Burbot	WY, ND, IA		NSS <sub>3</sub> , Level 2, SGCN-THR
Carmine Shiner	SD, ND, IA		S <sub>2</sub> , Level 3, SGCN
Central Mudminnow	MO, SD, IA		End-S <sub>1</sub> , S <sub>2</sub> , SGCN

Species	State	Federal Status	State Status
Channel Darter	MO		S <sub>3</sub>
Channel Shiner	IA		SGCN
Checkered Madtom	MO		S <sub>3</sub> S <sub>4</sub>
Chestnut Lamprey	ND, IA		Level 3, SGCN-THR
Common Shiner	CO, KS, WY		Tier I, S <sub>4</sub> , NSS <sub>4</sub>
Crystal Darter	IA, MN, MO		SGCN, END, End-S <sub>1</sub>
Cypress Minnow	MO		End-S <sub>1</sub>
Eastern Slim Minnow	MO		S <sub>2</sub> S <sub>3</sub>
Fantail Darter	IA		SGCN
Finescale Dace	NE, SD, WY, ND		S <sub>2</sub> , S <sub>1</sub> , NSS <sub>2</sub> , Level 3
Flathead Chub	CO, KS, MO, WY, ND, NE, MN, IA		Tier 1, THR-S <sub>1</sub> , End-S <sub>1</sub> , NSS <sub>4</sub> , Level 2, S <sub>2</sub> , SPC, SGCN
Freckled Madtom	IA		SGCN-End
Ghost Shiner	IA		SGCN
Gilt Darter	MN		SPC
Greenside Darter	KS		S <sub>2</sub>
Golden Shiner	IA		SGCN
Golden Topminnow	MO		S <sub>1</sub>
Goldeye	WY		NSS <sub>3</sub>
Goldstripe Darter	MO		End-S <sub>1</sub>
Gravel Chub	MN, IA		THR, SGCN
Harlequin Darter	MO		End-S <sub>2</sub>
Highfin Carpsucker	KS, MO		S <sub>2</sub> , S <sub>2</sub>
Hornyhead Chub	WY, SD, ND, KS		NSS <sub>1</sub> , S <sub>3</sub> , Level 3, THR-S <sub>1</sub>
Iowa Darter	WY, IA		NSS <sub>3</sub> , SGCN
Ironcolor Shiner	MO		S <sub>1</sub>
Kendall Warm Springs Dace	WY	Endangered	NSS <sub>1</sub>
Lake Chub	SD, MN		S <sub>1</sub> , SPC
Lake Sturgeon	IA, MN, MO, NE		SGCN-End, SPC, End-S <sub>1</sub> , S <sub>1</sub>
Largescale Stoneroller	ND, IA		Level 3, SGCN
Least Darter	IA, MN, MO		SGCN, SPC, S <sub>2</sub>
Logperch	SD, ND, IA		S <sub>3</sub> , Level 3, SGCN
Longnose Dace	IA		SGCN
Longnose Darter	MO		End-S <sub>1</sub>
Longnose Sucker	SD		S <sub>1</sub>
Mimic Shiner	IA		SGCN
Mottled Sculpin	IA		SGCN
Mountain Madtom	MO		End-S <sub>1</sub> S <sub>2</sub>
Mountain Sucker	CO, SD		Tier I, S <sub>3</sub>

Species	State	Federal Status	State Status
Mud Darter	IA		SGCN
Neosho Madtom	KS, MO	Threatened	THR-S <sub>2</sub> , End-S <sub>1</sub>
Niangua Darter	MO	Threatened	End-S <sub>2</sub>
Northern Brook Lamprey	MN, IA		SPC, SGCN
Northern Hog Sucker	KS		S <sub>1</sub>
Northern Pearl Dace	WY, ND, SD		NSS <sub>2</sub> , Level 1, S <sub>2</sub>
Northern Pike	IA		SGCN
Northern Plains Killifish	KS, WY, MO		S <sub>3</sub> , NSS <sub>3</sub> , S <sub>2</sub>
Northern Redbelly Dace	CO, NE, ND, SD		Tier I, S <sub>2</sub> , Level 2, S <sub>2</sub>
Orangespotted Sunfish	CO		Tier I
Orangethroat Darter	WY, CO, IA		NSS <sub>3</sub> , Tier I, SGCN-THR
Ozark Minnow	MN, KS, IA		SPC, S <sub>1</sub> , SGCN
Ozark Shiner	MO		S <sub>2</sub>
Paddlefish	MN, MT, ND, IA		THR, S <sub>2</sub> , Level 2, SGCN
Pallid Shiner	MN, IA		END, SGCN
Pallid Sturgeon	IA, MO, MT, NE, SD, ND, KS	Endangered	SGCN-End, End-S <sub>1</sub> , S <sub>1</sub> , S <sub>1</sub> , S <sub>1</sub> , Level 2, Endangered-S <sub>1</sub>
Pearl Dace	IA, MT,		SGCN-End, S <sub>2</sub>
Peppered Chub	KS		End-S <sub>1</sub>
Pirate Perch	MN, IA		SPC, SGCN
Plains Minnow	CO, KS, WY, NE, IA, MO		Tier I, Thr-S <sub>2</sub> S <sub>3</sub> , Tier I, NSS <sub>3</sub> , S <sub>2</sub> , SGCN, S <sub>2</sub>
Plains Topminnow	MN, NE, WY, CO, MO		THR, S <sub>3</sub> , NSS <sub>3</sub> , Tier I, S <sub>3</sub>
Pugnose Minnow	IA		SGCN
Pugnose Shiner	IA, MN, ND		SGCN-End, THR, Level 3
Rainbow Darter	IA		SGCN
Redfin Darter	MO		End-S <sub>1</sub>
Redside Dace	MN		SPC
Redspot Chub	KS		THR-S <sub>1</sub>
River Darter	ND, KS, IA, MO		Level 3, S <sub>1</sub> S <sub>2</sub> , SGCN, S <sub>3</sub>
River Redhorse	KS		S <sub>1</sub> S <sub>2</sub>
River Shiner	KS, IA		S <sub>3</sub> S <sub>4</sub> , SGCN
Roundtail Chub	CO, WY		Tier 1, NSS <sub>1</sub>
Sabine Shiner	MO		End-S <sub>1</sub>
Sauger	MT, WY		S <sub>2</sub> , NSS <sub>3</sub>
Scaly Sand Darter	MO		S <sub>3</sub>
Shoal Chub	IA		SGCN
Shortnose Gar	MT		S <sub>1</sub>
Shovelnose Sturgeon	WY, SD, IA	Threatened	NSS <sub>3</sub> , S <sub>4</sub> , SGCN
Sicklefin Chub	IA, MT, ND, NE, SD, KS		SGCN, S <sub>1</sub> , Level 1, S <sub>1</sub> , S <sub>1</sub> , End-S <sub>1</sub>

Species	State	Federal Status	State Status
Silverband Shiner	IA		SGCN
Silver Chub	ND		Level 2
Silver Lamprey	ND, IA		Level 3, SGCN
Skipjack Herring	MN, IA		END, SGCN
Slender Madtom	MN, IA		END, SGCN
Slenderhead Darter	IA		SGCN
Slimy Sculpin	IA		SGCN
Southern Brook Lamprey	MN, MO		SPC, S2-S3
Southern Redbelly Dace	CO, SD, KS, IA		Tier I, S1, S2S3, SGCN
Speckled Darter	KS		S1S2
Spotfin Shiner	KS		S1
Spotted Gar	KS		S1S2
Spotted Sucker	IA		SGCN
Stargazing Darter	MO		S2
Starhead Topminnow	MO		S2
Stonecat	CO		Tier I
Striped Shiner	KS		S1
Sturgeon Chub	IA, MT, ND, NE, WY, SD, KS, MO		SGCN, S2S3, Level 1, S1, NSS2, S2, THR-S1, S3
Suckermouth Minnow	CO, WY, MN, IA		Tier I, NSS2, SPC, SGCN
Sunburst Darter	KS		S1
Swamp Darter	MO		End-S1
Tadpole Madtom	KS, IA		S2S3, SGCN
Taillight Shiner	MO		End-S1
Topeka Shiner	KS, MN, MO, NE, SD, IA	Endangered	THR-S2, SPC, End-S1, S1, S2, SGCN-THR
Trout Perch	MT, ND, SD, IA, MO		S2, Level 2, S2, SGCN, S1
Weed Shiner	IA, MO		SGCN-End, S3
Western Blacknose Dace	KS		S1
Western Mosquitofish	IA		SGCN
Western Sand Darter	IA, MO		SGCN-THR, S2S3
Western Silvery Minnow	IA, WY, NE, KS, MO		SGCN, NSS2, S2, THR-S2, S2
Western Slim Minnow	MO		S3
Yellow Bullhead	ND		Level 3
Flat Floater	NE, KS, MN, IA, MO		S1, End-S1, SPC, SGCN, S2
Creek Heelsplitter	ND, SD, IA		Level 1, S1, SGCN-THR
Creeper	ND, KS, IA		Level 3, S2, SGCN
Deertoe	ND, KS, IA		Level 3, S1S2, SGCN
Fragile Papershell	ND		Level 3
Pink Papershell	ND, IA		Level 1, SGCN

Species	State	Federal Status	State Status
Threeridge	ND, IA		Level 2, SGCN
Wabash Pigtoe	ND, IA		Level 2, SGCN
Black Sandshell	ND, MN, MO		Level 2, SPC, S2
Pink Hellsplitter	ND, KS, IA		Level 2, S2S3, SGCN
Cylindrical Papershell	WY, CO, KS, IA, MO		NSS2, Tier 2, S1, SGCN-THR, S1
Giant Floater	WY		NSSU
Plain Pocketbook	WY, NE		NSS1, S2
Elktoe	SD, KS, MN, IA, MO		S1, End-S1, THR, SGCN, S2
Ellipse	KS, MN, IA		End-S1, THR, SGCN-THR
Hickorynut	SD, IA		S1, SGCN
Higgins Eye	SD, MN, IA, MO	Endangered	S1, End, SGCN-End, End-S1
Mapleleaf	SD, ND, IA		S2, Level 3, SGCN
Pimpleback	SD, NE, IA		S1, S2, SGCN
Pistolgrip	NE, MN, IA		S1, End, SGCN
Rock Pocketbook	SD, KS, MN, IA		S1, THR-S1, End, SGCN
Scaleshell	SD, NE, MO	Endangered	S1, S1, End-S1
Yellow Sandshell	SD, KS, MN, IA		S1, S2S3, End, SGCN-End
Butterfly	KS, MN, IA		THR-S1, THR, SGCN-THR
Fatmucket	KS, IA		S1S2, SGCN
Fawnsfoot	KS, MN, IA		S2, THR, SGCN
Flutedshell	KS, MN, IA		THR-S1, THR, SGCN
Lilliput	KS, IA		S2S3, SGCN
Mucket	KS, MN, IA		End-S1, THR, SGCN
Neosho Mucket	KS, MO	Endangered	End-S1, S2
Ouachita Kidneyshell	KS		THR-S1
Purple Wartyback	KS, MN, IA		S1, End, SGCN-THR
Rabbitsfoot	KS, MO	Threatened	End-S1, S1
Snuffbox	KS, MN, IA, MO	Endangered	Extirpated, End, SGCN, End-S1
Spike	KS, MN, IA		S2S3, THR, SGCN
Wartyback	KS, MN, IA		S2, THR, SGCN
Washboard	KS, MN, IA		S2, End, SGCN
Western Fanshell	KS, MO		End-S1, S2
Spectaclecase	MN, IA, MO	Endangered	End, SGCN-End, S3
Eastern Elliptio	MN		SPC
Elephant Ear	MN, IA, MO		End, SGCN, End-S1
Ebonyshell	MN, IA, MO		End, SGCN, End-S1
Pond Mussell	MN, IA		THR, SGCN
Sheepnose (Bullhead)	MN, IA, MO	Endangered	End, SGCN-End, End-S2
Round Pigtoe	MN, IA		SPC, SGCN

Species	State	Federal Status	State Status
Winged Mapleleaf	MN, MO	Endangered	End, End-S1
Monkeyface	MN, IA		THR, SGCN
Salamander Mussel	MN, IA, MO		End, SGCN, S1
Slippershell	IA, MO		SGCN, S1
White Heelsplitter	IA		SGCN
Threehorn Wartyback	IA		SGCN
Pyramid Pigtoe	IA		SGCN
Paper Pondshell	IA		SGCN
Curtis Pearlymussel	MO	Endangered	End-S1
Pink Mucket	MO	Endangered	End-S2
Southern Hickorynut	MO		S1
Fat Pocketbook	MO	Endangered	End-S1
Ouachita Kidneyshell	MO		S3
Purple Lilliput	MO		S

## Appendix IV - Great Plains FHP aquatic species in State Wildlife Action Plans

Taxonomic Group	Scientific Name	Common Name
Fish	<i>Alosa alabamae</i>	Alabama Shad
Fish	<i>Lampetra appendix</i>	American Brook Lamprey
Fish	<i>Lethenteron appendix</i>	American Brook Lamprey
Fish	<i>Anguilla rostrata</i>	American Eel
Fish	<i>Etheostoma cragini</i>	Arkansas Darter
Fish	<i>Notropis girardi</i>	Arkansas River Shiner
Fish	<i>Etheostoma euzonum euzonum</i>	Arkansas Saddled Darter
Fish	<i>Etheostoma zonale</i>	Banded Darter
Fish	<i>Fundulus diaphanus</i>	Banded Killifish
Fish	<i>Cottus carolinae</i>	Banded Sculpin
Fish	<i>Lepomis symmetricus</i>	Bantam Sunfish
Fish	<i>Notropis boops</i>	Bigeye Shiner
Fish	<i>Notropis dorsalis</i>	Bigmouth Shiner
Fish	<i>Ictiobus niger</i>	Black Buffalo
Fish	<i>Moxostoma duquesnei</i>	Black Redhorse
Fish	<i>Rhinichthys atratulus</i>	Blacknose Dace
Fish	<i>Notropis heterolepis</i>	Blacknose Shiner
Fish	<i>Percina maculata</i>	Blackside Darter
Fish	<i>Fundulus notatus</i>	Blackstripe Topminnow
Fish	<i>Ictalurus furcatus</i>	Blue Catfish
Fish	<i>Cycleptus elongatus</i>	Blue Sucker
Fish	<i>Catostomus discobolus</i>	Bluehead Sucker
Fish	<i>Percina cymatotaenia</i>	Bluestripe Darter
Fish	<i>Cyprinella camura</i>	Bluntface Shiner
Fish	<i>Etheostoma chlorosoma</i>	Bluntnose Darter
Fish	<i>Pimephales notatus</i>	Bluntnose Minnow
Fish	<i>Amia calva</i>	Bowfin
Fish	<i>Hybognathus hankinsoni</i>	Brassy Minnow
Fish	<i>Noturus miurus</i>	Brindled Madtom
Fish	<i>Labidesthes sicculus</i>	Brook Silverside
Fish	<i>Ameiurus nebulosus</i>	Brown Bullhead
Fish	<i>Lota lota</i>	Burbot
Fish	<i>Luxilus cardinalis</i>	Cardinal Shiner
Fish	<i>Notropis percobromus</i>	Carmine Shiner
Fish	<i>Umbra limi</i>	Central Mudminnow
Fish	<i>Percina copelandi</i>	Channel Darter
Fish	<i>Notropis wickliffi</i>	Channel Shiner
Fish	<i>Noturus flavater</i>	Checkered Madtom



<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Fish	<i>Ichthyomyzon castaneus</i>	Chestnut Lamprey
Fish	<i>Salvelinus fontinalis</i>	Coaster Brook Trout
Fish	<i>Luxilus cornutus</i>	Common Shiner
Fish	<i>Crystallaria asprella</i>	Crystal Darter
Fish	<i>Etheostoma euzonum erizonum</i>	Current Saddled Darter
Fish	<i>Hybognathus hayi</i>	Cypress Minnow
Fish	<i>Myoxocephalus thompsonii</i>	Deepwater Sculpin
Fish	<i>Lepomis marginatus</i>	Dollar Sunfish
Fish	<i>Pimephales tenellus parviceps</i>	Eastern Slim Minnow
Fish	<i>Etheostoma flabellare</i>	Fantail Darter
Fish	<i>Chrosomus neogaeus</i>	Finescale Dace
Fish	<i>Catostomus latipinnis</i>	Flannelmouth Sucker
Fish	<i>Platygobio gracilis</i>	Flathead Chub
Fish	<i>Centrarchus macropterus</i>	Flier
Fish	<i>Noturus nocturnus</i>	Freckled Madtom
Fish	<i>Notropis buchanani</i>	Ghost Shiner
Fish	<i>Percina evides</i>	Gilt Darter
Fish	<i>Moxostoma erythrurum</i>	Golden Redhorse
Fish	<i>Notemigonus crysoleucas</i>	Golden Shiner
Fish	<i>Fundulus chrysotus</i>	Golden Topminnow
Fish	<i>Hiodon alosoides</i>	Goldeye
Fish	<i>Etheostoma parvipinne</i>	Goldstripe Darter
Fish	<i>Erimystax x-punctatus</i>	Gravel Chub
Fish	<i>Etheostoma blennioides</i>	Greenside Darter
Fish	<i>Cottus specus</i>	Grotto Sculpin
Fish	<i>Etheostoma histrio</i>	Harlequin Darter
Fish	<i>Carpionodes velifer</i>	Highfin Carpsucker
Fish	<i>Nocomis biguttatus</i>	Hornyhead Chub
Fish	<i>Gila cypha</i>	Humpback Chub
Fish	<i>Etheostoma exile</i>	Iowa Darter
Fish	<i>Notropis chalybaeus</i>	Ironcolor Shiner
Fish	<i>Etheostoma nigrum</i>	Johnny Darter
Fish	<i>Rhinichthys osculus thermalis</i>	Kendall Warm Springs Dace
Fish	<i>Coregonus kiyi</i>	Kiyi
Fish	<i>Couesius plumbeus</i>	Lake Chub
Fish	<i>Erimyzon sucetta</i>	Lake Chubsucker
Fish	<i>Acipenser fulvescens</i>	Lake Sturgeon
Fish	<i>Campostoma oligolepis</i>	Largescale Stoneroller
Fish	<i>Etheostoma microperca</i>	Least Darter
Fish	<i>Percina caprodes</i>	Logperch

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Fish	<i>Lepomis megalotis</i>	Longear Sunfish
Fish	<i>Rhinichthys cataractae</i>	Longnose Dace
Fish	<i>Percina nasuta</i>	Longnose Darter
Fish	<i>Catostomus catostomus</i>	Longnose Sucker
Fish	<i>Notropis volucellus</i>	Mimic Shiner
Fish	<i>Hybognathus nuchalis</i>	Mississippi Silvery Minnow
Fish	<i>Cottus bairdii</i>	Mottled Sculpin
Fish	<i>Noturus eleutherus</i>	Mountain Madtom
Fish	<i>Catostomus platyrhynchus</i>	Mountain Sucker
Fish	<i>Etheostoma asprigene</i>	Mud Darter
Fish	<i>Noturus placidus</i>	Neosho Madtom
Fish	<i>Etheostoma nianguae</i>	Niangua Darter
Fish	<i>Coregonus nipigon</i>	Nipigon Cisco
Fish	<i>Ichthyomyzon fossor</i>	Northern Brook Lamprey
Fish	<i>Hypentelium nigricans</i>	Northern Hog Sucker
Fish	<i>Lepidomeda copei</i>	Northern Leatherside Chub
Fish	<i>Margariscus nachtriebi</i>	Northern Pearl Dace
Fish	<i>Esox lucius</i>	Northern Pike
Fish	<i>Fundulus kansae</i>	Northern Plains Killifish
Fish	<i>Chrosomus eos</i>	Northern Redbelly Dace
Fish	<i>Chrosomus eos x chrosomus neogaeus</i>	Northern Redbelly X Finescale Dace
Fish	<i>Lepomis peltastes</i>	Northern Sunfish
Fish	<i>Lepomis humilis</i>	Orangespotted Sunfish
Fish	<i>Etheostoma spectabile</i>	Orangethroat Darter
Fish	<i>Notropis nubilus</i>	Ozark Minnow
Fish	<i>Polyodon spathula</i>	Paddlefish
Fish	<i>Hybopsis amnis</i>	Pallid Shiner
Fish	<i>Scaphirhynchus albus</i>	Pallid Sturgeon
Fish	<i>Moxostoma pisolabrum</i>	Pealip Redhorse
Fish	<i>Margariscus margarita</i>	Pearl Dace
Fish	<i>Macrhyopsis tetranema</i>	Peppered Chub
Fish	<i>Aphredoderus sayanus</i>	Pirate Perch
Fish	<i>Hybognathus placitus</i>	Plains Minnow
Fish	<i>Fundulus sciadicus</i>	Plains Topminnow
Fish	<i>Opsopoeodus emiliae</i>	Pugnose Minnow
Fish	<i>Notropis anogenus</i>	Pugnose Shiner
Fish	<i>Prosopium coulterii</i>	Pygmy Whitefish
Fish	<i>Carpiodes cyprinus</i>	Quillback
Fish	<i>Etheostoma caeruleum</i>	Rainbow Darter
Fish	<i>Xyrauchen texanus</i>	Razorback Sucker

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Fish	<i>Esox americanus</i>	Redfin (Grass) Pickerel
Fish	<i>Etheostoma whipplei</i>	Redfin Darter
Fish	<i>Lythrurus umbratilis</i>	Redfin Shiner
Fish	<i>Clinostomus elongatus</i>	Redside Dace
Fish	<i>Nocomis asper</i>	Redspot Chub
Fish	<i>Gila pandora</i>	Rio Grande Chub
Fish	<i>Percina shumardi</i>	River Darter
Fish	<i>Moxostoma carinatum</i>	River Redhorse
Fish	<i>Notropis blennius</i>	River Shiner
Fish	<i>Ambloplites rupestris</i>	Rock Bass
Fish	<i>Gila robusta</i>	Roundtail Chub
Fish	<i>Notropis sabiniae</i>	Sabine Shiner
Fish	<i>Sander canadensis</i>	Sauger
Fish	<i>Ammocrypta vivax</i>	Scaly Sand Darter
Fish	<i>Macrhybopsis hyostoma</i>	Shoal Chub
Fish	<i>Moxostoma macrolepidotum</i>	Shorthead Redhorse
Fish	<i>Coregonus zenithicus</i>	Shortjaw Cisco
Fish	<i>Lepisosteus platostomus</i>	Shortnose Gar
Fish	<i>Scaphirhynchus platyrhynchus</i>	Shovelnose Sturgeon
Fish	<i>Macrhybopsis meeki</i>	Sicklefin Chub
Fish	<i>Macrhybopsis storeriana</i>	Silver Chub
Fish	<i>Macrhybopsis storeriana</i>	Silver Chub
Fish	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey
Fish	<i>Moxostoma anisurum</i>	Silver Redhorse
Fish	<i>Notropis shumardi</i>	Silverband Shiner
Fish	<i>Alosa chrysochloris</i>	Skipjack Herring
Fish	<i>Noturus exilis</i>	Slender Madtom
Fish	<i>Percina phoxocephala</i>	Slenderhead Darter
Fish	<i>Cottus cognatus</i>	Slimy Sculpin
Fish	<i>Etheostoma gracile</i>	Slough Darter
Fish	<i>Ichthyomyzon gagei</i>	Southern Brook Lamprey
Fish	<i>Typhlichthys subterraneus</i>	Southern Cavefish
Fish	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace
Fish	<i>Etheostoma stigmaeum</i>	Speckled Darter
Fish	<i>Cottus ricei</i>	Spoonhead Sculpin
Fish	<i>Cyprinella spiloptera</i>	Spotfin Shiner
Fish	<i>Minytrema melanops</i>	Spotted Sucker
Fish	<i>Forbesichthys agassizii</i>	Spring Cavefish
Fish	<i>Percina uranidea</i>	Stargazing Darter
Fish	<i>Fundulus dispar</i>	Starhead Topminnow

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Fish	<i>Noturus flavus</i>	Stonecat
Fish	<i>Mugil cephalus</i>	Striped Mullet
Fish	<i>Macrhybopsis gelida</i>	Sturgeon Chub
Fish	<i>Phenacobius mirabilis</i>	Suckermouth Minnow
Fish	<i>Etheostoma mihileze</i>	Sunburst Darter
Fish	<i>Etheostoma fusiforme</i>	Swamp Darter
Fish	<i>Noturus gyrinus</i>	Tadpole Madtom
Fish	<i>Notropis maculatus</i>	Taillight Shiner
Fish	<i>Notropis topeka</i>	Topeka Shiner
Fish	<i>Cottus rhotheus</i>	Torrent Sculpin
Fish	<i>Percopsis omiscomaycus</i>	Trout Perch
Fish	<i>Lepomis gulosus</i>	Warmouth
Fish	<i>Notropis texanus</i>	Weed Shiner
Fish	<i>Rhinichthys obtusus</i>	Western Blacknose Dace
Fish	<i>Ammocrypta clara</i>	Western Sand Darter
Fish	<i>Hybognathus argyritis</i>	Western Silvery Minnow
Fish	<i>Pimephales tenellus tenellus</i>	Western Slim Minnow
Fish	<i>Acipenser transmontanus</i>	White Sturgeon
Fish	<i>Catostomus commersonii</i>	White Sucker
Fish	<i>Morone mississippiensis</i>	Yellow Bass
Fish	<i>Ameiurus natalis</i>	Yellow Bullhead
Fish	<i>Luxilus chrysocephalus</i>	Striped Shiner
Fish	<i>Lespisosteus oculatus</i>	Spotted Gar
Freshwater Snails	<i>Galba techella</i>	A Freshwater Snail
Freshwater Snails	<i>Pyrgulopsis bedfordensis</i>	A Spring Snail
Freshwater Snails	<i>Oreohelix alpina</i>	Alpine Mountainsnail
Freshwater Snails	<i>Gyraulus parvus</i>	Ash Gyro
Freshwater Snails	<i>Physa spelunca</i>	Cave Physa
Freshwater Snails	<i>Ferrissia walkeri</i>	Cloche Ancyloid
Freshwater Snails	<i>Ferrissia rivularis</i>	Creeping Ancyloid
Freshwater Snails	<i>Probythinella emarginata</i>	Delta Hydrobe
Freshwater Snails	<i>Galba dalli</i>	Dusky Fossaria
Freshwater Snails	<i>Somatogyrus rosewateri</i>	Elk Pebblesnail
Freshwater Snails	<i>Ferrissia fragilis</i>	Fragil Ancyloid
Freshwater Snails	<i>Lioplax sulculosa</i>	Furrowed Lioplax
Freshwater Snails	<i>Fluminicola coloradoensis</i>	Green River Pebblesnail
Freshwater Snails	<i>Fontigens aldrichi</i>	Hoosier Springsnail
Freshwater Snails	<i>Physa acuta</i>	Hot Springs Physa
Freshwater Snails	<i>Pyrgulopsis robusta</i>	Jackson Lake Springsnail
Freshwater Snails	<i>Physa megalochlamys</i>	Large-Mantle Physa

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Freshwater Snails	<i>Stagnicola elodes</i>	Marsh Pondsnaill
Freshwater Snails	<i>Planorbella trivolvis</i>	Marsh Rams-Horn
Freshwater Snails	<i>Fontigens antroecetes</i>	Missouri Cavesnaill
Freshwater Snails	<i>Marstonia scalariformis</i>	Moss Pyrg
Freshwater Snails	<i>Marstonia ozarkensis</i>	Ozark Pyrg
Freshwater Snails	<i>Physa acuta</i>	Pewter Physa
Freshwater Snails	<i>Campeloma crassulum</i>	Ponderous Campeloma
Freshwater Snails	<i>Galba bulimoides</i>	Prairie Fossaria
Freshwater Snails	<i>Fontigens proserpina</i>	Proserpine Cavesnaill
Freshwater Snails	<i>Acroloxus coloradensis</i>	Rocky Mountain Capshell
Freshwater Snails	<i>Colligyrus greggi</i>	Rocky Mountain Dusksnaill
Freshwater Snails	<i>Pleurocera alveare</i>	Rugged Hornsnaill
Freshwater Snails	<i>Micromenetus sampsoni</i>	Sampson Sprite
Freshwater Snails	<i>Somatogyrus depressus</i>	Sandbar Pebblesnaill
Freshwater Snails	<i>Pleurocera acuta</i>	Sharp Hornsnaill
Freshwater Snails	<i>Promenetus exacuouus</i>	Sharp Sprite
Freshwater Snails	<i>Fisherola nuttalli</i>	Shortface Lanx
Freshwater Snails	<i>Pomatiopsis lapidaria</i>	Slender Walker
Freshwater Snails	<i>Amnicola stygius</i>	Stygian Amnicola
Freshwater Snails	<i>Physa gyrina</i>	Tadpole Physa
Freshwater Snails	<i>Antrobia culveri</i>	Tumbling Creek Cavesnaill
Freshwater Snails	<i>Promenetus umbilicatellus</i>	Umbilicate Sprite
Freshwater Snails	<i>Physa gyrina utahensis</i>	Utah Physa
Mussel	<i>Plectomerus dombeyanus</i>	Bankclimber
Mussel	<i>Epioblasma florentina curtisii</i>	Curtis Pearlymussel
Mussel	<i>Leptodea fragilis</i>	Fragile Papershell
Mussel	<i>Pyganodon grandis</i>	Giant Floater
Mussel	<i>Quadrula verrucosa</i>	Pistolgrip
Mussel	<i>Unio merus tetralasmus</i>	Pondhorn
Mussel	<i>Toxolasma lividum</i>	Purple Lilliput
Mussel	<i>Obovaria jacksoniana</i>	Southern Hickorynut
Mussels	<i>Ligumia recta</i>	Black Sandshell
Mussels	<i>Potamilus purpuratus</i>	Bleufer
Mussels	<i>Ellipsaria lineolata</i>	Butterfly
Mussels	<i>Anodonta californiensis</i>	California Floater
Mussels	<i>Lasmigona compressa</i>	Creek Heelsplitter
Mussels	<i>Strophitus undulatus</i>	Creeper
Mussels	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell
Mussels	<i>Truncilla truncata</i>	Deertoe
Mussels	<i>Elliptio complanata</i>	Eastern Elliptio

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Mussels	<i>Fusconaia ebena</i>	Ebonyshell
Mussels	<i>Elliptio crassidens</i>	Elephant Ear
Mussels	<i>Alasmidonta marginata</i>	Elktoe
Mussels	<i>Venustaconcha ellipsiformis</i>	Ellipse
Mussels	<i>Potamilus capax</i>	Fat Pocketbook
Mussels	<i>Lampsilis siliquoidea</i>	Fatmucket
Mussels	<i>Truncilla donaciformis</i>	Fawnsfoot
Mussels	<i>Anodonta suborbiculata</i>	Flat Floater
Mussels	<i>Lasmigona costata</i>	Fluted Shell
Mussels	<i>Obovaria olivaria</i>	Hickorynut
Mussels	<i>Lampsilis higginsii</i>	Higgins Eye
Mussels	<i>Villosa lienosa</i>	Little Spectaclecase
Mussels	<i>Quadrula quadrula</i>	Mapleleaf
Mussels	<i>Quadrula metanevra</i>	Monkeyface
Mussels	<i>Actinonaias ligamentina</i>	Mucket
Mussels	<i>Lampsilis rafinesqueana</i>	Neosho Mucket
Mussels	<i>Lampsilis brittsi</i>	Northern Brokenray
Mussels	<i>Ptychobranhus occidentalis</i>	Ouachita Kidneyshell
Mussels	<i>Utterbackia imbecillis</i>	Paper Pondshell
Mussels	<i>Quadrula pustulosa</i>	Pimpleback
Mussels	<i>Potamilus alatus</i>	Pink Heelsplitter
Mussels	<i>Lampsilis abrupta</i>	Pink Mucket
Mussels	<i>Potamilus ohiensis</i>	Pink Papershell
Mussels	<i>Lampsilis cardium</i>	Plain Pocketbook
Mussels	<i>Ligumia subrostrata</i>	Pondmussel
Mussels	<i>Cyclonaias tuberculata</i>	Purple Wartyback
Mussels	<i>Pleurobema rubrum</i>	Pyramid Pigtoe
Mussels	<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot
Mussels	<i>Quadrula cylindrica</i>	Rabbitsfoot
Mussels	<i>Arcidens confragosus</i>	Rock Pocketbook
Mussels	<i>Pleurobema sintoxia</i>	Round Pigtoe
Mussels	<i>Simpsonaias ambigua</i>	Salamander Mussel
Mussels	<i>Leptodea leptodon</i>	Scaleshell
Mussels	<i>Plethobasus cyphus</i>	Sheepnose
Mussels	<i>Alasmidonta viridis</i>	Slippershell
Mussels	<i>Epioblasma triquetra</i>	Snuffbox
Mussels	<i>Cumberlandia monodonta</i>	Spectaclecase
Mussels	<i>Elliptio dilatata</i>	Spike
Mussels	<i>Toxolasma texasense</i>	Texas Lilliput
Mussels	<i>Obliquaria reflexa</i>	Threehorn Wartyback

<b>Taxonomic Group</b>	<b>Scientific Name</b>	<b>Common Name</b>
Mussels	<i>Amblema plicata</i>	Threeridge
Mussels	<i>Fusconaia flava</i>	Wabash Pigtoe
Mussels	<i>Quadrula nodulata</i>	Wartyback
Mussels	<i>Megalonaias nervosa</i>	Washboard
Mussels	<i>Cyprogenia aberti</i>	Western Fanshell
Mussels	<i>Margaritifera falcata</i>	Western Pearlshell
Mussels	<i>Lasmigona complanata</i>	White Heelsplitter
Mussels	<i>Quadrula fragosa</i>	Winged Mapleleaf
Mussels	<i>Lampsilis teres</i>	Yellow Sandshell
Mussels	<i>Lampsilis teres anodontoides</i>	Yellow Sandshell
Mussels	<i>Toxolasma parvum</i>	Lilliput

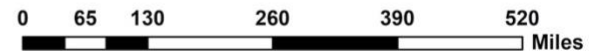
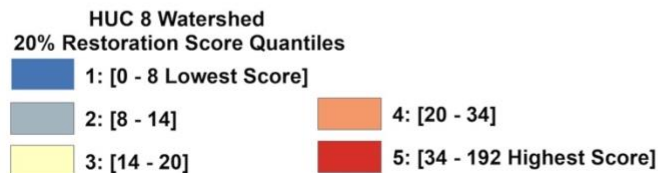
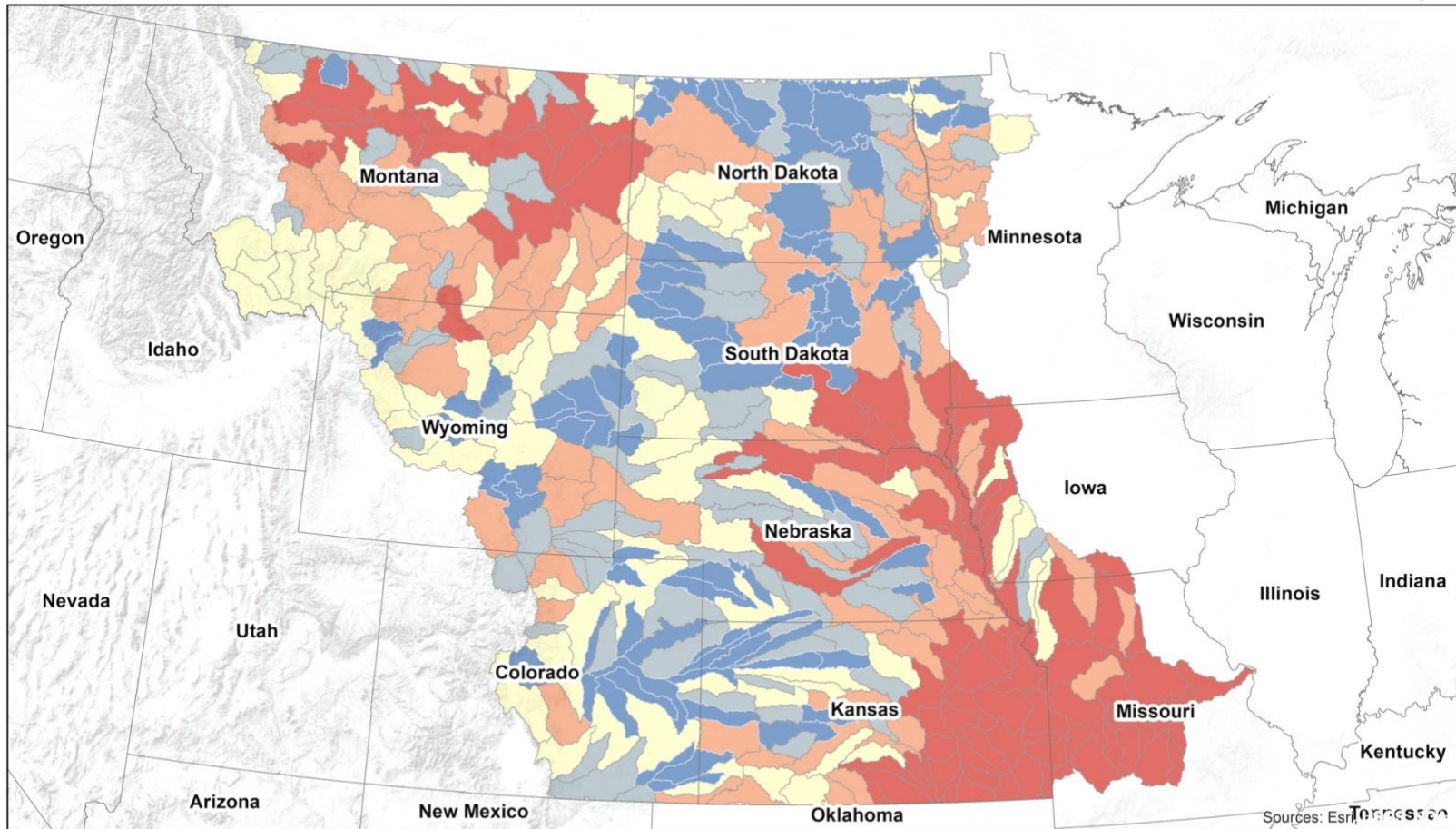
## Appendix V - Great Plains FHP habitat information inventory

<b>Metric</b>	
Area (square miles)	629,657
Number of river / stream miles	744,186
Number of HUC 4 watersheds	41
Number of HUC 8 watersheds	403
Number of HUC 10 watersheds	2,992
Number of HUC 12 watersheds	16,514
Number of HUC Catchments	529,467
Area (square miles)	629,657
Number of river / stream miles	744,186
<b>Number of HUC 8 Watersheds within Great Plains FHP Boundary</b>	
Montana	82
Wyoming	59
Colorado	52
North Dakota	52
South Dakota	49
Nebraska	69
Kansas	88
Minnesota	22
Iowa	22
Missouri	32
<b>Potential Barrier Information</b>	
Potential Barriers	567,828
Dams	6,029
Dams Snapped to Flowline	11,195
Bridges	6,833
Bridges Snapped to Flowline	69,104
Road Stream Intersections	474,667



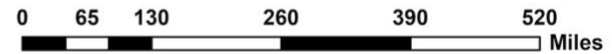
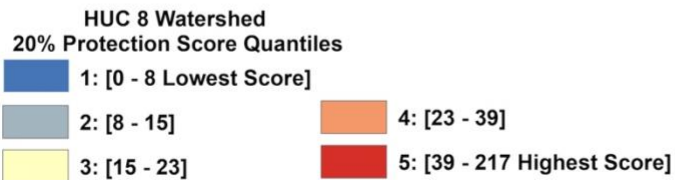
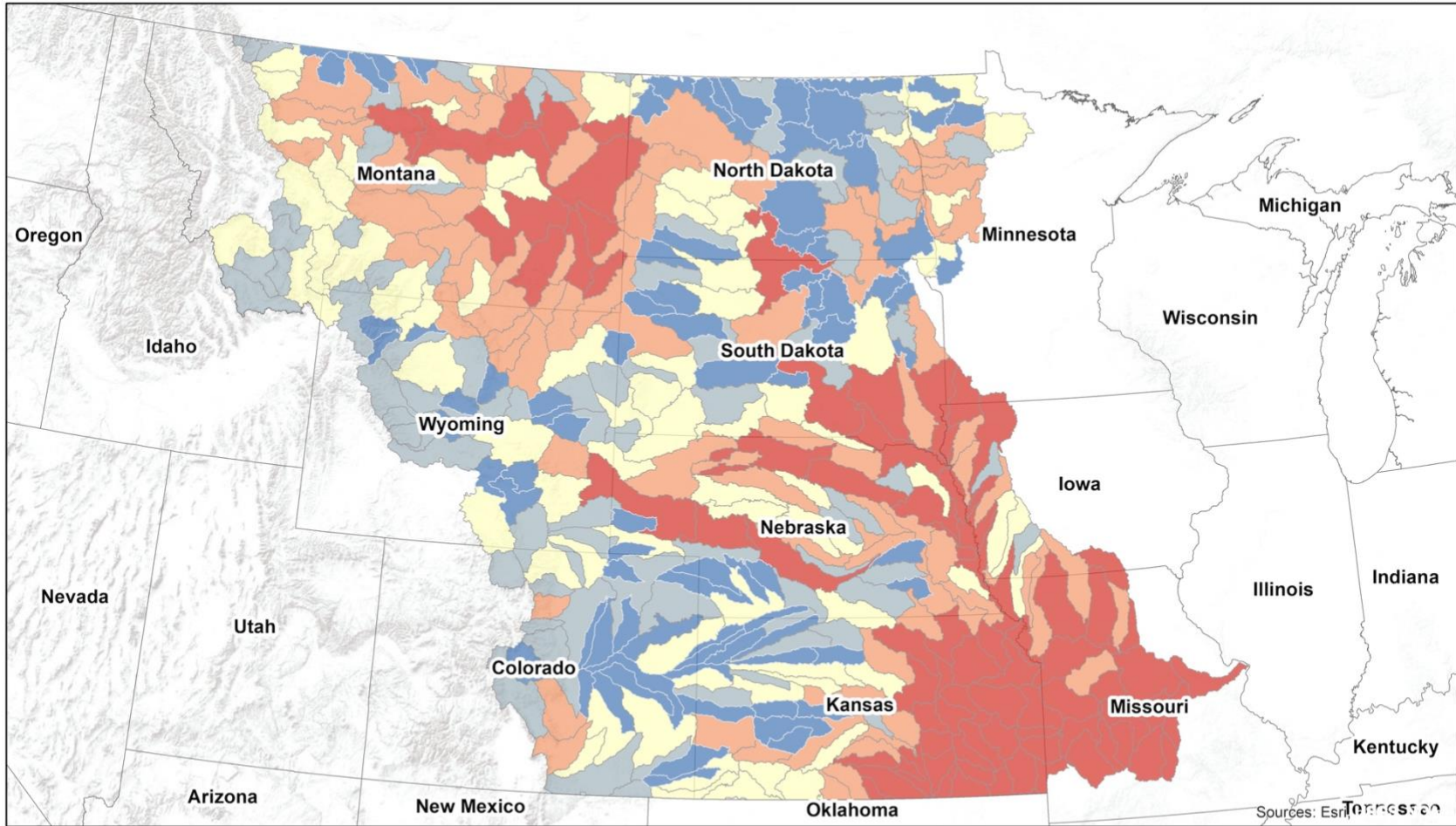
# Appendix VI - Great Plains FHP HUC 8 aquatic restoration and protection scores

## Great Plains Fish Habitat Partnership: Hydrologic Unit Code 8 Aquatic Restoration Scores



Note: A higher score indicates a higher opportunity need. Analysis performed by the Great Plains Fish Habitat Partnership and US Fish and Wildlife Service.  
[www.fishhabitat.org/the-partnerships/great-plains-fish-habitat-partnership](http://www.fishhabitat.org/the-partnerships/great-plains-fish-habitat-partnership)

# Great Plains Fish Habitat Partnership: Hydrologic Unit Code 8 Aquatic Protection Scores



Note: A higher score indicates a higher opportunity need. Analysis performed by the Great Plains Fish Habitat Partnership and US Fish and Wildlife Service.  
<[www.fishhabitat.org/the-partnerships/great-plains-fish-habitat-partnership](http://www.fishhabitat.org/the-partnerships/great-plains-fish-habitat-partnership)>