

## 2020 Upper Basin Pallid Sturgeon Workgroup Prioritized RFP Scope:

- *Develop a database that allows population assessment crews and hatchery managers to track the status of Pallid Sturgeon (extant and hatchery origin pallid sturgeon [HOPS]) using computers, laptops or smartphones.*

A database that would compile information by PIT tag would benefit biologists in their desire to monitor individual fish or the sturgeon population as a whole. This tool will allow managers to monitor growth, movement, survival, genetic composition, maturation, stocking location viability, hatchery success, age-based survival, and overall status of HOPS populations in their native habitat. It would facilitate broodstock collections being able to pull up a PIT tag and determine the number of progeny released in to each RPA and whether or not the fish has a need for genetic samples, blood work or a radio tag replant. Programs written in conjunction with the database that would track survival success of individual family lots, evaluate stocking locations, age at stocking, or other variables would provide valuable insight to biologists.

- *Develop a monitoring strategy to evaluate the contribution of reservoir habitats to the recovery of Pallid Sturgeon.*

Pallid Sturgeon continue to be collected in Lake Sakakawea, both extant adults and hatchery reared. Carrying capacity issues related to recovery in the river are causing a concern among biologists, however, carrying capacity calculations are based on the assumption that the reservoirs do not have a role in the life history of the pallid population. Having additional information as to the extent pallid sturgeon use the reservoir and their overall condition will help inform models designed to evaluate survival and possibly give biologists a better perspective on the role of the reservoir.

- *Develop a larval feed for Pallid Sturgeon to reduce hatchery selection.*

Pallid Sturgeon initiation to feed is highly variable in the hatchery setting. Biologists have documented feeding larvae that apparently do not assimilate the diets being fed or do not find the diets palatable. Since transition to feed significantly effects survival to stocking, hatcheries are introducing unnatural selection and thereby influencing the genetic composition of the population as a whole. A diet that increases survival and it practical to feed on a production scale is needed to improve hatchery success in pallid recovery.

- *Conduct one or more additional 3D hydraulic surveys to assess Pallid Sturgeon embryo dispersal at any discharge between 4,500 and 15,000.*

At each river stage, determine the drift speed, pathways and locations where drifters would stall. Determine the range of flows at which Pallid Sturgeon drift duration is maximized. Overlay all the locations where particles stall on the river maps to help ground crews target areas where larvae concentrate for sampling.

- *Examine habitat changes at various river discharges, as they relate to dam operation strategies.*

Currently three measurements of river bathymetry in a short reach of Missouri River downstream of the Milk River confluence exist. These data can be used to determine where change has occurred, to produce a map of erosion and deposition patterns. An additional survey at 12,000 cfs would be useful to map where the riverbed is moving.

- *Perform field and laboratory studies that describe Pallid Sturgeon drift characteristics, behavior, and the relationship between downstream drift, discharge and habitat complexity.*

New drift models utilizing three-dimensional hydraulic mapping indicate that higher dispersion of larvae is predicted to occur in complex habitat patches of the river habitat than previous models suggested based on larvae that are directly entrained into thalweg and remain in the thalweg until deposited into the reservoir. The results of laboratory and field studies should target restoration activities or prioritize water use to create and maintain habitat complexity that contributes to larval survival.

- *Update and develop population and survival estimates for wild and hatchery origin Pallid Sturgeon in the Upper Missouri River Basin in RPMAs 1,2, and 3.*

An update to the Upper Basin Pallid Sturgeon population and survival estimates for wild and hatchery origin Pallid Sturgeon in RPMAs 1, 2, and 3 were last updated in 2017. To continue to provide useful guidance in adaptive conservation for the Upper Basin Pallid Sturgeon Workgroup, updated recapture and stocking information through 2019-2020 would help to incorporate data corrections from earlier years into existing models of survival and abundance in the Upper Basin and provide for more accurate projections on population demographics and dynamics.

- *Develop an understanding of food-resource limitations in RPMA 2 with focus on densities of small-bodied fishes and their distributional extents.*

Following studies focused on the carrying capacity in RPMA 2, further information is needed to understand energetic demands of small-bodied fish throughout RPMA 2 and how their abundance and distribution may have trophically-cascading effects on Pallid Sturgeon at varying life history stages. In the past, several pelagic-spawning minnows were identified as being particularly important in Pallid Sturgeon diets and being able to trace this influence isotopically may yield a better understanding of where exactly these fish acquire the bulk of their energetic resources and what direct links can be made in identifying habitats and ecosystem processes necessary to maintain the population of Pallid Sturgeon. This work could also have applications in understanding tributary

influence on populations of Pallid Sturgeon inside and outside of RPMA 2 (e.g., the Niobrara River, the Powder River, the Milk River, the Marias River, etc.).

- *Perform field and laboratory studies that describe Pallid Sturgeon growth and development at varying temperatures and under varying resource-limiting circumstances.*  
Growth limitations may be of concern for adult and juvenile Pallid Sturgeon in the Upper Basin. Individuals are often collected and recaptured at lengths and weights similar to those of much younger year-classes raising issue with rates of growth and habitat utilization by individuals in the system. The results of laboratory and field studies should target varying scenarios of temperature and resource to further an understanding of how environmental conditions and habitat complexity may contribute to slowed development and growth.
- *Synthesize a summary of the impacts of hypolimnetic releases from Fort Peck Dam and benefits to Pallid Sturgeon of a naturalized thermograph.*  
There are few complete summaries of the impacts of the existing unnatural thermograph on Pallid Sturgeon and the species' habitats. By working closely with biologists and managers in the reaches of the Missouri River between Fort Peck Dam and Lake Sakakawea, a better understanding of the temperature effects on various developmental, behavioral, and environmental conditions could be made. This summary report would then hopefully serve as a single-source reference for Pallid Sturgeon recovery planning and provide complementary understanding with planned experimental discharges at Fort Peck Dam for the benefit of Pallid Sturgeon.
- *Perform field and laboratory studies that describe the efficacy and fit of using Shovelnose Sturgeon as surrogates to understand various life history, physiological, and behavioral aspects of Pallid Sturgeon.*  
As the endangered Pallid Sturgeon limits some study of aspects related to life history, its physiological extents, and behavioral tendencies, the use of surrogates has become a necessity. Understanding how the use of the closely related Shovelnose Sturgeon could better inform how surrogacy is approached and how meaningful results may be under varying scenarios.