

Platte River Recovery Implementation Program



2021 Science Report Session: Pallid Sturgeon

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How does the current Platte River Pallid Sturgeon Project dovetail into the Missouri River Recovery Program?



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SCHOOL OF NATURAL RESOURCES

NEBRASKA



MISSOURI RIVER
RECOVERY PROGRAM



Missouri River Recovery Program (MRRP)

What is it?

The MRRP effort consists of two primary components:

1. **Identifying and implementing an action that will avoid a finding of jeopardy for three federally listed species: the piping plover, the interior least tern, and the pallid sturgeon.** The current proposed action was described in the U.S. Army Corps of Engineers' October 2017 Biological Assessment. The proposed action allows the Corps to continue to operate for all authorized purposes while complying with all applicable laws, regulations, and treaty and trust responsibilities.
2. **Implementing the Bank Stabilization and Navigation Project Fish and Wildlife Mitigation Project (BSNP Mitigation Project) as authorized** under Section 601 of the 1986 Water Resources Development Act (WRDA) and Section 334 of WRDA 1999 and amended by Section 3176 of WRDA 2007. For more information on these authorizations, go to the [BSNP Mitigation Project page](#). It is recognized that some of the actions necessary to avoid jeopardy may contribute to the objectives of the BSNP Mitigation Project.

MISSOURI RIVER RECOVERY PROGRAM

MRRP Goal: develop a suite of actions that meets ESA responsibilities for pallid sturgeon (PS), while continuing to operate the Missouri River System to meet its authorized purposes

FWS Fundamental Objective for Pallid Sturgeon: Avoid jeopardizing the continued existence of the pallid sturgeon from the USACE actions on the Missouri River.

Sub-objective 1: Increase pallid sturgeon recruitment to age 1.

Metric_1.1: catch rates of naturally produced age 0 and age 1 PS

Metric_1.2: model-based estimates of abundance of naturally produced age 0 and age 1 PS using data for age 0-4 fish

Metric_1.3: model-based estimates of survival of naturally produced PS to age 1, using data for age 0-4 fish

Target: measurable recruitment to age 1

Sub-objective 2: Maintain or increase numbers of pallid sturgeon as an interim measure until sufficient and sustained natural recruitment occurs.

Metric_2.1: population estimates for PS by size class, age (particularly ages 2 to 3) and origin

Metric_2.2: catch rates of all PS by size class and origin (to maintain legacy data)

Target: TBD. Possible targets: 1) $\lambda > 1$ for PS age 2 and older; 2) survival rates of all size/age classes sufficient to provide stable population of PS age 2 and older; 3) acceptable probabilities of persistence and recovery (> 0.95) over 50 years (utilizing population models); and 4) > 5000 self-sustaining, genetically diverse PS in each adult population unit.

PSPAP v2.0 & HAMP Projects

Sub-objective 1: *Increase pallid sturgeon recruitment to age 1.*

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Metric_1.2: model-based estimates of abundance of naturally produced age 0 and age 1 PS using data for age 0-4 fish

Metric_1.3: model-based estimates of survival of naturally produced PS to age 1, using data for age 0-4 fish

Target: measurable recruitment to age 1

IRCs were constructed to intercept and rear drifting age-0 sturgeon

Benthic trawling efforts:

- IRC monitoring
- Randomized (bend level) sampling
- Areas of Enhanced Capture (Hotspots) sampling

PSPAP v2.0 & HAMP Projects

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Metric_1.3: model-based estimates of survival of naturally produced PS to age 1, using data for age 0-4 fish

Target: measurable recruitment to age 1

Direct evidence of survival to age-1 has not been documented

Indirect evidence of successful recruitment through wild-origin sub-adult and adult sized fish are captured annually

Limited reproduction (capture of age-0 fish) has been document:

- 2014: 4 free embryos & 3 exogenously feeding embryos
- 2018: 4 exogenously feeding embryos
- 2020: 2 exogenously feeding & 3 undetermined embryos

PSPAP v2.0 & HAMP Projects

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Abundance estimates and catch rates of juveniles, sub-adult and adult-sized Pallid Sturgeon

- Mark/recapture sampling

Population augmentation

- Hatchery stocking

PSPAP v2.0 & HAMP Projects

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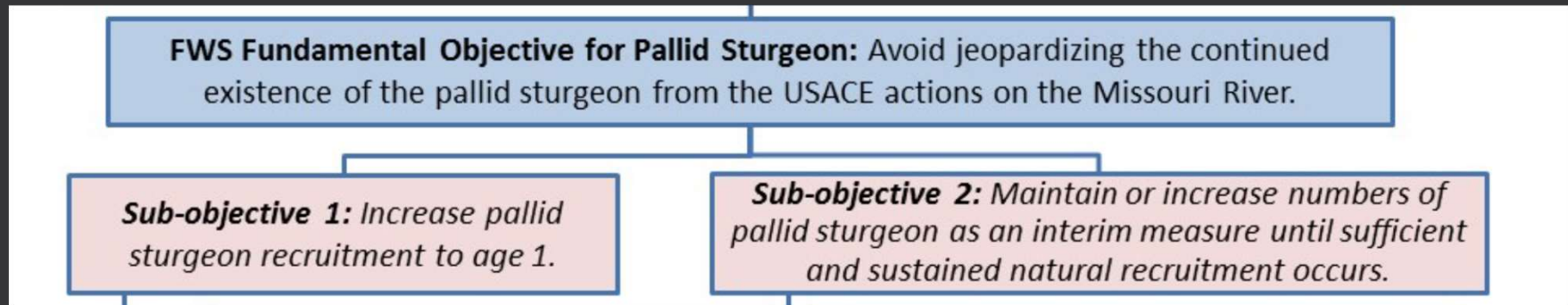
Population estimate: ~40k (BCI 11k to 247k) adult size PDSG in lower Mo River

- Wild-Origin: ~10k (BCI 2k to 167k)
- Hatchery-Origin: ~21k (BCI 6k to 160k)

but unknown if self-sustaining

Population augmentation continues with experimental larval and continued age-1 stockings from Gavins Point National Fish Hatchery

PSPAP v2.0 & HAMP Projects



- Telemetry efforts monitor (active and passive tracking):
 - Monitor migrational movements
 - Focused on reproductive females
 - Location spawning areas(s)
 - Survey crews maps areas to describe depths, velocities, substrates
 - Identify spawning cues
 - Temperature, discharge

Platte River references in MRRP documents:

Delonay et al. (2016): Monitoring efforts in the Mississippi, Yellowstone, and Platte Rivers may also be important in tracking progress toward meeting the MRRP fundamental objectives and understanding recruitment of pallid sturgeon

MRRP SAMP (2018): The Platte River has been utilized by pallid sturgeon populations in the lower Missouri River, but the Platte River is not within the geographic scope for the MRRP and the SAMP

MRRIC - Recommendation 10 (MRRIC 2021): MRRIC has recommended that USACE evaluate fish movement in and out of tributaries and use this information to understand the role of tributaries in meeting life history needs of pallid sturgeon

Attachment A

**Research Proposal – University of Nebraska-Lincoln (UNL) & Nebraska Game and
Parks Commission (NGPC)**

Pallid Sturgeon Biology in the Platte River and Its Tributaries

Objective 1: Identify relations among environmental conditions (i.e., river discharge and temperature) with the **timing and extent of Pallid Sturgeon movement into** and within the lower Platte River.

Objective 2: **Identify Pallid Sturgeon spawning habitat** in the lower Platte River and its tributaries.

Objective 3: **Verify successful spawning by Pallid Sturgeon** in the Platte River and/or its tributaries.

Objective 4: Provide Pallid Sturgeon **genetic samples for further population and hybridization assessment** (in collaboration with Dr. Heist's parallel proposal).

Objective 1: Identify relations among environmental conditions (i.e., river discharge and temperature) with the timing and extent of Pallid Sturgeon movement into and within the lower Platte River

- Quantify seasonal movements of juvenile and adult Pallid Sturgeon into and out of the lower Platte River.
- Quantify environmental patterns including—but not exclusive to—components of the flow regime and temperature variation in the lower Platte River.

MRRP ties:

Capture Data:

- Inform MRRP population models:
 - Abundance (size and origin)
 - Demographic rates (gender and reproductive stage)
 - Growth, dispersal and survival estimates (recapture data)

*Population estimates are NOT likely for direct MRRP comparison but this work was cut from the FY22 MRRP scope-of-works

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MRRP ties:

Telemetry Data:

- Movement (emigration, immigration) related to temperature, discharge, etc.
 - Reproductive and seasonal movements
- Migrational patterns, aggregations, and spawning cues
- Temporal and spatial habitat use

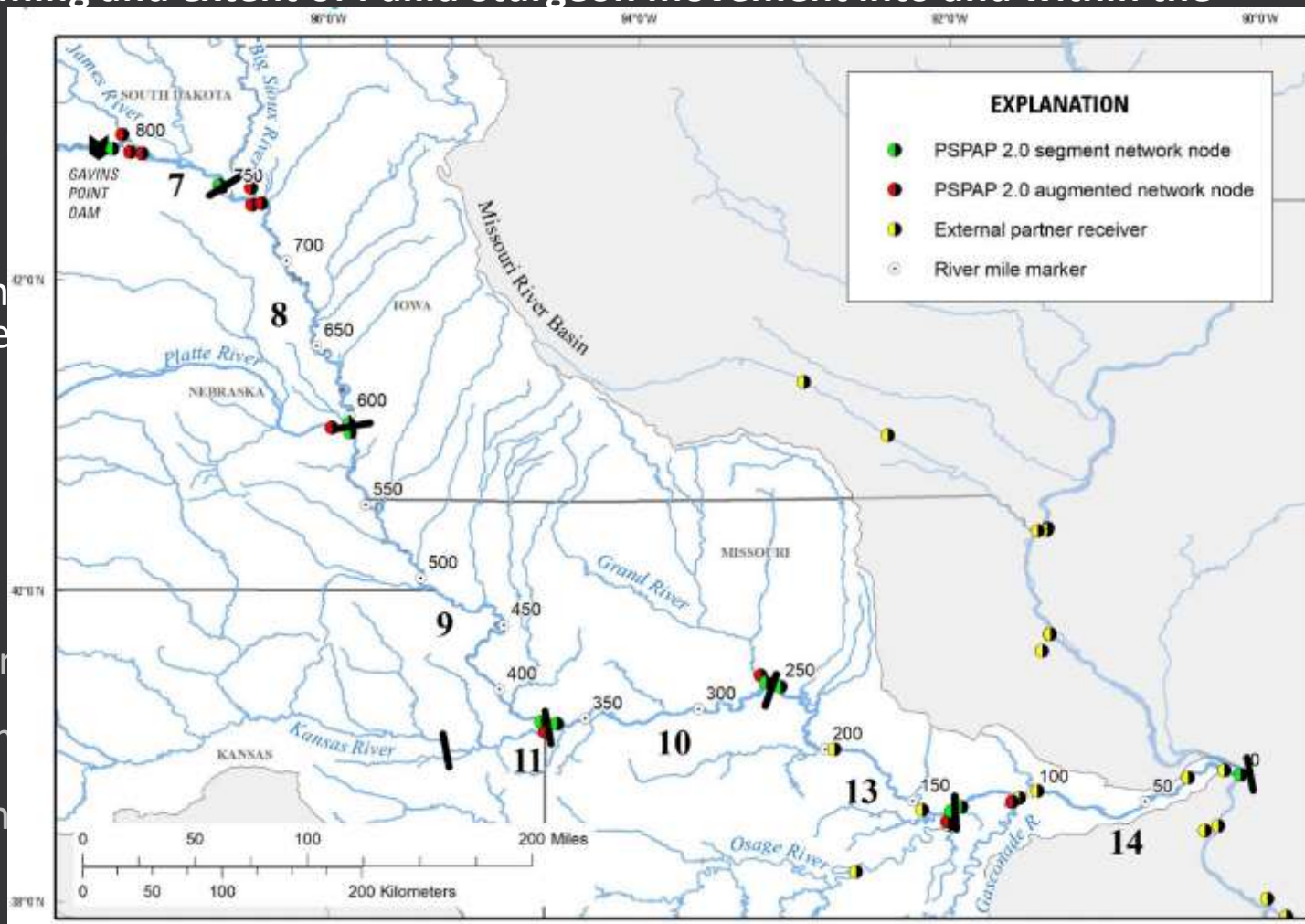
Objective 1: Identify relations among environmental conditions (i.e., river discharge and temperature) with the timing and extent of Pallid Sturgeon movement into and within the lower Platte River

- Quantify seasonal lower Platte River.
- Quantify environmental flow regime and temperature

MRRP ties:

Telemetry Data:

- Movement (emigration)
- Migration, aggregation
- Temporal and spatial h



Objective 2: Identify Pallid Sturgeon spawning habitat in the lower Platte River and its tributaries.

- Locate probable spawning areas used by gravid Pallid Sturgeon.
- Document physical characteristics of the habitat at spawning locations.

MRRP ties:

Spawning Patch Characteristics (depth, velocity, substrate)

- When/where success metrics
- Allow comparisons between mainstem lower Missouri River and Yellowstone River spawning sites
- Contribute information to potential/future spawning habitat construction

Objective 3: Verify successful spawning by Pallid Sturgeon in the Platte River and/or its tributaries.

- Assess lower Platte River contribution of Pallid Sturgeon offspring to greater Missouri River population.
 - Gather information on free embryo, larva, and exogenous feeding life-stages.

MRRP ties:

Document successful reproduction and hatch from the lower Platte River and mainstem Missouri River

- Document conditions for successful reproduction and hatch
- Inform Pallid Sturgeon drift models

Objective 4: Provide Pallid Sturgeon genetic samples for further population and hybridization assessment (in collaboration with Dr. Heist's parallel proposal)

- Assess fraction of free embryo/larval/exogenous feeding individuals that are pure pallid, hybrid, and shovelnose sturgeon.
 - Adult and juvenile Pallid Sturgeon fin clips from telemetry collection.
 - Free embryo/larvae/exogenous feeding individuals.

MRRP ties:

Provide insights into Pallid Sturgeon population dynamics (i.e., ratio of wild to hatchery-origin, natural recruitment via juvenile wild-origin fish collected, occurrence/rate of hybridization).

Age-0 (embryos, larval, and exogenous feeding) individuals collected under will provide insights into reproductive success in the lower Platte River, purity of these reproductive events, and contribution of the Platte River to the lower Missouri River sturgeon populations

Genetic identification of will aid in estimating N_e for the in-river population for the LMR

Questions & Discussion

