

June 9, 2021 ISAC Check-in with PRRIP GC

ISAC thoughts on the UNL / NGPC / SIU Proposal for Research on Pallid Sturgeon (PS)

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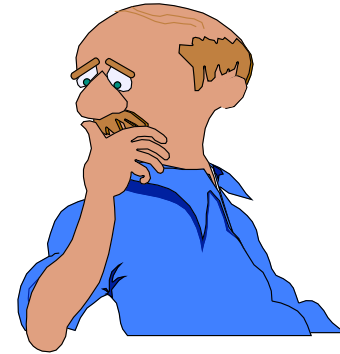


What's important in evaluating a research proposal?

- **Why** is the study proposed? 
- **Who** would be doing the study? 
- **What** would be measured? 
- **How** would the measurements be acquired? 
- **Where** and **when** would the sampling occur? 
- **How** would the data be analyzed, and results reported? 
- **Good investment?** 

The only equation in this presentation...

$$\text{Satisfaction} = \text{Results} - \text{Expectations}$$

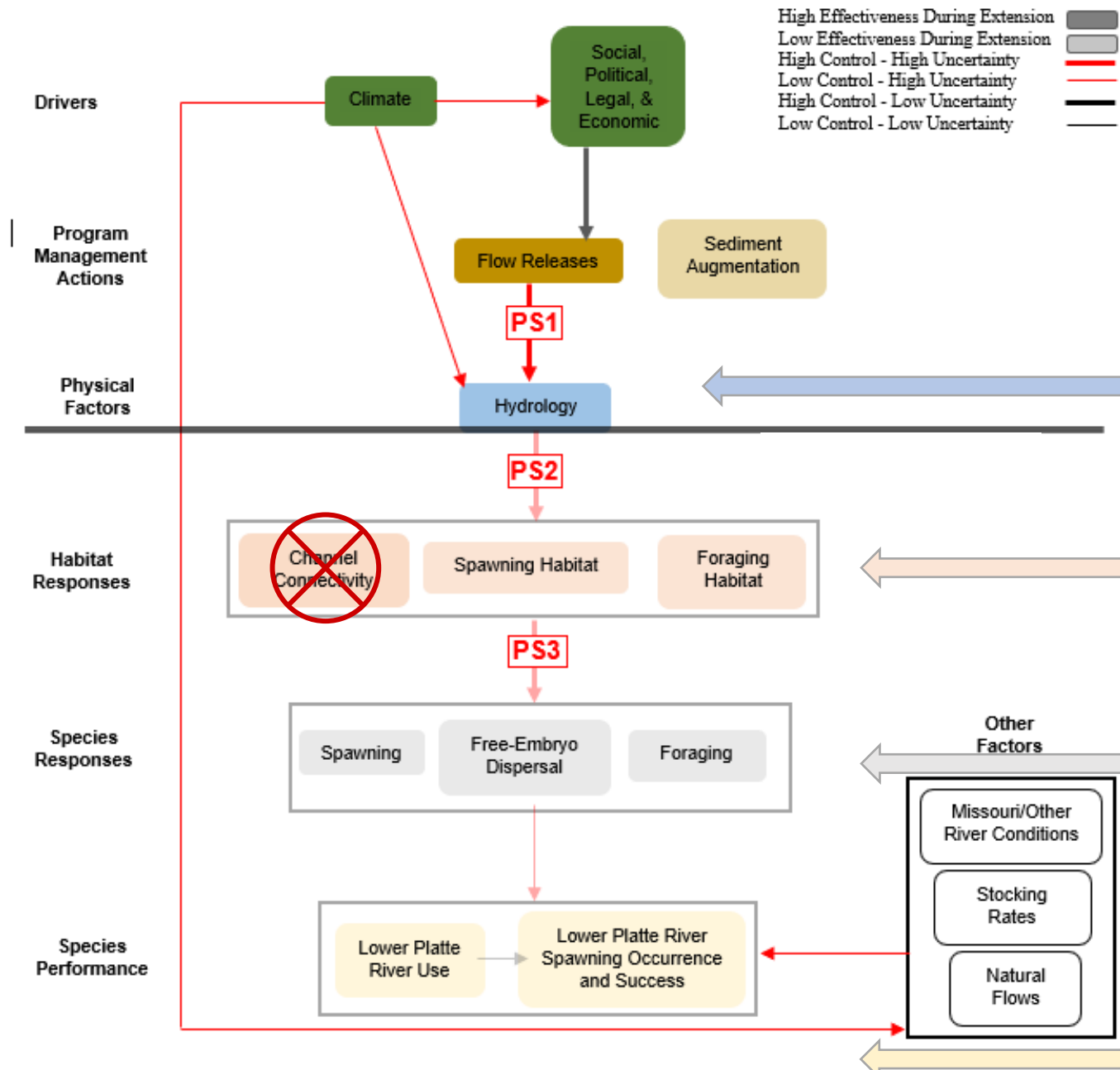


Why is the study proposed? [ISAC comments in blue]



- *Habitat and spawning research.* Fill knowledge gaps about pallid spawning, reproduction and recruitment in the Lower Platte River (LPR) and tributaries
 - **Valuable** – understand when and where adult PS use the LPR
 - **Useful** - physical conditions correlated with use (or not); document variability
 - **Scoping the Problem** - range of physical conditions to which PS *may* respond; puts PRRIP flow actions in context
- *Genetics Analysis.* Distinguishing PS vs. hybrids vs shovelnose sturgeon, understanding genetic diversity of Missouri and Platte R PS populations
 - **Valuable** – estimate Platte R natural reproduction of PS
 - **Scoping the Problem** - estimating effective population size of Missouri River PS
→ indicates how far to go to reach recovery criteria

Figure 3. Pallid Sturgeon Conceptual Ecological Model



Why: What the Proposal Can / Can't Accomplish

Proposed work *may* provide insights on the level of correlations between biological responses [juvenile and adult use, spawning, reproduction] and habitat metrics [flow, temperature and turbidity] in the LPR, **IF** there are: 1) sufficiently large contrasts in these covariates due to within-year and among-year **natural environmental variation**; **AND** 2) enough telemetered and tracked spawning adults. ISAC believes current **Program flow management actions** are too small to provide sufficiently large contrasts in these covariates, affect habitat availability, or affect pallid sturgeon spawning, growth or survival*.

Proposed work should help to define characteristics of spawning habitat used **IF** enough telemetered and tracked adult fish spawn in the LPR. Channel connectivity not part of scope of study. Tagged juveniles will provide some insight on their foraging habitat.

Proposed work should increase understanding of where/when PS spawn in LPR and tribs, and possibly increase learning of reproductive success (capturing free-embryos and doing genetics) **IF** enough telemetered and tracked adult fish spawn in the LPR. Some learning on juvenile foraging from passive / active tracking.

Proposed work should increase understanding of where and when PS spawning occurs in LPR and tribs, and associations of these locations and times with flow, temperature and turbidity. This should help to define the magnitude and timing of physical changes in the river that *may* influence spawning in *some* years.

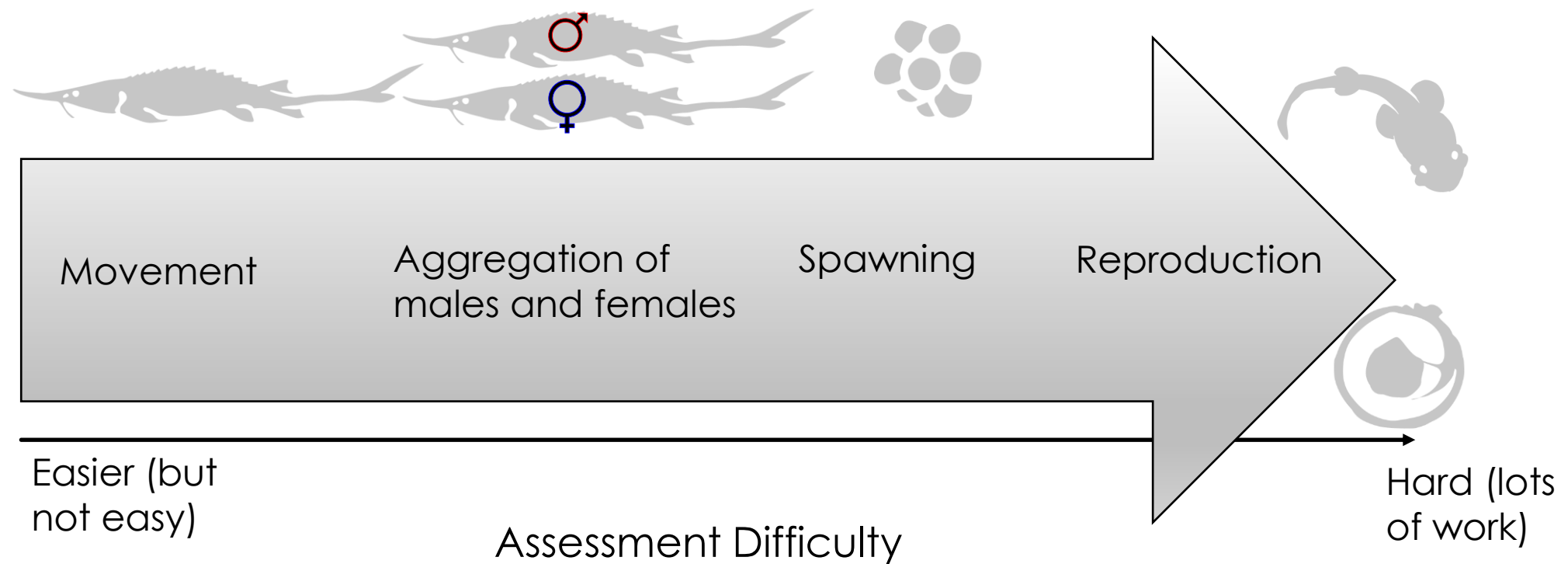
* But *natural* flow fluctuations may provide useful contrasts. See ISAC reports from 2017, 2018 and 2019

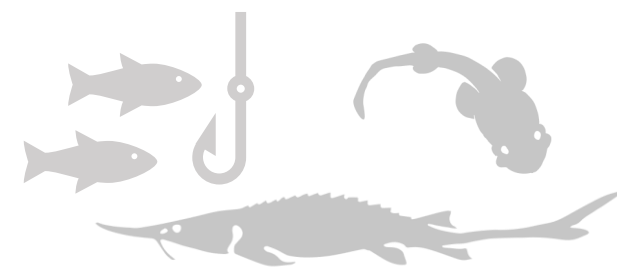
Who would be doing the study?



- **UNL.** Mark Pegg and Jonathon Spurgeon
 - Drs. Pegg and Spurgeon extremely well qualified; will stimulate grad students
 - Great to have EDO's Dr. Malinda Henry on grad student's committees (will focus the work)
 - Strong training of students by NGPC is essential
- **NGPC.** Kirk Steffensen
 - Dr. Steffensen very experienced with field techniques and data analysis
 - Consistency with MRRP is good; perhaps have students accompany NGPC crews on Missouri
 - Involving Aaron Delonay (USGS) in training would be prudent (very knowledgeable)
- **SIU.** Ed Heist
 - Dr. Heist is leading authority on the genetics of PS, shovelnose sturgeon and hybrids
 - SIU essential for identifying wild or hatchery origin PS, distinguishing them from shovelnose and hybrids, especially for young of the year sturgeon.
- ***Overall team and forms of collaboration is a strength of the proposal.***
 - Close involvement and interest of PIs over entire project is critical to its success.

What would be measured and how?

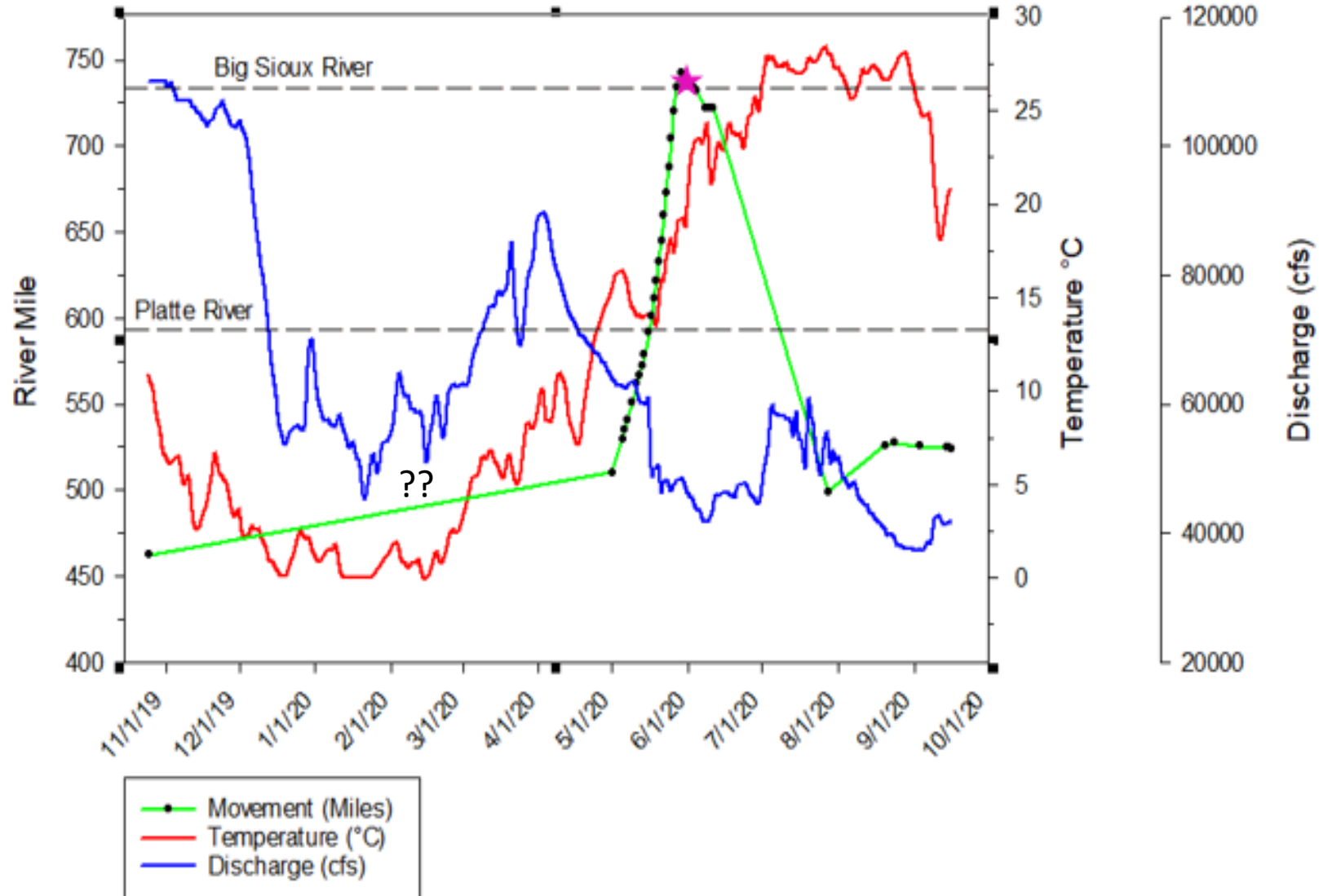
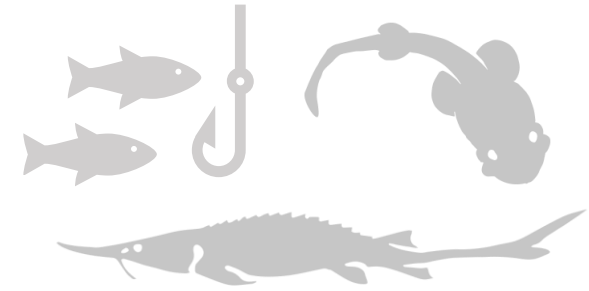




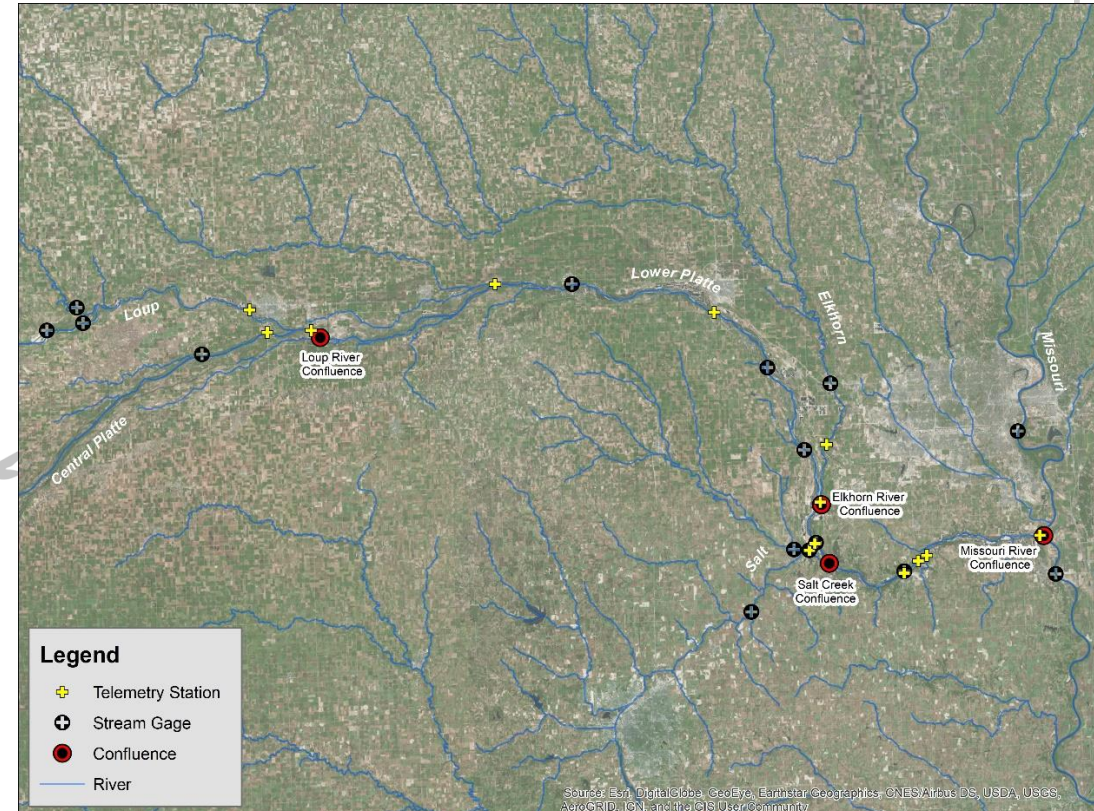
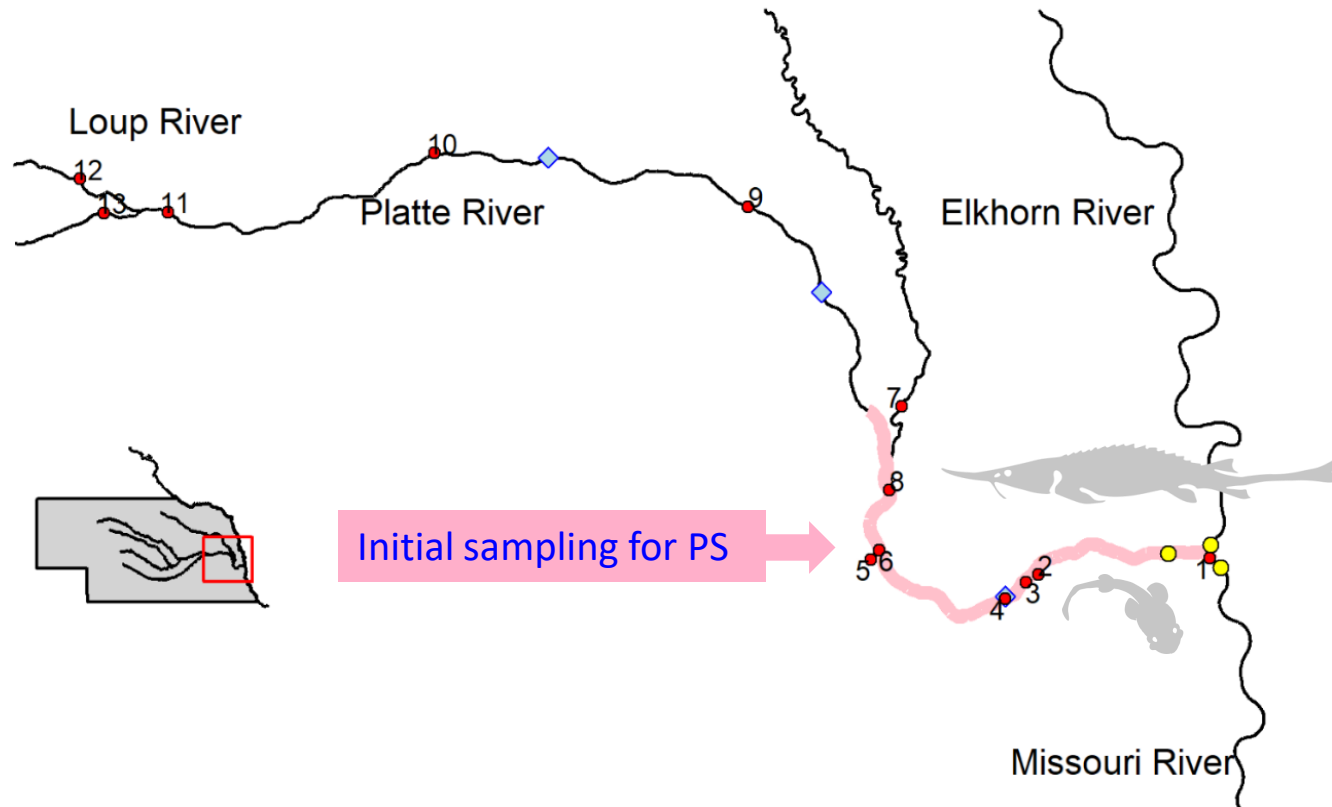
What would be measured and how?

| Component | Benefits | Challenges |
|--|--|--|
| <i>Adult pallid sturgeon movement, spawning and reproduction</i> | <ul style="list-style-type: none"> • Consistency of methods with MRRP • Likely to observe PS use of LPR (100 PS in Lower Missouri tagged + 40 more intended in Platte) • Use of tribs by PS very valuable for scoping problem. • Confirming spawning / reproduction in even a few cases a big step forward; consider using USGS ovipositing tags | <ul style="list-style-type: none"> • Some tagged fish will be hybrids, should not be tracked subsequently. • Tracking movement easier than confirming spawning/reproduction. |
| <i>Habitat measures at PS capture locations, relocation sites and spawning sites</i> | <ul style="list-style-type: none"> • Proposed habitat metrics are appropriate. Flow gages should be representative. • Will yield new information on characteristics of spawning habitat and juvenile rearing habitat • Could compare to work in Missouri and Yellowstone | <ul style="list-style-type: none"> • Likely only a small # of spawning, tagged PS (though more tagged juveniles) |
| <i>Young-of-year PS collection and genetic analysis</i> | <ul style="list-style-type: none"> • Methods to capture age-0 sturgeon are sound. Have a Plan B if you catch more than 1000 /year. • Valuable to distinguish PS, shovelnose and hybrids, and to estimate effective population size of Lower Missouri PS | <ul style="list-style-type: none"> • Only ~1 / 1000 of age-0 fish are PS (rest shovelnose) • Might develop Plan B to sample more than 1000 / yr |

What would be measured and how?

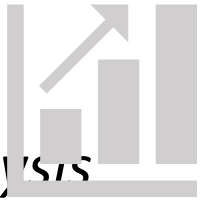


Where / when sampling occur?



- Intensive sampling of fish and habitat is excellent (● = listening stations; ● = embryo / larval sampling)
- Lots of gaging stations on LPR (◆), and on Missouri, Elkhorn and Loup Rivers (⊕)
- # of adult PS which enter LPR (and their reproductive state) is beyond control of researchers

How would the data be analyzed and reported?



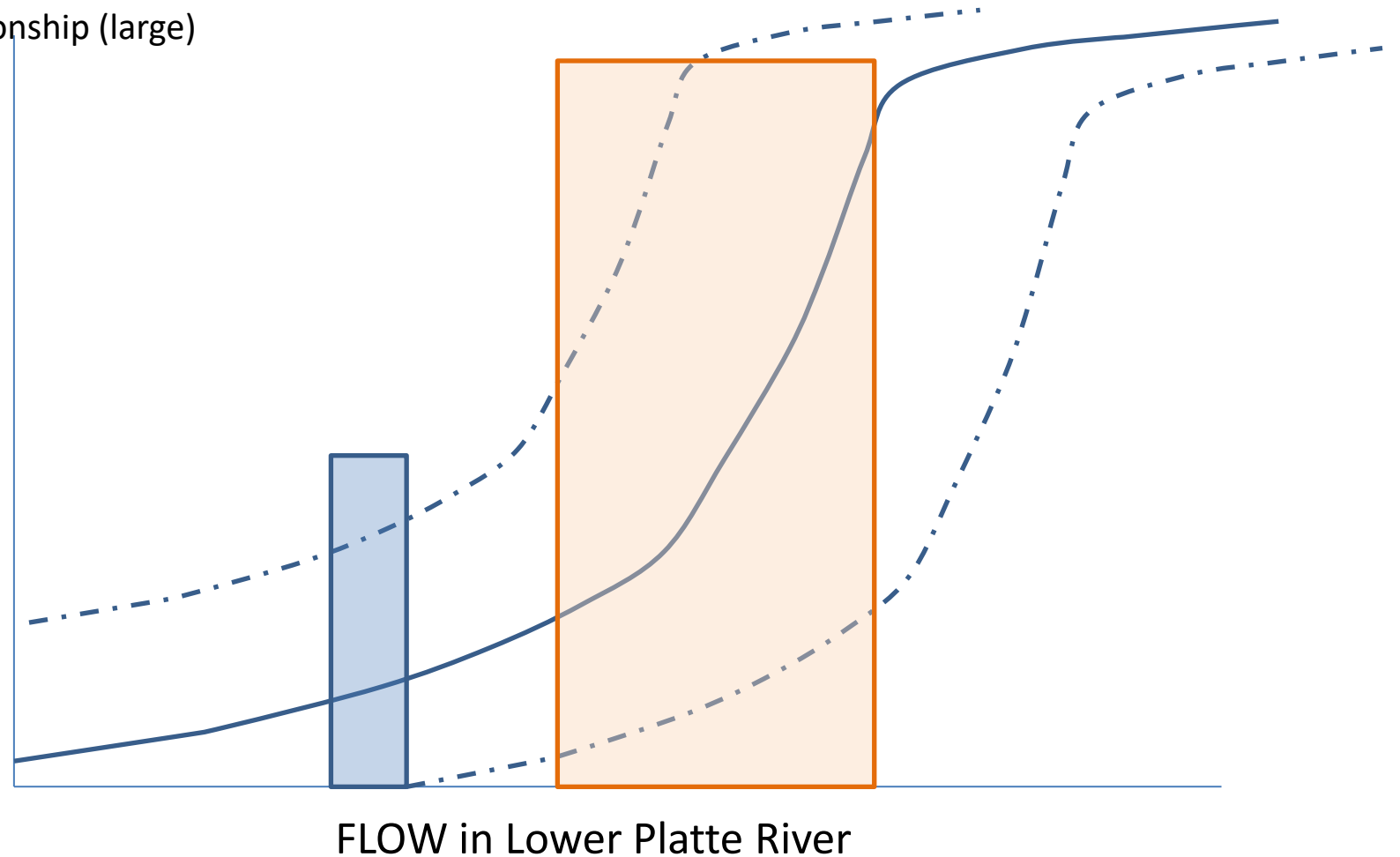
- *Proposal intentionally does not contain many details on methods of data analysis*
 - Review data analysis methods as technical proposals are developed (before any field work begins)
 - Build on MRRP methods but go beyond with other creative ideas
 - Several features of the proposal will keep research relevant to PRRIP:
 - Having Dr. Malinda Henry of EDO on thesis committees, provide input on thesis proposals
 - Monthly updates on field work and progress towards study objectives
 - Annual reports presentations at AMP symposium **addressing key questions** [not data dumps]
 - Possibly (suggested, not in proposal), presentations at MRRP annual Fall Science Meetings
 - Final reports; Review of draft publications by EDO, TAC and ISAC
- *Results are likely to be more qualitative than quantitative*
 - Low # telemetered, tracked adult female PS in reproductive condition + Low # age-0 PS → challenging to quantitatively estimate factors affecting PS spawning success
 - May be more feasible to develop functional relationships for juveniles (larger sample size)
 - Won't be feasible to quantitatively estimate % of age-0 PS from Platte [vs. Missouri], BUT
 - Could learn a lot from distribution of age-0 *Scaphirhynchus* (using shovelnose as surrogates)

How would the data be analyzed and reported?



- Range of flow variation under PRRIP control, but unlikely to affect Pallid sturgeon
- Range of natural flow variation which might affect Pallid sturgeon (though temperature may be more important than flow)
- Best guess functional relationship
- Uncertainty in functional relationship (large)







Biological Responses of Pallid Sturgeon (movement, aggregation, spawning, reproduction)



Good investment? **YES!**



- *Research should provide excellent returns on knowledge for the money*
 - Most work done by students at very low cost; PIs very experienced and will train students to ensure work done well; frequent interaction with EDO to keep work on track
 - There **is** substantial uncertainty and variability in PS movement and behavior. Documenting that uncertainty and variability will be a major advance.
- *Beneficial to fund DNA sequencer to be used by Dr. Ed Heist for genetics analysis*
 - Study requires specialized analyses of LOTS of age-0 sturgeon, requiring close supervision by Dr. Heist to be done correctly with careful quality control, and quickly (to adjust sampling effort).
 - Outsourcing genetics analyses would cause delays and errors, undermining study results

| # days post fertilization | Pallid Sturgeon | Shovelnose Sturgeon |
|---------------------------|--|---|
| 5 |  |  |
| 11 |  |  |
| 18 |  |  |