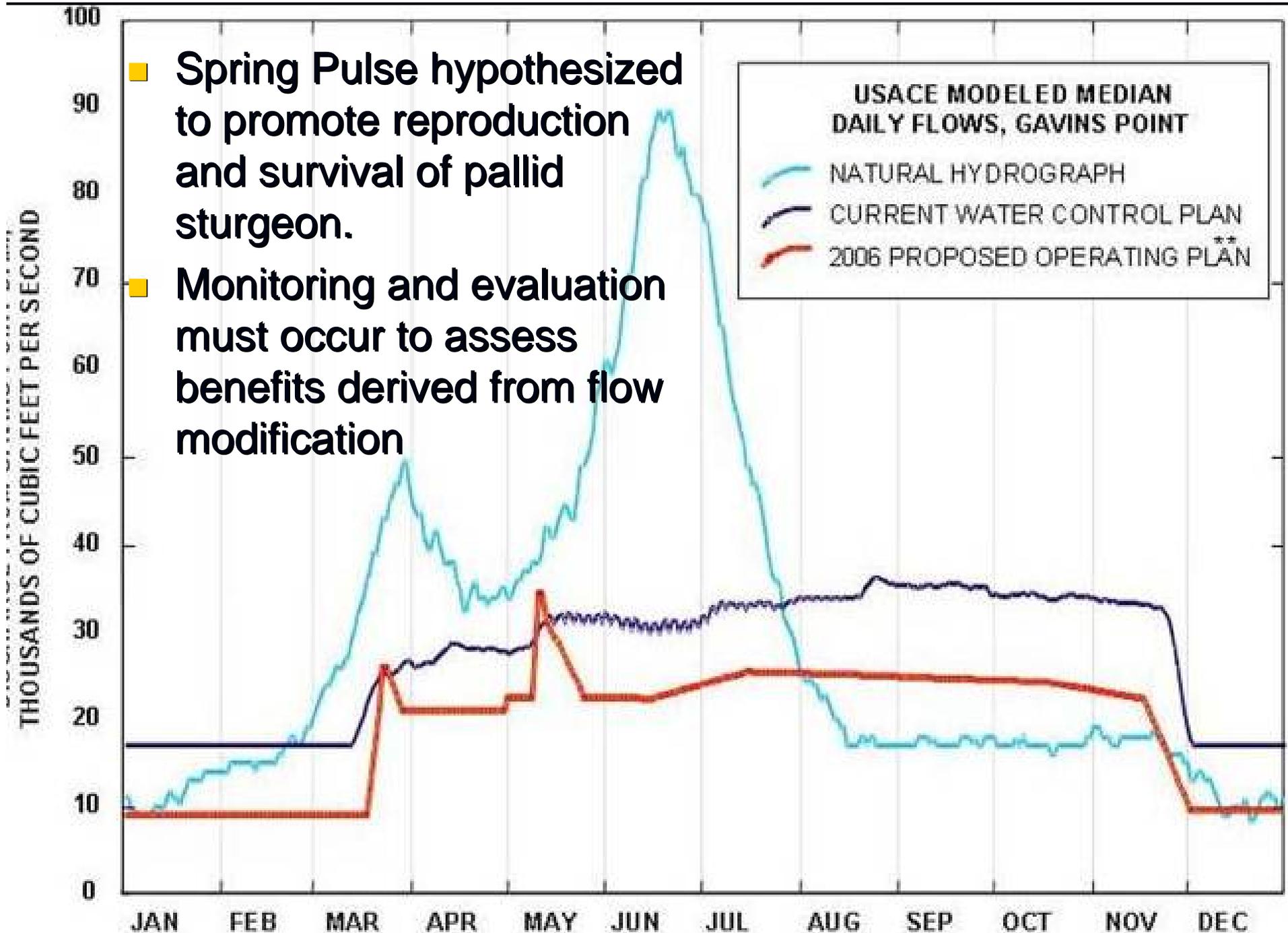




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# Sturgeon & Habitat Response to Gavins Point Flow Modification

- Purpose
- Questions
- Plan to address questions
- Description of activities



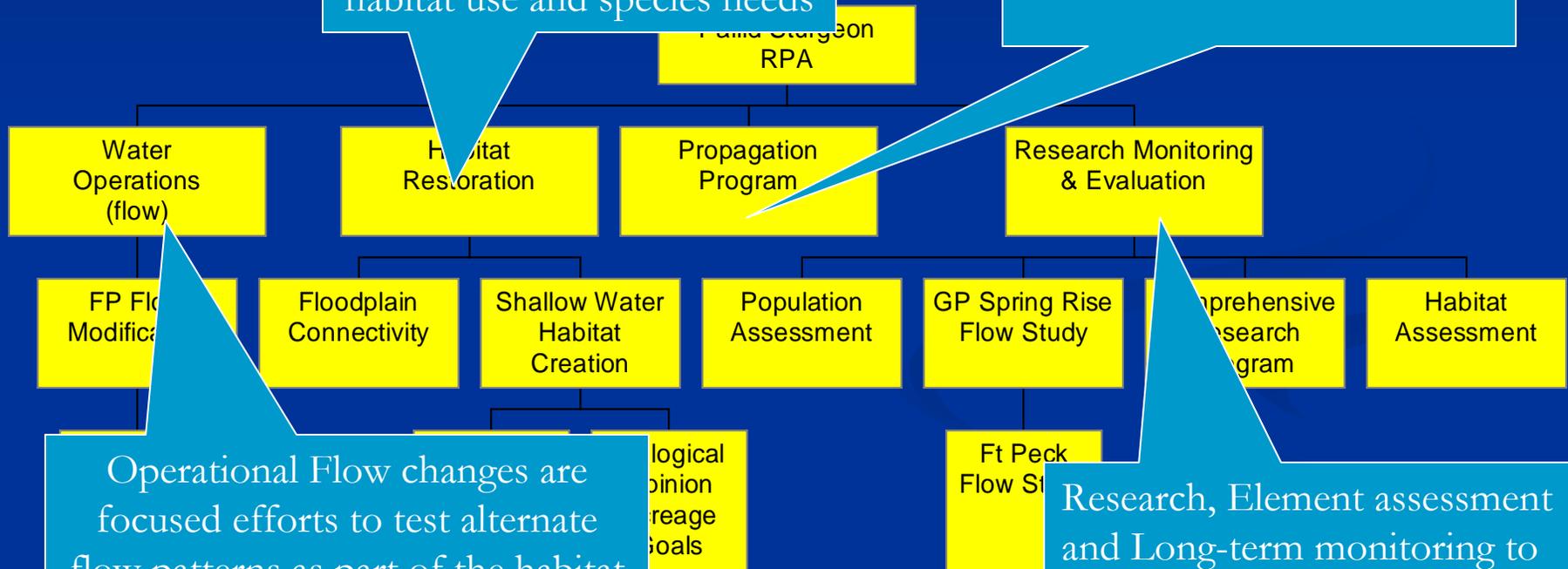
- Spring Pulse hypothesized to promote reproduction and survival of pallid sturgeon.
- Monitoring and evaluation must occur to assess benefits derived from flow modification



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Habitat restoration focuses on restoring form and function to the riverine system. Also to begin to understand the link between habitat use and species needs

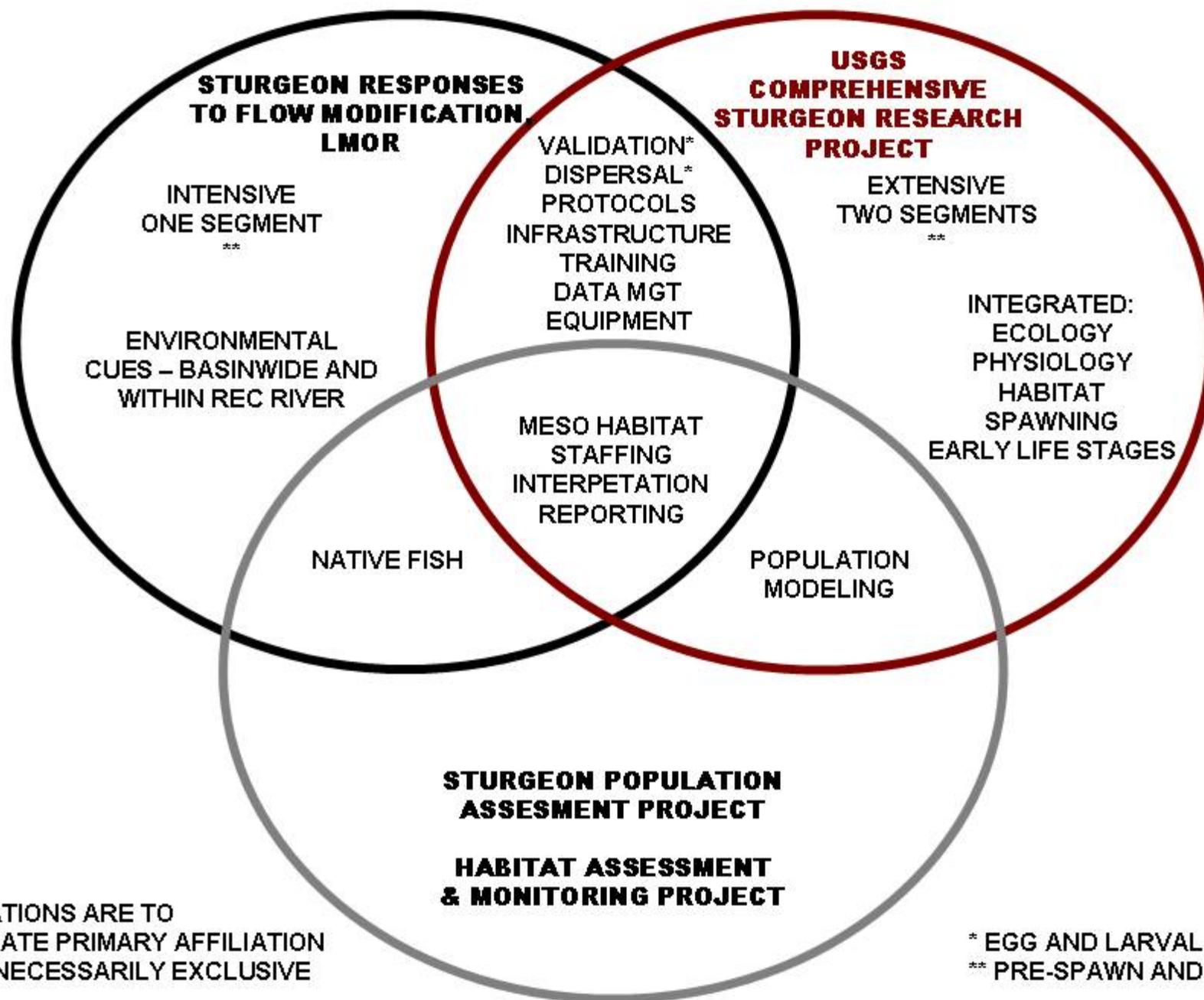
Propagation: to augment population by establishing year class structure to strengthen population to avoid catastrophic extinction



Operational Flow changes are focused efforts to test alternate flow patterns as part of the habitat restoration effort to attempt to restore environmental cues to the system.

Research, Element assessment and Long-term monitoring to assess management actions, detecting population change and trends, and build baseline life history information.

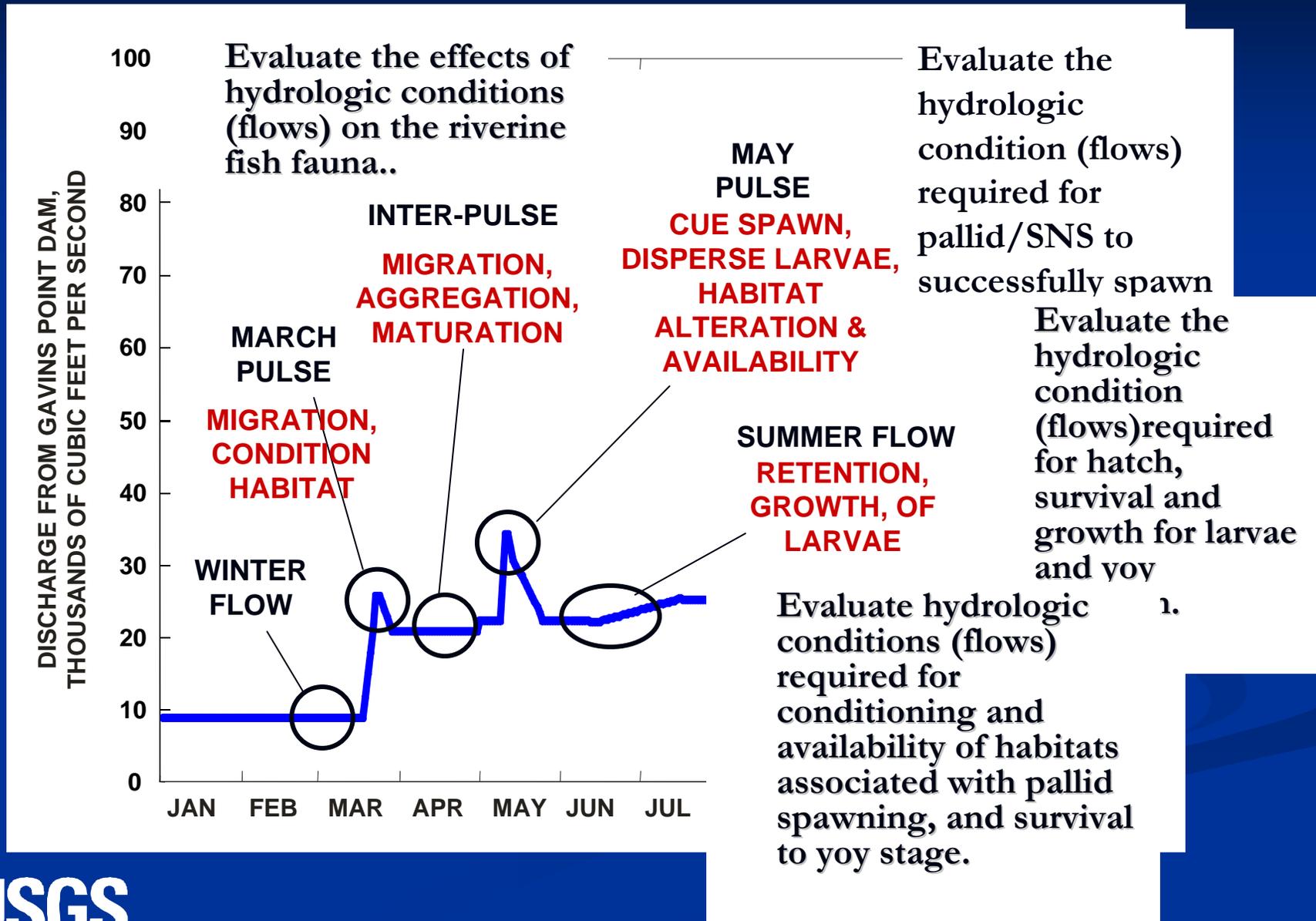
# Sturgeon Science 2006 – Ideas on Coordination of Efforts



LOCATIONS ARE TO INDICATE PRIMARY AFFILIATION NOT NECESSARILY EXCLUSIVE

\* EGG AND LARVAL STAGES  
\*\* PRE-SPAWN AND SPAWN

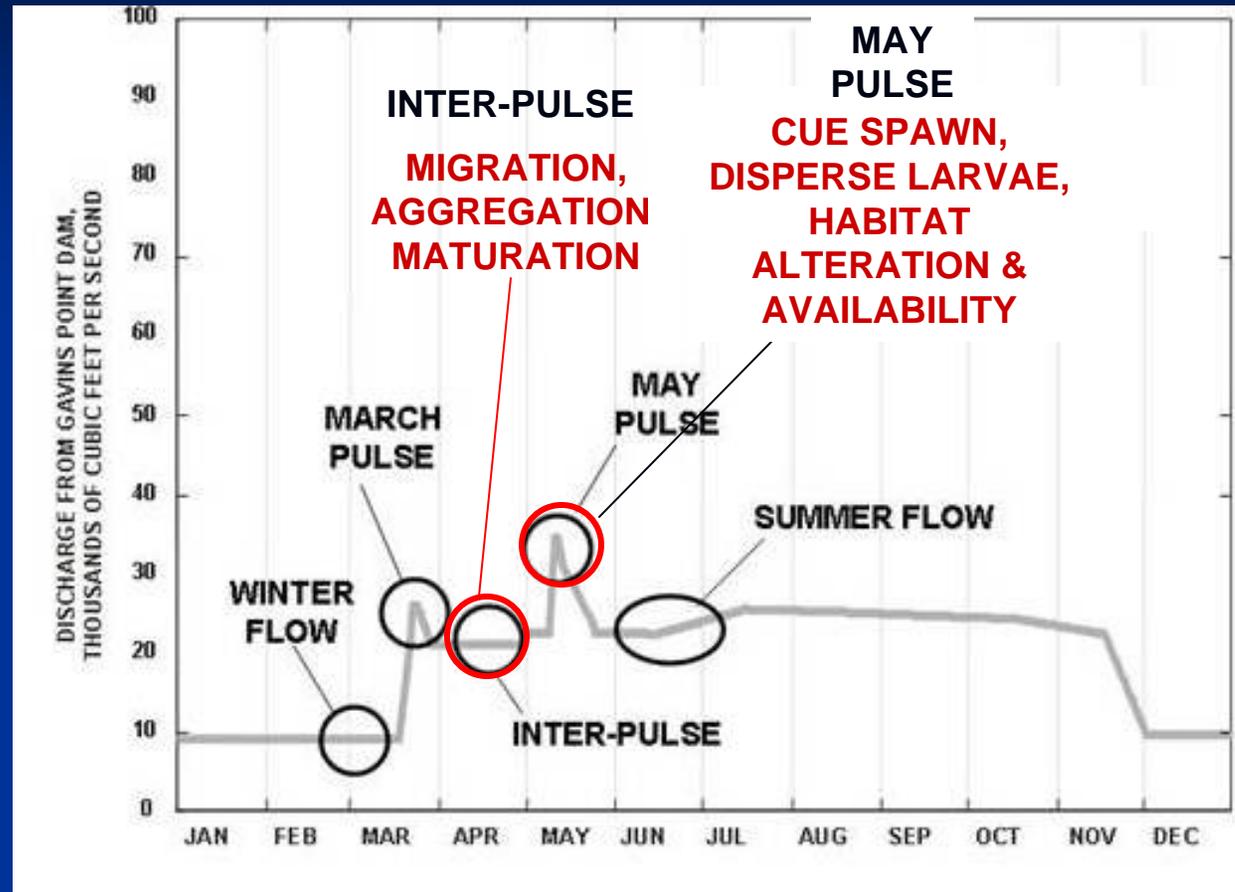
## ELEMENTS AND HYPOTHESIZED FUNCTIONS OF PROPOSED 2006 FLOW MODIFICATIONS





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1. Evaluate the flow required for sturgeon to successfully spawn
  - Are sturgeon aggregation behaviors and habitat use associated with modified flows?
  - Is spawning associated with modified flows





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1. Evaluate the flow required for pallids/SNS to successfully spawn
  - Intensive individual based telemetry
  - Acoustic Camera
  - Habitat Use & Availability
  - Site specific assessment





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## Telemetry

- Collected beginning March 1, crews from PA, HA, CSRP and SRFM will begin collecting pallids



Photo: NGPC



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## Telemetry

- Pallids meeting criteria will be assessed for reproductive readiness
  - Blood chemistry
  - Egg morphology



Photo: USGS



Photo: USGS



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## Telemetry

- Pallids meeting criteria will be tagged with sonic/acoustic tags
- Fish will be released at the same location it was captured



Photo: USGS



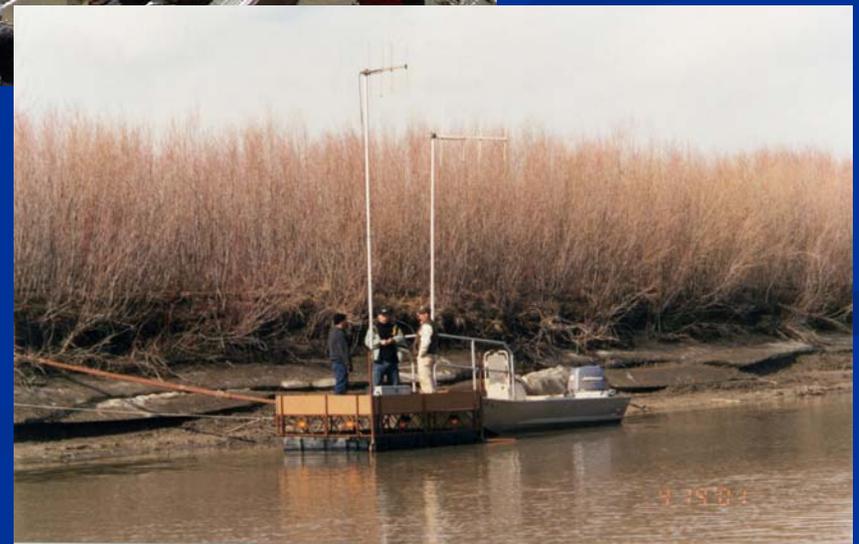
Photo: USGS



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## Telemetry cont...

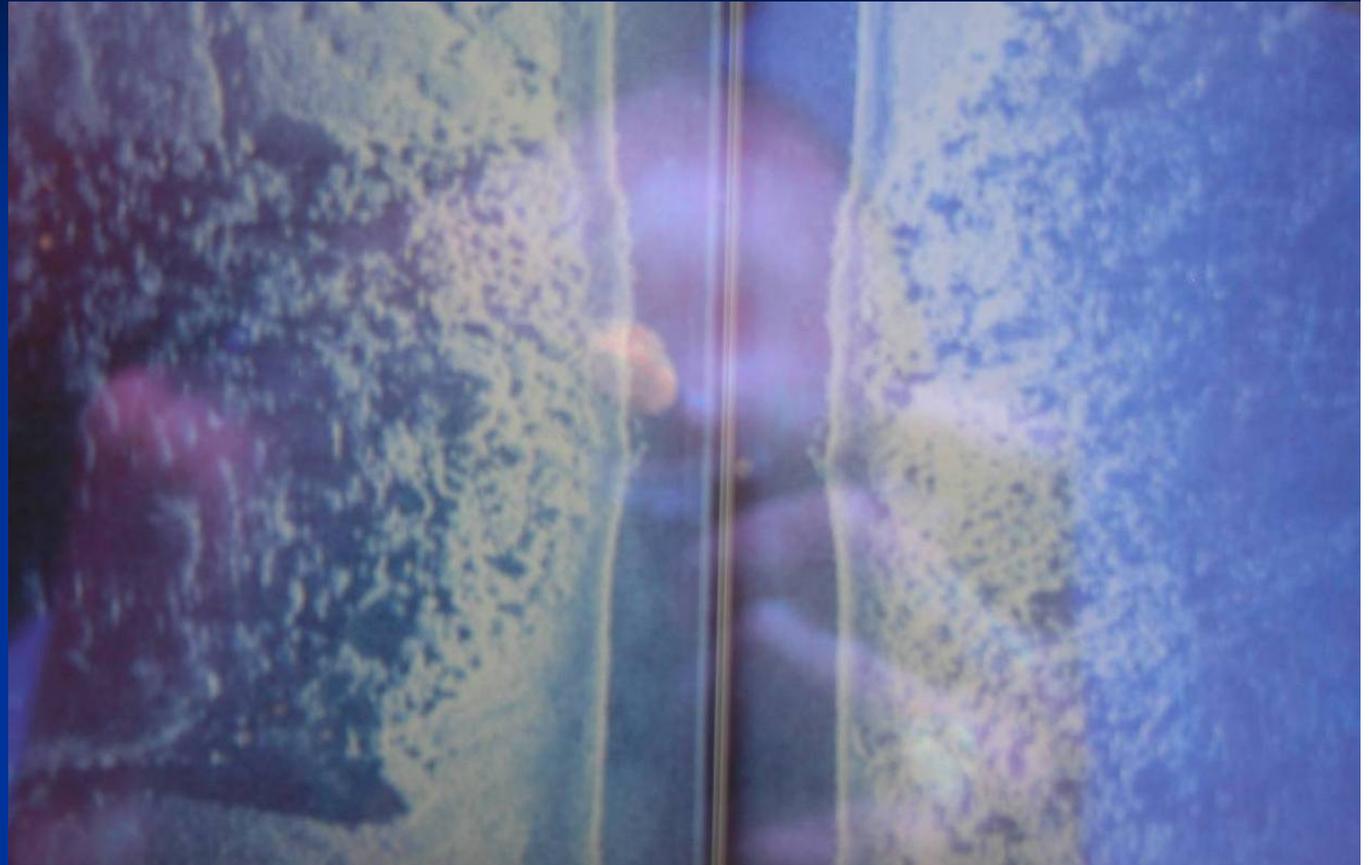
- NE & USGS tracking crews will track each of the pallids tagged 1-3 times a week to gather behavior data.
- Stationary receivers will collect information of passing fish 24 hours a day.





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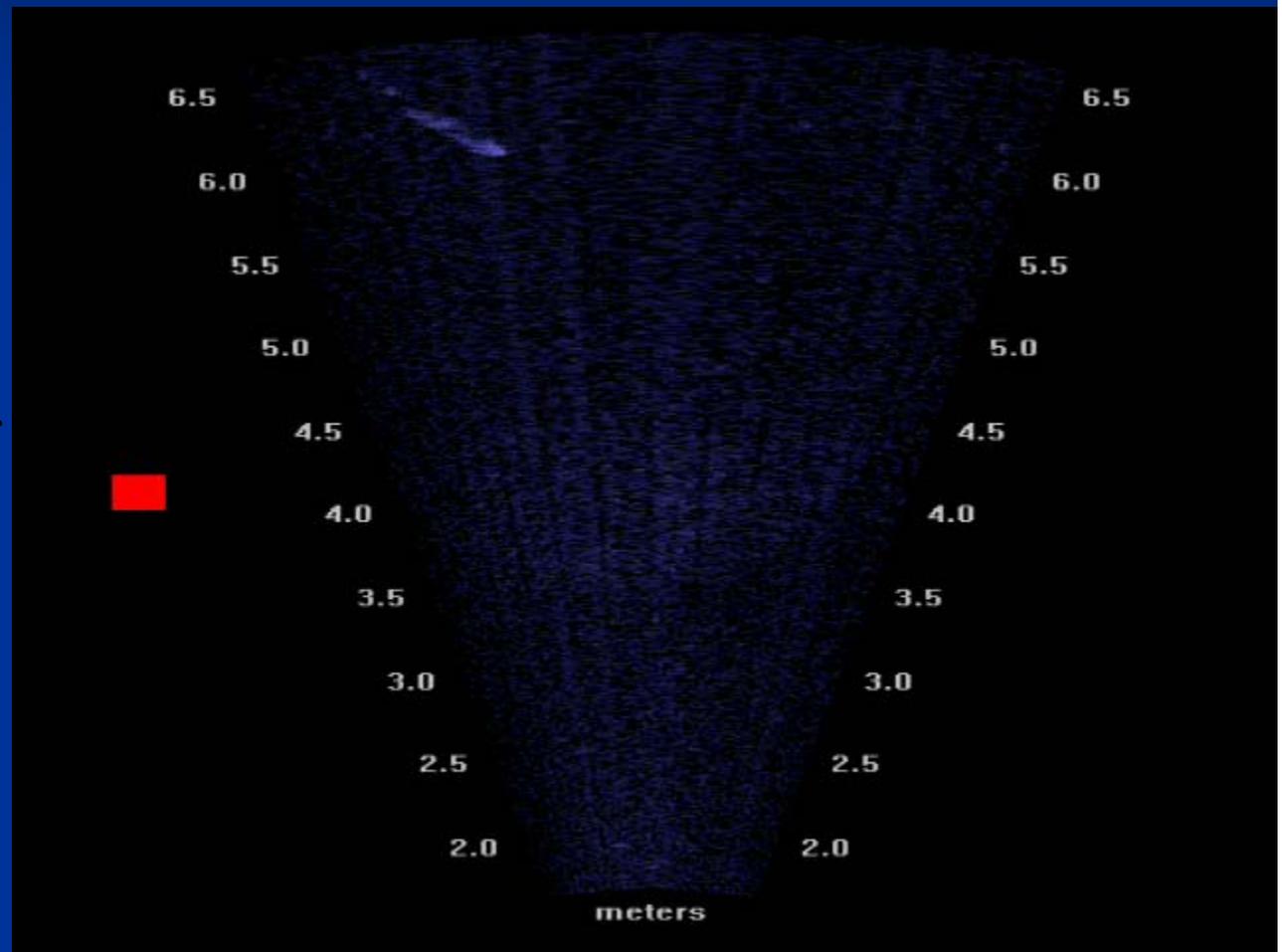
- Tracking crews will collect habitat information at every sighting/relocation
  - Depth, water quality, substrate, velocity
- Habitat information will be used to create hydroacoustic maps of relocation sites \*





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- Acoustic camera will be deployed to telemetry relocation sites for behavior validation

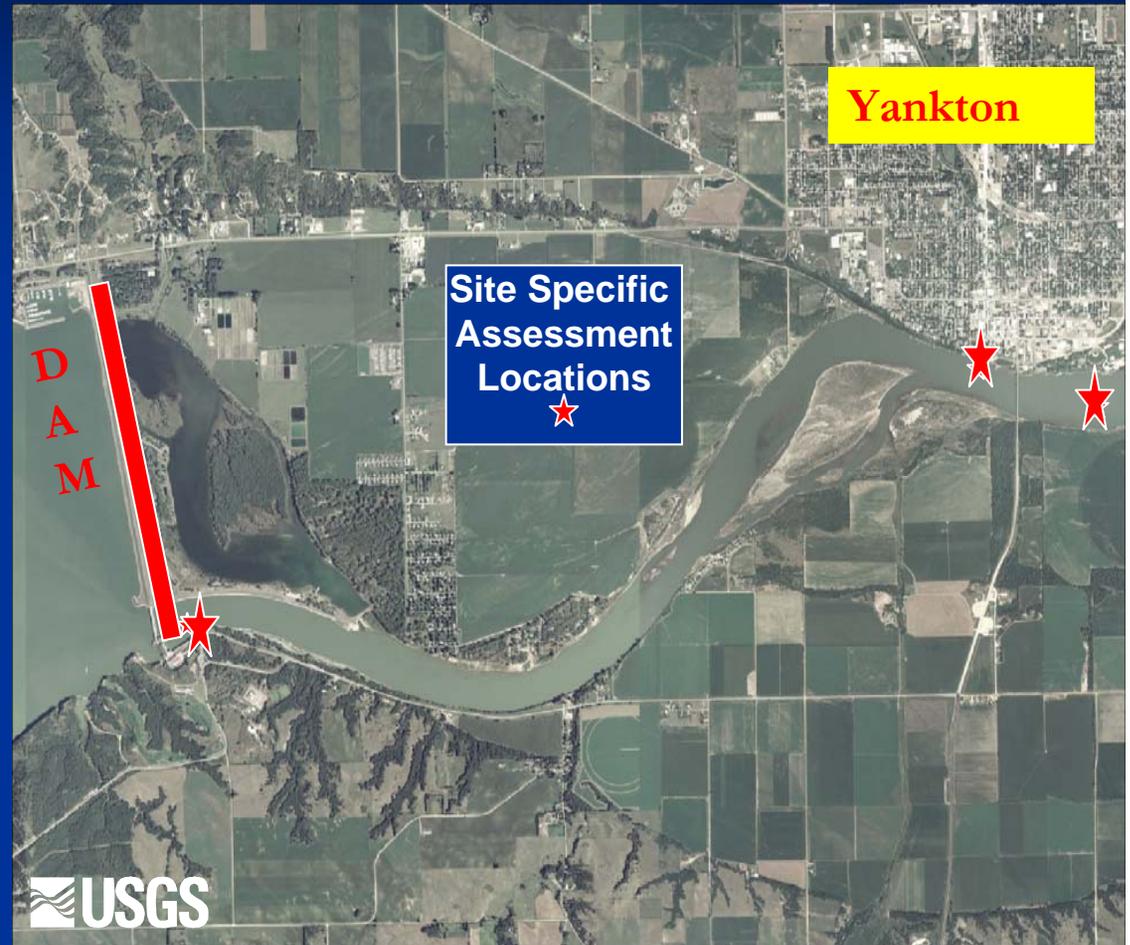




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## Site Specific Sampling

- To further assess aggregation, spawning, and habitat use a crew (SD & USGS) will conduct site specific sampling
  - Repeated sampling at selected sites (twice a week)
  - Captured fish will be sampled for physiological cond. and reproductive readiness. If not already tagged fish will be tagged for population and recapture purposes.





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## Telemetry Follow Up...

- After the flow event sonic tagged fish will be recaptured to address spawning success.
- Recaptured fish will be assessed for spawning success, tag retention and tag data retrieval

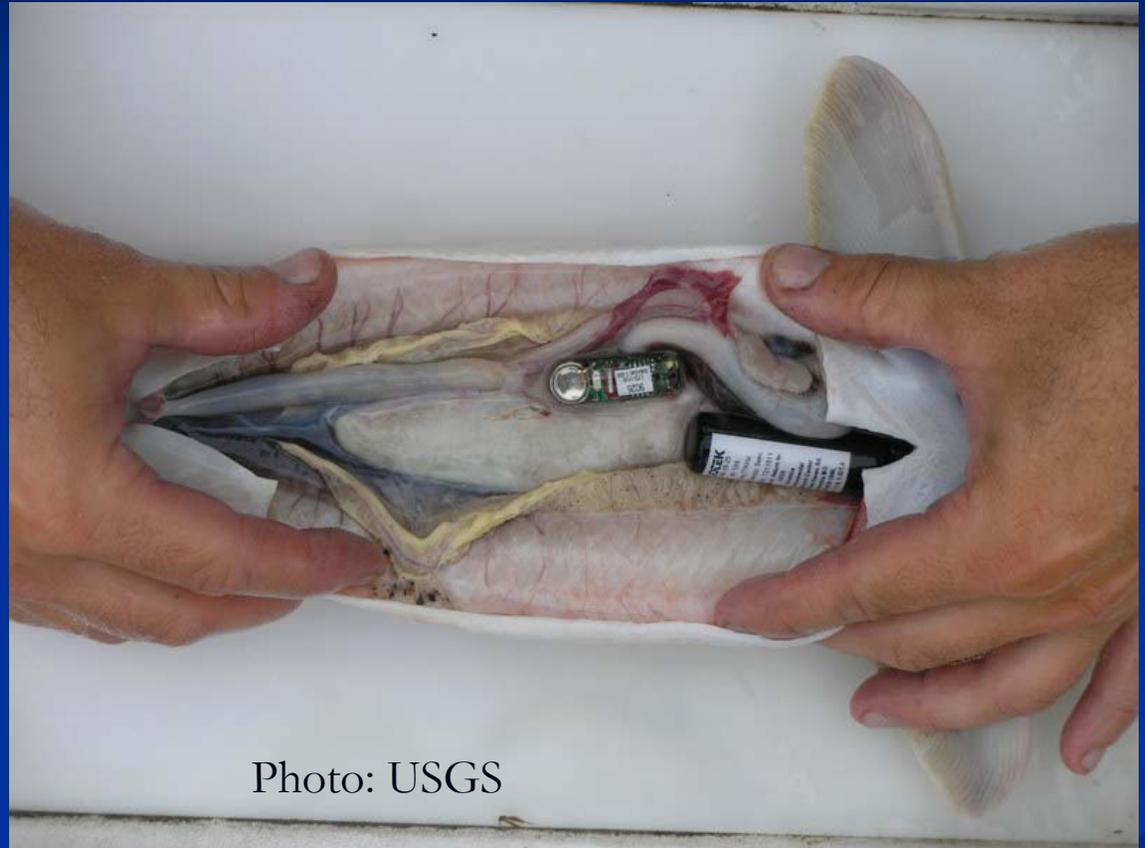
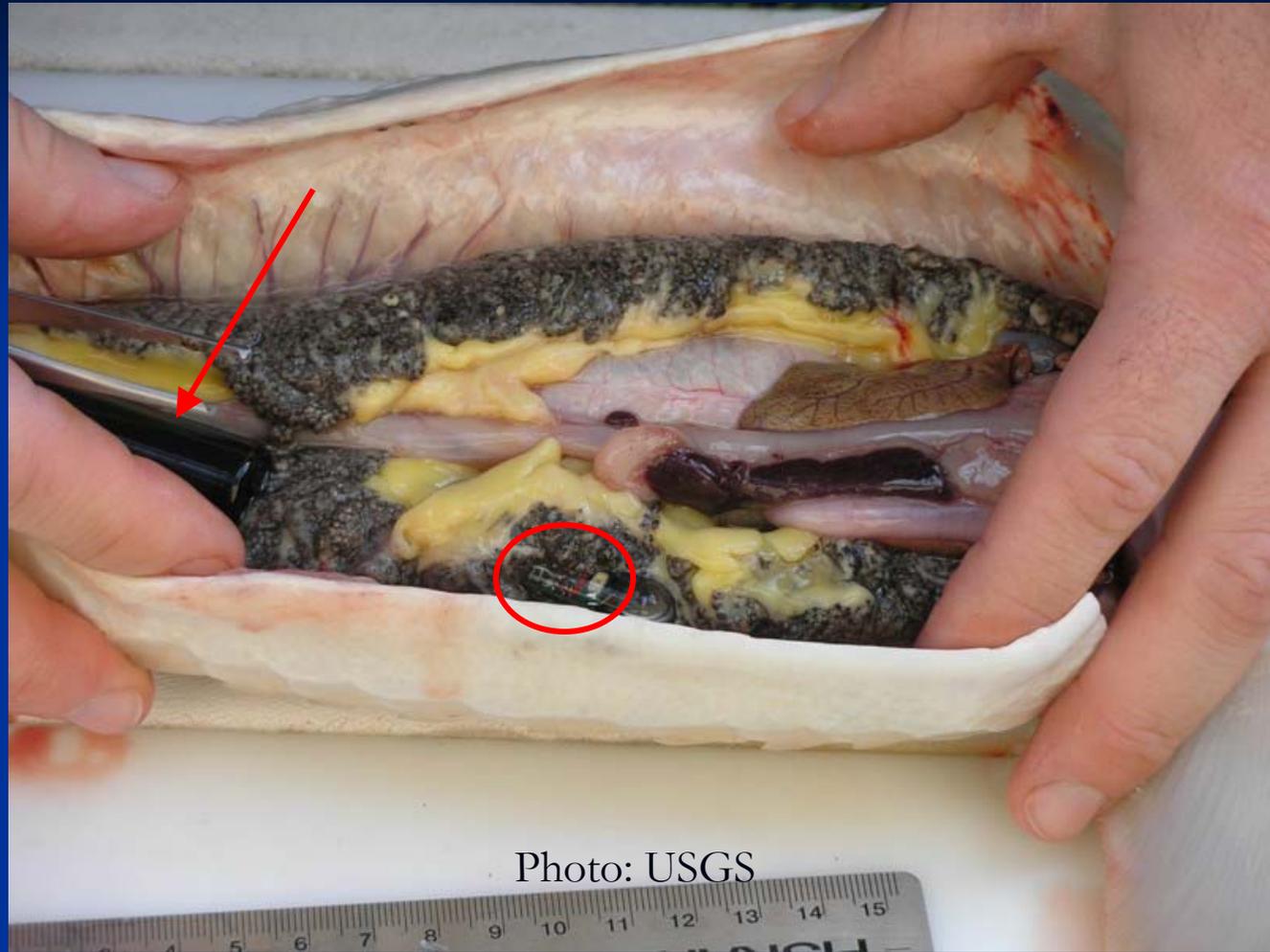


Photo: USGS

**Spawned shovelnose**



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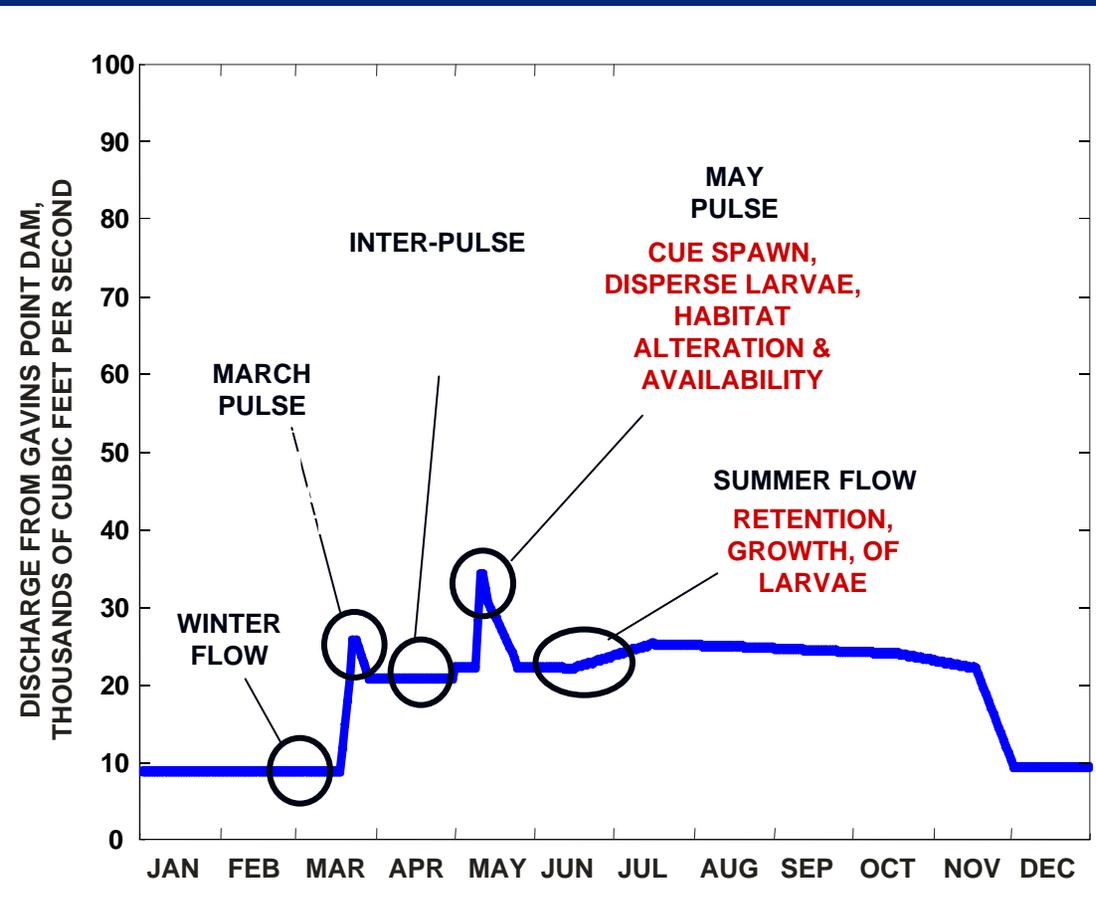


**Unspawned shovelnose**



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2. Evaluate the flow required for hatch, survival and growth for larvae and yoy sturgeon.
  - Is timing of dispersal of larval pallids associated with the flow pattern
  - Are transport and fate of larval pallids associated with the flow pattern





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## 2 Evaluate the hydrologic condition required for hatch, survival and growth for larvae and yoy sturgeon

- Egg mats \*
- Larval trawl
- Juvenile monitoring \*





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## 2 Evaluate the hydrologic condition required for hatch, survival and growth for larvae and yoy sturgeon

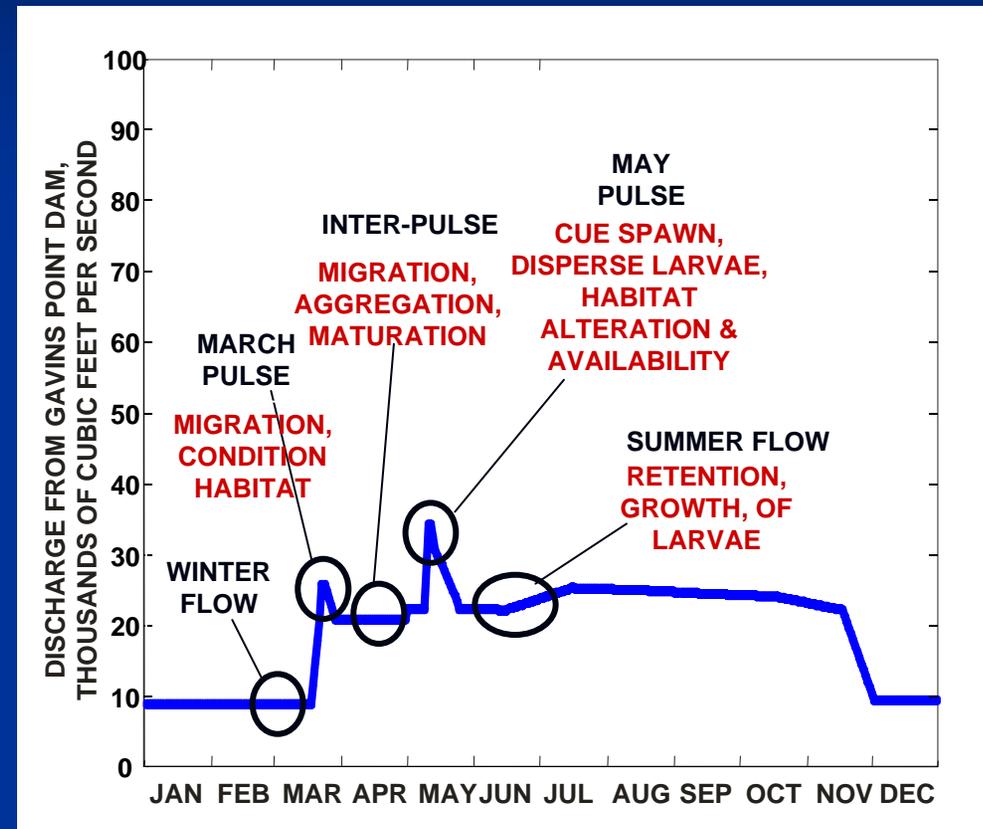
- Egg mats \*
- Larval collections \*
- Juvenile monitoring \*





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3. **Evaluate hydrologic conditions required for conditioning and availability of habitats associated with sturgeon spawning, and survival to yoy stage.**
  - Are channel morphology and potential spawning substrate changed by flow modifications
  - Are habitat availability characteristics associated with spawning, larval dispersion, and larval retention changed by flow modifications
  - Are water quality and temperature changed by flow modification





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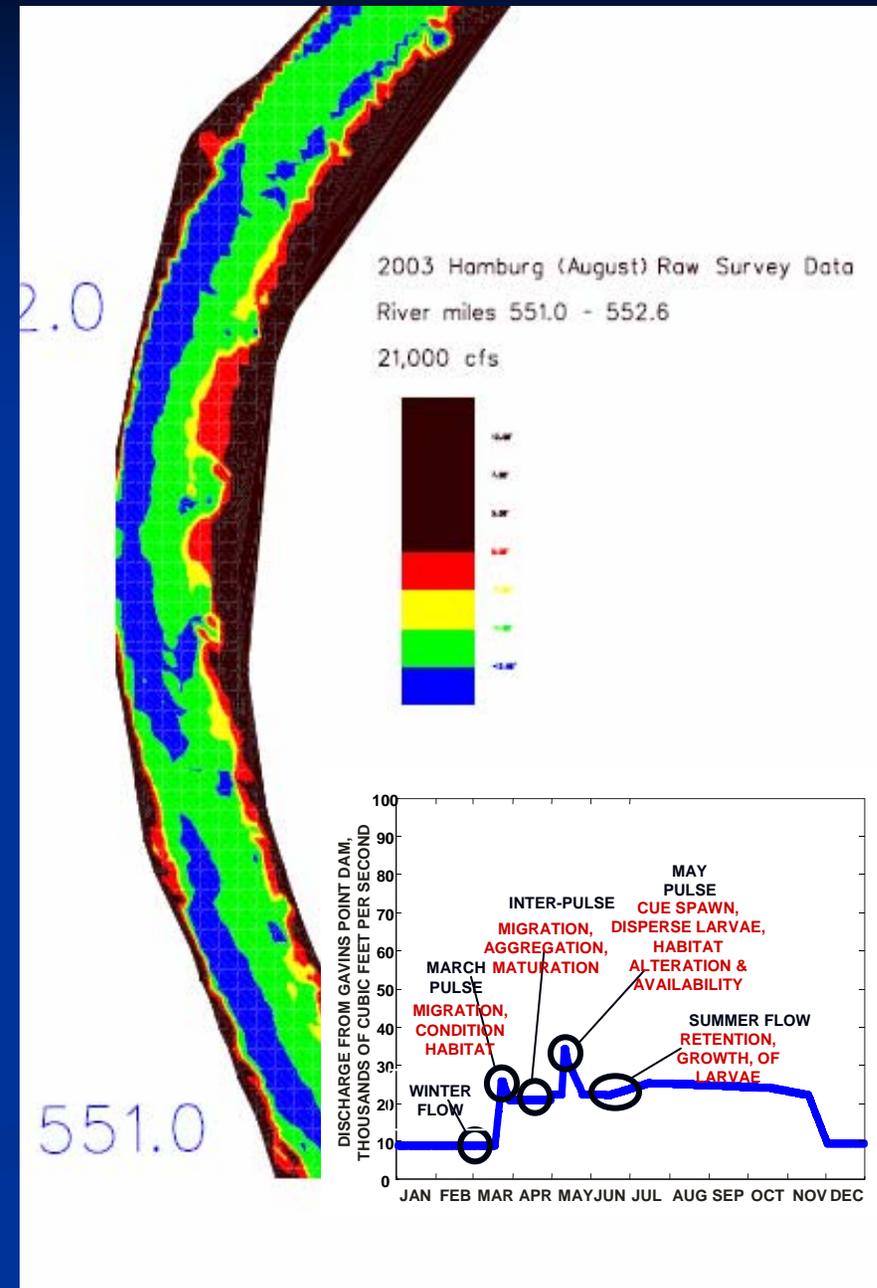
3. Evaluate hydrologic conditions required for conditioning and availability of habitats associated with pallid spawning habitat
  - Event based physical monitoring/mapping
    - Sediment, bathymetry, water quality, depth, velocity
  - Habitat availability mapping \*



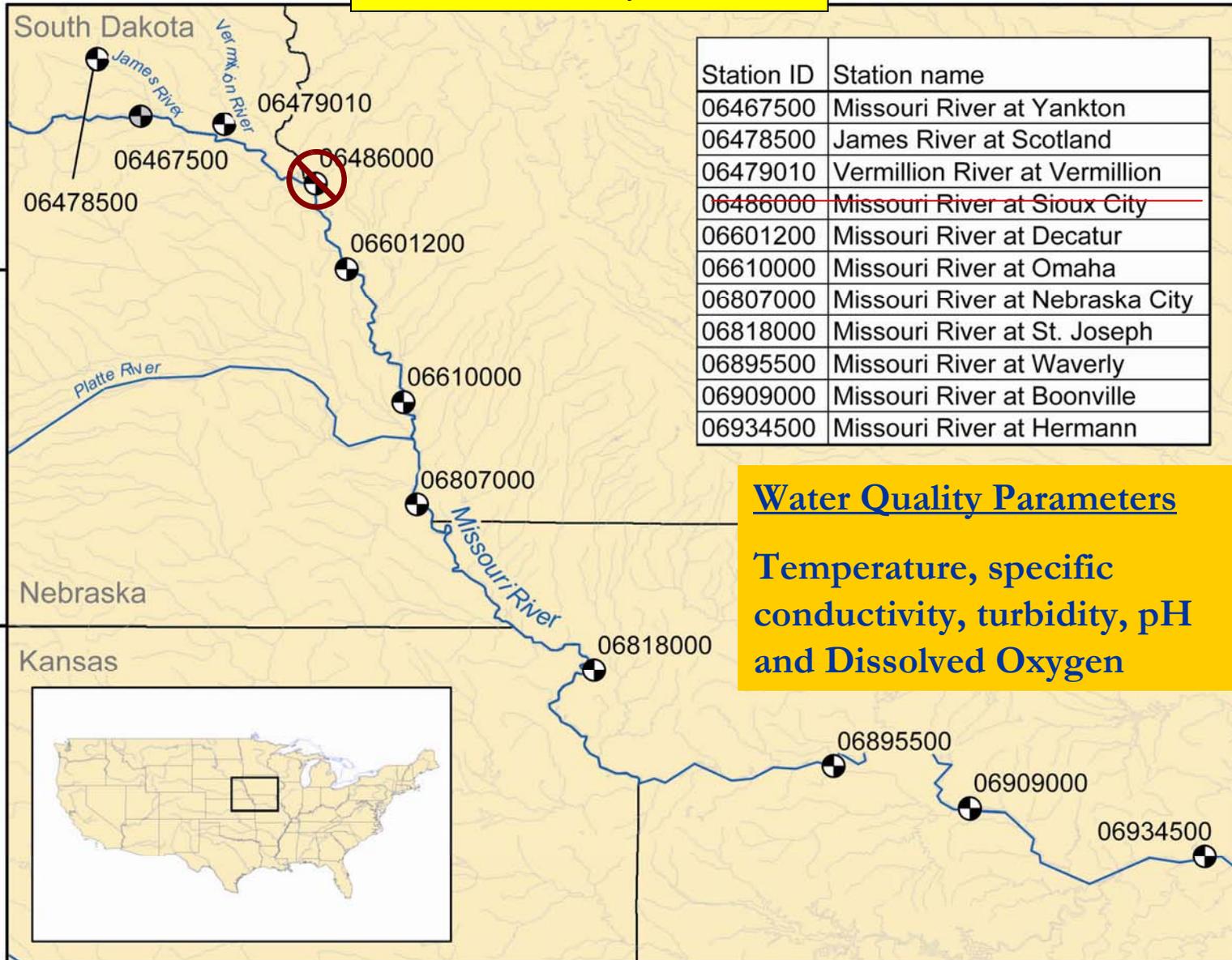


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- USGS crews will collect substrate, geometry, sediment, sediment transport, depth, velocity and water quality info at three sites between Gavins to Platte, under the 5 distinct hydrologic conditions in graphic
- Info will be used to create a multi-dimensional surface water flow model.
- Installation of 11 water quality monitors



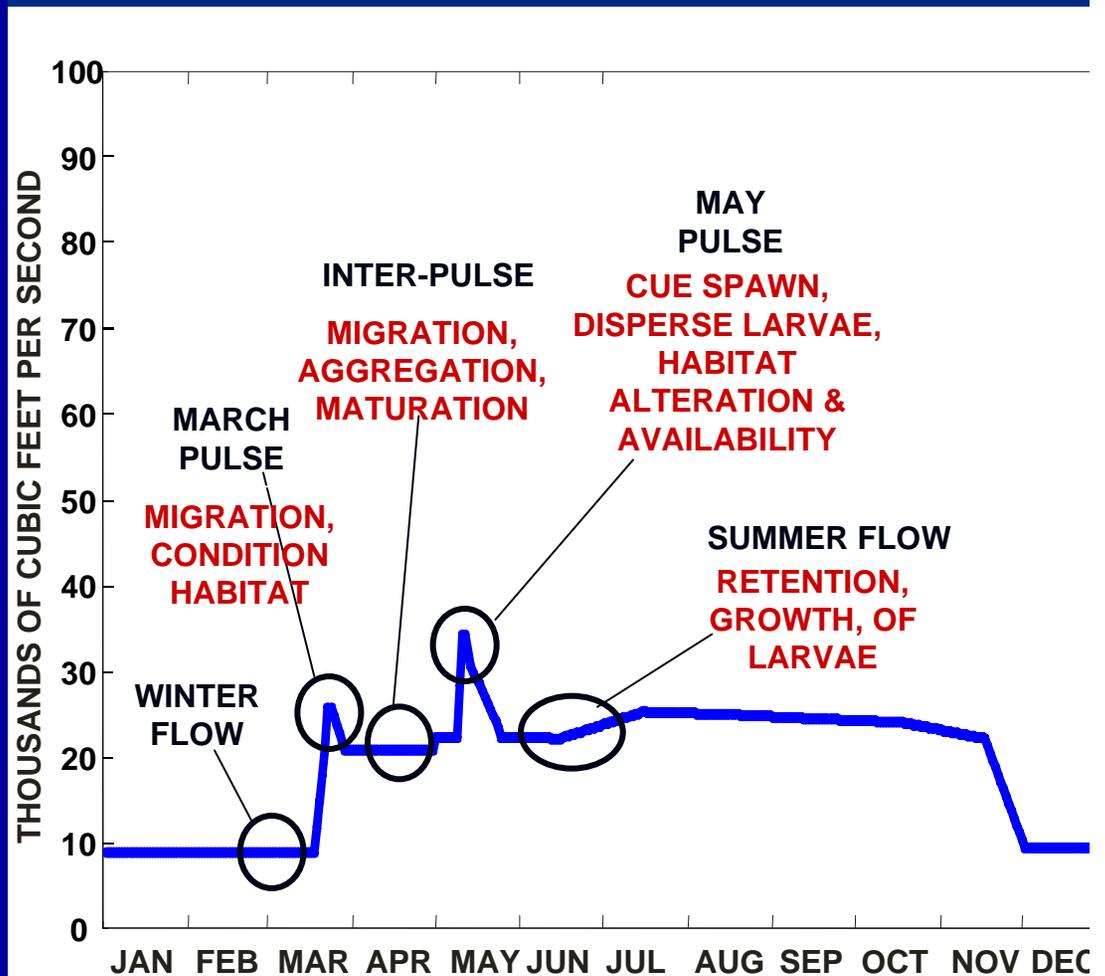
# Water Quality Sites





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4. Evaluate the effects of hydrologic conditions on the riverine fish fauna..
- Are population dynamics of selected native fish changed by modified hydrologic conditions





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#### 4 Evaluate the effects of hydrologic conditions on the riverine fish fauna..

- Random sampling of fish populations targeting all life history stages \*



Photo: NGPC



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# Analysis & Reporting

A final element of this study worth mentioning is our task for Analysis and Reporting.

- Database Management
- Information Dissemination and Outreach
- Publication & Reports

# The End



# SWH Monitoring Project Timeline

