

EVOLUTION OF ADAPTIVE MANAGEMENT WITHIN THE MISSOURI RIVER RECOVERY PROGRAM

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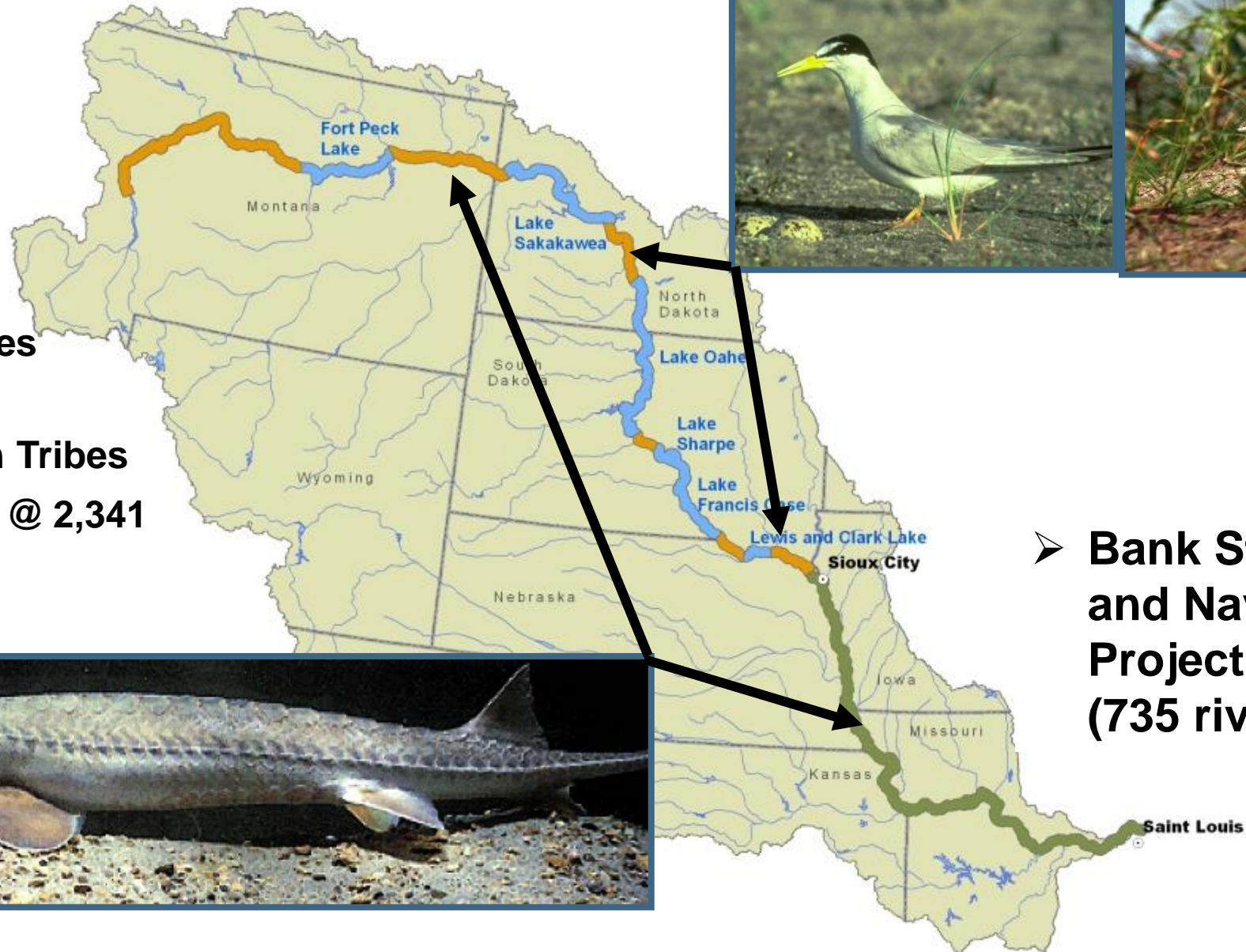


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System Modifications

- 530,000 square miles
- 10 States
- 29 Native American Tribes
- Longest U.S. River @ 2,341 miles

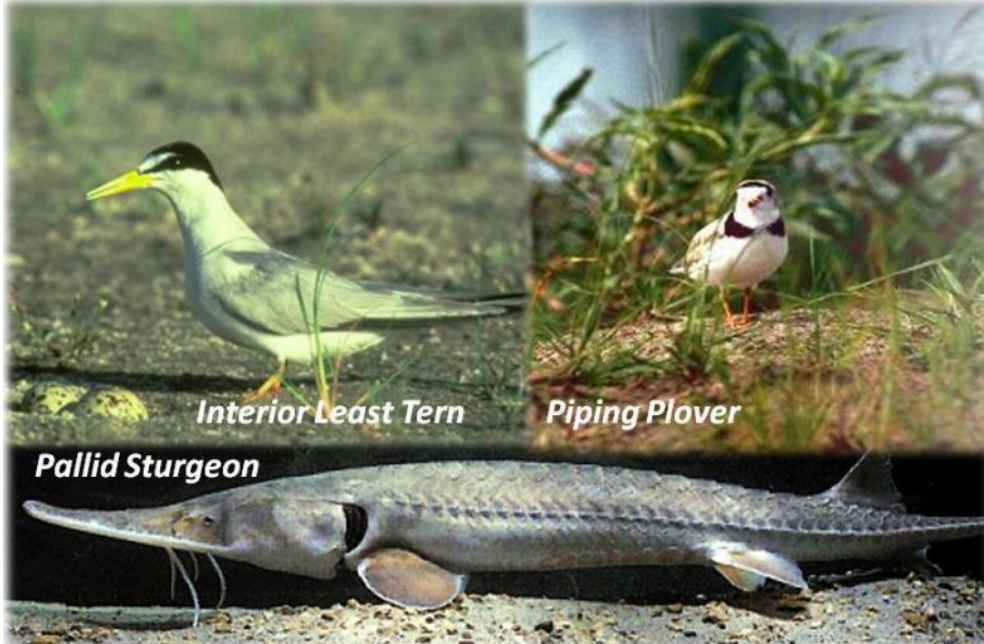


- **Bank Stabilization and Navigation Project (735 river miles)**



BIOLOGICAL OPINION & ADAPTIVE MANAGEMENT WITHIN THE MRRP

- 1990 Jeopardy BO for the Interior Least Tern, Piping Plover and the Bald Eagle
- 2000 and 2003 Jeopardy BO for the Pallid Sturgeon and non-jeopardy for the Interior Least Tern and Piping Plover
 - RPA included **Adaptive Management** as fundamental component to preclude jeopardy
- 2005 USACE established the **Missouri River Recovery Program**



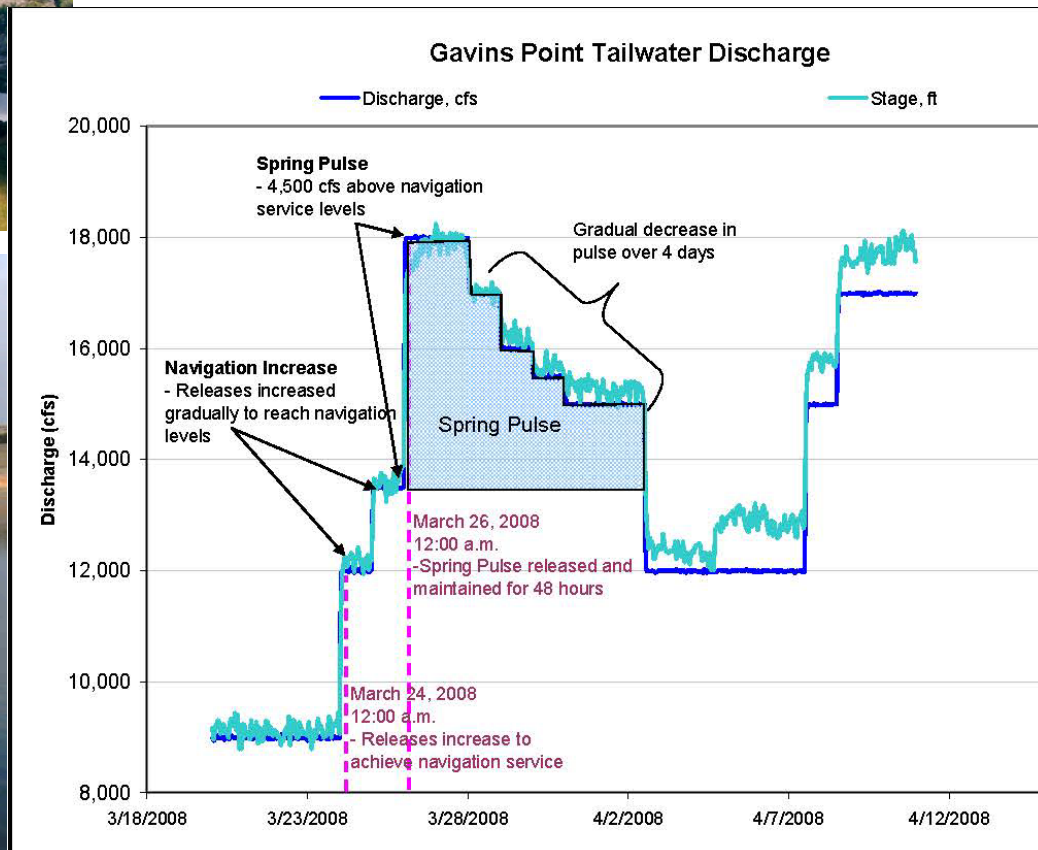
“The Corps should embrace an adaptive management process that allows efficient modification/ implementation of management actions in response to new information and to changing environmental conditions to benefit the species . . .” (USFWS 2000)



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MISSOURI RIVER RECOVERY PROGRAM 2006-2011: PALLID ACTIVITIES TO DATE



MISSOURI RIVER RECOVERY PROGRAM: BIRD ACTIVITIES TO DATE

ESH Mechanical Construction



Vegetation Management



Flow Management to Reduce Take



Human Restrictions



Monitoring & Research



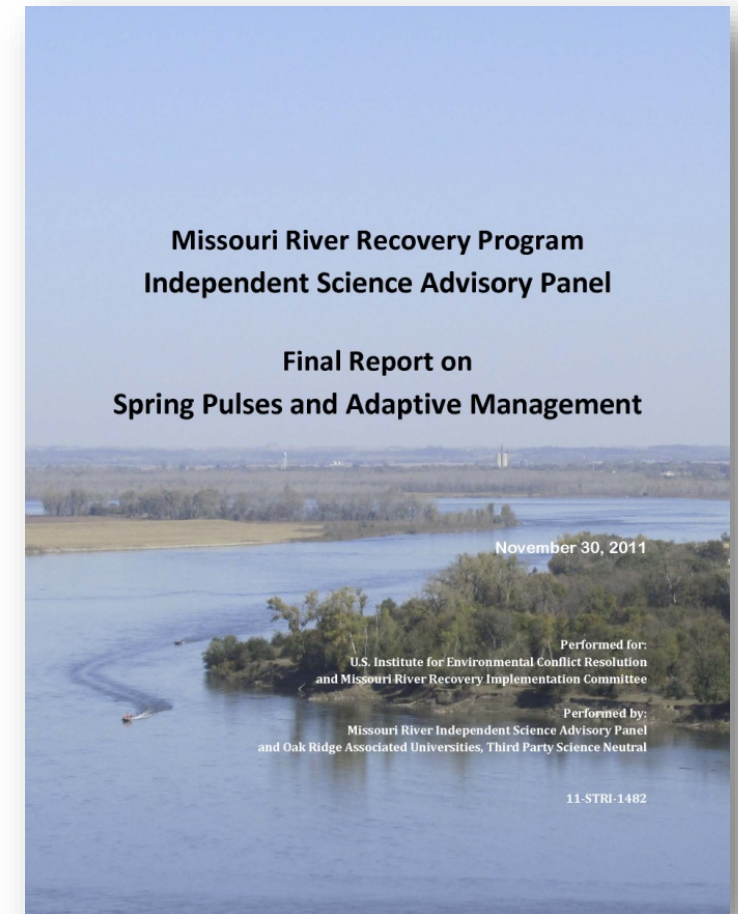
Predator Management



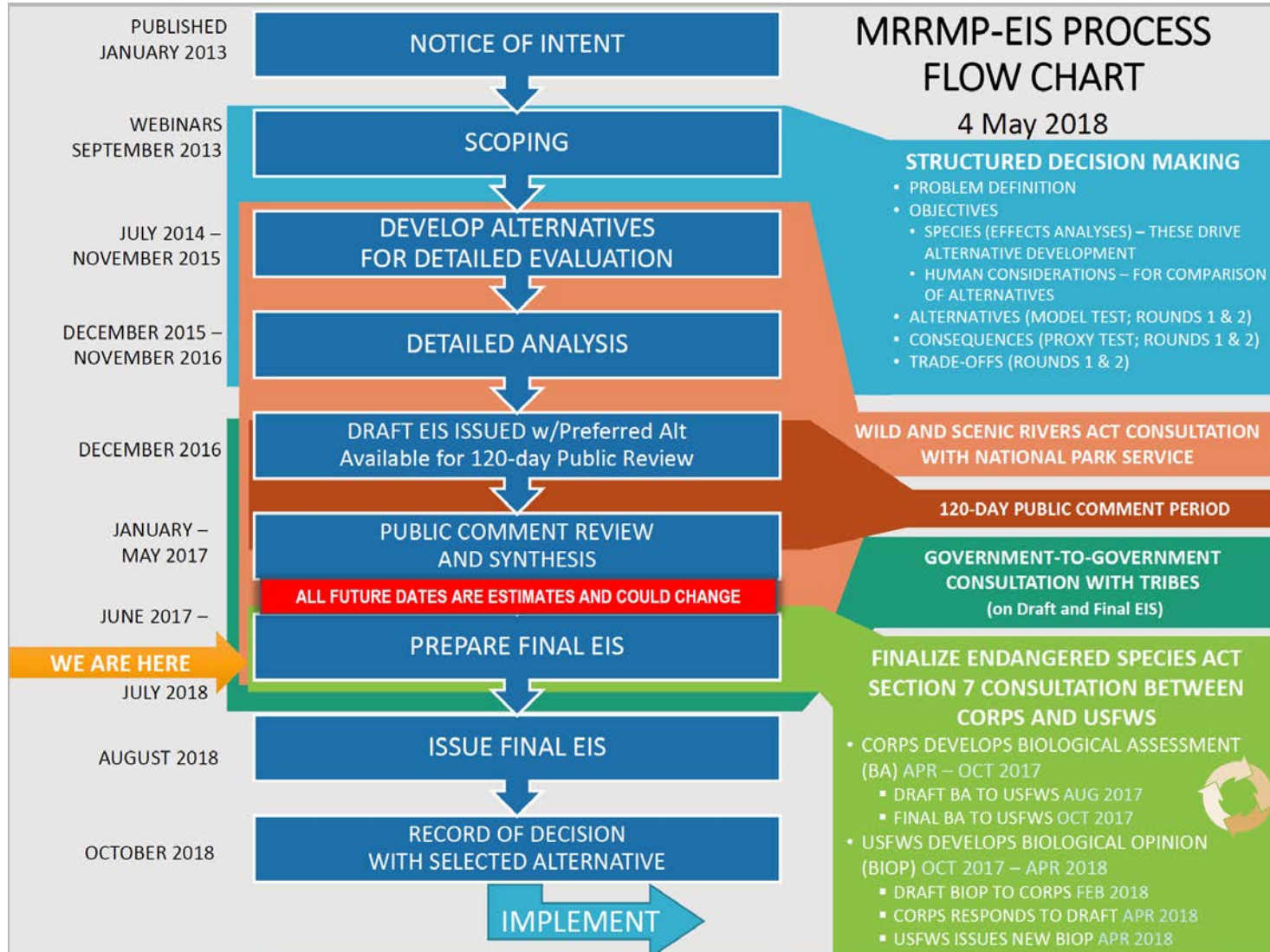
STAKEHOLDERS COME ON THE SCENE

- 2007 **Missouri River Recovery Implementation Committee (MRRIC)** est. through WRDA
- 2009 MRRIC selection of **Independent Science Advisory Panel**
- 2011 MRRIC **consensus recommendations**

1. Develop Effects Analysis
2. Develop Conceptual Ecological Models for listed species
3. Evaluate other Recovery programs
4. Develop overarching adaptive management strategy
5. Design monitoring programs
6. Identify decision criteria
7. Evaluate entire hydrograph effects on the listed species



BRINGING IT TOGETHER



ERDC/EL TR-18-DRAFT

Environmental Laboratory



US Army Corps of Engineers®
Engineer Research and Development Center

Science and Adaptive Management Plan

Missouri River Recovery Program

Draft/Pre-decisional/For Review and Comment

May 2018



Draft Document for Review

ENABLING CHARACTERISTICS FOR EFFECTIVE ADAPTIVE MANAGEMENT

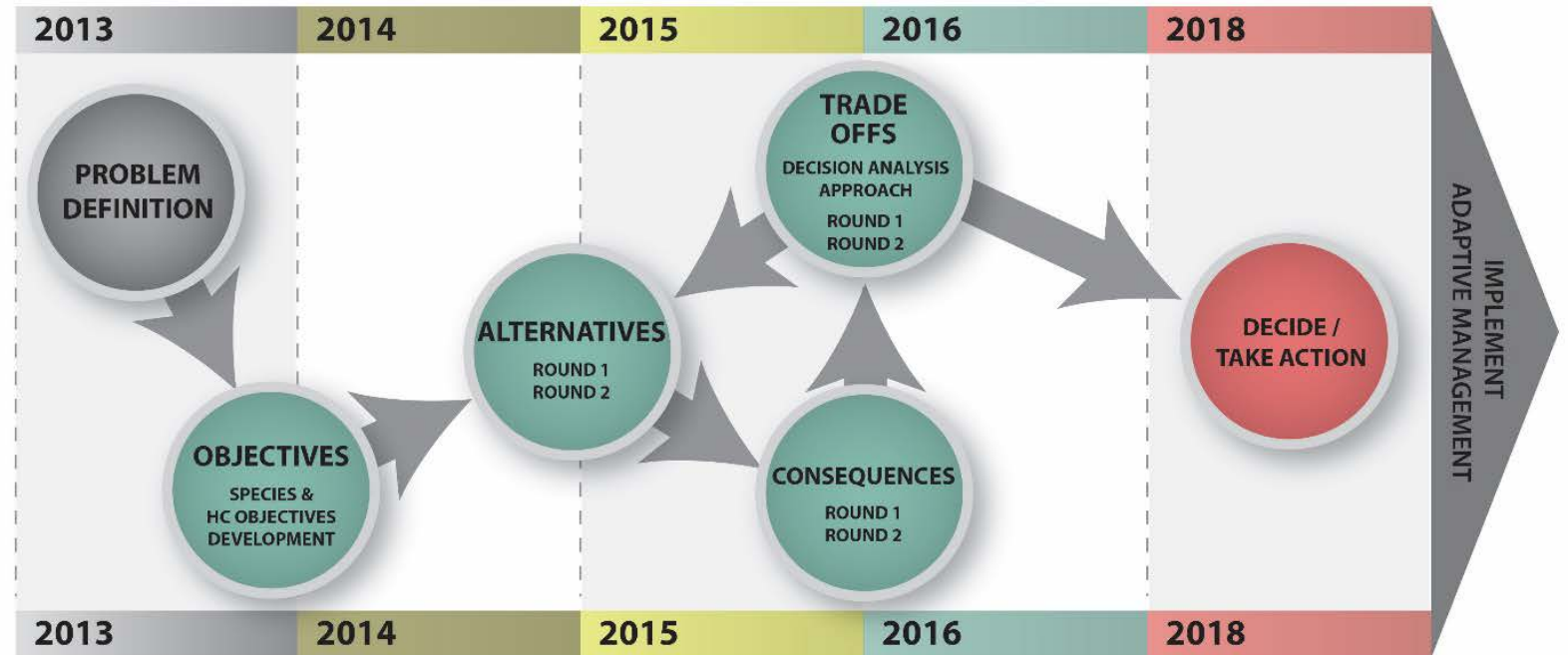
1. Build a great team, including outside expertise and facilitation
2. ***Stakeholder engagement early and throughout***
3. ***Clear articulation of program scope, objectives, metrics and contingent decision criteria***
4. ***Effects analysis to establish the best available science***
5. Monitoring in an experimental framework
6. ***Modeling to forecast outcomes from proposed management actions***
7. Applying structured decision-making strategies to acknowledged trade-offs
8. Integrating human considerations into all aspects of risk assessment
9. Purpose-built AM governance structure and process
10. ***Independent scientific advice and review***



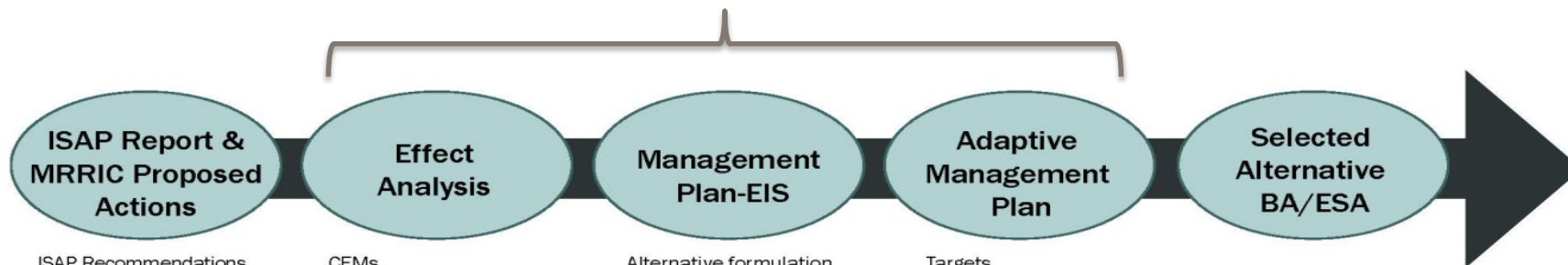
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STAKEHOLDER ENGAGEMENT



Concurrent Development



- ISAP Recommendations
- Develop Effects Analysis
- Develop CEMs
- Evaluate other programs
- Overarching adaptive management
- Design Monitoring Programs
- Identify decision criteria
- Evaluate entire hydrograph

- CEMs
- Synthesis of existing scientific data, information and models
- Management hypotheses
- Evidence-based hypothesis assessment
- Hydrogeomorphic models
- Population models
- Potential management actions

- Alternative formulation
- Human considerations metrics
- ProACT engagements
- Assessment of benefits/impacts

- Targets
- Performance criteria
- Monitoring and assessment
- Research
- Decision criteria
- Governance process



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SCOPE, OBJECTIVES, METRICS & DECISION CRITERIA

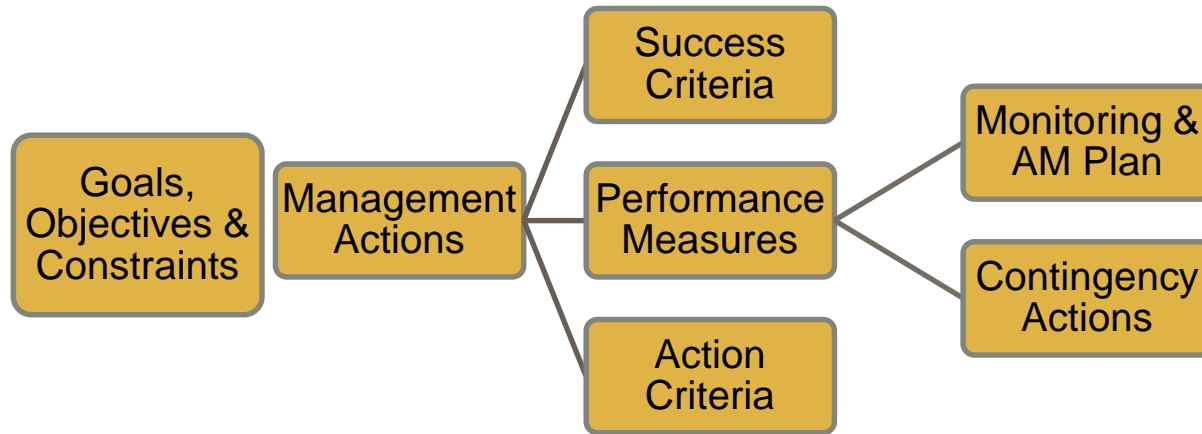


Table 4. Summary of time limits for level 3 implementation and scope of actions.

Action Category	Time Limit*	Minimum Scope	Maximum Scope
Population augmentation	Immediate	Current avg. stocking rate	Variable over time
IRC habitat development	2 years	Add 260K ac-d/yr	Add 500k ac-day/yr
Spawning habitat			Decision tree**
Spawning cue flows			to be 1 in 3 years m and maximum

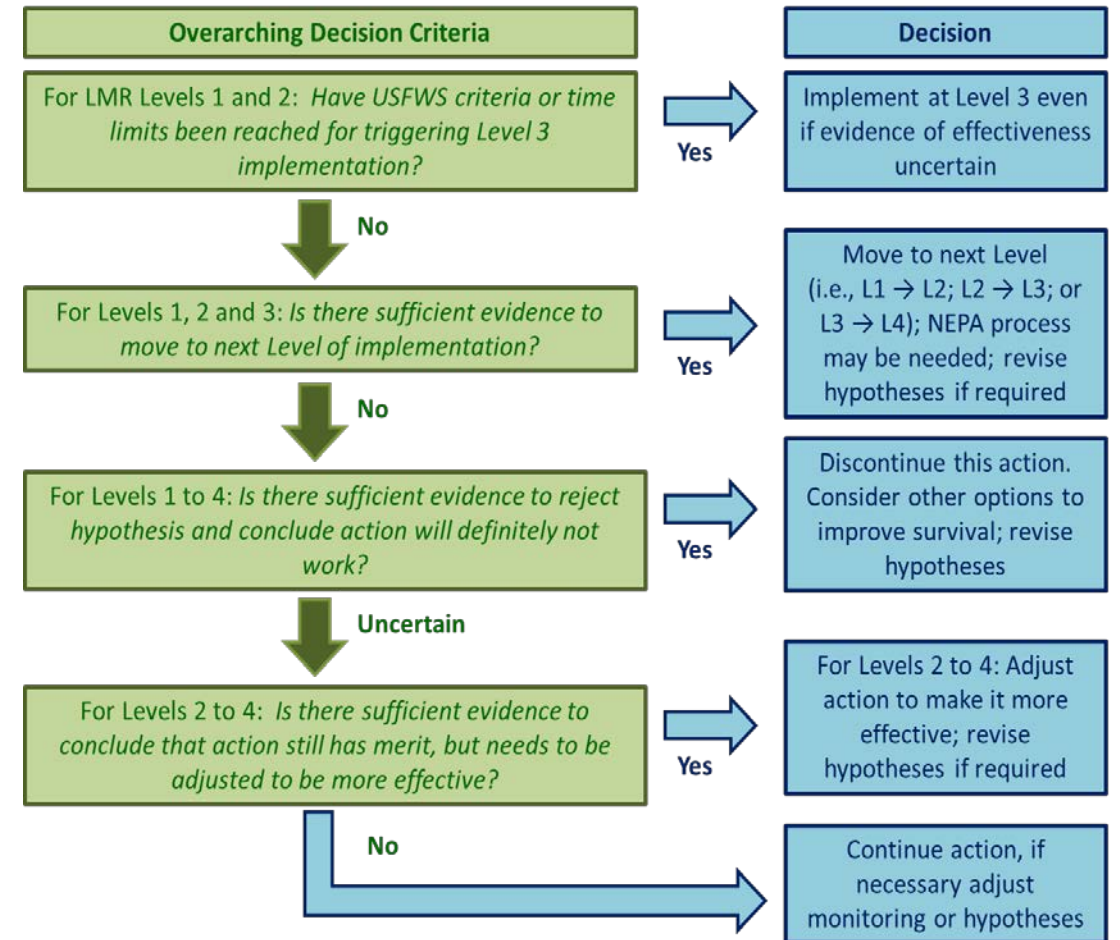
Targets & Decision Criteria

required implementation scope will be developed and informed by population models and impact assessments***

* Anticipated as Level 2 pilot projects focused on developing and evaluating high-quality spawning habitat.

** Spawning habitat implementation will be guided by the decision tree and associated decision criteria as described in the section below on spawning habitat.

*** Pallid population modeling will be used to set minimum spawning flow needs; bird impacts and status may inform decisions regarding spawning cue flows below Gavins Point Dam in any particular year.



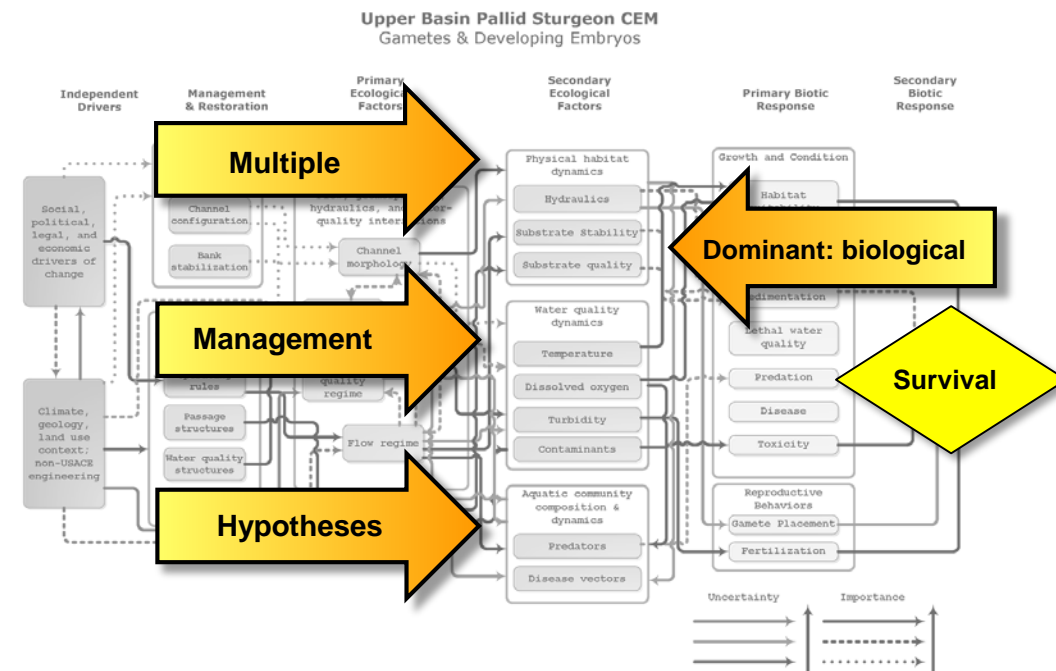
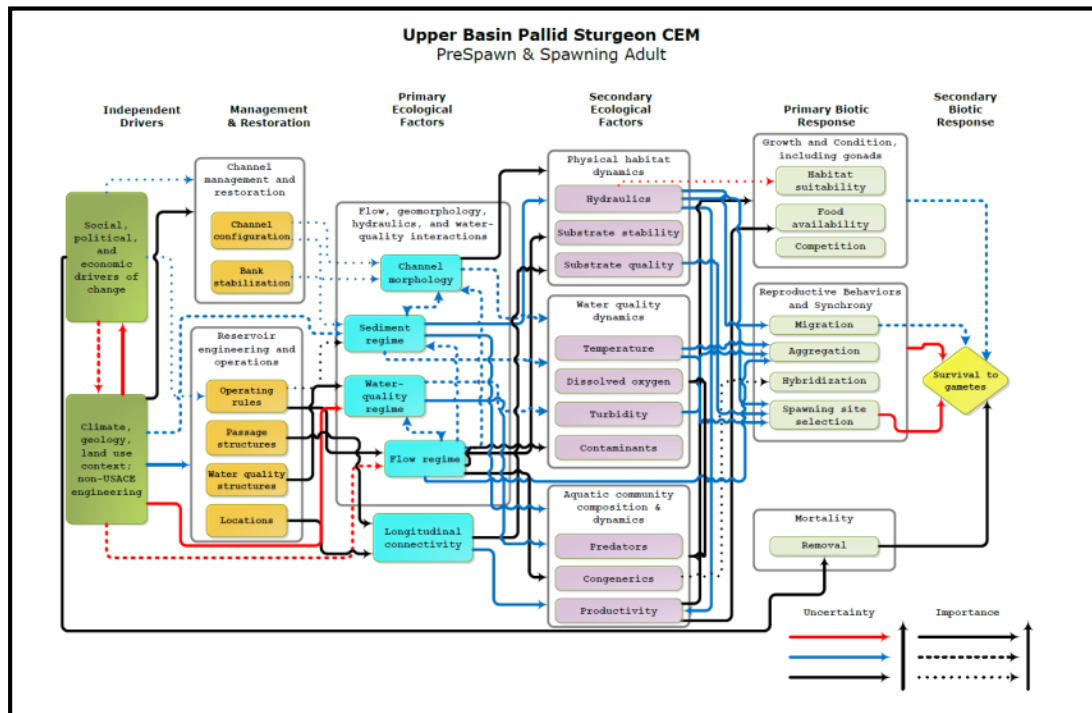
Effects Analysis

Conceptual Ecological Models

Synthesis of Existing Data, Information, & Models

Population & Hydrogeomorphic Models

Management Hypotheses



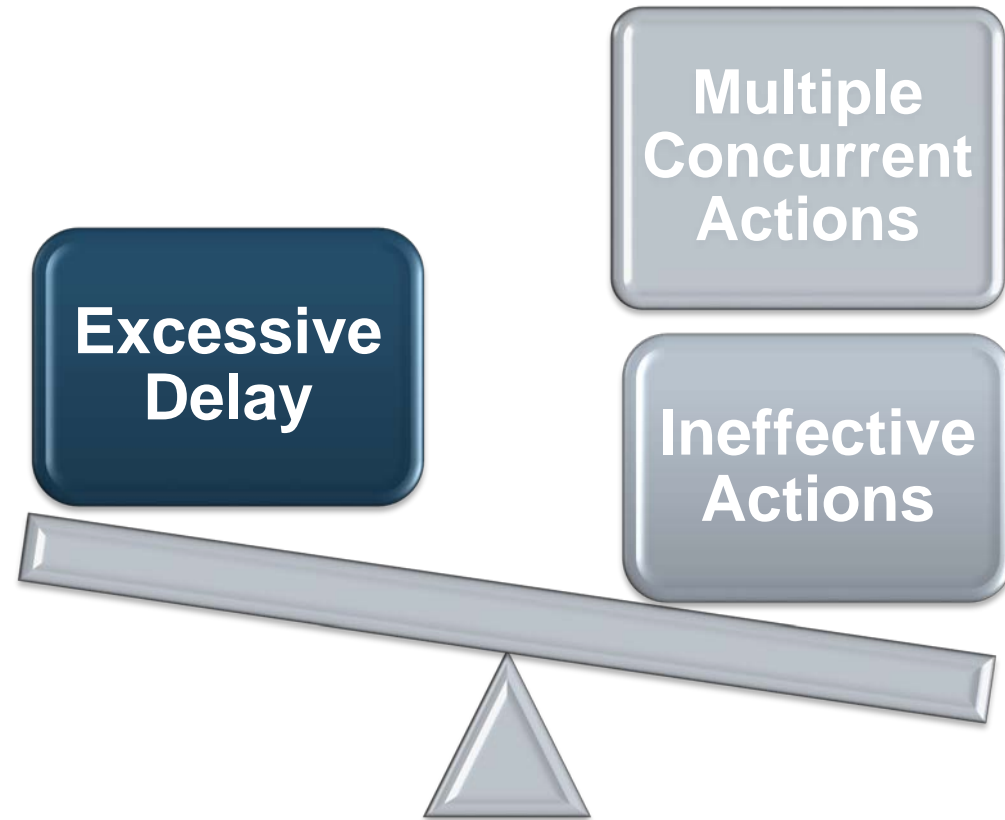
WHO WINS?

USACE avoids cost and delay associated with unnecessary and ineffective management actions

USFWS gains confidence that the necessary actions to avoid jeopardy will be implemented and impacts to species avoided

Stakeholders avoid undesirable and potentially impactful actions unless and until they are deemed essential

Balancing Risks in Alternatives Development



CONCLUSIONS

- EA provided concurrence on best available science
- Up-front investment in modeling tools
- Collaboration with USFWS
- Embraced Independent Review
- Transparent process with stakeholders
- AM Plan with objectives, metrics, targets, and action-forcing decision criteria



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THANK YOU!!

QUESTIONS??

<http://moriverrecovery.org>



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