Pr-O-A-C-T Process

PROBLEM DEFINITION

OBJECTIVES
Species & Human Considerations

Effects Analysis refines species objectives

ALTERNATIVES

Effect Analysis informs which management actions are effective

Models and Methods

CONSEQUENCES
Species and Human Considerations

TRADE-OFFS w/ MRRIC

DECIDE / TAKE ACTION

Prepare Management Plan/EIS

IMPLEMENT

ADAPTIVE MANAGEMENT
Problem Definition

The purpose of the Missouri River Recovery Management Plan and integrated Environmental Impact Statement is to develop a management plan that includes a suite of actions to meet ESA responsibilities for the piping plover, the interior least tern, and the pallid sturgeon using USACE authorities. These may include Missouri River System operations for listed species and acquisition and development of land needed for creation of habitat for listed species provided by section 601(a) of Water Resources Development Act (WRDA) of 1986, as modified by section 334(a) of WRDA 99, and further modified by section 3176 of WRDA 2007.
Objectives
Piping Plover and Least Tern Objectives

• Fundamental Objective: Avoid jeopardizing the continued existence of the piping plover and least tern from the US Army Corps of Engineers actions on the Missouri River.
  • Sub-objective 1: Maintain a total population number of Missouri River birds that keep the population resilient on the Missouri River in the long term.
  • Sub-objective 2: Maintain a long-term trend in population growth that is at least stable.
  • Sub-objective 3: Increase and maintain the success of breeding pairs on Missouri River.
  • Sub-objective 4: Maintain a geographic distribution of plovers in the river and reservoirs in which they currently occur.
Pallid Objectives

• Fundamental Objective: Avoid jeopardizing the continued existence of the pallid sturgeon from the US Army Corps of Engineers actions on the Missouri River.
  • **Sub-objective 1**: Increase pallid sturgeon 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.
Human Considerations (HC) Objectives

- Basis for evaluating alternatives’ effects on HC during final Trade-Off step
- Approximately 32 Objectives
- Described as monetary or non-monetary values
- MRRIC reached final consensus at Aug meeting
Need for HC Proxies

- Full set of HC objectives and metrics is complex and time-consuming for use in early stages of alternative evaluation
- Need ‘proxy’ measures in early stages to help stakeholders efficiently conduct trade-off analysis among alternatives
- Full set of HC objectives will be used in later stages of alternative evaluation
A Good Proxy…

• Should be quick and easy to calculate
• Should help reveal the relative trade-offs across alternatives without complex analysis (e.g. should help answer the question, “is alternative A or B better for this objective”)
• Is clearly related to the underlying human considerations objectives and metrics
Example HC Proxy

• Interim step in objective calculation:
  • if a desired objective is:
    • **Regional Economic Development (RED)**
      contribution of Recreation in $ / yr,
    • a proxy might be:
      • **# of days reservoir elevations and river stages are in a desirable range during the recreation season**
HC Proxies

• Wastewater
• Fish and Wildlife
• Irrigation
• Navigation
• Property Tax Base
• Cultural Resources

• Hydropower
• Commercial Dredging
• Flood Risk/Agriculture
• Recreation
• Thermal Power
• Water Supply
Effects Analysis Team

• Three sub-tems:
  • Hydro/Geomorphic - Led by Craig Fischenich, ERDC
  • Pallid - Led by Robb Jacobson, USGS
  • Birds - Led by Kate Buenau, Pacific Northwest National Laboratory

• Effects Analysis Interim Reports
  • Conceptual Species Ecological Models (CEMs)
  • Compilation and Assessment of best available information
  • Management Hypotheses/Actions
  • Quantitative Predictive Models
Bird Management Actions

- Actions that create habitat structure
  - Habitat-creating flows
  - Habitat-conditioning flows
  - Mechanical habitat creation
  - Vegetation removal
  - Mechanical augmentation of sandbars
  - Reservoir habitat creation

- Actions that affect availability of habitat, given existing structure
  - Reservoir water level management
  - Low summer flows
  - Steady or declining water levels during nesting season

- Actions that support long-term habitat availability
  - Channel modifications to increase width
  - Sediment redistribution

- Actions that increase egg/chick/(adult) survival
  - Steady or declining water levels during nesting season
  - Predator removal/ Nest caging
  - Restoration of predator habitat off-river
  - Human restrictions measures
## Lower River Pallid Management Hypotheses/Actions

<table>
<thead>
<tr>
<th>Where</th>
<th>What</th>
<th>Management Hypothesis</th>
<th>Implied Limiting Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alter Flow Regime at Gavins Point</td>
<td>Naturalized flows for aggregation &amp; spawning cues</td>
<td>Insufficient spawning cue signals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naturalized flows for increased productivity</td>
<td>Insufficient food producing habitat for Age-0 pallid sturgeon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naturalized flows for decreased energetic demands</td>
<td>Insufficient foraging habitat for Age-0 pallid sturgeon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decreased spring flows &amp; velocities for reduced drift</td>
<td>Inappropriate drift dynamics</td>
<td></td>
</tr>
<tr>
<td>Temperature management, Gavins Point</td>
<td>Naturalized temperatures, increased Aggregation and spawning cues</td>
<td>Insufficient spawning cue signals</td>
<td></td>
</tr>
<tr>
<td>Channel Reconfiguration</td>
<td>Reconfigure channel for spawning habitats</td>
<td>Insufficient spawning habitat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reconfigure channel for food production habitats</td>
<td>Insufficient food producing habitat for Age-0 pallid sturgeon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reconfigure channel for foraging habitats</td>
<td>Insufficient foraging habitat for Age-0 pallid sturgeon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reconfigure channel for interception habitats</td>
<td>Insufficient interception habitat</td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>Regulation of contaminants will decrease incidence of reproductive impairments</td>
<td>Presence of contaminants</td>
<td></td>
</tr>
<tr>
<td>Flow Regime of Platte River</td>
<td>Naturalization of flow regime will allow recruitment to Missouri River population</td>
<td>Insufficient habitat in the Platte River</td>
<td></td>
</tr>
<tr>
<td>Propagation Lower Basin</td>
<td>Improved stocking strategy, size classes</td>
<td>Insufficient number / fitness of adults</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved stocking strategy, parentage &amp; fitness</td>
<td>Insufficient number / fitness of adults</td>
<td></td>
</tr>
</tbody>
</table>
Lower Pallid Decision Tree

Potential to implement:
- Reconfigure channel for spawning habitats
- Increase number of adults
- Manipulate flows and/or temperature for reproductive cues

Potential to implement:
- Decreased discharges to lower velocities
- Increase interstitial space in spawning substrates

Potential to implement:
- Reconfigure channel to increase food-producing habitats
# Upper River Pallid
## Management Hypotheses/Actions

<table>
<thead>
<tr>
<th>Where</th>
<th>What</th>
<th>Management Hypothesis</th>
<th>Science Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Missouri River</td>
<td>Alter Flow Regime at Fort Peck</td>
<td>Naturalized flows, food and energetic demands</td>
<td>No model available, exploratory field experiment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naturalized flows, aggregation &amp; spawning cues</td>
<td>No model available, research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreased spring flows &amp; velocities, reduced drift</td>
<td>Models available, validate with field experiment; research on hiding</td>
</tr>
<tr>
<td>Temperature Control, Fort Peck</td>
<td></td>
<td>Increased temperature, increased productivity</td>
<td>No models available, exploratory field experiment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased temperature, increased growth, decreased drift</td>
<td>Models available, validate with field experiment; research on hiding</td>
</tr>
<tr>
<td>Sediment Augmentation, Fort Peck</td>
<td></td>
<td>Increased turbidity, decreased predation</td>
<td>No model available, research</td>
</tr>
<tr>
<td>Yellowstone River</td>
<td>Passage at Intake</td>
<td>Increased potential drift distance</td>
<td>Models available, implemented, validate with field experiment; research on hiding; monitor movements, spawning</td>
</tr>
<tr>
<td>Upper Missouri and Yellowstone</td>
<td>Upper Basin Propagation</td>
<td>Improved stocking strategy, size classes</td>
<td>Implemented, validate with monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved stocking strategy, parentage &amp; fitness</td>
<td>No model available, research</td>
</tr>
<tr>
<td>Lake Sakakawea</td>
<td>Drawdown, Lake Sakakawea</td>
<td>Increased potential drift distance</td>
<td>Models available, validate with field experiment; research on hiding.</td>
</tr>
</tbody>
</table>
Upper Pallid Decision Tree

1. Is Lake Sakakawea anoxic and lethal?
   - Yes → Look for other sources of mortality
   - No → Do fish migrate and spawn in Yellowstone?

2. Do fish migrate and spawn in Yellowstone?
   - Yes → Does interstitial hiding occur?
     - Yes → Likely recruitment failure
     - No → Potential to implement:
       - Low flows
       - Temperature increases
       - Drawdown of Lake Sakakawea
   - No → Does interstitial hiding occur?

3. Does interstitial hiding occur?
   - Yes → Likely recruitment failure
   - No → Spawn occurs > 500 km upstream?

4. Spawn occurs > 500 km upstream?
   - Yes → Potential recruitment
   - No → Does interstitial hiding occur?

5. Does interstitial hiding occur?
   - Yes → Potential to implement:
     - Drawdown of Lake Sakakawea
   - No → Likely recruitment failure
Alternative Development

Develop Bird “Test” alts to meet Bird Targets

Forecast Flow and WSE’s for Bird “Test” alts

Calculate HC Proxies for Bird “Test” alts

Develop Pallid alts to meet Jeopardy Criteria

Revise HC Proxies if necessary

Present and Discuss HC Proxy Calculations w/MRRIC

Integrate Pallid alts with Bird alts

Forecast Flow and WSEs for Integrated alts

Calculate HC Proxies for Integrated alts and conduct Trade-Off w/MRRIC
Bird Test Alternatives

- Future w/o change condition
- Mechanical Based ESH Creation
- Flow Based ESH Creation
- Reservoir Level ESH Creation
Pallid Alternative Development

- Coordinating with USFWS to identify jeopardy avoidance criteria
- Working with USFWS to determine how to address each potential limiting factor in the initial step of the AM plan
- Identify metrics and decision triggers that will be used to move to next AM step
- Identify level of stakeholder engagement required for each AM decision point
NEPA Cooperating Agencies

- Western Area Power Administration
- National Park Service
- Bureau of Reclamation
- US Fish and Wildlife Service
- State of Wyoming
- State of South Dakota
- Nebraska Game and Parks Commission
Approach for Cooperating Agencies

- Information sharing via the MRRIC venue
  - Primarily SAM, SPA, HC Ad Hoc work groups
  - Following the Critical Engagement Points plan
- However, Cooperating Agency business is addressed directly with the Corps
- Consistent with the following Fact Sheet available on the website
Management Plan/EIS Coordination Fact Sheet

How the Corps will coordinate throughout the Management Plan and EIS process

Coordination
The U.S. Army Corps of Engineers (Corps) plans to coordinate with the public, other federal agencies, states and Tribes throughout the Management Plan and EIS process:

- MRRIC
- States
- Public
- Tribes
- Coop. Agencies

The Corps will collaborate with the Missouri River Recovery Implementation Committee (MRRIC), which represents a cross-section of basin interests, including federal and state agencies, Tribes, industry and other interests. Collaboration with MRRIC will allow for substantive input on key activities and products in a tight project timeline.

The U.S. Fish and Wildlife Service will support the Corps by engaging state fish and wildlife agencies in the Management Plan and EIS consistent with the Fish and Wildlife Coordination Act. State agencies are encouraged to take full advantage of this opportunity.

The Corps will provide opportunities to hear information about plan development and the science used to inform decision making. Initial public comments were collected in September 2013. Additional public scoping will be offered following the selection of a draft plan.

The Corps will engage with Tribes pursuant to Tribal Trust responsibilities, including government to government consultation as requested by Tribes.

Cooperating agencies have jurisdiction by law or special expertise with respect to any environmental impact involved in the federal action.
STAY INVOLVED BY VISITING

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