Approaches and Tools for Science-Decision Maker Collaboration and Actionable Science

Patricia Gorman
South Florida Water Management District
NCER April 20, 2016
Panel Members

- April Patterson, USACOE, Everglades
- Jennifer Pratt Miles, Meridian Institute
- Craig Fischenich, ERDC Environmental Laboratory, Missouri River Recovery Program
- Jerry Kenny, Headwaters Corp., Platte River Recovery Program
Panel Format

- Introduction to the subject matter
- Panel member self introductions
- Q & A’s to stimulate an interactive dialog amongst panelists and audience
- Closing Summary
Panel Focus

- Approaches, tools, and structures for scientist and decision maker collaboration
- Co-producing actionable science
- Barriers to and benefits of collaboration in large scale environmental restoration programs
Actionable science can be produced if scientists and decision makers spend more time co-defining the problem and identifying how the information will be used.

Co-production is critical for tackling complex societal problems. Decision makers can explain the type of decisions including the legal, political, social, and fiscal constraints.
Sustained collaboration is needed not only to specify the research goals, but also to plan how the science will be used.

To identify the most useful formats to interject scientific understanding and uncertainty into specific decisions over the entire length of a program.
Platte River
Target Species on the Platte River
Jennifer Pratt Miles
Senior Mediator
Fred Sklar, South Florida Water Management District
• Stakeholders, managers, and scientists collaborating.
• Management goals and objectives are clearly stated.
• Conceptual model of the system is developed.
• Key uncertainties/questions are articulated.
• Alternative management strategies are identified.
• Monitoring results are compared to objectives.
• System in place to adjust management based on learning.
• Learning is communicated among stakeholders.
Figure 1: Adaptive Management Cycle, adapted from Nyberg, 1999.
Panel: Approaches and Tools for Scientist-Decision Maker Collaboration and Actionable Science

The Missouri River Recovery Program: A Framework for Addressing Threatened and Endangered Species Challenges

Dr. Craig Fischenich
ERDC Environmental Laboratory
Missouri River Recovery Implementation Committee (MRRIC) established in 2007 WRDA to make recommendations to ASA(CW) Independent Science Advisory Panel (ISAP) 2011 review of program MRRP makeover 2013-2016 New ROD 2017

“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)
Framework Overview

Framework components in three parts:

- Identification of the “best available science”
- Quantification of effects and tradeoffs of alternatives
- Use of progressive adaptive management practices
  - Research and hypothesis testing
  - Targets and decision criteria
  - Governance structure/process

The framework is implemented in a transparent, collaborative environment with stakeholders
RECOVER: Providing Sound Science to Drive Decision Making in the Comprehensive Everglades Restoration Program

April Patterson, Project Manager

National Conference on Ecosystem Restoration
April 20, 2016
Comprehensive Everglades Restoration Plan (CERP)

Restoration will:

- Improve the health of over 2.4 million acres of the south Florida ecosystem, including Everglades National Park – Greater Everglades
- Improve the health of Lake Okeechobee
- Significantly reduce damaging freshwater releases to the Northern Estuaries
- Improve water deliveries to Florida and Biscayne bays, Southern Coastal Systems
- Improve water quality
- Enhance water supply and maintain flood
RECOVER

- The science behind the Comprehensive Everglades Restoration Plan (CERP)
- Provides system-wide science perspective for planning and implementation of CERP projects
- REstoration COordination and VERification
- Conducts system-wide monitoring and assessment
How do you define actionable science and what are some strategies for producing it?
Actionable Science

Data, analyses, projections, or tools that can support decisions regarding management. It is ideally co-produced by scientists and decision makers and creates rigorous and accessible products to meet the needs of stakeholders.

Adapted from the Advisory Committee on Climate Change & Natural Resource Science (ACCCNRS)
Actionable Science Principles

1. Most reliably co-produced by scientists and decision makers/managers.
2. Start with a decision that needs to be made.
3. Give priority to processes and outcomes in addition to products.
5. Evaluate - Was the science used?

Adapted from Advisory Committee on Climate Change & Natural Resource Science
What structures/processes do you have in place to facilitate communication and collaboration between scientists and decision makers/managers (e.g. what does collaboration look like)?
Governance Structure: Working Level

Bird Team
- Implementation Team
- Management Team
- MRRIC Members

Fish Team
- Implementation Team
- Management Team
- MRRIC Members

Technical Team

ISAP/ISETR
Communication and collaboration among scientists, managers and stakeholders
Structure for Implementation

- Governance Committee
  - States, DOI, water users, environmental groups
  - Policy and Direction
- Independent Implementation
  - Executive Director and EDO staff – independent contractor
  - Honest Broker
- Land, Water, Technical Advisory Committees
  - Representatives of stakeholders
- Independent Science
  - Independent Science Advisory Committee
  - Independent Peer Review
  - Independent third party contractor develops candidates
Communication in the Science Sphere

- Effective Communication is essential
  - Amongst stakeholders within a committee
  - Amongst Advisory Committees
  - Between Advisory Committees and Governance Committee

- Science informs decisions, Governance Committee makes the decisions
  - Communication of science findings to assist decision makers is critical
  - Science is means for reducing uncertainties
  - Many considerations factor into decisions
What tools and techniques do you use to convey information between scientists and managers?
What tools/techniques do you use to convey information between scientists and managers?

Effects Analysis:
- Establish the best available data and science
- Develop and use conceptual and numerical models
- Identify critical uncertainties and formulate associated hypotheses

AM Plan Development:
- Metrics, targets, decision criteria, decision trees, contingency plans…
- Create websites/tools for open access to information

AM Plan Implementation:
- Periodic monitoring and assessment reports
- Science and adaptive management meetings
- Utilize independent science panels and review processes
Is interception habitat limiting?
Yes
No

Successful fertilization, incubation, and hatch?
Yes
No

Can free embryos transition, feed in the thalweg?
Yes
No

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 for interception

Potential to implement:
- Reconfigure channel to increase food-producing and/or foraging habitats

Potential to implement:
- Remove, bypass, Intake, Cartersville - drift

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

<table>
<thead>
<tr>
<th>Action Category</th>
<th>Time Limit</th>
<th>Minimum Scope</th>
<th>Maximum Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population augmentation</td>
<td>Immediate</td>
<td>Current avg. stocking rate</td>
<td>Variable over time</td>
</tr>
<tr>
<td>IRC habitat development</td>
<td>2 years</td>
<td>Add 260K ac/yr</td>
<td>Add 500k ac/day/yr</td>
</tr>
<tr>
<td>Spawning habitat</td>
<td>2 years**</td>
<td>Spawning sites</td>
<td>Spawning sites</td>
</tr>
<tr>
<td>Spawning cue flows</td>
<td>2 years**</td>
<td>Spawning sites</td>
<td>Spawning sites</td>
</tr>
</tbody>
</table>

* 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 Gaines Point Dam in any particular year.
# Critical Uncertainties

<table>
<thead>
<tr>
<th>PRRIP Big Question</th>
<th>2014 Assessment</th>
<th>Basis for assessment</th>
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<tbody>
<tr>
<td><strong>Implementation – Program Management Actions and Habitat</strong></td>
<td></td>
<td></td>
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<tr>
<td>1. Will implementation of SDHF produce suitable tern and plover riverine nesting habitat on an annual or near-annual basis?</td>
<td></td>
<td>Peer-reviewed Program synthesis concludes that SDHF will not produce suitable nesting sandbars.</td>
</tr>
<tr>
<td>2. Will implementation of SDHF produce and/or maintain suitable whooping crane riverine roosting habitat on an annual or near-annual basis?</td>
<td></td>
<td>Trending negative; Program synthesis chapters now in development will be discussed with the TAC and ISAC and peer reviewed in 2015; those synthesis chapters and published manuscripts related to the Program’s vegetation and lateral erosion research will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.</td>
</tr>
<tr>
<td>3. Is sediment augmentation necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?</td>
<td></td>
<td>Trending positive; certainty about the sediment deficit; uncertainty about the role of that deficit in habitat creation and maintenance.</td>
</tr>
<tr>
<td>4. Are mechanical channel alterations (channel widening and flow consolidation) necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?</td>
<td></td>
<td>Trending positive; planform management manuscript now in development will be published and will likely support a “two thumbs up” assessment in the 2015 State of the Platte Report.</td>
</tr>
<tr>
<td><strong>Effectiveness – Habitat and Target Species Response</strong></td>
<td></td>
<td></td>
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<tr>
<td>5. Do whooping cranes select suitable riverine roosting habitat in proportions equal to its availability?</td>
<td></td>
<td>A definitive assessment is expected by 2017 once peer review of data analyses (monitoring, telemetry, stopover study data, habitat availability assessments, IGERT research) is complete.</td>
</tr>
<tr>
<td>6. Does availability of suitable nesting habitat limit tern and plover use and reproductive success on the central Platte River?</td>
<td></td>
<td>Trending positive; three documents now in development will be peer reviewed and/or published and will likely support a “two thumbs up” assessment in the 2015 State of the Platte Report.</td>
</tr>
<tr>
<td>7. Are both suitable in-channel and off-channel nesting habitats required to maintain central Platte River tern and plover populations?</td>
<td></td>
<td>Trending negative; three documents now in development will be peer reviewed and/or published and will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.</td>
</tr>
<tr>
<td>8. Does forage availability limit tern and plover productivity on the central Platte River?</td>
<td></td>
<td>Trending negative; synthesis document related to tern forage (fish) will be peer reviewed that, in combination with the results of the Foraging Habits Study, will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.</td>
</tr>
<tr>
<td>9. Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?</td>
<td></td>
<td>Peer-reviewed Program stage change study concludes Program flow management actions will avoid adverse impacts.</td>
</tr>
<tr>
<td><strong>Larger Scale Issues – Application of Learning</strong></td>
<td></td>
<td></td>
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<tr>
<td>10. Do Program management actions in the central Platte River contribute to least tern, piping plover, and whooping crane recovery?</td>
<td></td>
<td>By definition, implementation of the Program contributes to recovery of the target species. A definitive answer for this question can only be obtained by a broader analysis of the contribution of the central Platte to range-wide recovery.</td>
</tr>
<tr>
<td>11. What uncertainties exist at the end of the First Increment, and how might the Program address those uncertainties?</td>
<td></td>
<td>This question is a “parking lot” for uncertainties that could be addressed through adaptive management in an extended First Increment or new Second Increment.</td>
</tr>
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Table 2. 2014 Big Questions table.
What challenges have you faced in your efforts to collaborate with or facilitate collaboration between scientists and decision makers? How did you overcome them?
How does it work?

How much does it cost?
What benefits have you seen from scientist-decision maker collaboration (e.g. how has it helped accomplish goals/save money/change how the program is executed)?
What factors do you think are most influential in enabling/inhibiting collaboration between scientists and managers in your program?
Communicating to Managers

- Sync timeline of restoration with ecosystem response reporting and planning
- Inform management about the value of investments in monitoring, modeling, and planning tools.
- Engage in planning for new projects
- Collaborate among interagency teams to communicate a unified message
Question?

What specific things about your science programs’ organizational structure assist with governance challenges? What do you see as the biggest impediments to effective science governance?
Science Framework

- The Monitoring and Assessment Plan (MAP)
  - Organized around Conceptual Ecological Models (CEM’s)
  - Hypothesis Clusters
  - Indicator Species
  - Performance Measures
- Interim Goals and Interim Targets
- Adaptive Management
Closing Comments and Thank you!