



# Collaborative Water Governance and Social- Hydrological Justice:

## The Case of the Upper Colorado River Endangered Fish Recovery Program

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### Student Handouts



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© Bankert, Beck, Boone, D’Amico, and Sueltenfuss (2015). *Colorado Headwaters Watershed Opportunities Map and Management Plan*. Unpublished manuscript, Colorado State University, Fort Collins, CO.

© Huayhuaca, C. (2015). *Interactions among Collaborative Initiatives and Implications for Adaptive Capacity in a Complex Water Governance System*. Unpublished manuscript.

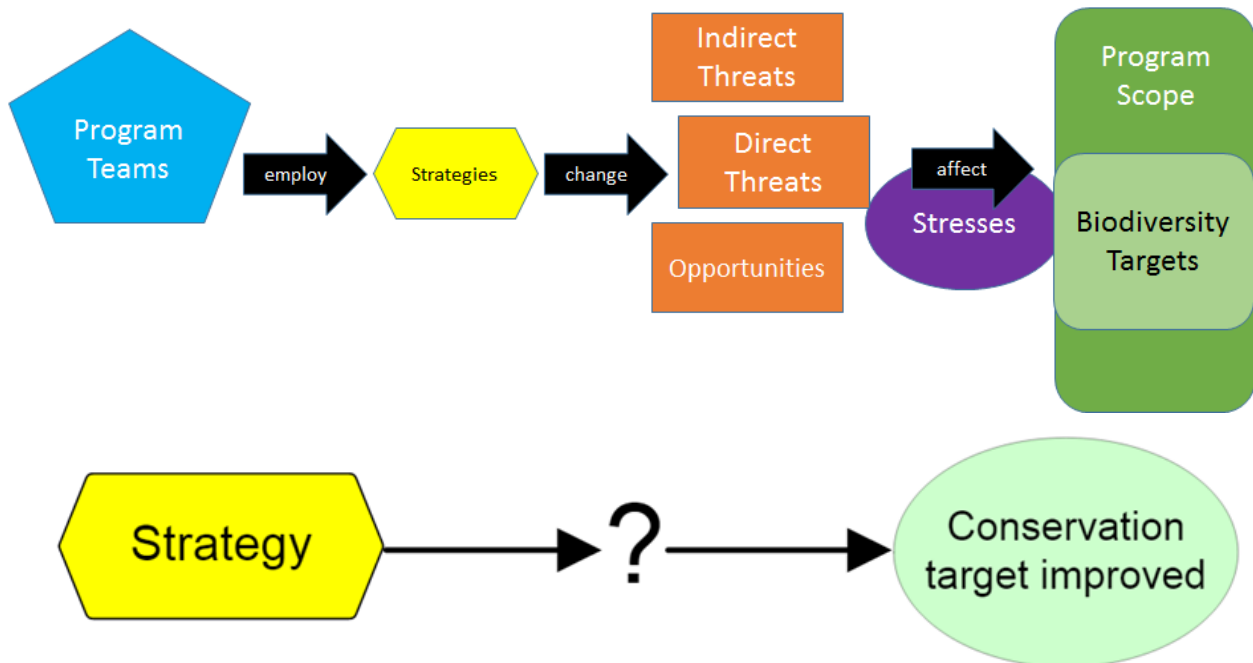
© 2007 American Institute of Biological Sciences. Eigenbrode, S. D., O’rourke, M., Wulforst, J. D., Althoff, D. M., Goldberg, C. S., Merrill, K., ... & Bosque-Pérez, N. A. (2007). Employing philosophical dialogue in collaborative science. *BioScience*, 57(1), 55-64.

© Regents of the University of California. The Lawrence Hall of Science (2016). *The Beetles Learning Cycle Explained*. Berkeley, CA. <http://beetlesproject.org/>.

### Module 1, Session 1.1, Activity 1.B

#### Upper Colorado River Endangered Fish Recovery Program Concept Modeling Guide for Students

The Open Standards for the Practice of Conservation used in this activity is particularly useful when designing effective conservation projects (see reference below for more information). Here we are adapting the concept model to visually depict the intended outcomes of the UCREFRP, a bit like a logic model. Like similar maps and models, it presents a diagram consisting of boxes and arrows that, with enough information, would present a set of causal relationships among factors expressing the logic of how a proposed intervention would impact one or more conservation targets.



#### Glossary of Open Standards Terms:

- **Scope:** Definition of the broad parameters or rough boundaries (geographic or thematic) for where or on what a project will focus.
- **Conservation Target:** An element of biodiversity at a project site, which can be a species, ecological community, or habitat/ecological system on which a project has chosen to focus.
- **Contributing Factor:** The indirect threats, opportunities, and other important variables that positively or negatively influence direct threats.
  - **Direct Threat:** Usually human activities, though they may be natural phenomena altered or exacerbated by human activities. For our in-class activity, we will use the broad primary threat discussed in the lecture (e.g. habitat modification), but for the homework you will identify more specific direct threats in the readings (e.g. creation of reservoirs or operation of dams).

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- **Indirect Threat:** The economic, cultural, societal, or institutional factors that are identified as drivers of direct threats to occur. Sometimes called a root cause or underlying cause. (e.g., logging policies, demand for fish, and human population growth)
- **Opportunity:** A factor identified in a situation analysis that potentially has a positive effect on one or more targets, either directly or indirectly, and is often an entry point for conservation actions (e.g., demand for sustainably harvested timber, and established culture of conservation).
- **Key ecological attribute:** Aspects of a target's biology or ecology that help define a healthy target and that, if missing or altered, would lead to loss or extreme degradation of the target over time.
- **Stress:** The biophysical way in which a direct threat impacts a conservation target; they can be thought of impaired key ecological attributes.
- **Strategy:** A group of actions with a common focus that work together to reduce threats, capitalize on opportunities, and/or restore natural systems.
- **Activity:** A specific action or set of tasks included within an overall strategy

### IN-CLASS ACTIVITY

Think about the following questions during the introduction to the Upper Colorado River Endangered Fish Recovery Program:

1. What is the geographic scope of UCREFRP? What about its thematic scope?
2. Why was it initiated?
3. What biodiversity is it trying to restore or maintain?
4. What are the Program's goals?
5. What are the major threats to the biodiversity targets?
6. What are the 5 main elements or strategies that the program is using to address these threats?

#### In-class activity instructions:

- Open the link to the Draw IO template provided by the instructor:  
<https://drive.google.com/file/d/0BxJNSQEgg6tYRnBITXdtRGZvTGM/view?usp=sharing>
- You have 20 minutes to edit the template directly as you answer the following questions:
- What is the scope of the UCREFRP?
- What are its primary conservation targets?
- What are the direct threats to those targets?
- What are its main strategies or program elements?
- What are the relationships between the elements of your model?

#### Reference:

Foundations of Success. 2009. Using Conceptual Models to Document a Situation Analysis: An FOS How-To Guide. Foundations of Success, Bethesda, Maryland, USA. Download available here:

<http://www.fosonline.org/resource/using-conceptual-models-to-document-situation-analysis>

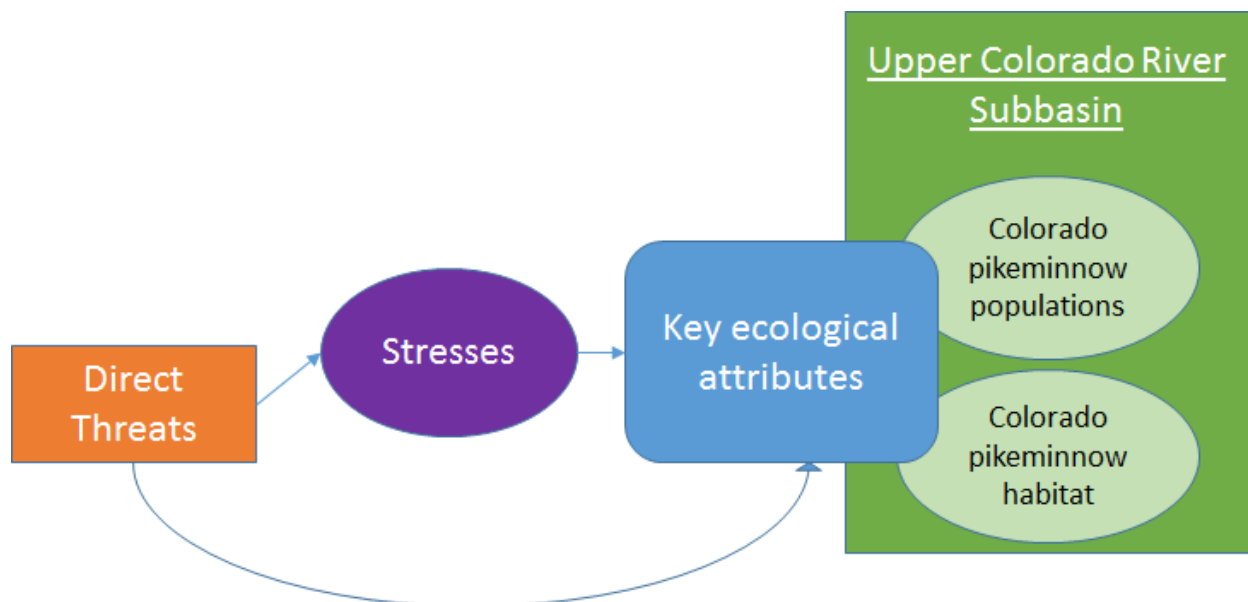
## Module 1 Team Homework Assignment

**Purpose:** To prepare your team for next class, in which you will build a more comprehensive conceptual model at a smaller scale than the one we built in today's class.

**Instructions:** Divide and conquer! There are three main sections to this homework, so decide before the end of class how you plan to divide the work amongst yourselves. The team member(s) completing each section will serve as the 'expert' on that topic in the next class session. Answer the guiding questions within each section and use that information to begin 'sketching out' your ideas for your new and improved model. You may do this in your own notes or in Draw IO (<https://www.draw.io/>). Do not worry about perfecting a final product, but do generate lots of ideas, you can pare these down as your team reconvenes in the next class.

**Deliverable:** Send answers to the guiding questions to the instructor by \_\_\_\_\_. Include the name(s) of the team members who completed the work. You may also send your independently revised model sections (or questions about them) if you would like feedback before the next class. You do not need to combine answers or model sections as a team, you will have a chance to do this in the next class.

### Section 1: Linking threats to conservation targets



Recall that a stress is the biophysical way in which a direct threat impacts a conservation target. To understand stresses, we need to understand the pikeminnow's key ecological attributes (see session 1.1 handout glossary). When determining key ecological attributes, think about things like:

- Geographic extent of habitat
- Abundance and/or demographics of the species population
- Condition of the species and its habitat, and its biotic interactions

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- Landscape-scale ecological processes and connectivity important to target health

**First identify key ecological attributes of the Colorado pikeminnow.**

1. What important spatial and temporal processes characterize the life cycle of the fish in general? (e.g. migration, seasonal flooding)
2. What are its general habitat requirements? (Including flow regimes and temperature)
  - a. How do these differ at different life stages?
3. What is the diet of the Colorado pikeminnow?

**Then use your understanding of key ecological attributes of the endangered Colorado pikeminnow to link primary (aka direct) threats to conservation targets.**

1. What are the primary threats to the Colorado pikeminnow?
2. What are some specific examples of the threats to the Colorado pikeminnow associated with streamflow regulation and habitat modification?
3. What non-native fish species are found within the Upper Colorado River subbasin?
4. How do streamflow regulation, habitat modification, and interactions with nonnative fish explicitly affect the conservation targets by placing stresses on their population viability and habitat?
5. What are some management strategies identified in the reading that may help address some of the threats associated with streamflow regulation, habitat modification, and nonnative species?
6. Where is the 15-Mile Reach and why is it important?

Readings:

U.S. Fish and Wildlife Service. 2002. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado. **See executive summary, pages 22-33, and Appendix A** [https://www.fws.gov/southwest/sjrip/pdf/DOC\\_Recovery\\_Goals\\_Colorado\\_pikeminnow\\_2002.pdf](https://www.fws.gov/southwest/sjrip/pdf/DOC_Recovery_Goals_Colorado_pikeminnow_2002.pdf)

Regional Director, Region 6 Fish and Wildlife Service. 1999. "Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions In the Upper Colorado River Above the Gunnison River." Denver, CO. **Read pages 36-37**

<http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/15mile/FinalPBO.pdf>

Additional resources:

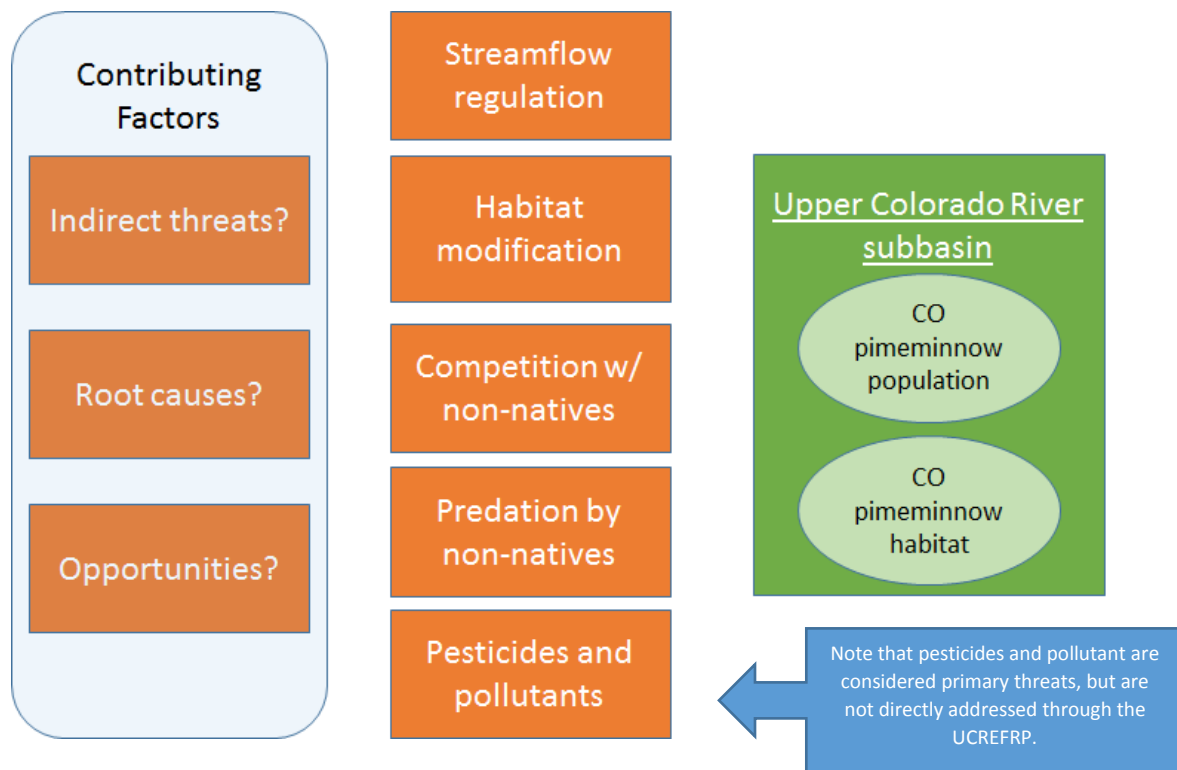
Endangered fish fact sheet and non-native fish fact sheet available here:

<http://www.coloradoriverrecovery.org/general-information/general-publications/fish-fact-sheets.html>

2015-2016 Highlights UCREFRP: Report

[http://www.coloradoriverrecovery.org/general-information/general-publications/briefingbook/2016-Briefing\\_book.pdf](http://www.coloradoriverrecovery.org/general-information/general-publications/briefingbook/2016-Briefing_book.pdf)

## Section 2: Elaborating contributing factors



In this section we are interested in better understanding what factors are driving the primary threats to the conservation targets specifically within the scope of our system. The first step is to clarify the threats identified above in the central column, then identify possible contributing factors within the Upper Colorado River subbasin in the Bankert et al. (2015) and CWCB (2015) readings.

**For the Upper Colorado River subbasin (known as the Colorado River Basin within the state of Colorado), identify possible contributing factors for direct or primary threats to the Colorado pikeminnow.**

1. What is the potential impact of climate change on streamflows and habitat conditions?
2. How is population expected to impact water availability?
3. Briefly describe Colorado's system of water administration (Prior Appropriation), and summarize some of the key water rights in the Colorado River Basin. (See CWCB, 2015 pp. 20-22 and Bankert et al. 2015 section 1.6)
4. What is the relationship between water and the economy in the Colorado River Basin? (See CWCB, 2015 p. 27)
5. What are some resource-related human values in the Upper Colorado River subbasin identified in Bankert et al., 2015, section 1.4?
6. Brainstorm some of the social, cultural, economic, and institutional factors that might directly affect the following, and how:
  - a. The abundance and extent of nonnative fish populations

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- b. The extent and connectivity of the Colorado pikeminnow's habitat
  - c. Streamflows and flow regulation
7. Can you identify opportunities that could have a positive effect (direct or indirect) on the conservation targets? (For example, are there social or economic values associated with the river identified in the readings that might coincide align with reducing threats to the targets?)

### Readings:

Bankert, Beck, Boone, D'Amico, and Sueltenfuss (2015). Colorado Headwaters Watershed Opportunities Map and Management Plan. **Read Entire Introduction: 1.1-1.7** (Reading Available in Appendix of Case Study Teaching Notes)

Colorado Water Conservation Board (CWCB) (2015). Colorado Basin Implementation Plan. **Read pages 12, 20-30, and 34-38.** <https://www.colorado.gov/pacific/sites/default/files/CBIP-April-17-2015.pdf>

### Additional resources:

Conservation Measures Partnership (2005). Taxonomy of Direct Threats. <http://cmp-openstandards.org/using-os/tools/threats-taxonomy/>

### Section 3: Linking strategy to threat



The in-class activity highlighted major strategies of the overall program, but we had very little information about what activities or actions were included in those strategies (refer to glossary of terms in Session 1.1 handout). In this section we look at one example of a strategy applied within the boundaries of Colorado portion of Upper Colorado River subbasin.

**The 15-Mile Reach Historic Users Pool (HUP) phone call is an example of an effort nested within UCREFRP that is applying a strategy to manage streamflows. Describe the actions involved in this call, and think about how it is intended to impact the threats to conservation targets.**

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1. Where is the 15-Mile Reach and why is it important to the efforts of UCREFRP?
2. What is the purpose of the HUP call?
3. Which of the direct threat(s) described in the in-class activity does this strategy address?
4. Who are some of the major water users and other stakeholders that might participate in a given weekly call?
5. How does water move in, out, and through the system? (*also see additional reading for help*)
6. How does the phone call alter those flows?
7. What are the biggest constraints associated with flow management?
8. Who are the major stakeholders (rights holders, diverters, etc., if different from participants)?
9. What is the process of interaction for participants on the call?

### Readings:

Final Programmatic Biological Opinion (PBO) Regional Director, Region 6 Fish and Wildlife Service. 1999. "Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions In the Upper Colorado River Above the Gunnison River." Denver, CO. **Read pages 36-37**

Best, Allen. 2016. "Phoning for Flows." Colorado Foundation for Water Education Magazine. [https://www.yourwatercolorado.org/index.php?option=com\\_content&view=article&id=475:phoning-for-flows&catid=122](https://www.yourwatercolorado.org/index.php?option=com_content&view=article&id=475:phoning-for-flows&catid=122). **Read entire article**

- *Note that a "call" for river water, such as the Shoshone call referred to in the article, is distinct from the phone call. A river call happens when a senior water rights holder has insufficient water to meet a valid need (as determined by the decreed purpose of that water right). The senior right notifies their district water commissioner of the short, and if the commissioner finds the call to be valid, they will notify upstream junior rights holders, whose water supply is then curtailed until the needs of the senior user are met.*

Bankert, Beck, Boone, D'Amico, and Sueltenfuss (2015). *Colorado Headwaters Watershed Opportunities Map and Management Plan*. **Read sections 1.4, and 1.6** (Reading Available in Appendix of Case Study Teaching Notes)

### Additional Resource

CWCB (2009). "Statewide Water Supply Initiative Factsheet."

<http://cwcbweblink.state.co.us/weblink/docview.aspx?id=113227&searchhandle=30039&dbid=0>



## **Module 1, Session 1.2, Activity 1.C:**

### **Expanding the Concept Models**

Last class, you developed simple concept models illustrating how the full-scale Upper Colorado River Endangered Fish Recovery Program is trying to influence its conservation targets, endangered fish. Through the discussion we recognized the challenges of creating a concept model of the full Program due to its large geographic and thematic scale, as well as our limited information about the system at that scale. Now that your team has had a chance to explore information related to UCREFRP at a smaller scale, we can develop more detailed (and no doubt messier) concept models.

In this new concept model, we are interested in illustrating the Colorado portion of the Upper Colorado River subbasin as a social-hydrological system that is influenced by the activities of the Historic User Pool (HUP) phone (an effort nested within UCREFRP and directed towards the area of critical habitat known as the 15-Mile Reach).

### **IN-CLASS ACTIVITY**

You will have one hour in class to work on developing an expanded concept model. Begin by sharing information gathered separately through homework. Begin adding components to your concept model as they emerge from the discussion. As you learn more about the social elements of the system (revealed in Homework sections 2 and 3), try to identify ecosystem services provided by healthy/functioning conservation targets that might translate to human wellbeing targets. *Ecosystem services* are the outputs of ecological processes that directly or indirectly contribute to social wellbeing. With regards to the conservation efforts of the UCREFRP, human wellbeing might be achieved through ecosystem services provided by healthy or functioning populations of pikeminnow and pikeminnow habitat. Possible categories of human wellbeing targets developed by the Millennium Ecosystem Assessment include:

- Necessary material for a “good life”: including secure and adequate livelihoods, income and assets, food, shelter, access to goods, etc.
- Health: including being strong, feeling well, and having a healthy physical environment
- Good social relations: including social cohesion, mutual trust and respect, good gender and family relations, the ability to help others
- Security: including secure access to natural and other resources, safety of person and possessions, and living in a predictable and controllable environment with security from natural and human-made disasters
- Freedom and choice: including having control over what happens and being able to achieve what a person values doing or being

Your team will most likely not have time to complete the models in an hour, so focus on getting as many elements down as you can. The questions below should help you determine what to include (answers to these questions should be incorporated into the narrative essay accompanying your final model).

1. What are the ecological (biological and physical) components of the system that directly or indirectly influence the conservation targets?

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2. Besides the HUP call, what are the social, cultural, economic, and institutional elements within the boundaries of the system that directly or indirectly influence the conservation targets?
3. What are the mechanisms through which the above elements influence the conservation targets and their key ecological attributes?
4. What are the key laws and policies that directly or indirectly influence the conservation targets?
5. Without getting too far into the weeds, what are the property rights in the system regarding water resources, and how might they affect the conservation target?
6. What agencies/entities control how water moves through the system?
7. What other key stakeholder groups might directly or indirectly influence the conservation targets?
8. What are potential ecosystem services that could be generated by improving the condition of the conservation targets, and how might these translate to human wellbeing targets? (see explanation below)
9. Now that you have a more complete picture of the socio-hydrological system, how do the activities of the 15-Mile Reach HUP call affect 1) the conservation targets, and 2) other parts of the social-hydrological system?
10. What important elements of the system are not addressed by the HUP call?
11. Discuss some of the challenges or frustrations you faced while developing this model.
12. Discuss the potential value of representing a socio-hydrological system in this way. How might you use it for evaluating the efforts of the UCREFRP?

### **Reference**

Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC. <http://www.millenniumassessment.org/documents/document.356.aspx.pdf>

### **FINAL TEAM PRODUCT**

You will need to work as a team outside of class to complete the UCREFRP social-hydrological concept model. Your final model should be completed in Draw IO as neatly as possible. While you may start out with lots of elements in the model, the final model should be 'pruned down' somewhat to include those elements and relationship that your team feels are most appropriate for answering the questions above. Answers to these questions will form the narrative to accompany your final model.



## Module 2, Session 2.2, Activity 2.B

### Upper Colorado Endangered Fish Recovery Program Participatory Development of Assessment Indicators

#### Scenario Activity

*“Participatory evaluations driven by collaborative efforts themselves are needed to determine progress toward goals, provide feedback to guide future actions, and identify larger scale issues that impact specific efforts...can play an important role in illuminating these larger scale issues and are best used to address specific questions with broad import for policy-making and management” (Conley and Moote 2003).*

#### Introduction

The Upper Colorado Endangered Fish Recovery Program (UCREFRP) began collaborative negotiations between diverse user groups in 1988 after over a decade of failed litigation cases reacting to the implementation of the Endangered Species Act in the Colorado River Basin. The Act was amended to direct Federal Agencies to work with State and local agencies to resolve water resource issues in concert with conservation of endangered species. In 1984, the Department of the Interior, Colorado, Wyoming, Utah, water users, and environmental groups formed a coordinating committee to discuss a process to recover the endangered fishes while new and existing water development proceeds in the Upper Colorado River Basin in compliance with Federal and State law and interstate compacts. After 4 years of negotiations, the UCREFRP was developed.

The participants on the Colorado sub-basin, from its headwaters in Rocky Mountain National Park to Grand Junction, Colorado have focused their energies on meeting target habitat flows set by the U.S. Fish and Wildlife Service for a critical river segment called the 15-Mile Reach (See Figure 1). This segment is located downstream of several large diversions contributing to extremely low water during late summer and early fall, creating a reduction of off-channel, quiet pikeminnow spawning habitat. In addition, the building of dams and reservoirs, alteration of water flow patterns, introduction of non-native species, diversion of water for irrigation and urban purposes, and destruction of plant life along river banks has affected the habitat and reproductive success of the rare Colorado pikeminnow.

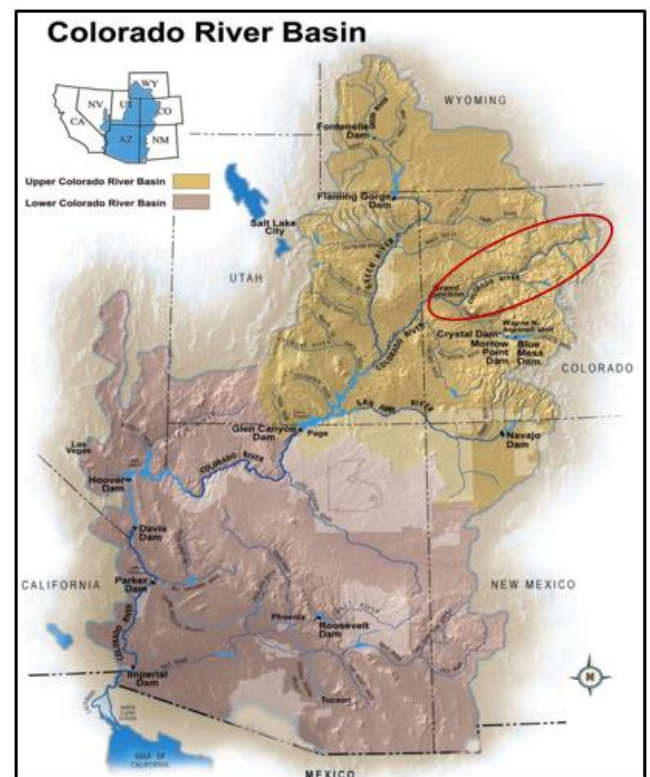


Figure 1. The Colorado River Basin with Colorado subbasin inside the red oval. Adapted from *Reclamation and Arizona: 1960s Photo Gallery* (Image 6, “The Colorado River Basin States”), U.S. Department of the Interior Bureau of Reclamation, <https://www.usbr.gov/lc/phoenix/AZ100/1960/photogallery.html#top-of-page>. Public Domain.

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As the group approaches three decades of collaborative governance on the mainstem in Colorado, the population of adult Colorado pikeminnow in the Colorado River sub-basin averages 612 individuals (1992 – 2014). The current USFWS criteria for downlisting this population is >700. Flows are managed in the sub-basin to benefit all life stages of the pikeminnow, the product of a weekly management phone call where participants make decisions about how much water will flow in every tributary and the mainstem itself (Best 2016). This weekly management call includes federal and state agency representatives, environmental groups and irrigators drawing approximately 80 percent of the river's flow to irrigate 70,000 acres of peaches, pears and corn, but also alfalfa, winter wheat and exurban lawns, and in recent years, vineyards. In addition to water development continuing, fish passage is provided at all major migration barriers and the species is self-sustaining (not stocked). However, after more than 30 years, the pikeminnow populations are not eligible for downlisting.

Recovery program participants in the Colorado sub-basin are working with the U.S. Fish and Wildlife Service (FWS) to produce a Species Status Assessment which will assist in revision of the recovery plan and inform the Service on the status of the species and potential reclassification.

As a participant in the Recovery Program, you are being asked to participate in redefining assessment indicators to include as next steps in the Species Status Assessment to FWS. The Recovery Program's diverse stakeholders will meet to decide together what to evaluate, or assess, using a collaborative and inclusive process.

### **Process: Participatory development of assessment indicators**

You will take on the role of one stakeholder, which you will research extensively before representing their interests and preferred assessment indicators at the planning meeting for the Species Status Assessment Report. Your goal is to collaboratively negotiate assessment indicators by identifying criteria and indicators that can be used to measure progress toward goals & possible outcomes. As a stakeholder, you will use data, facts, and a professional attitude. The resources provided for you below will help you as you develop your preferred assessment indicators. Feel free to research beyond these resources and to use resources from previous modules to define the most relevant indicators for your stakeholder role. Roles include farmer, rancher, water manager from the Colorado River District, state water administrator from the Colorado Division of Water Resources, FWS, The Nature Conservancy, and facilitator. Come prepared on XXX to play the role of your stakeholder—"in character."

### **Stakeholder Instructions**

A. Farmer: Congratulations! You are a farmer. Your family has lived in Garfield County for the last four generations. You have some of the oldest water rights in region dating back to the late 1800's and use water to grow alfalfa, wheat, hay and onions. Your water rights are very valuable and you aren't sure if your son will take over the farming operations after you retire.

B. Rancher: Congratulations! You are part of a family that has been ranching in Mesa County for four generations. You own some of the oldest water rights in the county and plan to pass them on to your son once he graduates from college and takes over the family ranching operations. In addition to the

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500 head calf/cattle operation, you irrigate 1200 acres and raise a lot of alfalfa, hay, and some small grains, barley and oats.

C. Water manager at the Colorado River District: Congratulations! You play a very important role in managing the storage, timed release, and flows on Colorado sub-basin. You are the one with “the finger on the button” to release water based on the needs expressed in the weekly HUP call.

D. State water administrator from the Colorado Division of Water Resources: Congratulations! You play the crucial role of administering the state’s water rights. Your authority is to regulate and distribute in accordance with the statutes and the priorities of the decreed water rights. It is your job to make sure water users follow the rules and regulations of the state’s system of prior appropriation.

E. U.S. Fish and Wildlife Service (FWS): Congratulations! You are part of the federal agency that initiated the recovery program. Under the ESA, FWS is given the responsibility to issue jeopardy opinions, designate critical habitat, and promote the recovery of the Colorado pikeminnow. The FWS has the ultimate responsibility to decide whether or not the program is working, in the sense that the fish are recovering in the Colorado River and negative depletion impacts are being offset.

F. The Nature Conservancy Deputy Director, Colorado River Program: Congratulations! You are involved to ensure that the rare pikeminnow is recovered. Your main complaint is the huge amount of time progress towards that end is taking. Also you are hesitant when it comes to trust or faith in such a large bureaucratic project run by the FWS.

G. Western Resource Advocates Healthy Rivers Program Director: Congratulations! You are involved to ensure that the rare pikeminnow is recovered. Your main complaint is the huge amount of time progress towards that end is taking. Also you are hesitant when it comes to trust or faith in such a large bureaucratic project run by the FWS.

H. U.S. Bureau of Reclamation: Congratulations! You play the important role of funding parts of the Recovery Program through power revenues and other sources. Your agency has a long history of water development in the West. Take some time to research that history as well as your role in the recovery program.

I. Facilitator: Congratulations! You get to facilitate the development of assessment indicators amongst a diverse group of stakeholders. As the neutral third party facilitator in this discussion you have no vested interest in any particular outcome. You are part of a local private environmental mediation practice and

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were hired by the US Bureau of Reclamation. Your charge is to help stakeholders understand each other's perspectives and interests, thereby finding common ground, and identifying potential opportunities for collaboration and "mutual gains" solutions—agreements that benefit everyone, or at least leave no one worse off. To prepare for the scenario, consider how you will manage the dialog among the stakeholder in your group. You may want to propose some ground rules for interaction, for example.

### Consider the following questions to prepare for your stakeholder role:

1. What are the primary goals, interests and values held by the stakeholder's entity/organization?
2. What role does the entity play in the UCREFRP on the Colorado sub-basin? What skills and/or resources do you contribute to the collaborative?
3. How has the entity historically participated in administration, management, or governance of the sub-basin?
4. Based on the answers to the above questions, what are your preferred assessment indicators?
5. Which other stakeholders might you align with? Which might challenge your preferred assessment indicators?

### Resources

*Use these links and articles to research your role and that of your agency, organization or affiliated group. They will also be helpful in responding to the above questions.*

#### Articles:

Best, Allen. 2016. "Phoning for Flows." *Colorado Foundation for Water Education Magazine*.  
[https://www.yourwatercolorado.org/index.php?option=com\\_content&view=article&id=475:phoning-for-flows&catid=122](https://www.yourwatercolorado.org/index.php?option=com_content&view=article&id=475:phoning-for-flows&catid=122).

Brower, Ann, Chanel Reedy, and Jennifer Yelin-kefer. 2001. "Consensus versus Conservation in the Upper Colorado River Basin Recovery Implementation Program." *Society for Conservation Biology* 15 (4): 1001–7.

Hopfl, Karen. 1994. "Case Study of the Endangered Fish Recovery Program of the Upper Colorado River." Boulder, CO.

Loomis, J, and J Ballweber. 2012. "A Policy Analysis of the Collaborative Upper Colorado River Basin Endangered Fish Recovery Program: Cost Savings or Cost Shifting?" *Natural Resources Journal* 52 (2): 337–62. <Go to ISI>://WOS:000313388200004.

Mueller, Gordon. 2005. "Predatory Fish Removal and Native Fish Recovery in the Colorado River Mainstem." *Fisheries* 30 (9): 19–26. doi:10.1577/1548-8446(2005)30.

Tyus, Harold M., and James F. Saunders. 2000. "Nonnative Fish Control and Endangered Fish Recovery: Lessons from the Colorado River." *Fisheries* 25 (9): 17–24. doi:10.1577/1548-8446(2000)025<0017:NFCAEF>2.0.CO;2.

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Websites:

Upper Colorado Endangered Fish Recovery Program Website:  
<http://www.coloradoriverrecovery.org/index.html>.

Program Documents and Publications: <http://www.coloradoriverrecovery.org/documents-publications/documents-publications.html>.

Links to Stakeholder's Websites: <http://www.coloradoriverrecovery.org/links/links.html>.

Colorado's Division of Water Resources: <http://water.state.co.us/Home/Pages/default.aspx>.

Quartarone, Fred. 1995. "Historical Accounts of Upper Colorado River Basin Endangered Fish."  
<http://www.coloradoriverrecovery.org/general-information/general-publications/Historicalaccounts.pdf>.

**Respond to these reflections questions after the in-class participatory development of assessment indicators scenario in the form of a short (6 - 8 paragraph) essay.**

1. Briefly summarize what happened in the scenario.
2. Recommend potential approaches to improve on participatory assessment processes and support your suggestions with peer-reviewed research.
3. Reflect on what you learned about assessment of ESA motivated collaborative projects and more generally about collaborative natural resource governance from participating in the scenario. What more do you want to learn?



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**Module 2, Session 2.2, Supplemental  
UCREFRP Participatory Development of Assessment Indicators  
Stakeholder Sign-up**

<b>Stakeholder Role</b>	<b>Group 1 Name</b>	<b>Group 2 Name</b>	<b>Group 3 Name</b>	<b>Group 4 Name</b>	<b>Additional Name</b>	<b>Additional Name</b>	
Colorado River District							
Colorado Division of Water Resources							
Nature Conservancy							
Western Resource Advocates							
Rancher							
Farmer							
US Bureau of Reclamation							
US Fish and Wildlife							
Facilitator							

**Module 3, Session 3.1, Activity 3.A Toolkit Activity**

Toolbox for philosophical dialogue, consisting of a set of question designed to draw out collaborating scientists' views on philosophical aspects of research as identified by Eigenbrode et al. 2007

<b>Principal philosophical domain (entry point)/specific philosophical issues</b>	<b>Core question</b>	<b>Probing Questions</b>
<i>Epistemology</i> Motivation	Is applied research or basic research more important to you as a researcher?	<p>Is basic research inherently disciplinary research, or can cross-disciplinary research address basic research questions?</p> <p>How do basic and applied research relate to each other in the traditions of your discipline and in the current team project?</p> <p>Should your collaborative research project emphasize applied over basic research?</p> <p>Is there a role for advocacy in research?</p>
Methodology	In your typical disciplinary research, what methods do you use, and which are most appropriate for your collaborative study (e.g., quantitative, qualitative, experimental, case study, observational, modeling)?	<p>What kinds of data constitute scientific evidence?</p> <p>In your research, do you combine different types of research approaches?</p> <p>How are your methods related to those used by other members of your team?</p> <p>Is a hypothesis required for research to be considered science?</p> <p>How does the spatial or temporal scale of your research approach compare and interact with the scales of your team's research approaches?</p>
Confirmation	What type and amount of evidence are required for knowledge in your work?	<p>What is required to ensure that measurements are valid?</p> <p>What is required to ensure that empirical data confirm a theoretical proposal?</p> <p>Is replication necessary for confirmation?</p> <p>Can unreplicated results that are confirmed by a combination of methods qualify a knowledge?</p> <p>In what ways do your research conclusions address or incorporate uncertainty?</p>

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<i>Metaphysics</i> Objectivity	Must scientific research be objective to be legitimate?	<p>In what way or ways is your research objective?</p> <p>Can one integrate values into research and still remain objective?</p> <p>Do you think it is valid to use one's personal perspective to frame a research question or hypothesis?</p> <p>Can subjective research be scientific?</p>
Values	Is value-neutral scientific research possible?	<p>If it is possible to conduct scientific research without values, how is that accomplished?</p> <p>Do you consider question about when hypotheses count as knowledge to be value questions?</p> <p>If you regard values as an ineliminable part of scientific research, how can they be managed to avoid biasing research results and interpretations?</p> <p>Does the introduction of values into the research process amount to advocacy?</p>
Reductionism and emergence	Can the world under investigation be fully reduced to individual, independent elements for study?	<p>Are there emergent properties of the system or subject of study, or is it reducible?</p> <p>Is the context in which a subject is investigated important (i.e. is the subject of study part of a larger system that should be considered)?</p> <p>Are multiple-scale (spatial, temporal) interactions important? To what degree can and should these be addressed?</p>

Source: *Eigenbrode et al. 2007*

### **Module 3, Session 3.1, Activity 3.B**

#### **Research Paradigm Small Group Activity Considerations for Research Study Designs**

**Directions:** In Module 1 you learned about the intended outcomes of the UCREFRP. While understanding outcomes is important, understanding participants' perceptions of outcomes is also an important part of researching collaborative efforts. Given what you learned from Session 3.1, "Social Science Perspectives on Socio-Ecological Complexity," review the research questions and answer the questions below.

**Research Questions:** *What are the UCREFRP stakeholders' perceptions of the collaborative's strategies and goals for reducing threats and stresses to the Colorado pikeminnow? Do participants believe the collaborative outcomes have been or are successful?*

1. Epistemology & Ontology: What kind of knowledge is valid? How can we make sense of stakeholder's realities and practices?

2. What research paradigm would be useful for answering the above research question (positivist, naturalist, or a combination)? Hint: Positivist approaches assume a single, objective reality that can be observed and measured without bias using standardized measurements, while the naturalist paradigm assumes that there is a reality but it cannot be measured directly, only perceived through how others experience it.

3. Methods: Describe: (a) the methods you could use (e.g. closed-ended questionnaires, depth-interviews); (b) the scale of your research (e.g. sample size) and (c) the mode of data collection (e.g. face-to-face, by post, by e-mail, by telephone).

4. Choose a spokesperson to report back on: (i) how your research brief grew out of your epistemological starting point(s); (ii) any difficulties you faced in agreeing on epistemological and ontological positions in relation to your proposed research; (iii) potential limitations to the research: e.g. in terms of validity, representativeness, etc.

**Module 3, Session 3.2, Activity 3.C**  
**Independent In-Class Activity**  
**Coding UCREFRP Qualitative Interview Instructions Handout**

**Directions:** In Module 3, Session 3.1 you were provided with a research question and asked a few questions about research design. In the current case, the research study was designed to include qualitative interviews to understand collaborative participants' experiences and perceptions of the collaborative's efforts and subsequent outcomes. In this session's lecture, you learned the basics of coding qualitative interviews. Your instructor has provided you with excerpts from the UCREFRP qualitative interviews, and has already developed codes for this case. These codes are provided to you in the UCREFRP Codebook. For this exercise, you should use this codebook to code the interview excerpts. You can do so electronically in Word, or by hand. This activity should be done first on your own and then you will have time to check in with your classmates.

**Questions to consider when moving from data coding to analysis**

1. How does my coding reflect the incident or described experience?
2. Do my analytic constructions begin from this point?
3. Have I created clear, evident connections between the data and my codes?
4. Have I guarded against misrepresenting a participants words or experiences?

**Module 3 Session 3.2**  
**Homework**  
**Reporting Findings from Coding Exercise**

Directions: Once coding has been completed, you will report your findings in a 1-2 page mock “results” and “discussion” section of a research article.

**Consider the following questions and include them in a write-up:**

(a) How do interview respondents perceive the recovery program and the collaborative strategies and goals for reducing threats and stresses to the Colorado pikeminnow?

(b) How is this different from the way that program reports define the recovery program and its strategies and goals?

(c) How do participants describe, define, and measure the success of the collaborative’s outcomes?

(d) How does this differ from the way the program reports describe, define, and measure the success of the collaborative’s outcomes?

**Module 3, Session 3.2, Activity 3C Supplemental**  
**Upper Colorado River Endangered Fish Recovery Program (UCREFRP)**  
**Selected Participant Interview Responses**

**Colorado Fish and Game**

Reference 1

As a **state agency** we are partners with the feds in our partnership really consists of helping them with bass and pike abatement efforts so we have very liberal take of Basin Pike on the western slope. So whenever you catch them you're not required to pull them out although that's coming I think... but you can take as many bass out of whatever water bodies and then there are stocking regulations, you need a permit if you want to stock up pond. You have to have a structure that confines them.

Reference 2

We've stocked a lot of bony tail, The feds raise them, and then we'll get them and we have equipment to stock, And then we're out there with equipment doing the monitoring and the ponytails haven't really taken very well. There has been some natural reproduction of Razorbacks and Pikeminnow. That's kind of a good sign, It's encouraging. It's just a matter if you can sustain it, will you get to threshold ... what we love to do is reestablish the Pikeminnow as a big Sport fish. When thought be cool? Go in and catch 40 50 60 pound Pikeminnow? With your flyrod...

One guy landed a pikeminnow, it fought like hell, 18 to 20 inches. Really cool fish, they'll get big but not if they can't reproduce.

References 3-4

At the local level our aquatic biologists are out there doing fish surveys, Bass and Pike abatement, Courtney's stocking with Fish and wildlife, That's the extent of it. It's a big effort they commit to do four weeks a year, crews of 3 to 8 people to help with that effort. So it is pretty resource intensive and it's really hard to see what good it's doing. We have water up in steamboat lake that has multiple purposes decreed. 3300 AF out of 26,000 AF in the lake that was intended originally to be also used for instream purposes so we can dump it through the Elk River into the mainstem Yampa and use it to supplement recovery program flows

Reference 5

Elkhead reservoir was enlarged and they really use it as the operations facility to get recovery program flows from the Maybelle gauge, It's a critical point. I guess if the habitat is not deemed good habitat above elk head, so below that... we have steamboat water for instream flow purposes. We used that in 2012 to dump water for Rocky Mountain white fish which is a native salmonder to the Yampa and White basins. It was so low in 2012 that they couldn't get up to their spawning territory. They make these great runs in late September early October to spawn and they couldn't get through the ripples. It was

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somewhat controversial because we dumped water and expected that water to be in the river and not be taken by headgates, to fill trout ponds alongside the river.

### References 6-7

The Yampa is light on administration, the Yampa and the White River pride themselves on not having administration. A lot of that is really not good for wildlife in the river because people divert more than they need and last fall we forced administration a little bit because there is an instream flow and that is how you would protect water released for a purpose. So they used the instream flow, it was stored water with a decree that allowed for that to occur, so that was a very expedited process since the decree allowed for instream flows. All we had to do was a phone call and brief letter, coordination with the conservation board to meet with the instream flow working to dump 20 the 30 CFS and the request to water resources was that you would administer this past headgates. So what's ever there... we want to make sure that gets passed all those headgates because it's stored water in priority, You can't allow anybody to take that. There was interesting calculations for stock water rights... you're taken 12 – 15 CFS for stock water, well 12 gallons per head per day you'd maybe want to see 300,000 cattle out there to take that much water. Erin was coming up with some interesting math to say look, you guys are entitled to your .05 CFS for your 20 head but I don't see hundred thousand head so you can't take 10. A lot of it is literally ran through ponds.

There's a lot of absentee owners and local ranch managers and when the absentee owners come to visit in the fall for hunting season they want to do some trout fishing in the ponds and a lot of those don't have decreed water rights for that. They have irrigation rights. Erins saying look, if it's October it's been freezing every night so the irrigation rate is off and for stock water you don't need 15 CFS maybe half or one. We force administration much to the consternation of other people.

Brian was up there, taggin head gates, trying to get people understand that they have to have a measuring gauge, poor guy. If you don't have a measuring device, I'm going to cut you off because I can't tell how much you're taking. You know, if you don't have a functional headgates and measuring device, I'm going to tag and shut you off, so that's tough.

## **Environmental Organization**

### Reference 1

the instream flow program is a great program and it finally gave instream flow priority water, a water right that's equal to other water rights, and that's how it should be administered. There is a lot of turmoil and consternation caused when the instream flow decrees end up being the calling right on a river. There is this idea that those rights should be subordinate to human uses whether the human uses are excess or not. It's not just domestic. Its cows and stock ponds, everything else. If I have to subordinate my used to instream flows whether it's a decreed use or not there's something wrong about that, that's the perception. And we disagree. It's drawing this line. Kevin said he understands why you're forcing ministrations, but what it did was drive this big dividing line in the community. There were some conservation folks that were all for it and then meanwhile there's this other group that is adamantly opposed and doing everything they could to undermine it. And so that is the threat it now it's



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not a second-class water right, it's just like any other water right and you should treat it like that, just like you treat all the other water rights in the state. And yet it's hard to make that argument. It's hard to get it to stick with certain communities. I think it's evolving, becoming more culturally ingrained, especially as more older farmers retire and sell their water

### Reference 2

There aren't a lot of instream flow water rights in the Grand Valley region just because the way the Recovery Program was set up, it allowed future development to keep going forward. At the time those fish were listed, every single project that had any depletion it could have been adding an acre to a piece of land, or some impacts because you had to go do something to a headgate in the river. Every single activity that incurred the depletion went to Fish and Wildlife Service for a section 7 consultation and every single one came back with an opinion that said this is going to jeopardize the future so it was a giant bottleneck for any kind of water development to occur.

So they had the foresight to say okay, if you keep supplying fish water through the 15 mile reach and you keep on board with the program elements and we keep seeing some sort of sufficient progress in the recovery of these fish species then you are allowed a depletion increment. And it's different for each different basin. I think it's 60,000 AF in the Colorado. 40,000 in the Yampa. The White River is now trying to get a PBO to cover future depletions. They want to do the same thing the Colorado has going. The Gunnison has a PBO.

It allows people to continue what they've been doing... okay we've got this listed species and you want to do something, change something on your water rate. Hold on. Section 7. You're not going to get your permit to do it. Most of the time it was a Corps of Engineers permanent because it would trigger consultation with Fish and wildlife. And they would say well, it's an incremental depletion considered here I want out, We have this contract through NRCS... we had a habitat diversity contract put a pond in on our property. Doing that was going to introduce a small incremental depletion so I had to jump through all these hoops. They eventually said well, the depletion is covered under the recovery program. And I was thankful that there was such a thing. I could see how a small land owner is going, huh? I've got to go and buy some water from somebody and have it delivered from Green Mountain reservoir or Wolford reservoir down past some place in the Grand Valley... why do I have to deal with this ya know?

### References 3

that is a good one, there is some concern that because the monitoring data isn't showing great recovery of these species, and it's been going on for a really long time now, what time does the Fish and Wildlife folks say, okay, we've been doing all the stuff but we're not seeing recovery and we think there is a water component to this. Ha ha ha. Maybe we're going to reassess that. The state is really scared of that aspect because it will grind things to a halt in a big way.

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#### Reference 4

And and maybe it's like as long as you're doing the other things and meeting the 15 mile reach flows then you're good, it might be as simple as that.

there's a lot more political power between Denver water and Northern, the River District then any state game and Fish... keep 'em off the list, yeah ha ha. We're not to get that kind of pull so

#### Reference 5

I: do you have a sense if oil and gas water use restricts access by other users, including the environment?

P: it just makes it harder to make everything work. Like on peons Creek we had some water rights, the low end of the creek crossover parcels, There were native Fish concerns no instream flow on the last chunk of ground below really the calling right. So oil and gas would pull up to a bridge on on our property across Pieance Creek below the structure and stick their hoses in and sucked the last drops out of the river basically. And there was nothing we could do about that. We had no leverage at all except saying don't do it on our land. So they wouldn't drove in made a little pad on somebody else's land.

They didn't even need a water right. That's the quirk of Colorado water law, If you have a beneficial use... if there's no call you can go and take as much as you want as long as you're not wasting it. So industrial purposes ends filling 50,000 gallons tank trucks... there was one station where they had these three huge tanks that were probably about hundred thousand gallons, half an acre foot maybe... and they would just have this thing set up where they'd have maybe three tanks and adjacent said that tracks would just pull up to the last tank, in they have these level adjusters in the tanks so whenever you drop below, You know, level A in the upper tank the valve would kick on in the river and suck more water out... free river...

#### Reference 6

I talked to Laurie the other day, there was this highly touted, well respected pipe project the bluestone irrigation is doing called the Coby pipeline... they were running water 10 miles up the Creek for gas purposes but also cutting out quite a bit to irrigators and I don't know if they were dumping it right back into the river for people to pick up or... one of the concerns there is if they're introducing non-native fish up into a reach that we've tried to abate a non-native fish, They're not really taking that into concern... people are really looking physically at the water supply and not so much at water quality or what sort of biological agents might be exchanged in a situation like that. And there's no real great way for us to get involved in that... we don't have permitting authority. Unless we have some sort of leverage in the process, we sometimes find out after-the-fact.... Shit we just took out all these brook trout out of here, and reinstalled cutthroat and spend \$50,000 on a barrier and now they're just circulating Brooktrout to back into that region.

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#### Reference 7

If I was an irrigator up Rowan Creek, I'd be like yeah this is great but from our concern, Dane, you're putting crap fish up into a reach... and I don't know if that's actually happening... we've been trying to keep a fragile population of cutthroats up in Rowan and up in parachute. Some of those tributaries high up and I don't know how high up there delivering water. I mean they're not taking Brooktrout out of the Colorado River but I know there's this concern about that biological exchange

#### **Water Conservancy District (water managers)**

##### Reference 1

Going back to the ESA issues, 1982, the colony project, black Tuesday or whatever they call it when the colony project shutdown, Colorado Ute Water Utilities abandoned Juniper Cross but on the east slope there was another decision called the Riverside case. It was a damn being proposed on a tributary to the South Platte and the Corps basically trumped it, gave it the Jeopardy opinion and that was appealed the proponents of the river site case up to the 10th circuit and the 10th circuit ruled pretty much unanimously in favor of the court's action. So that was in the early 80s...

##### Reference 2

The recovery program then what was it 1988 when they signed the first agreement... looking back on it it was a wonderful agreement because it was about a page and a half or two pages long. It basically outlined what the program would do. It would cover the fish and allow for continued development of the Colorado River River resources. It left all the other gory details to be worked out in the future. It worked pretty well. That model worked okay. I compare it to the Platte River recovery program where instead of having two pages they had 2000 pages. And they were trying to negotiate every detail where the recovery on the Colorado we said let's negotiate the goals of the program, sign an agreement, and leave the details to be worked out in the future. And that's worked.

##### References 3-5

So we were negotiating the PBO until 1999. One of the things the River District wanted was not to end up with just the Colorado sub basin. They wanted one in the Yampa and White which we got and one in the Gunnison which we got. So we were actively involved in those. We don't have one on the white yet because there hasn't been a problem. But we now have three PBO's that allow for some incremental development in those basins. I think they've been successful. The fact that the PBO has survived 15 or 16 years... It still seems to be working from water acquisition, the water slide of it is still important but has diminished where is the non-native species problem has really become the major issue. And 15 years ago it was the opposite. There was a view in the recovery program, the scientist viewed that the non-natives were an issue but if we restore the flows, The flow regime we want will benefit the natives at the expense of the non-natives. That was dead wrong, that's just my personal opinion. It didn't work.

We have huge problems with non-natives. Another question of whether the recovery program will work or not it's probably going to be based on how well Utah Wyoming Colorado, The local wildlife agencies

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can work with the fish and wildlife agency to deal with the non-native.

The other thing that we backed off on was, the water community realized that, in negotiations for the PBO's we got to stay away from critical habitat. It's one thing to have a project upstream, like Denver's doing now. Projects that are outside of the you know, above the habitat that slightly alter the stream flows... But we can't go down in the middle of critical spawning habitat and build a project, it's just not acceptable. It doesn't say that anywhere in the recovery program rules but it's been well accepted that you can't have any specific impacts.

### References 6-7

well, it's changed the way we've collectively on the Colorado looked at this... look at the main stem on the Colorado, the Fish Recovery program is a benefit to the basin from water quality and recreation perspective.. from an instream flow perspective so now the way we look at this is we know there is competing needs. The recovery program has resources in Rudei Reservoir, resources in Wolford Reservoir, we enlarged Woolford, we've got water in Green Mountain Reservoir when there's a surplus, they have water in Granby and they actively participate in the weekly management calls and the HUP meeting. Every Wednesday our operator Don Meyer does that as well. You talk about now where it doesn't make sense to deliver water from Rudei, let's make sure it's coming from the upper part of the Colorado River... or that the Colorado River is looking good for instream flows... you know, so you just have that dialogue and whatever that has done that it's turned many of the irrigation districts in the Grand Valley into, I wouldn't call them friends of the ESA, but they are allies of their Recovery Program because those instream flows are meeting their purposes. The same thing is true here in Glenwood Canyon, the operation of Green Mountain, HUP surplus, the operation of the upstream reservoirs adds value to the river, so...

### Reference 8

I: So it wasn't always like that right? Were there was some conflicting priorities at the beginning?

P: there was conflicting priorities, there was a sense in the water community, I'm not sure this was true or not, but there was a sense that some of the biologists in the Fish and Wildlife Service didn't like the existence of the recovery program. They saw it as they were giving up some sort of control that they might have had. Again, I'm not sure that was true but that was sort of the sense of many in the water community. There was the sense in the water community that if this were a success story... like the Recovery Program was not good in terms of a political goal of seriously amending the ESA. To give an example, Tom Pitts is an expert on this but, we would take these Washington trips and they still do, go to Washington in March, April and just update folks on the progress of the recovery program. One of the Wyoming representatives, they're only representative who's no longer in office, basically said no I don't want to talk to you people, I don't want to hear a success story about the ESA. It doesn't meet my long-term goals. So, you know, you have that dynamic.

But in the basin itself the Colorado is an example, same things happening in the Gunnison. The way we're operating the system, mainly Aspinall and the selenium control, all of that is being done in a way that the water users are saying, this benefits me. For selenium control we're putting laterals and piping, Or getting funding. We're using it in conjunction with the salt program, all accomplishing the same

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goals... there is general compliance and support for the program because of the benefits. The secondary benefits of better water quality and streamflow and more reliability in the system.

#### Reference 9

well, I think there were two challenges the first was getting, again, getting those with their view that any capitulation on the ESA was undermining a political approach to make major changes to the ESA. And not really surfaced in 1994 after Republicans took over Congress. There was a feeling there that this is really our opportunity. As a practical matter it is 21 years later and there's been no change and I don't see a change on the horizon. Maybe some targeted issues, but I don't see that.

#### References 10-11

The other thing, when Greg Walscher who was with club 20, he sort of had that view and he became director of natural resources he wanted to force the recovery program to have a deadline for recovering the fish. He created a lot of problems... we still have section 7 consultations. Only section 7 consultations can be reopened if there's new information and if the fish don't recover.

Basically George Bush came in and undid the Greg Walsher thing and brought the recovery program back to where it was before Greg. That was one of the challenges but again it's not dynamic of, do you work with something that some people think is unpopular or some people think is unjust or... by doing so are you becoming a part of the problem?

## **Farmer Experiences**

#### Reference 1

I: Did you have any challenges with the negotiation process?

P: no. the first meeting was the hardest. The one where they began negotiating because of their manager... after that it got much better but they learned a lot too.

Any kind of retrofit or changes that needed to be made, the bureau has been great at that... If we need to make this more efficient operation we need a mini excavator. They pay for one, they buy one. Recovery has been truly great to work with. They realize that we're irrigators first and fish do come second but we tried not to act that way. I get along really well with all the recovery people.

#### Reference 2

I: Were there any organizations or groups that you felt like should have been involved in the negotiations but weren't at the table?

P: I was in the area but I wasn't really a manager at that time. The fewer involved, the better. I like eye to eye discussions. That way there's no secrets. We've got the most user friendly bureau office in the West. And I've worked with several of them. They don't say we can't do that, they figure out a way how can we do that, Or how can we help you do that.

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They're not the typical bureau office. I was a consultant for them for three years. I retired from the NRCS on a Friday and went to work with them on Monday. Keep that in mind, if you enjoy what you're doing you're not working for a living. And I've always enjoyed what I was doing.

### Reference 3

I: Has your ranch/farm participated in arrangements where your water rights were used for a non-ag purpose such as the Upper Colorado River Endangered Fish Recovery Program?

Not because we wanted to be. That's a lot of federally mandated stuff. You know endangered fish recovery, these humpback suckers that all the people in Grand Junction caught the damn things back in the 1940s, threw them out on the bank because they aren't worth a shit for nothing. And put catfish in the river because catfish are good to catch, good for people to eat. Yeah, endangered fish is not very high on my list. That is probably one of the biggest waste of federal money. We're already digging ourselves into a black hole that there is no light at the end of the tunnel.

I don't think we had to give up any water, all the federal projects are somewhat tied together. I think they use Green Mountain water to subsidize the River in order to keeping the damn endangered fish alive. I don't know. And still, If I catch one of them I'll throw the damn thing out on the bank over my shoulder and not tell anybody.

### Reference 4

We actually had a huge problem to start with because the bureau of reclamation had been to the local conservancy district and said we need to sign our reservoir water rights over to the government. Most, a lot of the bureau of reclamation projects are that way but our project, that never happened and then they come back 30 years later and want us to give them the water rights and we said no. They tried to sue us and that really started a strong relationship with Ute Water because they, Ute Water came to our conservancy board, I wasn't on it at that point but my dad was part of it at that time and said you go ahead and fight the bureau and we'll pay your legal fees because they had more to lose than the farmers did because that was their water source. Eventually that was dropped, the bureau of reclamation backed off but they wanted to take the water Ute was taking and use it for fish recovery water so that would have left Ute Water without their primary source of water and they would have had to probably buy irrigation water for their customers so it would have basically destroyed agriculture and municipalities.

### Reference 5

Basically a lot of the water for the recovery program came from the Grand Valley Irrigators through Green Mountain reservoir they were able to give up some of their water rights because they were threatened too with having water taken away from them. And they did give up a fairly significant amount of water out of Green Mountain reservoir. Green Mountain was built basically as storage for

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transmountain diversions when the Colorado Big Thompson project was built so that was water that was supposed to go to the western slope to replace the water taken out for the Colorado Big Thompson project so the Grand Valley farmers gave up a significant share of their water for fish recovery

#### Reference 6

Other problems aside from taking their water there is concern that fish and wildlife may come back and say it's not working and we need more water than what happens next. It's a bit of a hammer hanging over the head of western Colorado agriculture at this point.

#### Reference 7

Are we giving up water? It's almost more visceral than water rights, what are you giving up, what are you getting in return, are we getting enough? Is there any amount big enough to compensate us for what we're giving?... the board was somewhat reluctant to do it. 2 things: given our role with the reclamation we're not in complete control of our destiny. The service and reclamation, previous manager, I think put it correctly in this way: if this is inevitable how do we get something good out of what is demanded from us. I think the discussions parallel some of the discussions we're having currently. If we don't do this and can't help all get on board with this compliance, we have to get in compliance no matter if the fish recovery program is implemented or not.

#### Reference 8

They're out to protect species but nothing is protecting us.

## **State Administrator, Division of Water Resources**

#### Reference 1

We came up with this idea that cities down here like water flowing by them for recreational purposes. You can boat on it, you can just look at it and say yeah, there's a nice river flowing by. So we entered into contracts between the feds and the city of Grand Junction and the city of Fruita where by the cities would agree to have this water flowing by them and be a delivery point for the water of the fish. Under these muni-rec contracts, the feds agreed to release their surplus water from Green Mountain reservoir and deliver it down to these muni – rec contracts.

So that was a way to build in flexibility for getting this water from the headwaters down to the fish and beyond. In order to protect this water that's released from Green Mountain you have to have some end user to deliver it to. And that way the state can protect it all the way down and prevents intervening people from picking it off. That was developed back in the mid 90s as an additional way to build flexibility into the system and to get more uses in there. Nowadays the state is looking at those contracts, some saying well, we're not really sure we like the muni- rec contracts anymore. They're kind of backpedaling on it. We've tried to do it for other purposes to protect water going downstream and the state has given us some pushback on that.

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Reference 2

Under the settlement in that case we set up a procedure whereby people that were interested in Green Mountain Reservoir water would talk on a weekly basis and try to manage the amount of water in that reservoir and if it were properly managed the idea was that at the end of the year when flows are low and the Colorado River, There might be some extra water in that HUP water could be released to help maintain flows for the benefit of the endangered Fish. But one of the problems was, how do you get the water from Green Mountain Reservoir Down to the 15 mile reach without people picking it off in between. That's just water flowing in the river and other buyers could come in and take that water.

Reference 3

So the water in the HUP was for municipal and irrigation purposes not fish purposes and so we could just release it for fish purposes so what we came up with was the idea of a municipal recreational contract. Basically, if you look at some of the cases for municipal water right, They often include water for recreation purposes as part of the umbrella that the municipal rate covers.

Reference 4

That started back in 1988 when they officially listed the species and initiated the recovery, implementation plan. As a state agency we are partners with the feds in our partnership really consists of helping them with bass and pike abatement efforts...I think there is a rigorous process right now in place, There's the Green Mountain Weekly call, the historic user pool call and they try to keep basically all their irrigation rights in the lower Valley here at Cameo diversion satisfied and have some extra water to run through that 15 mile reach.

How do you get that water down here to help the fish consistently under law. One of the major ways to do that is to take water in reservoirs that's not needed for other purposes and get it down here with the fish somehow. Green Mountain reservoir was constructed as part of the Colorado big Thompson project. It holds hundred and 54,000 acre feet of water and there is a pool of water in that reservoir that's meant to provide water to western Colorado and that's call the historic users pool HUP. It's a 66,000 acre feet pool. It's managed pretty carefully throughout the year. It provides water for the benefit of irrigation and municipal users. We had some litigation back in the mid-1990s relating to green Mountain reservoir and it was called the orchard Mesa check case.



**Water Manager - Irrigation District**

Reference 1

The Recovery Program is a successful example where existing stakeholders we're at a minimum not damaged, that the objectives for another party created the value exchange was an improvement in the system...if you're going to serve as a change agent it always helps to have some successful examples to refer to.

Reference 2

With the fish recovery program now, their doing, we are getting quite a few millions of dollars to do them improvements on our irrigation systems, on our canals. And the goal is to leave more water in the river at Palisade. So we're gonna, instead of pumping all the water up into the canals and then spilling it back into drainages and such, we are going to run it through the power plant. We generate electricity with it too. Our Orchard Mesa system is a hydraulic pumping system.

**Module 3, Session 3.2, Activity 3.C Supplemental**  
**Codebook for UCREFRP Interview Coding Activity**

Overarching Research Question: How do UCREFRP participants perceive the social, economic, and environmental outcomes of their collaborative efforts?

Code Name	Code Description
Description of collaborative components	Descriptive characteristics of the collaborative process from the participant's perspective
Social process	
Economic process	
Environmental process	
Collaborative challenges	participant describes the challenges or difficulties that faced trying to reach its goals, implement new projects, etc.
Engineering solutions	Respondent identifies engineering technologies or infrastructure for fish recovery
Institutional solutions	Human or administrative methods/behavior changes employed to improve water efficiencies and create more water for fish recovery
Problem definition	The respondents unique way of describing a problem with the collaborative process, goals, or outcomes
Decision-making and power differentials	This code captures how decisions were made and any power struggles involved in the process
Assessing outcomes for fish	Perceived and actual outcomes of collaborative efforts pertaining specifically to the fish
Delegitimizing fish stakeholder	Resisting inclusion of fish as legitimate stakeholder
Legitimizing fish stakeholder	Including fish as an important stakeholder
Continued water development	Enabling continued water development while fish is listed as endangered
Benefiting all users	The UCREFRP collaborative process is identified as beneficial to all involved stakeholders
Continuing irrigation habits	Irrigators didn't have to change water consumption habits

## Collaborative Water Governance and Social-Hydrological Justice

### Student Handouts

Fostering future negotiations	Recovery program networked water users, leaving a structure and relationships in place for continued and future collaborative projects
Social network	The respondent prioritizes collaboration and social relationships amongst stakeholders as important outcome of the UCREFRP.
Social network only	The respondent prioritizes collaboration and social relationships amongst stakeholders as most important outcome of the UCREFRP, not necessarily concerned with fish population recovery
Contra ag	Respondent viewing the UCREFRP at odds with agricultural production, communities, etc.
Contra fed	Resisting fed involvement in collaborative decision-making
Ecological complexities	The respondent demonstrates formal or informal knowledge of ecological processes and interactions between ecological communities, species, etc.

**Module 4, Session 4.1, Activity 4.A**  
**Small Group Activity: Guidelines for Peer Reviewing**

**Purpose:** The purpose of this exercise is to develop the ability to provide constructive criticism to your peers, and in turn, be able to incorporate their constructive feedback into your own work to improve your approach to assessing the UCREFRP collaborative, and collaboratives focused on socio-environmental issues as a whole. You are expected to provide your peer feedback by developing your review comments into a 1-page single spaced organized narrative for them to review. You may also include any line-by-line or grammar/spelling corrections in a separate document, if applicable.

As you prepare to review your peers work, keep in mind that the central focus of this exercise is to identify areas of improvement based on what we have learned in Modules 3 and 4, building on Modules 1 and 2. In addition, here are some helpful tips for developing your feedback for your peer:

**Before and while you read the evaluation:**

- Be sure to read the entire draft before commenting
- Think about the collaborative goals and intentions:
  - Are they being stated?
  - Are they being measured appropriately?
  - Whose voices are being overrepresented? Underrepresented?
- How well is the evaluator able to identify all of the above? How might they improve this?
- How might the collaborative enhance equity or incorporate different indicators in the evaluation, keeping in mind principles of environmental and ecological justice? How can your peer incorporate this into their assessment?

**What to include in your critique**

- First and foremost, praise what is done well
- Comment on large, overarching issues first (Are the main points clear? Is there a clear focus? Is it effectively organized? Are ideas adequately developed? Is evidence used properly?). Go on to smaller issues later (awkward or confusing sentences, style, grammar, word choice, proofreading).
- Time is limited (for your response and for the author's revision), so concentrate on the most important ways the draft could be improved.
- As much as you can, explain why you're making particular suggestions.
- Try describing what you see (or hear) in the paper--what you see as the main point, what you see as the organizational pattern.
- Identify what's missing, what needs to be explained more fully. Also identify what can be cut.

**How to criticize appropriately**

- Be honest (but polite, thoughtful and constructive) in your response
- Don't argue with the author or with other respondents
- This exercise should be more of a dialogue between your peer review group than anything else

**Module 4 Session 4.1**  
**Final Assignment Instructions**

For your final assignment, you will submit a revised version of your situation assessments from Module 2. This should incorporate concepts and activities from Modules 3 and 4, including information from your mock results and discussion assignment in Module 3 and feedback you received from your peers in Module 4. It should also build on your previous stakeholder roleplay activity from Module 2. The purpose of this final exercise is to build on the knowledge gained across all 4 modules, to develop a more holistic approach to engaging in collaboratives, designing collaborative goals, outcomes, and assessments, and evaluating collaborative goals, outcomes and assessments. As you incorporate issues of environmental and ecological justice to revise your assessment, think about what additional quantitative and qualitative indicators should be incorporated. In addition to revising your evaluations, you will want to add a new section to your evaluation that focuses on policy recommendations. In this section, you will develop policy recommendations for improving UCREFRP assessment (i.e. identifying gaps, additions for enhancing equity across stakeholders, different indicators), incorporating considerations of environmental and ecological justice.