

Population Monitoring Work Group Meeting

September 30, 2020

Meeting Materials:

Agenda

Minutes

Approval of 1st Task for Review of the Collaborative Program Fish Monitoring Program for the RGSM: A Proposal for a Catch-Per-Unit-Effort Metrics and Methodologies Workshop [read-ahead]

Draft Review of MRG Fish Population Monitoring Plan [read-ahead, draft, not included]



Middle Rio Grande Endangered Species Collaborative Program

Est. 2000

Population Monitoring Work Group (PMWG)

September 30, 2020

1:00 PM – 4:00 PM

Zoom Information:

<https://west-inc.zoom.us/j/8983593120>

Call-In: +1-669-900-6833; Meeting ID: 898-359-3120

Meeting Agenda--Revised

- | | | |
|-------------|--|-------------------------|
| 1:00 – 1:15 | Welcome, Intros, Agenda, Meeting Notes | <i>PMWG Chair</i> |
| | <ul style="list-style-type: none">➤ Decision: Approval of September 30, 2020 meeting agenda➤ Decision: Approval of September 9, 2020 meeting minutes | |
| | Read aheads: <ul style="list-style-type: none"><input type="checkbox"/> September 9, 2020 PMWG meeting minutes | |
| 1:15 – 1:45 | Program Portal data update
Program Portal information update on how the Rio Grande silvery minnow (RGSM) Population Monitoring data is presented on the portal document archive and in the mapper. | <i>Shay Howlin</i> |
| 1:45 – 2:15 | Update on Integrated Model <ul style="list-style-type: none">• Flow Scenarios• Other Questions for Model | <i>Charles Yackulic</i> |
| 2:15 – 2:30 | Break | |
| 2:30 – 3:45 | Report to EC on Current Fish Monitoring Program (FMP)
Task 2 Objectives – Open Discussion: <ul style="list-style-type: none">• Primary Goals and Tasks• Evaluate and Refine Sampling Design• Evaluate and Refine Sampling Methods• Evaluate and Refine Data Collection Protocols• Evaluate and Refine Data Analyses• Identify Other Data Needs for Concurrent Sampling• Evaluate How Modeling May Assist in Refining Monitoring | <i>PMWG Chair</i> |
| | Read aheads: <ul style="list-style-type: none"><input type="checkbox"/> EC Approval of Workgroup and CPUE Workshop<input type="checkbox"/> PMWG Task 2 Report-Draft 1.0 | |
| 3:45 – 4:00 | Wrap-Up <ul style="list-style-type: none">• Announcements• Action Items• Next Meeting | <i>PMWG Chair</i> |
| 4:00 | Adjourn | |



Middle Rio Grande Endangered Species Collaborative Program

Est. 2000

Population Monitoring Work Group (PMWG) Meeting Minutes

September 30, 2020; 1:00 PM–4:00 PM

Location: Zoom Meeting

Decisions:

- ✓ Approval of September 30, 2020 PMWG meeting agenda
- ✓ Approval of September 9, 2020 PMWG meeting minutes

Action Items:

Who	What	By When
Program Support Team (PST)	Schedule the October 22, 2020 PMWG meeting	10/1/2020
PST	Schedule Flow Scenarios Small Group meeting for October 7, 2020, with the following participants: <ul style="list-style-type: none">• Mo Hobbs, Albuquerque Bernalillo County Water Utility Authority• Joel Lusk, U.S. Bureau of Reclamation• Charles Yackulic, U.S. Geological Survey• Stephen Zipper, SWCA Environmental Consultants• Mick Porter (if funding is available), U.S. Army Corps of Engineers	10/1/2020
Debbie Lee	Send table with recommendations from the science panels to Mike Marcus and Mo H.	10/2/2020
Mick P.	Send Charles Y. the draft environmental flow analysis report	10/5/2020
Mike M.	Summarize Task 1 objectives with a table and connect Task 1 and 2	10/22/2020
Mo H. and Mike M.	Document progress made on recommendations from the science panels	10/22/2020
Rich Valdez	Begin writing the executive summary and introduction sections for the report to the Executive Committee	10/22/2020
Eric Gonzales	Share information about the Utah State University (USU) model workshop with the PMWG	10/22/2020

Next Meeting: October 22, 2020; 1:00 – 4:00 PM

Meeting Summary

Welcome, Intros, Agenda, Meeting Notes

PMWG Chair Rich V., SWCA Environmental Consultants, opened the meeting and Debbie L., PST, introduced the meeting attendees. Rich V. reviewed the September 30th agenda, September 9th minutes, and September 9th action items. The following comments were made:

- Following up on a previous action item, Catherine Murphy, PST, and Rich V. discussed the executive summaries. They agreed that the executive summaries needed to be reviewed further. The review process is still being developed.
 - One executive summary from Rich V. was reviewed by PMWG members and the PST. It will continue to be reviewed.
 - The other executive summaries have topics that are too large. They will be handed to the Science and Adaptive Management Committee (SAMC) to be broken down into smaller, more manageable research topics. The SAMC will reinstate the executive summary process with appropriately scaled questions.
- ✓ **Decision:** Approval of September 30, 2020 PMWG meeting agenda
- ✓ **Decision:** Approval of September 9, 2020 PMWG meeting minutes

Program Portal Data Update

Shay Howlin, PST, gave an update on the Program Portal geospatial mapper. These are the main points from the update and following discussion:

- Shay H. sent a summary of PMWG suggestions for the Portal mapper to U.S. Geological Survey (USGS). Shay H. also met with USGS to discuss the mapper.
- USGS split the suggestions into three categories: things they can do under the current scope and budget, things they need more information about, and things they cannot do under the current scope and budget.
 - Can do:
 - Build in filters to narrow down what data appears in a pop-up.
 - For example, users will be able to filter for data from July 2017 to present.
 - Make a separate map layer for water quality and include filters.
 - Change the size and color of symbols for the 20 main monitoring sites.
 - Provide a version of the mappers that users can give feedback on, hopefully in a month or two.
 - Need more information:
 - Adding in trend figures.
 - USGS may need to move the figures to a dashboard if users want the ability to compare two sites.
 - USGS wants to know the big picture on the potential use of the mapper before creating the figures. USGS wants the larger intent of the mapper to inform design of the figures.
 - The figures will wait until after the initial mapper is out.
 - Filtering before exporting data.

- Although USGS can implement most of the suggestions, USACE will not be funding the Portal after January. The Program cannot plan for additional development at this time.
- Are there any particular questions USGS wants the PMWG to answer?
 - USGS will need opinions from the mapper's likely user base. They want to discuss the scope of the mapper with members of the PMWG.
 - This conversation will likely wait until next year. First, USGS needs to complete development of a functional mapper.
- Members of the PMWG are encouraged to use the Program Portal to find potential bugs or identify new functions they would like to see.
- If users notice any errors on the Portal, please email Michelle Tuineau, PST.

Update on Integrated Model

Flow Scenarios

Other Questions for Model

Charles Y. gave an update on the integrated model and opened discussion on flow scenarios. These are main points from the discussion:

- The model has been presented to the PMWG a few times already.
- A few loose ends need to be tied up before the structure is finalized.
 - That includes looking at different approaches for habitat availability, expanding the model to include additional age classes, testing whether the model can incorporate relationships from Colleen Caldwell's work, and considering how to incorporate salvage data.
- Flow scenarios:
 - The flow scenarios tie into work by USU. The USU model is being designed to allow users to run various flow scenarios and assess the estimated outcomes.
 - Charles Y. is interested in having people think like water managers instead of looking immediately at the data.
 - Think about how different biologists would shape a fixed amount of water available in the spring. Consider how that would change if there was double that amount of water.
 - The different hydrograph shapes would represent various flow scenarios.
 - This exercise will identify where there is disagreement over how to manage water.
 - If there is disagreement, the model may offer a path forward for determining which approaches are most beneficial.
 - This goal of the model is to inform managers working in the system.
 - Is it possible to model how alternative management actions play out in the future based on possible climate and flow conditions?
 - Yes, that relies on how much we know about future hydrology. If there is a sense of future water availability and possible choices managers might make, this can be done.
 - The more difficult task is thinking of the two or three different ways managers would manage the water.
 - Would it be helpful for PMWG members to look at an annual hydrograph, real or manipulated, and come up with the best ways to distribute water that year?

- It would be better to first focus on moving a fixed amount water within a season, and then consider how to move water between seasons.
 - Do we first need to determine how much water is needed to produce Rio Grande silvery minnow (RGSM)?
 - Instead, we could model scenarios with different volumes of water, such as the amounts available in 2019, 2018, 2015, and 2012. At these different volumes of water, determine the management options.
 - Find out if everyone agrees on what aspects of the hydrograph (e.g., timing, magnitude, duration, rates of rising and falling limbs) to focus on. Determine what people optimize to benefit RGSM. The key is to find contrasts in management decisions.
 - Joel L. suggests a scenario of flooding 15,000 acres of habitat at the right depth and velocity within season to create RGSM nursery conditions. He posits that management is less about water and more about soil movement and soil interaction with the riverscape.
 - Joel would like to model this scenario to determine the level of response that would be detectable with the current (or a more precise) monitoring program. This would help managers determine what to monitor to find out if there was a landscape-level effect on a population.
 - What is the best way to provide scenarios to Charles Y.?
 - Suggestion to form a small group to formulate a plan for eliciting responses.
 - The group may want to create a spreadsheet with a couple different scenarios and ask people to reshape a hydrograph as they see fit.
 - Note the differences between responses and determine how to quantify those differences.
 - Mo H., Joel L., Charles Y., Stephen Z., and Mick P. (if funding is available) volunteer to be on the Flow Scenarios Ad Hoc Group.
 - The meeting is set for October 7, 2020 from 2:00 PM to 3:30 PM.
 - Mick P. has finished a rough draft of a paper analyzing the effect of environmental flow on RGSM recruitment.
 - Consider what other questions you would want a model to answer outside of hydrology (e.g., how much augmentation affects population).
- **Action Item:** The PST will schedule a Flow Scenarios Small Group meeting for October 7, 2020, with the following participants:
 - Mo Hobbs, Albuquerque Bernalillo County Water Utility Authority
 - Joel Lusk, U.S. Bureau of Reclamation
 - Charles Yackulic, U.S. Geological Survey
 - Stephen Zipper, SWCA Environmental Consultants
 - Mick Porter (if funding is available), U.S. Army Corps of Engineers
- **Action Item:** Mick Porter will send Charles Yackulic the draft environmental flow analysis report

Report to EC on Current Fish Monitoring Program (FMP)

Task 2 Objectives – Open Discussion:

Primary Goals and Tasks

Evaluate and Refine Sampling Design

Evaluate and Refine Sampling Methods

Evaluate and Refine Data Collection Protocols

Evaluate and Refine Data Analyses
Identify Other Data Needs for Concurrent Sampling
Evaluate How Modeling May Assist in Refining Monitoring

Rich V. opened discussion on the FMP report to the EC. Rich V. prepared a document to guide the discussion around the six objectives included on the EC report. The group continued to fill out an outline for the report. The following are some of the points made during the discussion:

- The six objectives in the outline were taken from Task 2 of “Approval of 1st Task for Review of the Collaborative Program Fish Monitoring Program for the RGSM: A Proposal for a CPUE Metrics and Methodologies Workshop.”
 - The document is 8 years old, and there may be issues with using it to guide a report today, especially with the Program moving towards adaptive management and the SAMC. We do not know what direction the SAMC will take with PMWG’s work.
 - We do not want to change the objectives but may need to refine and update them with what we know now.
 - Is there any information on the USU model?
 - A workshop on the USU model is planned for early next year. The purpose of the workshop is to explain the model and provide source code, so others can use it to model hydrologic scenarios.
 - Eric G., U.S. Bureau of Reclamation, will get more information about the USU model and workshop and share it with the PMWG.
 - It may be useful to include a table with the objectives from Task 1, as it relates to Task 2.
 - Mike M., Assessment Payers Association of the Middle Rio Grande Conservancy District, will summarize Task 1 objectives with a table and connect Task 1 and 2.
 - The report should include a summary of the recommendations from the science panels in Task 1 and the progress made on each since.
 - Mo H. and Mike M. will document progress made on recommendations from the science panels.
 - Ashley Tanner, former Deputy Science Coordinator on the PST, previously compiled a list of recommendations from the science panels with the progress of each. Debbie Lee will send that list to Mo H. and Mike M.
 - Rich V. will begin writing the report’s executive summary and introduction based on the outline.
 - When should the report reach the EC?
 - The final EC meeting of the year is on December 17th.
 - The report may not be completed by that time.
 - The work of PMWG will carry on through the SAMC. The SAMC will break down large tasks into smaller, more manageable tasks and assign them to Science and Technical Ad Hoc Groups.
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- **Action Item:** Eric Gonzales will get more information about the USU model and workshop and share it with the PMWG
 - **Action Item:** Mike Marcus will summarize Task 1 objectives with a table and connect Tasks 1 and 2
 - **Action Item:** Mo Hobbs and Mike Marcus will document progress made on recommendations from the science panels

- **Action Item:** Debbie Lee will send table with recommendations from the science panels to Mike Marcus and Mo Hobbs
- **Action Item:** Rich Valdez will begin writing the executive summary and introduction sections for the report to the EC

Wrap-Up

- At the next meeting, the PWMG will finish discussion on temporal sample design and engage in discussion on spatial sample design.
- The next meeting is tentatively scheduled for October 22nd from 1-4 PM.
- **Action Item:** The PST will schedule the October 22, 2020 PWMG meeting

Participants

Andy Dean
Catherine Murphy
Charles Yackulic
Debbie Lee
Eric Gonzalez
Grace Haggerty
Joel Lusk
Lynette Giesen
Michelle Tuineau
Mick Porter
Mike Marcus

Mo Hobbs
Rich Valdez
Shay Howlin
Stephen Zipper
Thomas Archdeacon

U.S. Fish and Wildlife Service
Program Support Team
U.S. Geological Survey
Program Support Team
U.S. Bureau of Reclamation
New Mexico Interstate Stream Commission
U.S. Bureau of Reclamation
U.S. Army Corps of Engineers
Program Support Team
U.S. Army Corps of Engineers
Assessment Payers Association of the Middle Rio
Grande Conservancy District
Albuquerque Bernalillo County Water Utility Authority
SWCA Environmental Consultants
Program Support Team
SWCA Environmental Consultants
U.S. Fish and Wildlife Service

**Approval of the 1st Task for Review of the Collaborative Program Fish
Monitoring Program for the Rio Grande Silvery Minnow**

A Proposal for a CPUE Metrics and Methodologies Workshop

**Submitted to
The Executive Committee of the
Middle Rio Grande Endangered Species Collaborative Program**

July 13, 2012

Executive Committee Action Requested:

- Approval to Conduct a Workshop on Catch-per-Unit-Effort (CPUE) Methodology used by the Current Rio Grande Silvery Minnow Population Monitoring Program (i.e., Task 1, see Appendix A).
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Introduction

Background

This document was developed by the RGSM Population Monitoring workshop organizers at the request of the Executive Committee (EC) of the Middle Rio Grande Endangered Species Collaborative Program. The document outlines a proposed approach for evaluating and updating the fish monitoring plan for the Middle Rio Grande, New Mexico. This proposed approach helps to address issues identified in a scientific review of the Rio Grande silvery minnow (RGSM) population monitoring program and by the U.S. Fish and Wildlife Service (Service) in a letter dated March 23, 2012. The Service's letter recommended, as a step toward resolution, that the EC host a facilitated science workshop to discuss outstanding issues over the use of catch-per-unit-effort (CPUE) for monitoring the RGSM. Task 1 of this proposed approach addresses the Service's recommendation as part of a broader effort to develop a fish monitoring plan.

Primary Goal

The primary goal of this proposed approach is to evaluate and update the fish monitoring plan for the Middle Rio Grande. The focus of this plan shall be on the endangered Rio Grande silvery minnow, along with the identification and development of population demographic parameters that will best meet the needs of the Collaborative Program and the Recovery Implementation Program (RIP). The EC of the Collaborative Program has expressed the need to reliably measure the effects of Middle Rio Grande water management actions and conservation measures on the RGSM, and the Service seeks to determine the best population demographic parameter(s) for gauging species recovery and for measuring sufficient progress for the RIP. The proposed approach is intended to resolve how the RGSM population monitoring program can provide a reliable, precise, and accurate measure of the status and trend of the species for these purposes and that is also reasonably attainable (i.e., reasonable expenditure).

Proposed Approach

The workshop organizers believe that three major steps are needed to achieve the stated goal:

- Task 1 focuses on addressing technical questions concerning use of CPUE in the current RGSM monitoring program (see detailed write-up of Task 1 in Appendix A). This task should be approved and implemented as soon as possible to provide sufficient time to identify and invite qualified scientists to participate in the workshop process and to plan and organize the workshop.
- Task 2 is a review of the current monitoring program including temporal and spatial aspects of sampling design, data collection protocols, and data analyses.
- Task 3 is the development of a formal Fish Monitoring Plan with details of sampling design (e.g., number and location of samples, frequency of sampling, gear types, etc.), data collection protocols (e.g., data to be collected, manner of storage, etc.), and analytical methods (e.g., CPUE computation, relationship of CPUE to population estimates, use in PVA models, etc.).

Overview of current fish population monitoring

The fishes of the Rio Grande between Velarde and Elephant Butte Reservoir and their habitat associations were first reported in 1987 (Platania 1993). Monitoring of the fish population with catch-per-unit-effort (CPUE) and specifically the endangered Rio Grande silvery minnow began in 1993 and has been carried out annually except for 1989 (e.g., Dudley and Platania 2011). The current monitoring program continues to provide annual, as well as more or less monthly, CPUE estimates for each of three reaches of the Middle Rio Grande: the Angostura, Isleta, and San Acacia reaches. Sampling has generally been conducted at 15-20 sites for up to 10 months in a year. Fish are taken with multiple seine hauls at a given sample site, and CPUE is computed for each species at each sample site as the pool of seine hauls expressed as the number of individuals per 100 m² (surface area) of water seined.

Outline of Actions by Task

The following is an outline of the three major tasks of this proposed approach with objectives and actions identified for each.

1. Task 1. Conduct a Workshop on Catch-per-Unit-Effort (CPUE) Methodology used by the Current Rio Grande Silvery Minnow (RGSM) Population Monitoring Program (see Appendix A for details)

Objectives:

- Evaluate statistical properties and interpretations of the current RGSM monitoring program, including precision and accuracy of CPUE.
- Discuss, evaluate, and reconcile areas of concern/disagreement over CPUE.
- Discuss and evaluate population estimation for RGSM and compare and correlate with CPUE,
- Identify and evaluate other methods for monitoring the RGSM, including methods used in other river systems.
- Identify, discuss, and reconcile uses of CPUE for RGSM, including demographic recovery criteria, sufficient progress metrics, and inputs and parameter estimates for Population Viability Analysis.

Actions:

- Retain two or three external scientists with expertise in CPUE, fish sampling design for small-bodied fishes, and other methodologies to participate in data examination, workshop presentation/interaction, and assist in preparing workshop report.
- Distribute and provide for independent examination, the existing monitoring data (and available population estimation data) to evaluate existing and potential precision and levels of detectable change in abundance of RGSM.
- Conduct a 3-day workshop that includes an introduction session with EC members (2-3 hr) followed by technical presentations, discussion, and draft report preparation.
- Prepare and present a report of the CPUE Workshop to the EC (report to be prepared jointly by workshop organizers and external scientists).

2. Task 2. Review Middle Rio Grande Fish Population Monitoring Plan

Objectives:

- Evaluate and refine sampling design, including statistical properties of spatial aspects (longitudinal locations of sample sites, habitats in which samples are taken) and temporal aspects (frequency of sampling, times of year when samples are taken).
- Evaluate and refine sampling methods, including gear types, sampling strategies, etc.
- Evaluate and refine data collection protocols, including types of data collected, recording methods, quality control, electronic storage, and data custody.
- Evaluate and refine data analyses.
- Identify other data needs for concurrent sampling during fish monitoring to support other studies (e.g., augmentation, fish movement, drying, genetics, adaptive management) as part of a programmatic monitoring program
- Evaluate how PVA may assist in refining monitoring.

Actions:

- Retain two or three external scientists with expertise in sampling design to participate in the workshop, evaluate and revise the fish monitoring plan, and prepare the workshop report.
- Conduct workshops and work sessions that address elements necessary for long-term fish population monitoring program development, including what other monitoring is needed that can be performed in conjunction with fish monitoring. Prepare and present a report to the EC as guidance to update the Fish Monitoring Plan for the Middle Rio Grande.

3. Task 3. Update the Collaborative Program Middle Rio Grande Fish Monitoring Plan

Objectives:

- Update the current Fish Monitoring Plan with revisions that may include sampling design, data collection, quality control, storage, and custody; cost estimates; and responsibilities.
- Define the metrics of interest for the initial phase of the Monitoring Plan (3 yrs), define how they will be calculated from the monitoring data, and document data precision and accuracy for the desired performance (such as precision and correlation with some “ground truth”).
- Implement the updated Fish Monitoring Plan for a 3-year period for evaluation and refinement.
- Ensure that the needs of the Collaborative Program and the RIP are met with a monitoring program for RGSM sufficiently sensitive to:
 - a. Detect changes in RGSM abundance with management actions;
 - b. Provide reliable demographic recovery criteria for RGSM; and
 - c. Provide reliable metrics for sufficient progress for the RIP.
 - d. Utilize past data and analyses to be comparable to any proposed changes

Actions:

- Integrate the findings of Tasks 1 and 2 and update the Fish Monitoring Plan with emphasis on the RGSM.
Implement and evaluate the Fish Monitoring Plan for meeting needs of the EC and the Service for monitoring species response(s) to management actions; demographic recovery criteria; and sufficient progress metrics.

Anticipated Time Schedule

An anticipated time schedule for this proposed approach is provided in Table 1. The following summarizes the schedule for each task and action.

Task 1: CPUE Workshop

- EC approval of Task 1 in July, 2012.
- Contract 2 or 3 external scientists that have the ability and time to participate in CPUE workshop.
- Independent data examination by external scientists and by Collaborative Program scientists to start as soon as data can be provided (the Program does not have the Population Estimation data at present, and some details are still missing from the Population Monitoring data). A reasonable period of time for this analysis is 3 months (Aug-Oct; given possible time conflicts of scientists and actual data analysis).
- Distribute pertinent existing reports concerning the population monitoring to all anticipated workshop participants at the same time that the data are made available.
- 3-day workshop by end of October 2012.
- Report to EC by December 2012.

Task 2: Review Monitoring Program

- Evaluate and refine aspects of fish monitoring program; workshops may be scheduled in January and February of 2013.

Task 3: Update the current Fish Monitoring Plan

- An updated draft RGSM Population Monitoring Plan will be vetted through the federal agencies and RIP so that it can be funded and implemented in FY2014.
- It is assumed that the current monitoring program will continue until a new or revised program is implemented, evaluated, and refined.

Table 1. Proposed time schedule for revision of the Fish Monitoring Plan.

Tasks	2012						2013					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1. CPUE Workshop												
• EC Approval	X											
• Contract Scientists		X										
• Data Examination		X	X	X								
• 3-Day Workshop				X								
• Report to EC					X	X						
2. Evaluate Monitoring						X	X	X				
3. Update Plan								X	X	X	X	X

Estimated Costs

- The costs for Task 1 are estimated at \$30,000 of federal funding (USFWS and Reclamation/CP) with cost share contributions from nonfederal signatories anticipated. The majority of this cost (\$20-25,000) is for contracting external scientists' time and per diem. The costs for participation by the Collaborative Program participants or their contractors are not factored into this estimate.
- The costs of Tasks 2 and 3 are undetermined at this time. Each workshop for Task 2 is estimated to cost about the same as for Task 1 (\$30,000).

Workshop Organizers

The CPUE Metrics and Methodologies workshop planners include:

- Rick Billings, Albuquerque-Bernalillo County Water Utility Authority
- Jim Brooks, U.S. Fish and Wildlife Service
- Michael Porter, U.S. Army Corps of Engineers
- Grace Haggerty, New Mexico Interstate Stream Commission
- Daniel Goodman, Montana State University
- Richard Valdez, SWCA
- Jason Remshardt, U.S. Fish and Wildlife Service

Literature Cited

Dudley, R.K. and S.P. Platania. 2011. Rio Grande silvery minnow population monitoring program results from September 2009 to October 2010. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the U.S. Bureau of Reclamation, Albuquerque, NM.

Platania, S.P. 1993. The fishes of the Rio Grande between Velarde and Elephant Butte Reservoir and their habitat associations. Report to the New Mexico Department of Game and Fish, Santa Fe, and U.S. Bureau of Reclamation (Albuquerque Projects Office), Albuquerque, NM.

U.S. Fish and Wildlife Service. 2010. Rio Grande Silvery Minnow (*Hybognathus amarus*) Recovery Plan, First Revision. Albuquerque, NM.

Appendix A: Task 1 Description.

Task 1. Conduct a Workshop on Catch-per-Unit-Effort (CPUE) Methodology used in the Current Rio Grande Silvery Minnow (RGSM) Population Monitoring Program

This task is intended to explore and reconcile issues and concerns with using CPUE to monitor the RGSM. This task will accomplish the first necessary step in developing a better understanding of the current methodologies used to monitor the species and ways to improve and refine the monitoring program. This task will also begin to establish better communications among the scientists, managers, and the EC over the meaning and use of monitoring information. The workshop will also review methodologies for monitoring used in other river systems, as well as analytical methods that may help to improve a fish monitoring program for the Middle Rio Grande.

Objectives:

- Evaluate statistical properties and interpretations of the current RGSM monitoring program, including precision and accuracy of CPUE.
- Discuss, evaluate, and reconcile areas of concern/disagreement over CPUE.
- Discuss and evaluate population estimation for RGSM and compare and correlate with CPUE, with available population estimation data.
- Identify and evaluate other methods for monitoring the RGSM, including methods used in other river systems.
- Identify, discuss, and reconcile uses for CPUE, including recovery demographic criteria, sufficient progress metrics, and inputs and parameter estimates for Population Viability Analysis.

Actions:

- Retain 2-3 external scientists with expertise in CPUE, fish sampling design for small-bodied fishes, and other methodologies to participate in data examination, workshop presentation/interaction, and assist in preparing workshop report.
- Distribute and provide for independent examination, existing pertinent reports and the existing monitoring data (and available population estimation data.) to evaluate existing and potential precision and levels of detectable change in abundance of RGSM.
- Conduct a 3-day workshop, with EC members participating in a 2-hour introduction followed by technical presentations, discussion, and report preparation.
- Prepare and present a report of the CPUE Workshop to the EC (report to be prepared jointly by workshop organizers and external scientists).

Proposed Structure and Process:

- Workshop tentatively scheduled for 3 days in the last week of October, 2012. Draft agenda for the workshop (to be refined with the assistance of the external scientists) is:
 - Day 1—Morning: Presentation to EC of background, workshop objectives and EC/scientists dialogue/questions/comments.

- Day 1—Afternoon: Technical presentations and discussions on RGSM current monitoring.
- Day 2—Morning: Continuation of presentations and discussion of other methods used, data analyses, etc (to be further defined).
- Day 2—Afternoon: Discussion session (facilitated).
- Day 3—Morning: Technical presentations and discussion on demographic metrics for sufficient progress and recovery milestones (facilitated).
- Day 3—Afternoon: Report preparation by Participating Scientists.
- This workshop will involve a detailed evaluation of CPUE collection and analysis methodologies. It is recommended that primary attendees are scientists familiar with fish population monitoring in the MRG and that participating scientists are well prepared. A list of scientists will be developed jointly by the workshop organizers and the EC; that list will be used to form the discussion groups and to write the Workshop Report. A list of technical participants will be distributed to the EC for approval prior to the workshop. A cross section of knowledgeable scientists from the diverse agencies/entities is encouraged.
- Other attendees may participate as observers and be allowed to provide comments or questions only during specified comment/question periods, most likely at the end of each presentation and discussion session. This is done to ensure that the workshop stays on schedule with technical issues. However, this is a public meeting.
- Two to three scientists not currently involved in the Collaborative Program and with expertise in sampling methodologies/statistical analysis/CPUE monitoring for small-bodied river fishes will be contracted to participate in data examination, workshop participation, and report preparation. Availability will most likely be a determining factor in who is contracted. Prior to contracting with these individuals, their names and CVs will be provided to the EC members for approval.
- The contracted external scientists are not considered to be a science panel or peer reviewers but will participate as other scientists do in the workshop and will assist in drafting the Workshop Report on the last day of the meeting and following the workshop.
- A facilitator will be used to lead the workshop. The facilitator shall be experienced at leading technical workshops. One or two additional assistants may be requested to help with workshop materials, monitor and record discussion sessions, etc. The facilitator's contract may be with any of the EC members and the facilitator's name and CV will be provided to the EC for approval at the same time the information is provided to external scientists.
- The workshop organizers will remain in place to assist in selection and contracting the external scientists, setting up the workshop, and finalizing the Workshop Report. Technical editing and technical and administrative assistance will be provided by the Collaborative Program PMT and EC contributions.

Products/Outcomes:

- Workshop Report written by the workshop organizers and the external scientists to include:
 - Summary of CPUE issues as used in the MRG.

- Effectiveness of current program and CPUE to address Collaborative Program and RIP needs.
- Recommendation to the EC on continued use and refinement of CPUE.
- Other uses for CPUE (e.g., survival, recruitment).
- Recommendation to the EC for additional sampling methods for monitoring the RGSM.
- Provision for minority reports to document alternative views or opinions on content of report.
- Electronic and hard copies of workshop proceedings and presentations.
- Summary of discussion group dialogue.
- Proposed outline to help guide Tasks 2 and 3.

Appendix B: Suggested External Scientists (Preliminary)

The following are recommended scientists and a list of their qualifications who are not directly involved with the Collaborative Program and who could provide an objective evaluation of the RGSM monitoring program and data:

- Dr. Wayne Hubert (retired)
 - Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, WY
 - Lead author: Relative Abundance and Catch-per-Unit-Effort, Chapter 7 *in* Analysis and Interpretation of Freshwater Fisheries Data
- ✕ • Dr. Ron Ryel
 - Department of Forest, Range, and Wildlife Sciences, Utah State University, Logan, UT
 - Teaches classes in Inventory, Monitoring and Assessment
- Dr. Brett Johnson
 - Associate Professor, Colorado State University, Ft. Collins, CO
 - Co-author: Predator-Prey Interactions, Chapter 16 *in* Analysis and Interpretation of Freshwater Fisheries Data
- Dr. Carl Walters
 - University of British Columbia, Vancouver, BC
- Dr. Josh Korman
 - Ecometrics, Vancouver, BC
- Dr. William Pine
 - University of Florida, Gainesville, FL
- Dr. Lewis Coggins
 - NOAA's Southeast Fisheries Science Center, National Marine Fisheries Service, Beaufort, NC
- Dr. Ray Hilborn
 - School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA
- Dr. Mike C. Runge
 - US Geological Survey Patuxent Wildlife Research Center, Laurel, MD

Scientists will provide curriculum vitae to the Collaborative Program and the EC as part of the selection process for participating in the CPUE workshop.

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