

Middle Rio Grande Endangered Species Collaborative Program
Habitat Restoration Work Group
July 15th, 2014 – 12:30pm – 3:10pm
ISC

Actions

- Rick Billings will contact Ali Saenz to schedule a conference room at Reclamation for the August and September HRW meetings.
- Danielle Galloway will resend the 2013 Habitat Effectiveness Monitoring Report to HRW members with a request and deadline for submitting comments and feedback.
- Ann Demint will contact Kathy Dickinson to request a copy of the HRW project tracking spreadsheet.
- Danielle Galloway will contact Ondrea Hummel to schedule an update presentation of the Middle Rio Grande Bosque Restoration Project (Summary of Phase I and Update on Phase II).

Decisions

- The May 20th, 2014 meeting notes were approved for finalization with no changes.

Next Meeting: August 19th, 2014 from 12:30 to 3:30 at Reclamation

- Tentative agenda items include: (1) Population Monitoring Presentation; (2) SWCA Presentation; (3) final review of the 2013 Habitat Effectiveness Monitoring Report; (4) Update on the MRGCD Refugial Habitat Suitability Monitoring of Drain Outfalls;
- September Tentative Agenda Items: (1) Todd Caplan (GeoSystems) to present on potential/future ISC restoration projects; (2) Corps' MRG Bosque Restoration Project Phase I Summary and Update on Phase II (Ondrea Hummel)

Meeting Summary:

- Rick Billings brought the meeting to order. Introductions were made and the agenda was approved with a reordering of agenda items to allow the contractor presentation to occur first.
- The May 20th HRW meeting notes were reviewed and approved with no changes.
- All May 20th HRW Action Items were completed as assigned.
- Mike Marcus, with Tetra Tech, presented an update on the Ecohydrological Relationships along the Middle Rio Grande (MRG) of New Mexico for the Endangered RGSM and Habitat Relationships along the MRG of New Mexico for the Endangered Southwestern Willow Flycatcher. Both Draft Final reports are expected to be released to the HR workgroup within the next several weeks.
 - The main project task and objectives can be summarized as: “develop a reach-wide baseline assessment of RGSM and SWFL habitat availability and quality to determine the state of the system along the MRG.”
 - The highlights of the minnow-portion of the presentation included (but are not limited to):
 - In 2005, 2/3rd of minnow were found on the floodplain and 1/3 of those were from a single, off-channel shallow pond. Since then, the Service has indicated that minnow mortality on the floodplain is natural and so rescue efforts were not necessarily to be conducted there. However, questions remain if the minnow would have returned to the river and survived once the floodplain reconnects.
 - Minnow abundance and distribution decline with repeated wetting and drying events.

- A review of the current supplemental water program indicates that supplemental water used does not necessarily correspond to that year's classification. For example, 2007 was classified as a "dry" year but only 17,801 ac-ft of supplemental water was needed compared to 2008 which was classified as a "wet" year but 33,471 ac-ft of supplemental water was needed.
- FLO2D modeling of the floodplain and channel is now 10 years old and needs to be updated to be as accurate as possible. The river system has changed a lot in 10 years.
- In-channel flow for maximum juvenile and adult minnow habitat is ≤ 200 cfs when large, woody debris (LWD) is present and ≤ 80 cfs when LWD is absent.
- The project work included review of previous habitat quality studies to define the parameters of "quality habitat." For the purposes of this work, 3 habitat areas were defined as:
 - Most Commonly Occupied Habitat: ≤ 1.5 ft deep and 1.5 ft/sec velocity
 - Highest Quality Feeding and Rearing Habitat: ≤ 1.5 ft deep and 0.5 ft/sec velocity
 - Highest Quality Spawning and Egg/Larvae Retention Habitat: ≤ 1.5 ft deep and near zero (0.05 ft/sec) velocity
 - With these 3 "habitat categories" defined, in-channel and floodplain modeling of river flow at various rates were compared to river sites to determine the percentage of available "optimum" habitat for each.
 - The overall results indicate that for the current river system, which is highly channelized, as flows go up, Most Commonly Occupied habitat goes down until overbanking is achieved. Highest Quality Feeding and Rearing Habitat also continue to decrease until overbanking. However, the maximum feeding habitat tends to be a slight fraction of the overall occupied habitat – even in the best of scenarios.
 - For example, at the Bernalillo site, the total active channel at 2,108 cfs is about 15.5 acres but the maximum feeding habitat is only 0.37 acres.
 - Overbanking of the floodplain provides the best habitat for all the categories. Unfortunately, the Angostura to Isleta reach doesn't overbank until around 5,000 cfs; Isleta to San Acacia Reach doesn't flood until about 3,500 cfs; and the San Acacia Reach doesn't inundated until about 2,000 cfs.
- Included in the report is a table of Probability of Channel Drying by River Mile to help guide potential future restoration work by identifying areas that would require much upkeep and supplemental water to maintain.
- Review of the literature indicated several things for consideration:
 - *Floodplains Provide Key Habitat Values for Fish*
 - Fish populations that accompany floodplain inundation benefit from (1) significant enhancement of growth rates for larval and juvenile fish due to (a) warmer water temperatures and (b) shallow, food-rich conditions compared to the adjacent channel environment. This results in overall increases in the fish population productivity and abundance when compared to systems having disconnected floodplains.
 - *Inundated Floodplains Enhance Upstream Retention and Survival of Young Fish*

- In the Volga River, all fish species that are “stimulated to spawn” during a spring flood pulse spawned primarily on the floodplain.
- A 1987 study indicates that all larval fish less than 10 mm (0.4 inches) were killed within a few hours when exposed to large in-channel flow events.
 - Work done on the MRG minnow size newly hatched larvae at about 3.7 mm (0.15 inch) standard length after hatch and grow about 0.15 mm (0.006 inch) per day during their early larval stages.
 - If these observations can be extrapolated, then there is indication that in-channel minnow larvae do not survive long compared to those spawned on the floodplain.
- *Floodplain Stranding*
 - Regarding the concern of floodplain “stranding”, there are studies that indicate that both “adults and YOY [young-of-year] of all *native* species seemed to have the capacity to find their way off the floodplain before it disconnected...” However, it is noted that “exceptionally rapid, intermittent, and early disconnection of the floodplain did tend to strand abnormally high numbers of some species.”
- *Poor Isolated and Refugial Pool Conditions*
 - Regarding the concern of refugial and isolated pool conditions, studies on the minnow show that they have a “remarkable tolerance to low dissolved oxygen concentrations and elevated water temperature.”
- In the confined channel over much of the MRG, potential food for the minnow has been scoured away. This is supported by modeling completed that indicates quality feeding and rearing habitat is a small percentage of the occupied spaces. Considering that the minnow uses the vast amount energy on (1) overwintering and (2) egg and sperm production just prior to a (3) spring pulse spawn that requires maintaining water position in high flows, could it be that lack of food resources is a major cause for why the minnow are reported to only live just beyond their first or second spawn?
 - The contractors hypothesize that “connected, low-flow environments with abundant food supplies (floodplains) are critical for the survival of post-spawn adult minnow, and key to increased population abundance, a viable minnow population, and recovery of the species.”
- Conclusions and Recommendations include (but are not limited to):
 - Increasing Channel Flow Does Not Produce Higher Quality In-channel Silvery Minnow Habitat ... More water is not always better for all fish
 - Set “Low” Minimum Inundation Flows for Habitat Restoration Designs
 - Habitat Restoration Requires Large Contiguous Areas of Inundation
 - Need Silvery Minnow Refuge Habitats for Drought Conditions
- Mr. Marcus then presented the flycatcher portion of the work.
 - During the course of the work, the contractors identified 103 potential sites for restoration projects for flycatcher habitats. These sites were chosen based on the spatial intersection of tamarisk dominated stands with existing flycatcher breeding areas

- The results and conclusions of the work include (but are not limited to):
 - 25 HR Site ID maps provide candidate locations for consideration and further investigation;
 - the salt cedar beetle is here, throughout the state, and the impacts to flycatcher habitat have already begun and will continue;
 - preemptive, restoration measures are needed *now*;
 - *Recommendation*: Periodic updates of vegetation mapping and FLO-2D are needed
 - The highest priority locations identified would be those with current (2010-2013) nesting activity due to nest site fidelity.
- HR attendees agreed to postpone the discussion on the *Reach-specific projects and areas for development in the 5-year HR Plan* until the minnow and flycatcher reports are available. Attendees expressed the desire to review the reports and consider how to incorporate those recommendations on potential future restoration work.
 - Attendees decided to offer more review time on the 2013 Habitat Effectiveness Monitoring Report and have comments and feedback submit via email. The workgroup will then review as group at the August meeting and approve the report for finalization then.

Meeting Notes

Introductions and agenda approval: Rick Billings brought the meeting to order. Introductions were made and the agenda was approved with a change in order for the presentation to proceed first.

Tetra Tech Presentation: *Ecohydrological Relationships along the MRG of NM for the Endangered RGSM and Habitat Relationships along the MRG of NM for the Endangered Southwestern Willow Flycatcher*

- Mike Marcus, with Tetra Tech, presented an update on the Ecohydrological Relationships along the Middle Rio Grande (MRG) of New Mexico for the Endangered RGSM (draft dated March 2014) and Habitat Relationships along the MRG of New Mexico for the Endangered Southwestern Willow Flycatcher (draft dated July 2014). Both Draft Final reports are expected to be released to the HR workgroup within the next several weeks. *The following are notes taken of the presentation; for more details please refer to the actual presentation.*
 - The main project task and objectives can be summarized as: “develop a reach-wide baseline assessment of RGSM and SWFL habitat availability and quality to determine the state of the system along the MRG.”
 - Data from the RiverEyes observations of drying was used to calculate probabilities of drying at particular locations throughout the lower stretches of the river.
 - Fish and Wildlife staff has observed during salvage operations that “more than 2 episodes of drying and re-wetting clearly impact the local abundance and distribution of silvery minnow.”
 - In 2005, during salvage and rescue operations, $\frac{2}{3}$ rd of the minnow were found on the floodplain and $\frac{1}{3}$ of those were from a single, off-channel shallow pond. Since then, the Service has indicated that minnow mortality on the floodplain is natural and so rescue efforts were not necessarily to be conducted there. However, questions remain if the minnow would have returned to the river and survived once the floodplain reconnects.
 - The link between drying and fish mortality needs to be further researched and determined how representative those links are when considering the impacts of climate change.
 - A review of the current supplemental water program indicates that supplemental water used does not necessarily correspond to that year’s classification. For example, 2007 was classified as a “dry” year but only 17,801 ac-ft of supplemental water was needed compared to 2008 which was classified as a “wet” year but 33,471 ac-ft of supplemental water was needed.
 - The project work included review of previous habitat quality studies to define the parameters of “quality habitat.” “Quality” habitat – in terms of depth and velocity ranges - has been defined slightly differently by different technical advisory groups but those parameters vary slightly from the “quality” habitat defined in the Recovery Plan.
 - Based on a study from 2008 (Bovee et al.), in-channel flow for maximum juvenile and adult minnow habitat is ≤ 200 cfs when large, woody debris (LWD) is present and ≤ 80 cfs when LWD is absent.
 - The contractors considered all the available information (the slight differences in “quality” definitions, the indications of optimum flow, information on feeding and rearing habitat preferences) and then defined the criteria for this study as follows:
 - Most Commonly Occupied Habitat: ≤ 1.5 ft deep and 1.5 ft/sec velocity

- Highest Quality Feeding and Rearing Habitat: ≤ 1.5 ft deep and 0.5 ft/sec velocity
- Highest Quality Spawning and Egg/Larvae Retention Habitat: ≤ 1.5 ft deep and near zero (0.05 ft/sec) velocity. *Note: ideally, there might not be any velocity, but “0” cannot be used in modeling, so near zero velocities were selected.*
- With these 3 “habitat categories” defined, in-channel and floodplain modeling of river flow at various rates were compared to river sites to determine the percentage of available “optimum” habitat for each.
 - The overall results indicate that for the current river system, which is highly channelized, as flows go up, Most Commonly Occupied habitat goes down until overbanking is achieved. Highest Quality Feeding and Rearing Habitat also continue to decrease until overbanking. However, the maximum feeding habitat tends to be a slight fraction of the overall occupied habitat – even in the best of scenarios.
 - For example, at the Bernalillo site, the total active channel at 2,108 cfs is about 15.5 acres but the maximum feeding habitat is only 0.37 acres.
 - Overbanking of the floodplain provides the best habitat for all the categories. Unfortunately, the Angostura to Isleta reach doesn’t overbank until around 5,000 cfs; Isleta to San Acacia Reach doesn’t flood until about 3,500 cfs; and the San Acacia Reach doesn’t inundated until about 2,000 cfs.
 - This indicates that there is not nearly enough food and egg habitats for the minnow to “thrive.”
 - It was pointed out that the minnow can utilize relatively small “patches” of suitable habitat; these small “patches” are too small to be identified in the FLO2D modeling and are thus “missed” in the total.
 - Included in the report is a table of Probability of Channel Drying by River Mile to help guide potential future restoration work by identifying areas that would require much upkeep and supplemental water to maintain.
 - Review of available literature indicated several things for consideration:
 - *Floodplains Provide Key Habitat Values for Fish*
 - Fish populations that accompany floodplain inundation benefit from (1) significant enhancement of growth rates for larval and juvenile fish due to (a) warmer water temperatures and (b) shallow, food-rich conditions compared to the adjacent channel environment. This results in overall increases in the fish population productivity and abundance when compared to systems having disconnected floodplains.
 - *Inundated Floodplains Enhance Upstream Retention and Survival of Young Fish*
 - In the Volga River, all fish species that are “stimulated to spawn” during a spring flood pulse spawned primarily on the floodplain.
 - A 1987 study indicates that all larval fish less than 10 mm (0.4 inches) were killed within a few hours when exposed to large in-channel flow events.
 - Work done on the MRG minnow size newly hatched larvae at about 3.7 mm (0.15 inch) standard length after hatch and grow

about 0.15 mm (0.006 inch) per day during their early larval stages.

- If these observations can be extrapolated, then there is indication that in-channel minnow larvae do not survive long compared to those spawned on the floodplain.

- *Floodplain Stranding*

- Regarding the concern of floodplain “stranding”, there are studies that indicate that both “adults and YOY [young-of-year] of all *native* species seemed to have the capacity to find their way off the floodplain before it disconnected...” However, it is noted that “exceptionally rapid, intermittent, and early disconnection of the floodplain did tend to strand abnormally high numbers of some species.”

- *Poor Isolated and Refugial Pool Conditions*

- Regarding the concern of refugial and isolated pool conditions, studies on the minnow show that they have a “remarkable tolerance to low dissolved oxygen concentrations and elevated water temperature.”
- Possible interpretation means that water quality in ponds and refugial pools might not be as great a concern as originally thought.
- The contractors speculate that the lack of feeding habitat might be a probable cause for why the minnow does not live past the first or second spawn.
 - In the confined channel over much of the MRG, potential food for the minnow has been scoured away. This is supported by modeling completed that indicates quality feeding and rearing habitat is a small percentage of the occupied spaces.
 - Considering that the minnow uses the vast amount energy on (1) overwintering and (2) egg and sperm production just prior to a (3) spring pulse spawn that requires maintaining water position in high flows, the contractors speculate that a lack of feeding habitat is a probable cause for why the minnow are reported to only live just beyond their first or second spawn.
- The contractors hypothesize that “connected, low-flow environments with abundant food supplies (floodplains) are critical for the survival of post-spawn adult minnow, and key to increased population abundance, a viable minnow population, and recovery of the species.”
- Conclusions and Recommendations include (but are not limited to):
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 - During the course of the work, the contractors identified 103 potential sites for restoration projects for flycatcher habitats. These sites were chosen based on the spatial intersection of tamarisk dominated stands with existing flycatcher breeding areas
 - The results and conclusions of the work include (but are not limited to):

- 25 HR Site ID maps provide candidate locations for consideration and further investigation;
- the salt cedar beetle is here, throughout the state, and the impacts to flycatcher habitat have already begun and will continue;
- preemptive, restoration measures are needed *now*;
- *Recommendation*: Periodic updates of vegetation mapping and FLO-2D are needed
 - The highest priority locations identified would be those with current (2010-2013) nesting activity due to nest site fidelity.
 - Some of the existing flycatcher sites may have mixed vegetation with salt cedar – the influx of the tamarisk beetle is a pressing concern that needs to be addressed.

Approval of May 20th, 2014 HRW Meeting Notes

- With no objections or concerns voiced, the May 20th, 2014 meeting notes were approved for finalization with no changes.

May 20th, 2014 HRW Action Item Review:

- Rick Billings will send a reminder email to David Gensler about planning the second spawning spike to be accomplished through a change in Isleta operations. Ideally, the spike will occur after Memorial Day (Monday, May 26). – *completed*
- Brooke Wyman will provide a write up on the monitoring in the drains for the MAT meeting on Tuesday, May 27. – *completed*
 - MRGCD awarded the contract and the final permit approvals from the Service have been received. The intent is to begin the monitoring work this Wednesday.

Review and discussion of 2013 Habitat Effectiveness Monitoring Report

- At the April meeting, the 2013 Habitat Effectiveness Monitoring Report was projected for review, but members wanted the opportunity for more review time.
 - The report is based on an analysis of 3 years of monitoring data and offers a summary of the analysis of the monitoring site by site and concludes with recommendations on potential future work. Unfortunately, there is a lack of “consistencies between the years” due to the lack of water.
 - One criticism of the report is that a lot of the data was not collected with specific criteria in mind so it is hard to determine what the data is actually indicating.
- The contractor is seeking workgroup review and feedback (edits, comments, etc.) but would like to finalize the report as soon as possible.
 - Attendees agreed to review the draft report individual and come prepared for group discussion and feedback at the August meeting.

Reach-specific projects and areas for development in the 5-year HR Plan

- This discussion was postponed pending the receipt of the *Ecohydrological Relationships along the MRG of NM for the Endangered RGSM and Habitat Relationships along the MRG of NM the Endangered Southwestern Willow Flycatcher* reports.
- Attendees would like to consider the results and recommendations of the 2 reports, how those fit with recent and predicted flows and determine whether to incorporate any recommendations into the 5-Year HR Plan for potential future reach-specific projects.

Next Meeting: August 19th, 2014 from 12:30 to 3:30 at Reclamation

- Tentative agenda items include: (1) Population Monitoring Presentation; (2) SWCA Presentation; (3) final review of the 2013 Habitat Effectiveness Monitoring Report; (4) Update on the MRGCD Refugial Habitat Suitability Monitoring of Drain Outfalls;
- September Tentative Agenda Items: (1) Todd Caplan (GeoSystems) to present on potential/future ISC restoration projects; (2) Corps' Phase I Summary and Update on Phase II (Ondrea Hummel)
- October Tentative Agenda Items: (1) ISC Water Trust Board Grant Restoration Project Update
- Future Agenda Items: (1) HR Site Descriptions (built dates, if maintained, acres included, reference to specific reports, etc.) for the GIS/Map portion of the database. Tags for HR sites; (2) Review map presentation in/on DBMS - identifying needs and fixing; (3) Discussion on development of 10-year monitoring plan;
- Future Research/Study/Experiments: (1) location of minnow eggs – leaf litter areas, hydrostatic attachment to reeds, etc.; (2) comparing the survival of minnow fries at 15°C to determine if there is a genetic component to survival; and if so, then develop a stock that can survive and reproduce; (3) determine why the Pecos' hybognathus wouldn't hybridize with Rio Grande Silvery Minnow (hybognathus amarus) – determine if the Pecos minnow is actually a hybrid with the Plains Minnow (hybognathus placitus). If so, the Pecos' population could be replaced with the silvery minnow.

**Habitat Restoration Meeting Attendees
15 July 2014**

NAME	AFFILIATION	PHONE NUMBER	PRIMARY (P) ALTERNATE (A) OTHERS (O)	EMAIL ADDRESS
Rick Billings	ABCWUA	259-0535	CC/HRW Co-Chair	rbillings@abcwua.org
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Mike Marcus	Tetra Tech/Contractor	379-6891	O	mike.marcus@tetrattech.com
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Marta Wood	Alliant Environmental	259-6098	O – Note Taker	mwood@alliantenv.com

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