

**Gila River Basin Native Fish Program Technical Committee Meeting**  
**December 12-13, 2017**  
**BLM – Safford Field Office**  
**711 S. 14<sup>th</sup> Ave Safford, AZ**  
**Call-in Number: (267) 507-0440 Passcode: 130823**

**DRAFT notes**

**Meeting Objectives**

- Review, discuss, and revise CAP 5-yr Strategic Plan
- Discuss outputs from the August Workshop
- Provide updates on 2017 accomplishments and 2018 work planned
- Discuss and prioritize 2019 proposed projects and Tier 2 projects
- Provide updates on other projects

**Participants – see page 14**

**DAY 1**

**Strategic Planning**

**Background – Doug Duncan**

Doug Duncan from the US Fish and Wildlife Service (USFWS) delivered background information on the development of the existing Strategic Plan, the review and recommendations from the Wildlife Management Institute

- In 2003, based on the recovery plans for the 4 jeopardy fish species, the CAP Fund Transfer Program produced a document titled “Long-term Direction, Project Allocation Guidance, and Rationale” (Guidance Document) “to define the long-term goals, breadth, priorities, and processes of the 25-year CAP Fund Transfer Program.” The overall program goals set forth in the Guidance Document were described as those established by the biological opinions:
- Wildlife Management Institute (WMI) review:
  - WMI found both the CAP Fund Transfer Program “Long-term Direction, Project Allocation Guidance, and Rationale” (Guidance Document) and “Central Arizona Project Fund Transfer Program Strategic Plan 2003-2008” (Strategic Plan) had limited usefulness in encouraging rigorous project review, establishing priorities, and ensuring that funded projects address high priority tasks in the recovery plans. WMI found relationships were unclear among the recovery plans, Guidance Document, and Strategic Plan.
  - WMI recommends the current Guidance Document and Strategic Plan be replaced with a viable Strategic Plan that clearly states the long-term vision, mission, and goals of the program. Accompanying that long-term view should be a set of objectives designed to guide actions that advance toward Strategic Plan priorities within a 5-year period.
  - The remaining 96 project blurbs made no mention of specific recovery plan tasks or priorities. No blurb identified how a project addressed the program priorities and funding criteria established in the Guidance Document. No blurb referenced Strategic Plan recovery needs, goals, or objectives that would be met by a project.
- WMI Recommendations

- Recommendation 7: WMI recommends the Guidance Document be eliminated and replaced with a viable Strategic Plan that includes both a long-term vision and the 5-year objectives for the CAP Fund Transfer Program
  - Recommendation 8: WMI recommends the CAP Fund Transfer Program Strategic Plan be completely rewritten to clearly state the long-term vision, mission and goals of the program. Accompanying that long-term view should be a set of objectives designed to guide actions that advance toward Program priorities within a 5-year period. Program staff should seek help of outside professional planners as the new Strategic Plan is developed. The newly developed Strategic Plan should be updated at least every 5 years or as specifically needed.
  - Recommendation 9: The revised CAP Fund Transfer Program Strategic Plan should make clear how its priorities reflect or deviate from the priorities established in relevant recovery plans.
  - Recommendation 10: To be effective, the CAP Fund Transfer Program Strategic Plan must be a living document that clearly provides the framework for all program expenditures in relation to program goals and vision. All actions taken by both committees must be referenced back to Strategic Plan goals and objectives.
- Doug may not be able assist, as his time to work on GRBNFCP activities may be limited
  - The group may need to ask: what is needed; how does the strategic plan work for the program, and what needs to be added (e.g. sections like Habitat enhancements)?

#### **Review of current Strategic Plan – Bill Stewart**

Bill Stewart (BOR) reviewed all the Strategic Plan goals and objectives with the technical committee and larger group, edits were made in real-time regarding clarity, feasibility and overall document formatting.

- A general walk-through with participants of the SP (recovery needs, evaluation criteria, process highlighted, budget requests) highlighted

#### **Workshop output incorporation**

A brief overview of the structure of, and products from, the August GRBNFCP Workshop was given and how they can be woven into the existing strategic plan.

- Evaluate what has been accomplished by the program (capture historical knowledge)
- Focused discussions for subsequent revision of the Strategic Plan
- Sessions focused on hatchery, propagation and refuges; special status species; non-native aquatic management; long-term monitoring of non-native aquatic species, habitat enhancement projects; new and emerging technologies; and improving communications.
- Participant questionnaire: sent out pre-workshop,

#### **General Comments/considerations:**

The group gave feedback on the structure, format, focus areas and provided

- Structure/Format
  - Consider simpler structure of SP; “Research, Monitor, Manage,” or some other form like Conservation and Recovery actions..
    - Consider more appropriate headings for the SP
  - *Scientific Foundation* as a Recovery Need should be later in the document. Put *Prevent Extinction* and *Manage Toward Recovery* first. Doug was still not sure he agree with this, as science underpins everything we do, including the three Rs of conservation biology.
  - First 5 (Goals and Objectives) in *Scientific Foundation* are so similar, consider consolidating if possible.
  - Communication/collaboration- This program needs to tie into other Plans, NFCT, agencies- include in overarching language in the SP
  - Acquisition needs more discussion overall and where it lives within the Recovery Need

- Focus
  - Are Goals currently tied to money/funding?
    - If a Goal is not tied to money/funding, they should still be in the SP but will need to focus/be framed on increasing partnerships
  - Seems odd that the focus in SP isn't on the wild populations and seems to focus on the hatchery populations. This document should not confuse Hatchery/refuge and wild.
  - SP could be more aligned with Recovery Plans –
    - **\*\*caution to make sure it's following the most recent Recovery Plan.\*\***
- General Comments
  - At what level are we protecting or conserving fish through use of hatchery or other refuges?
    - Are we talking about every pop? How will we define? Lineages? Are they firmly established?
      - Yes, established lineages management units are available (except for new ones)
  - Need: more tools for eradication, this should be reflected in SP

### **Timeline in Strategic Plan**

It was discussed that Annual Reports/Annual Work Plans need to have clear timelines and systematic tracking and success metrics, this draft timeline was formed by the group:

- November
  - Write project concepts (short description with cost estimate)
- December
  - Send to Technical Committee 1 week before meeting
  - Technical meeting (gather feedback)
- January/February
  - Concepts to policy committee before meeting (end Jan/Feb) – Policy committee makes determinations on funding of projects
    - Policy committee can convene a meeting or reach out for questions.
    - Project concepts are broadened, budgets refined, etc.. into a scope of work.
    - If the project doesn't get it in by April, then October for the following FY (if missed)
- March
  - 1<sup>st</sup> deadline would give BOR a month to submit a project packet by April 1.
- April
  - BOR submits project packets
- Considerations
  - Challenge to get funding out in the same year therefore it's often October. The difference between the calendar year and the agencies' fiscal year can result in projects being delayed is projects are submitted late.
  - How do we address same FY issues? Need to include in SP
    - Supplemental agreements, mods, etc
    - Policy committee reviews and approves same FY issues..
  - Timing of reporting – improvements:
    - February – project reports due
    - March – comments on reports back to project lead
    - April – final reports complete and posted to website
- **\*\*Project concept** (short description with cost estimate) will be used instead of blurb

Bill is a little worried about meeting this deadline and may suggest an alternative timeline in the strategic plan.

## Appendices review – Evaluation Form

The discussion about the evaluation form within the Strategic Plan was rescheduled for after the 2017 Project Accomplishment portion of Day 1.

### Updates

- Upcoming Workshop ideas – *Bill Stewart, BOR*
  - Monitoring Workshop (based on August workshop comments)
    - To be held in 2018
    - Bill will reach out/hire contractor to begin workshop development
  - Spikedace/Loach Minnow PVA Workshop –
    - Julie Carter has been working with BOR on this
    - Middle Rio Grande did a PVA workshop on silvery minnow. The group can utilize lessons learned from this, although it is not clear if the work was ever finished.
    - A report was written in 2012 but not finalized, may be a good resource.
- Website – feedback from committee
  - Style: 5 conservation measures across the top with dropdowns
    - There could be a link to a storymap for a more public friendly site
  - **Projects** – completion reports (e.g. Supaverd) by year, longer term projects, will get updated with more reports, will also update tasks
  - **Hatcheries** – could add ASU and topminnow, could be used to highlight a project to tell a story
    - Could link to ARCC contact info, direction, etc.
    - Add hatchery numbers, populations that exist, keep a running tab/table, past reports
  - **Physical fish barriers** – pictures of each, NEPA/EA docs for each, pictures of construction for each, get design specs uploaded for others to use these efforts as a model for other areas
  - **Electrical barriers** – some have been decommissioned, general information and reports, construction reports will be here
  - **Canal monitoring** – yearly reports and five year reports
  - **Long-term monitoring** – annual reports from AGFD, looking to have an interactive map with sites (each site has the report attached) monitored over the course of the five years, linked to the monitoring page
  - **I&E** – opportunity for storymap
    - Partners – listed with icons/images
    - Most information copied from the previous site
    - Add Marsh education on the native species
    - Link to eDNA map for species
  - **Administrative** (new tab)
    - Repository for meeting information, workshop reports, etc.
    - Goals and background with links
    - Budget and work plan – include project concepts, with budgets for FYs
    - Meetings and workshops – a table with agendas, notes, dates, etc.
    - Committee members – need pictures and with contact info, add a section for affiliates
  - 3-4 months until it is live
- Outreach/Website sub-committee
  - **Mary, Yvette, Doug and Stuart to work with Bill on website content (think about the PIOs from the agencies as additional members on the subcommittee)**
    - How do we move forward and who needs to be added to help in developing more content?
    - Define an associated public friendly option (AGFD website, storymap, other?)
    - Consider a domain name that is easier to find (if possible within the federal agency restrictions)

## 2017 Accomplishments

Each agency provided a handout and/or a verbal report of the work accomplished in 2017, the highlights from the work and the status moving forward.

- AZGFD – *Tony Robinson* – ([see Appendix A](#))
  - Trends from year to year will be included in the annual report
  - Established Topminnow at Wildcat Canyon
  - Fresno – discussion with land owner about bringing fish from there to ARCC
- NMGFD – *Mike Ruhl and Bryan Ferguson* – ([see Appendix A](#))
  - Turkey Creek inventory (last inventory) – mostly dry
  - 117 Gila Forks Loach Minnow to ARCC
  - Fewer non-natives than before (by visual assessment, data not entered yet) – Gila River
  - Annual 3 species meeting (work with roundtail chub): USFWS will be leaving Gila Chub listed, group is engaged in a range-wide database effort leading to a range-wide species assessment for Gila Chub, likely a costly effort (includes 7 states), they will be looking for the on-the-ground data for that effort from agencies here (AGFD, USFWS, BOR, BLM, USFS, etc.).
- BLM (Safford, AZ) – *Heidi Blasius* – (*see handouts*)
  - Bonita creek (started mechanical removal effort in 2009) in 2016 more effort put forth in eradicating the green sunfish.
  - Aravaipa Creek – yellow bullhead were found in areas not typically found before, green sunfish eradication (Horse Camp site) seems successful in the main stem.
- BLM (Las Cruces, NM) – *Tim Frey* - (*see handout*)
  - Blue Creek was dry previously, no fish in the pools, upstream in 2016 and fish were found
  - Step pool structure, might be a good area for refugia, fish there for stationing or long-term. Inserting data loggers in the spring 2018
    - Habitat? – below the step pool, fairly small, but good ripple habitat and some pools, could be good chub habitat
  - Blue Creek and Apache Box and main stem sites are different than the NMDGF – BLM did the lower BLM sites (part of the CAP) – could be important for upcoming diversion project
- ASU Topminnow holding – *Doug Duncan* – ([see Appendix A](#))
  - Rediscovered in Nogales reach of the Santa Cruz, need to be brought into the facility
    - Source: markers indicating genes from Lower Sonoita Creek, some unknown alleles from Santa Cruz in Mexico (likely)
    - Discussion in this group about funding work in Mexico?
      - None, to date...
  - Rediscovered in Tucson reach of the Santa Cruz River in the past month in the effluent, first time since 1943 (this reach is fed by effluent)
    - Genetic typing of both to see where they are coming from
    - There may be a need to bring both populations into ASU if so the agreement with ASU will need to be amended.
  - Budget shortfall due to holding animal unit fees

## Project Evaluation Form

The group reviewed and discussed the relevance and potential updates needed for a project evaluation form that justifies project funding based on species recovery, and one that evaluates all projects with the same metrics.

- Evaluation type
  - A standardized approach will be executed in the future. Discuss and rated.
    - “please show me which species it benefits and which tasks it addresses..”
  - Good to have the form, this one is simple and hasn’t been used consistently

- Difficulty is applying it to the broad spectrum of projects – not good at comparing agencies with lots of projects (high score) vs. agencies that survey a few streams
- [Convert existing evaluation into a form that has criteria for funding.](#)
- Score each project as a group and agree on the evaluation (as the technical committee meeting)
- Project proponent indicates what tasks are addressed in the concept of the project (blurb)
- Funding
  - Justifying funding is key and how it ties back to Goals/objectives and Recovery Plans.
  - If someone really wants/a project really needs some funding, there should be a way to line out the things that are important to the program that leads to funding
  - Continued funding should be evaluated as well, but maybe the form should be used for Tier 2 (Tier 2 projects are discretionary Reclamation projects that are in addition to the \$550,000 identified in the 2008 BO.)
- Tier 2 Projects
  - Evaluation has been typically used for Tier 2 only but it was intended to be used for all projects.
  - Two tiers: open submission and RFP for program driven needs.
    - Tier 1 (agency funding) are projects that are of the highest priority and funded first. Funding for these projects is \$550,000 as identified in the 2008 BO.
    - Are Tier 2 are funded if any funding is available after Tier 1.
- [Technical committee will create a fillable PDF for after this meeting.](#) –
  - [Bill will convene a call after this meeting.](#)
  - [Need to re-evaluate criteria to identify justification for the project](#)

## DAY 2

### 2018 Work Planned

- AZGFD – *Tony Robinson* ([see Appendix B](#))
  - Red Tank Draw (4 removals). 2 tanks in Rarick, 2 in Mullican.. both have non-natives.
    - Some relationships issues with the private land owner.
  - Sharp Spring nonnative control – (afterwards stock topminnow and chub)
  - Boyce Thompson Arboretum nonnative control – waiting for the facility to get funding for new well.
- NMGFD – *Mike Ruhl and Bryan Ferguson* ([see Appendix B](#))
  - Doug(USFWS) would like to join NM at Burro Creek.
- BLM (Safford) – *Heidi Blasius*
  - Bonita creek- 15 trips to continue green sunfish removal. If they are detected, the effort will increase
  - Getting another shared intern in March
  - Aravaipa- 4 trips to remove yellow bullhead
- BLM (NM) – *Tim Frey*
  - Continue habitat assessment on Apache Creek for possible refugia
    - 1 logger in the upper portion
    - Using Sticks to see if there is continuity of flow
  - Blue Creek- getting another HOB0; allotment changed hands therefore private land above may be problematic to get into
    - Consider ‘grabs’ below and eDNA surveys. Last time surveys were done in upper reach was in the 80’s
  - Nichols Canyon- fence can be moved up (1-2 miles). Depending on permittee
    - Gap fence above the confluence of Blue creek would result in less grazing in the mainstem
  - Grazing impacts on fish habitat

- Observations: In times of less grazing, the stream channel changes and loach minnow habitat changes. With some managed grazing, would there be increase in habitat.
      - Gila Box where there is trespass cattle, pick up very few natives. OHV areas have more natives.. Deep pools from disturbance changes pool structure.
      - Habitat complexity is key
      - Blue River, trespass cattle, but very few..
      - Gila sites, experience grazing and there are more fish
  - Lower Box stretch – hasn't been actively monitored in the past, but sampling will be done May/June in low water. Then put this stretch on an annual/biannual monitoring schedule
  - Interest in float the middle box, to determine the fish assemblage.
  - Field visit- across the program might be a good avenue for learning
    - How to standardize monitoring protocols, other types of learning.
- ASU Topminnow holding – *Doug Duncan*
  - Two captive populations (Monkey Spring and Cienaga Creek) will be augmented
  - Determine which lineages will be housed at ASU
  - May have enough replicated elsewhere so the security of ASU is less needed.
  - Every 2-3 years 100-200 fish are available
  - Gila Topminnow genetics project needs fish, good to compare for wild genetics; need to talk about approach?
    - More discussion needed from Doug and Zack for Bylas.
    - Looking for 30 fish

## 2019 Proposed Projects - Project proposal, Q&A and prioritize

Tracking sheet from 2016-2018 projects – summary of actions, similar to what we will work out for 2019. There are tasks included that are more Reclamation's responsibility (not included in the funds transfer).

Break out the hatchery focused tasks from within projects

Format discussion

- 2019 proposed projects will be consolidated into a spreadsheet for the Policy Committee
- Makes it easier to follow the NM actions, highlights partnerships
- AZGFD – *Tony Robinson* ([see Appendix C](#))
  - ALL are continuing projects, with the exception of Eagle creek if fish barrier is completed in 2018
    - Updates/changes in projects to the 2018 work (see handout) should be documented in the notes and then sent to the policy committee, Tony's handout may be sufficient
    - For the projects that were removed, the money/time allocated for those will be spent on the other projects still on the list.
  - 2019 projects that have funding allocated to them, there will need to be justification given to the policy committee
  - [Cross reference the existing and new projects \(in yellow\) to see if new additions \(e.g. Expand Gila Chub Populations in Harden Cienaga Creek\) will be needed in the existing agreement with AGFD](#)
  - General schedule for piscicides projects for AGFD– Haigler Creek, West Fork Black River, Virgin River, Bear Wallow Creek, are all still priorities . A large-scale project (like Virgin River) will likely be implemented in 2018
  - Money that goes over the \$550,000 per year, then gets taken out of the longer term total
- NMGFD – *Mike Ruhl and Bryan Ferguson* ([See Appendix C](#))
  - All projects are continuing
  - Middle Fork inventory will be complete and then move to an inventory of another stream – a rotating inventory task

- Rename the task “remote inventory” and include Middle, East Fork, Main Stem, etc. for the proposed 2019 projects and update the budget numbers, include the new project concept/blurb/description/summary
  - Partner on the eDNA with FS (sampling by FS and NMDGF detected spikedeace, which may not have been detected with smaller sample size of one agency)
- BLM (Safford) – *Heidi Blasius*
  - Receives \$18,000 – typically uses that money to hire interns or contractors to assist with nonnative removal
  - Removals target 2 species in both Bonita and Aravaipa creeks
  - Closed-to fishing signs were installed after the chemical renovation in Bonita Creek
  - Mechanical removals have been successful. In response native fishes have increased in abundance (Gila chub, lowland leopard frogs)
  - 2019 – focus on yellow bullhead in main stem of Aravaipa, this may help spikedeace move down further, and continuing existing work.
  - Cost of work exceeds the \$18,000 (salary, trucks, equipment) GRBNFCP funds.
  - Continue utilize partnerships in on the ground work
- BLM (NM) – *Tim Frey*
  - 2019 – proposing to continue work, 2018 work could carry over
  - Blue Creek main stem and Apache creek
  - Money used for intern and travel
- ASU topminnow holding – *Doug Duncan*
  - Waiting on budget document from ASU, no new updates
  - Additional topminnow have come in, creating a shortfall
  - Further discussion on the money it takes to produce fish, primary intent should be refuge
  - Three years remaining on funding
- Q&A
- Prioritization

### Project brainstorm/prioritization - Tier 2 projects

Projects identified in 2017 were listed and new project ideas added (by brainstorm; in red) for later prioritization. Tom Dowling joined the meeting by phone to discuss the Chub DNA project, with a subsequent questions and answer session.

- Review current list of proposed projects
  - Mechanical removal crew
    - Hire a crew or a strike team from different agencies and responding would be on each agencies dime. Could be that Reclamation hires 5 interns and then each agency can ask for help in certain locations. Crew will have a list of prioritized mechanical removal projects. If a multi-agency team, having coordinated communication could lead to some projects having no cost.
  - Scott Bonar’s work
    - Correlate height of peak, length of time of flow with interactions between native and nonnative fish species. Riparian vegetation and how it affects fish communities
    - Most of this work is Gila River Basin streams below the Mogollon Rim
    - Data is pretty sparse on spikedeace and loach minnow
    - eDNA projects using the techniques from the Midwest. There is controversy surrounding the efficacy; new techniques and refinements are necessary to determine how to best sample
  - Genetic work



- make sure captive populations and wild replicate populations are genetically representative of wild remnant populations
  - recovery plans don't have genetic information because the initial genetic work was done after the writing of the recovery plans
  - Combined to say "Evaluate if hatchery/captive and reestablished populations are genetically representative or remnant populations"
    - Could be a phased approach
  - **Addition – Genetic tools ( $N_b$ ) for number of breeders in the wild, effective population size evaluation**
- eDNA
  - Confirming non-native eradication – use this tool with the mechanical removal crew (above)
  - **Addition – further refinement of it as a tool for spinedace and loach minnow**
- Factors that determine population establishment (repatriation success)... This is understanding why a species didn't establish in a water (e.g. Redfield Canyon) – thermal tolerance (are studies of upper thermal tolerance, but not lower thermal tolerance), determine the suite of variables that need to be measured. This could become costly
- Survey stock tanks in the Verde watershed – Upper Verde, ahead of the barrier construction
  - Revisit the report from Shaula
- Hatchery research
  - Year-round spawning
  - **Addition - Flow conditioned pupfish**
  - **Addition - Understand how the practices in the hatchery can contribute to successful repatriation**
- Reclamation equipment – stockpiling equipment for use across agencies/orgs
- Funds FS or contractor
  - Would need a list of projects that are in need (actions: renovate and repatriate)
- Investigate "soft release," and artificial structures at stocking sites
- Razorback movement
- Campbell Blue Creek brown trout control
- Lethal Grid electroshock – high powered generators in stock tanks for non-native eradication, electric seine, potential project with a grad student
- **Addition – Radio tracking study of fish during/after high flow events/flood events**
- Projects for revisiting
  - Topminnow genetics
  - Supermale project
  - eDNA (range wide) detection of spinedace and loach minnow
  - Sands Draw Habitat work
  - Coronado NF – fish and frogs in stock tanks
- **Chub DNA project: Tom Dowling**
  - There is sequencing information now available to determine genetic differences
  - Answers the question: are there adaptive differences between the 3 species
  - Important to come to scientific resolution on this issue and look at functional loci
    - Means of sub sampling the genome, 10,000 loci.
    - Focus on functional genes
  - Expect to find differences at this level
  - Hybridization, the same, or not.
  - Q: How do you know which genes are functional?
    - Functional gene work is known for Chub; done based on Zebra fish work (it has been functionally annotated)

- Q: How do you delineate a species vs differences of populations?
      - Microsatellites are too sensitive at the species level. Functional loci have much lower sensitivity, therefore phylogenies help track patterns of evolution in a better way than micro-satellites
    - Q: Are there other examples of using functional genes to determine species discrimination?
      - Yes, transcriptomics (how this is done) is happening in other labs (with corral) with good results.
    - Q: If you had the funding, when could you start?
      - Sometime late spring/early summer (June or July)
  - Surface water rights: Aravaipa reports should be looked into.
    - **Can get this online from the Arizona Department of Water Resources**
    - Hire someone for a specific report?
    - Beyond the scope of this program.
    - Connection to the land would be needed; program doesn't have this
- Restoration/mechanical removals
  - Success of mechanical removal projects can be hard to determine if habitat is complex; easier in simple and smaller systems
  - Important factors to consider
    - What is the goal? Suppression/eradication
    - Timeline
    - Measure of success?
    - What is the endpoint? Eradication no matter how long, or look at it after 3-5 years and reevaluate if it has worked.
    - How much effort (and for how long) is needed to complete the project/eradication?
  - Look at the length of time that there have not been non-natives caught/seen/etc. and the feasibility of complete eradication
  - Restoration Priorities – with input from the group
    - Red Tank Draw – Get input from Region II NFCT and then decide.
    - Sharp Spring – native fish are absent so lowest priority
    - Boyce Thompson – Tony decides

**Tier 2 Project Prioritization** – The group prioritized all projects by having each participant vote on their top three priorities, and the projects with the most votes were given the highest priority. Then the group prioritized only the projects requiring minimal funding (each participant voted on only one project).

Potential funding estimates were delineated by \$=10k-50K, \$\$=50k-100, \$\$\$= 100K and up. In the list below, the number in parentheses is the number of votes each project received.

**Prioritized list (no filter by financial constraints)**

1. Evaluate if hatchery/captive re-established populations are genetically representative of remnant populations (8) \$\$\$
2. eDNA – Developing the tool for further refinement for spikedace and loachminnow (7) \$\$
3. Chub DNA project (see dialogue below) (6) \$\$\$
4. Effective population size evaluation  $N_b$  (5) \$\$
5. Range wide spikedace and loach minnow assessment of variables that affect establishment success (4) \$\$\$
6. Research lethal grid electroshocking for non-native removal (3) \$\$\$
7. Non-native removal of yellow bullhead and green sunfish in Aravaipa (3) \$.5
8. Factors (all species) that determine success/failure of re-established populations (3) \$\$\$
9. On call mechanical removal crew (2) \$.5
10. Ammonia testing in a flowing system (1) \$\$

11. Survey Upper Verde stock tanks (1) \$\$
12. Reclamation equipment (1) \$.5
13. Pupfish/top minnow pond habitat maintenance work (1) \$
14. eDNA (range wide) confirming non-native eradication-use of the tool (0) \$
15. Weir at Morgan City wash- replacement (0) \$
16. Hatchery research on year-round spawning (0) \$
17. Physical manipulation of substrate to promote spawning of loachminnow (0) \$\$
18. Contractor for compliance work (0) \$\$
19. Thinning of riparian vegetation for habitat improvement for Gila Topminnow (0) \$\$
20. T4 Springs improvement (0) \$\$\$
21. Bog hole improvement – topminnow, pupfish Gila chub (0)\$\$\$
22. Understand how hatchery operations can influence/contribute to successful repatriation (0) \$\$
23. Radio study to follow fish after flood events (0)\$\$\$
24. Research on flow conditioned pupfish (0) \$
25. Razorback movement/survival study in the Verde River (0) \$\$\$
26. Removal of non-native trout in Campbell Blue Creek (0) \$.5

**Prioritized list (filtered by those projects under \$.5)**

1. On-call mechanical removal crew (8) \$.5
  2. Non-native removal of yellow bullhead and green sunfish in Aravaipa Creek (5) \$.5
  3. Weir at Morgan City wash- replacement (2) \$
  4. Pupfish/top minnow pond habitat maintenance work (1) \$
  5. Reclamation equipment (1) \$.5
- **Discussion on the Chub DNA project after projects were prioritized**
    - Chub DNA project – does this fall within the goal of the Program?
 

Discussion:

      - Split the streams out by species (when litigation with mining companies to show that most streams don't have all species of concern)
      - This informs management decisions – helpful for recovery.
      - Replicate lineages or establish mixed-lineage populations?
      - Would like to see evidence of using markers, as opposed to the current methodology – there are two other laboratories that are conducting genetics work, seeing those reports and the results before we jump into funding a similar effort
      - Management in uncertainty is what determines active management right now in this environment
      - There was concern from someone about understanding and accepting the methodology of the project as is, may need modifications
      - Stock a lineage now, when it is unknown to the landowner if they will have a ESA listed species on their property – risk
      - Workshop on understanding the genetics, what the questions are, what the standard is or if it exists

**Project Updates**

- Chub update - *Mary Richardson*
  - Uncertainty on how the Service would move forward on Gila Chub (roundtail and headwater have no status under ESA), range-wide species assessment (SSA), accepting AFS determination, need to revisit the delisting based on the uncertainty of taxonomic details
  - Region 6 Service working with AZ and NM

- Delay the SSA until the database is complete (2 yrs out) – Gary Frasier stated that the states would hold off on the SSA until the database is complete (database from all states and would inform the SSA)
- SSA would be presented to the 3 Species Team to make sure everyone is ready to go when the database is ready
- Determine the species status across the range, that is hard to know, thus delisting it altogether is very risky
- SSA would be done in 12 months if there was a petition from an organization
- Service indicated that SSA teams will have 2 state representatives (one from GFD and one from governor’s office) from each state (7 states = 14 people + USFWS people)
  - CBD may litigate because the process is politicized and is seen as violating FACA
- Subspecies can be listed
- The database
  - Effort has been going on for a while (2 firms have failed to develop a toolset). WYGES (Shannon Delbecky) has a good track record with developing fish database (cutthroat trout). It will likely cost \$130,000 in 3 phases to complete. UT paying for phase 1 and then NM paying for phase 2. Phase 3 (inputting data)
  - Discrepancies in sampling will prove challenging
  - Now more emphasis on historic versus current distribution
- Loach Minnow Recovery plan update, *Mary Richardson* ([See Appendix D](#))
  - Moving forward with updated versions of the draft recovery plans (loach minnow and spikedace), in the interim the service has changed the way they do recovery plans.
  - Recovery Plan and Implementation – dividing the old recovery plan into 3 pieces:
    - First with an SSA (foundational part of the recovery plan) or a biological report,
    - Second part is the recovery plan (with recovery criteria that is quantitative) and the
    - The third part is the implementation strategy (short term revisable document) – an adaptive management version without having to put it back into the federal register.
  - Due in June 2018 (loach minnow) and June 2019 (spikedace)
- Monitoring Contract/planned surveys - *Lara Upton/Bill Stewart*
  - Contract to Marsh and Associates
  - Monitor 15 streams per year, sites have been vetted, with new info that can change
  - Monitor places that don’t get enough attention – original list was 80+ sites
  - The protocol – how does that fit in with other work being done, especially across statelines, need to have comparable methodology
  - Monitoring workshop – is this beneficial to have sooner rather than later
    - [Tony, Lara, Yvette, Bryan – to help with developing the workshop](#)
  - \*\*If there is more information about where surveys are being done, or should be done, that would be helpful
- eDNA project review - *Yvette Paroz*
  - Began with determining presence and absence for species of trout . Then development of markers for spikedace and loachminnow.
  - Range-wide looking for the tributaries the younger trout are using
  - Next step is to take the markers and start applying them – having a tool that is sensitive enough to pick up markers
  - Then, develop a database (like the trout) to see where the samples have been taken and where the markers are present
  - Some funding for crews to go to areas that are difficult to get into, and some funding to process samples through the agreement
  - Agreement – species marker development (\$7500 per marker)
    - Prioritize – green sunfish, roundtail, pupfish, Sonora sucker, and others

- Next meeting – prioritize the list for funding new markers
  - Half of the sample taken is frozen so that when new parkers are developed the frozen sample can then be run again
- yy Male update - *Scott Bonar/Bill Stewart*
  - Recently funded project from the Program
  - YY technology (used to reduce populations– catfishes, carps, etc.). Produce YY males and stock them to crash the wild population of nonnative fish as YY males only produce male offspring.
  - Red shiner, green sunfish, and others stocked with a sterile male – could this suppress populations
    1. Examine feasibility of producing the species (red shiner and maybe green sunfish), short lived will be able to be assessed more quickly (from a PhD)
    2. How effective is this technique? Integrated: removal and stocking with yy male – especially if it is species dependent
    3. Model growth rates, reproductive rates, population characteristics to determine which species will be feasible in the wild
  - UofA has funding but is waiting on the grad student
    - Chad Teal (MS University of Miami), background in aquaculture (fresh and marine), start date would be January 2018
    - Funding for 4 years of Chad’s project, heritage program grant could (if selected) help with more funding
- Gila Topminnow – *Doug Duncan*
- Barrier update – *Bill Stewart (see Appendix D)*
  - Redfield Canyon – waiting on approval – 2019
  - Investigating 2 barriers on the upper Verde (20 miles and 40 miles downstream for headwaters) – hoping to start NEPA soon (waiting on Prescott National Forest Supervisor to be in place before starting NEPA)
  - Committed to 12 barriers by 2023, 8 completed so far.
  - Blue River – built river left there is some aggradation, leaving only a one-foot drop (ideally 4 foot), some sediment modeling to determine how functional it is, during 2 year events that happens and then 10 year events clear the barrier back to normal. Looking into altering the barrier to alleviate aggradation
    - Alter structure or maintenance? Due to remoteness the alteration may be cost effective compared to maintaining yearly
- WMAT/White River Loach Minnow update –*Doug Duncan*
  - Lineage of loach minnow in the east fork of the white river on WMAT
  - Co-op agreement 4 years ago, for surveys and assistance for getting samples to ARCC – seem amenable to continuing the arrangement and they would like first dibs on fish to repatriate on tribal lands
  - They are interested in continuing the effort (contract has run out)
  - Another agreement forthcoming (in the works), interested in doing eDNA/DNA on the lineage
    - Potentially tagging on with the effort with FS, but hesitant about where the information (specific to the tribal nations) would be kept...
      - Data/info can be excluded from the website, could be FOIA-able, data may go through Univ. of Montana -Yvette willing to help
  - No final report yet to determine the level of detail about monitoring data/info
  - May include habitat assessments in the new agreement (pending master agreement and funding)
- ARCC Renovation update – *Josh Walters and Tony Robinson (see Appendix D)*
  - Funding – phase 3 was funded, future re-obligation of funds back to ARCC for phase 3 with a 5 year timeline for completion.

## Next Steps

- **Desert Fishes Council on FB – like it and update work that is being done by your organization**
- **Madrean Conference – May 14-18<sup>th</sup> – call for fish papers, relatively easy to get something published there**

**Plus/Delta**

Plus

- Partner presence
- Timing in December is good (second week)
- Handouts for the level of detail in updates
- SDR presence/facilitation
- 1-2 day was good
- Research invitation was good to hear what the needs for the Program are

Delta

- Meeting in New Mexico, once every four years (Silver City/Gallup)
- Next meeting Pinetop/northeastern AZ – show and tell for Burro Cienega for a subsequent meeting
- Phone/teleconference improvement needed

**Participant list**

Bill Stewart	Bureau of Reclamation
Doug Duncan	US Fish and Wildlife Service
Tony Robinson	Arizona Game and Fish Department
Mike Ruhl	New Mexico Department of Game and Fish
Yvette Paroz	US Forest Service
Heidi Blasius	Bureau of Land Management - Arizona
Tim Frey	Bureau of Land Management – New Mexico
Bryan Ferguson	New Mexico Department of Game and Fish
Zac Jackson	US Fish and Wildlife Service
Stuart Wilkins	US Fish and Wildlife Service
Kent Mosher	Arizona Game and Fish Department
Mary Richardson	US Fish and Wildlife Service
Matt O’Neill	US Forest Service
Scott Bonar	University of Arizona
Lara Upton	Marsh and Associates

**Attendance by phone**

Tom Dowling	
Shaula Hedwall	US Fish and Wildlife Service
Julie Carter	Arizona Game and Fish Department

## Appendix A – 2017 Accomplishments

### Arizona Game and Fish Department - GRBNFCP funded 2017 ACCOMPLISHMENTS

Priority Action	Significant Accomplishments
<a href="#">Acquire Spikedace, Loach Minnow and rare populations of other native fish</a>	<p>On November 7, 2017, Department staff collected and transported 160 Spikedace and 100 Loach Minnow from Aravaipa Creek to the Aquatic Research and Conservation Center (ARCC).</p>
<a href="#">Muleshoe ecosystem stream and spring repatriations</a>	<p>During May 30 – June 1, 2017, Department and The Nature Conservancy staff performed a Green Sunfish removal in Redfield Canyon. Single-pass backpack electrofishing was conducted from below the Swamp Springs confluence to the Sunfish Barrier; captured 1 Green Sunfish, 140 Roundtail (Gila) Chub, 76 Sonora Sucker, 1 Gila Topminnow, and 7 Longfin Dace. On May 31, 2017, 20 mini-hoop nets were set in this same section and left to fish overnight. No Green Sunfish were captured; however, 163 chub and 78 Sonora Sucker were captured. On May 31, 2017, 19 mini-hoop nets were set in the perennial section near the wilderness boundary; captured 145 Green Sunfish, 1 Sonora Sucker, and 1 Sonora Mud Turtle. Also fly fished for 50 minutes and captured 20 Green Sunfish. About 300 – 400 Gila Topminnow (adult and YOY) were observed in the main pool. Traps were reset in the same location and left to fish overnight and captured 55 Green Sunfish, 7 Sonora Sucker, and 4 Sonora Mud Turtles were captured. Overall, 221 Green Sunfish were removed from Redfield Canyon.</p> <p>During September 18-20, 2017, monitored various sites. At Mint Spring captured 56 Desert Pupfish. At Upper Bass Canyon captured 25 Gila Topminnow and at Lower Bass Canyon captured 3 Gila Topminnow. At Wildcat Canyon captured 336 Gila Topminnow. In Hot Springs Canyon captured 21 Loach Minnow and 4 Spikedace (both size classes of each species). In upper Redfield Canyon capture 58 Roundtail (Gila) Chub, 28 Sonora Sucker, and 1 Speckled Dace above the waterfall.</p> <p>On September 18, 2017, 574 Gila Topminnow were stocked into Double R Canyon and 128 were moved further upstream in Wildcat Canyon.</p>
<a href="#">Fresno Canyon repatriations</a>	<p>The Department’s Aquatic Wildlife Branch staff coordinated potential native fish conservation actions with the landowner and FWS staff while they surveyed Sheehy Spring and other sites in the San Rafael Valley during June 2017. The number of chub captured in Sheehy Spring decreased from the previous year. The group considered a direct translocation to Pasture 9 tank, so that a backup population could be established there. However, aquatic vegetation in Pasture 9 Tank had grown very dense and only 31 Gila Topminnow were captured, so habitat may not be very suitable for chub.</p>

Priority Action	Significant Accomplishments
<a href="#">Bonita Creek renovation and repatriations</a>	<p>On September 26, 2017, Department staff monitored for Gila Topminnow, Desert Pupfish, and Loach Minnow in Bonita Creek. Collapsible minnow traps were set at the reservation boundary stocking pool (UTM NAD83 12S 634257 3657102) and at the confluence of Midnight Canyon (UTM NAD83 12S 635143 3653278 to 635124 3653274) to monitor for Gila Topminnow. The beaver dam pool at Reservation Boundary where Desert Pupfish were previously stocked was dry, so traps were set downstream from UTM NAD83 12S 634306 365912 to 634320 3656843. Loach Minnow were monitored using single-pass electrofishing at three 100m sites downstream of the Midnight Canyon confluence. Overall, Gila Topminnow continue to persist at the reservation boundary and Midnight Canyon stocking locations; however, no Desert Pupfish nor Loach Minnow were observed during the survey. Tables 4 and 5 summarize the catch for the monitoring. On September 27, 2017, Department, USFWS, and BLM staff reassessed habitat for Loach Minnow between Red Knoll and Midnight Canyon. In this section, there was 520.5 m of riffle habitat that the Department considered was suitable for Loach Minnow.</p>
<a href="#">Gila Topminnow stockings</a>	<p>Black Canyon City Heritage Pond. On 11/20/2017, Department staff surveyed for Desert Pupfish. They set 20 collapsible minnow traps for 2 hours and captured 23 Desert Pupfish (20 were <math>\leq 20</math> mm) and 3 American Bullfrog tadpoles. In five bag-seine hauls, 580 Desert Pupfish (470 were <math>\leq 20</math> mm) and several American Bullfrogs (tadpoles and adults) were captured.</p> <p>Charlebois Spring. On May 18, 2017, Department staff stocked 622 Gila Topminnow into Charlebois Spring. On October 19, 2017, Department staff set 10 collapsible minnow traps and captured 14 Gila Topminnow (<math>&gt;20</math> mm), 2 Lowland Leopard Frogs (tadpole), and 1 Sonora Mud Turtle (juvenile). They also performed 13 dip net sweeps in several pools below the main spring and captured 4 Gila Topminnow (<math>&gt;20</math> mm) and 2 lowland leopard frogs (1 tadpole and 1 juvenile). They also observed about 60 Gila Topminnow.</p> <p>Hidden Water Spring. On August 1, 2017, Department staff monitored for Gila Topminnow at Hidden Water Spring. Thirteen collapsible minnow traps were set and 401 Gila Topminnow (78 individuals were <math>\leq 20</math> mm), 283 Longfin Dace (174 were <math>\leq 40</math> mm), and 163 Lowland Leopard Frog tadpoles were captured. In three seine hauls, 24 Gila Topminnow (3 were <math>\leq 20</math> mm), 60 Longfin Dace (6 were <math>\leq 40</math> mm), and 7 Lowlands Leopard Frogs (1 adult, 6 tadpoles) were captured.</p> <p>International Wildlife Museum. On June 20, 2017, Department staff removed 10 Goldfish from the International Wildlife Museum outdoor exhibit pond to prepare the pond for Gila Topminnow. In the collapsible minnow traps, 252 desert pupfish were captured.</p> <p>Las Cienegas and San Pedro National Conservation Areas (NCA). On June 19, 2017, Department and U. S. Fish and Wildlife Service staff salvaged 87 Roundtail (Gila) Chub from Cienega Creek due to concerns about potential ash flows from the Sawmill Fire. Eighty-five of the chub were stocked into Spring Water Wetland; two others died during the process. On June 29, 2017, Department and U. S. Fish and Wildlife Service staff conducted a second salvage of Roundtail (Gila) Chub from Cienega Creek, and translocated 75 to Clyne Pond.</p> <p>San Pedro Riparian NCA - Horse Thief Draw was monitored on August 7, 2017. In 10 seine hauls no Gila Topminnow or Desert Pupfish were captured. These site can be considered failed.</p>



Priority Action	Significant Accomplishments
	<p>San Pedro Riparian NCA - Murray Spring was monitored on August 7, 2017. In 15 minnow traps and 11 dip nets sweeps, staff captured 10 Gila Topminnow, 1 Desert Pupfish, 68 Longfin Dace, and 52 Northern Crayfish. On August 21, 2017, Department staff stocked 1,221 Gila Topminnow at two locations within the Murray Spring. Fish were collected earlier in the day from Phoenix Zoo (530 individuals of Peck Canyon lineage) and Gaucho Tank (691 individuals of Cienega Creek lineage).</p> <p>Las Cienegas NCA - Clyne Pond was monitored on August 7, 2017. In 18 collapsible minnow traps and 15 mini-hoop nets 82 Gila Topminnow were captured; about 450 were observed outside of traps. No chub were captured.</p> <p>Las Cienegas NCA - Cieneguita Wetland Egret Pond was monitored on August 7, 2017. In 5 collapsible minnow traps, 1,204 Gila Topminnow and 25 Desert Pupfish were captured.</p> <p>Las Cienegas NCA - Cieneguita Wetland Crescent Pond was monitored on August 7, 2017. In 5 collapsible minnow traps 618 Gila Topminnow and 12 Desert Pupfish were captured.</p> <p>Las Cienegas NCA - Cieneguita Wetland Heart Pond was monitored on August 7, 2017. In five collapsible minnow traps, staff captured 87 Desert Pupfish.</p> <p>Las Cienegas NCA - Gaucho Tank was monitored on August 7, 2017. Staff set 10 minnow traps and captured 2,727 Gila Topminnow and 175 Desert Pupfish.</p> <p>Las Cienegas NCA - Bill's Tank was monitored on August 7, 2017. Department staff set 6 collapsible minnow traps and made 4 dip net sweeps and captured 22 Gila Topminnow. On August 21, 2017, Department staff stocked 636 Gila Topminnow (no mortalities) into Bill's Wildlife Pond. Fish were collected earlier in the day from Gaucho Tank (Lineage: Cienega Creek).</p> <p>Las Cienegas NCA - Cottonwood Tank was monitored on August 8, 2017. In 15 collapsible minnow traps staff captured 34 Desert Pupfish. On August 21, 2017, Department staff stocked 155 Desert pupfish (no mortalities) into Cottonwood Tank. Fish were collected earlier in the day from the Phoenix Zoo's Mandarin and Arizona Trail Ponds (Lineage: Santa Clara Slough).</p> <p>Las Cienegas NCA - Nogales Spring was monitored on August 14, 2017. Department staff set seven collapsible minnow traps and captured three Gila Topminnow.</p> <p>Robbins Butte Wildlife Area – Cottonwood Tank. On July 25, 2017, Department staff monitored Cottonwood Tank. They set 10 minnow traps and captured 38 Desert Pupfish (3 individuals were <math>\leq 20</math> mm). More than 100 Desert Pupfish were observed swimming around the center of the pond.</p> <p>Robbins Butte Wildlife Area – Stop Sign Tank. On July 25, 2017, Department staff monitored Stop Sign Tank. They set 10 minnow traps and captured 652 Gila Topminnow (13 individuals were <math>\leq 20</math> mm).</p> <p>Robbins Butte Wildlife Area – Swimming Pool Tank. On July 25, 2017, Department staff monitored Swimming Pool Tank. They set 5 minnow traps and</p>

Priority Action	Significant Accomplishments
	<p data-bbox="495 180 1388 239">captured 391 Gila Topminnow (65 individuals were <math>\leq 20</math> mm). Water level was low and greenish in color.</p> <p data-bbox="495 279 1388 369">Robbins Butte Wildlife Area – Twin Tanks. On July 25, 2017, Department staff monitored Twin Tanks. They set 10 minnow traps and captured 507 Desert Pupfish (91 individuals were <math>\leq 20</math> mm).</p> <p data-bbox="495 409 1388 569">Rock Creek. On May 11, 2017, Department and Tonto National Forest staff monitored for Longfin Dace in Rock Creek near Three Bar Cabin. Three randomly-selected 100-m transects were electrofished. No fish were captured or observed in the creek. One Canyon Treefrog was. Based on debris in the riparian area, it appears that the creek may experience high flows during the wet seasons.</p> <p data-bbox="495 609 1388 800">Rock Spring. On July 26, 2017, Department staff monitored for Gila Topminnow in Rock Spring. They set 10 collapsible minnow traps performed 6 seine hauls above and below the dam. One large Longfin Dace (ripe with eggs) and two adult Sonora Mud Turtles were captured; however, no Gila Topminnow were captured or observed. Department staff also hiked about 200m downstream from the spring and found seasonal water, but did not observe any fish.</p> <p data-bbox="495 840 1388 1094">Sabino Canyon. On June 12, 2017, Department staff monitored for Gila Topminnow in Sabino Canyon. In the section between the stocking pool and Tram Stop 8, 5 seine hauls and 2 dip net sweeps were conducted and 365 Roundtail (Gila) Chub and 42 Gila Topminnow (21 were <math>&lt; 20</math>mm) were captured. Eight collapsible minnow traps were also set and 1 seine haul performed in the stocking pool, but not Gila Topminnow were caught there. In the section below Tram Stop 8 to Tram Stop 1, 12 seine hauls and 9 dip net sweeps were conducted and 730 Roundtail (Gila) Chub and 61 Gila Topminnow (40 were <math>&lt; 20</math>mm) were captured.</p> <p data-bbox="495 1134 1388 1423">Sheepshead Canyon. On September 6, 2017, Department staff monitored Sheepshead Canyon for Gila Topminnow. Five collapsible minnow traps were set in the upper stocking pool and one Gila topminnow (<math>&gt; 20</math> mm) and two Sonora Mud Turtles were captured; about 325 Gila Topminnow were also observed swimming outside of the traps. Two traps were set in the middle pool, and captured 82 Gila Topminnow (10 were <math>\leq 20</math> mm), 1 Sonora Mud Turtle, and 5 Northern Crayfish; about 50 Gila Topminnow were also observed swimming outside of the traps. In the lower pools, six traps captured one Northern Crayfish; about 25 Gila Topminnow were observed swimming in the pool above the diversion dam.</p> <p data-bbox="495 1463 1388 1751">Tortilla Creek. On June 8, 2017, Department staff stocked 548 Gila Topminnow into upper Tortilla Creek. On November 1, 2017, Department and USFS conducted the first post-stocking monitoring for Gila Topminnow in upper Tortilla Creek. At the stocking location, they set 10 collapsible minnow traps and captured 829 Gila Topminnow (211 were <math>\leq 20</math> mm), 110 Fathead Minnow, and 1 Sonora Mud Turtle (juvenile). Leopard Frogs were also observed at the site. They also detected Gila Topminnow in the large perennial pool about 280 m below the stocking site, and near the confluence with Mesquite Creek. Overall, the Gila Topminnow are persisting and reproducing at the stocking location in Tortilla Creek.</p>

Priority Action	Significant Accomplishments
<a href="#">Arnett Creek repatriations</a>	<p>On May 15, 2017, stocked 522 Gila Topminnow into Arnett Creek. Gila Topminnow (Redrock lineage) were collected from Timbucktwo Pond on May 12, 2017 and held over the weekend at Department Headquarters' warehouse. On October 18, 2017, Department staff monitored the fish populations in Arnett Creek. They set 10 minnow traps for over 2 hours and captured 74 Gila Topminnow (13 were &lt;20 mm TL) and 77 Longfin Dace (6 were &lt;40 mm TL). They also performed 14 dip net sweeps and captured 16 Gila Topminnow (3 were &lt;20 mm TL), 6 Longfin Dace (all &lt; 40 mm TL), and 2 Lowland leopard Frog tadpoles. So, Gila Topminnow has persisted since they were stocked in May.</p>
<a href="#">Spring Creek (Oak Creek tributary) repatriations</a>	<p>During September 5 – 6, 2017, completed the annual monitoring of Spikedace and Gila Topminnow. Three 100-m transect electrofishing stations were sampled and one Spikedace (61mm TL) and two Gila Topminnow (&gt;20mm) were captured. In between these stations, during the nonnative removal portion of the trip, 10 Spikedace and 73 Gila Topminnow were captured. To monitor for Gila Topminnow, 10 collapsible minnow traps were also set in the lower U. S. Forest Service section of Spring Creek in the large pool above the fish barrier and 11 collapsible minnow traps were set in the upper U. S. Forest Service section in the two pools adjacent to the Willow Point road crossing. Traps soaked for roughly 5 hours in the lower U. S. Forest Service section and 2 to 2.5 hours in the upper U. S. Forest Service section. In the lower U. S. Forest Service section, 120 Gila Topminnow (3 individuals were ≤20 mm) were captured in traps; two dip net sweeps were also conducted below the fish barrier and 12 Gila Topminnow were captured. No Gila Topminnow were captured in the upper U. S. Forest Service section.</p>
<a href="#">Blue River native fish restoration</a>	<p>During June 26 – 27, 2017, Department staff completed the annual piscivore removal effort in the lower Blue River. During the removal effort, no Green Sunfish or Catfish were detected in the lower Blue River. This is the first year that Green Sunfish were not detected and the fourth year that Catfish were not detected.</p> <p>On September 11, 2017, Department staff set 22 large hoop nets to fish overnight (18-19 hour soak times) in Quinsler's Pond (private property located in the middle Blue River). A total of 274 Roundtail Chub (97 – 223 mm TL), 72 Sonora Sucker, 6 Desert Sucker, 23 Longfin Dace, 186 Northern Crayfish, and 1 Painted Turtle were captured.</p> <p>On September 12, 2017, Department staff set 18 large hoop nets to fish overnight in the middle Blue River between The Box and McKittrick Creek and captured 57 Roundtail Chub (119 – 228 mm TL).</p> <p>On September 13, 2017, Department staff stocked 448 Spikedace (plus 51 mortalities) into the upper Blue River at Cole Flat.</p> <p>During October 22-24, Department staff completed the annual post-stocking native fish monitoring in the lower Blue River. Spikedace was the most abundant species captured by electrofishing (caught 858). Spikedace of all size classes and were captured in every single transect. Spikedace are considered established in the Blue River. They also captured 114 Roundtail Chub by electrofishing this year which was far more than the 30 captured last year. So, roundtail chub are also considered established in the lower Blue River. They also captured far more Loach Minnow this year (326) than last year (19). But the high catch rate is likely partly because 390 Loach Minnow were stocked at Juan Miller Crossing a year ago (October 24, 2016). But Loach Minnow have persisted and have distributed throughout the river (caught in every transect). In hoop nets, they captured about the same number of fish as last year (103 this year and 107 last year). They</p>

Priority Action	Significant Accomplishments
	<p>captured fewer chub in hoop nets this year (37) compared to last year (52). No Green Sunfish were capture or observed. They did catch one Fathead Minnow in a hoop net, and one Red Shiner by electrofishing; both have rarely been captured in the past 5 years.</p>
<p><a href="#">Miscellaneous stock tank surveys</a></p>	<p>During May – June 2017, Department staff surveyed 41 stock tanks in the Red Tank Draw (Rarick/Mullican Canyon) drainage for nonnative fish. Of the 41 stock tanks surveyed by three-pass bag seining, only three locations contained fish: Mullican Place Tank, Rarick Tank, and large tank/pool below Gnat Tank. However, Bruce Tank, a large tank on private land, also has fish but we were not permitted to survey. In Mullican Place Tank, 1 Green Sunfish, 17 Black Bullhead, and 1 Northern Crayfish were captured. In Rarick Tank, 509 Fathead Minnow (adult and YOY) and 11 Northern Leopard Frog (1 adult, 10 tadpoles/juveniles) were captured. In a large tank/pool about 40m below Gnat Tank, 39 Fathead Minnow (adult and YOY) were captured.</p>
<p><a href="#">Assess potential repatriation waters</a></p>	<p>Cave Creek, North Fork Cave Creek, and South Fork Cave Creek were assessed during July 10 – 11, 2017. Overall, the locations surveyed did not appear suitable for Loach Minnow, Gila Topminnow, or Roundtail Chub at this time as much of the habitat in each stream was either dry or consisted of high gradient riffle and cascade habitat.</p> <p>East Turkey Creek was visited on July 11, 2017. Habitat above the main road crossing in East Turkey Creek was flowing continuously and consisted predominately of slick bedrock runs and pools. This section looked suitable for Speckled Dace and possibly Roundtail Chub; however, there were several bedrock waterfalls and slides throughout this reach which may reduce interactions between stocked fish. Fish could also potentially be washed out from this section during flash floods. The portion of East Turkey Creek below the road crossing consisted of interrupted habitat with shallow riffle, runs, and pools. The largest pool observed was located above a 10 m tall waterfall and was 4 m x 4 m with a max depth of 0.83 m. This section appeared suitable for Speckled Dace; however, habitat is limited.</p> <p>Copper Creek was assessed on February 22, 2017. The rancher and ranch hand indicated the spring and stream had gone dry in the last five years. The site needs to be visited in June to better assess if it is suitable for fish establishment. But Regional staff indicated they had never seen it go dry. A temperature logger could be installed at deepest part of the lower pool, which would provide data on whether or not the pool goes dry.</p> <p>Double R Canyon was assessed on June 13, 2017. A lower pool about 30 m in length, with a variety of shoreline vegetation looked like good habitat for Gila Topminnow. An upper pool was more isolated and was about 10 long by 3 m wide and with a maximum depth of 0.4 m. Program staff recommends that Gila topminnow be stocked into the lower section.</p> <p>Foote Creek was assessed during July 17 – 18, 2017. Overall, Foote Creek may be suitable for Loach Minnow if the substrate embeddedness reduces over time; however, it is unclear if the creek is perennial as yellow-brown algae covered most of the substrate throughout the creek and water flows doubled following afternoon and evening thunderstorms.</p>

Priority Action	Significant Accomplishments
	<p>Haunted Canyon was assessed on March 27, 2017. Overall, Haunted Canyon remains a possibility for Gila Topminnow introductions; however, further surveys are recommended during dryer months to better determine if the portions with the best habitat are perennial. Also, there was a section of stream near the confluence with Pinto Creek (may actually be Powers Gulch) that looked perennial based on the amount and kinds of algae and aquatic insects, and also had numerous large pools. This section still needs to be evaluated, but because there is no waterfall between it and Pinto Creek, Green Sunfish have been captured in this reach, so would pose a threat to Gila Topminnow. But the area could be suitable for other species like Gila Chub.</p> <p>Mule Spring was assessed on May 25, 2017. The spring and stream had a lush riparian area with about 200 – 300 m of perennial water. There were several pools present within the perennial section of Mule Springs with the largest pool measuring 10 m x 3 m with a max depth of 1.1 m. Overall, Mule Springs appears to be suitable for Gila Topminnow.</p> <p>Pigeon Creek and Turkey Creek were assessed on August 28 – 29, 2017. Overall, Pigeon Creek and Turkey Creek may be suitable habitat for Loach Minnow. Turkey Creek, below the waterfall barrier, appeared to have suitable pool habitat for Roundtail Chub. Additional surveys should be conducted in lower Pigeon Creek to better determine overall habitat suitability for these species throughout the creek.</p> <p>Raspberry Creek was assessed on July 18, 2017. Raspberry Creek consisted of predominantly riffle habitat with cobble substrate. Substrate embeddedness was moderate to high in the lower portion of Raspberry Creek. Lower Raspberry Creek still appeared to be experiencing post-fire impacts and there was a lot of sediment and huge log jams moving throughout this portion of the creek. Habitat in upper Raspberry Creek above and below the waterfall barrier appeared suitable for Loach Minnow.</p> <p>Sabino Canyon near the East Fork was assessed on June 13, 2017. Overall, there appears to be suitable habitat for a variety of native fish species in this section of Sabino Canyon. Although habitat is interrupted, there are several large, perennial pools that would serve as refuges during dry summer months.</p>
<p><a href="#">Expand Gila Chub Population in Harden Cienega Creek</a></p>	<p>Department staff monitored Roundtail (Gila) Chub in upper Harden Cienega Creek during April 24 – 25, 2017. The survey was focused from the start of the perennial water near Prospect Canyon downstream to a series of natural waterfalls. During the survey, 30 mini-hoop nets were set overnight in pools and runs throughout the reach. They captured 391 Roundtail (Gila) Chub1 (273 individuals were &gt;100 mm, 118 individuals were 51-100 mm), 1 Longfin Dace, 1 Speckled Dace, and 1 Green Sunfish. Since the mesh size of the mini-hoop nets was too large to capture young of year Roundtail (Gila) Chub1 (≤50 mm), young of year chub were visually estimated in each of the pools/runs that were trapped; estimates yielded 146 young of year Roundtail (Gila) Chub across all pools. Overall, Roundtail (Gila) Chub appear to be establishing in upper Harden Cienega Creek as they were abundant throughout the creek and all age classes were present.</p>
<p><a href="#">Fish health assessments of translocation populations</a></p>	<p>On February 2, 2017 Department staff collected 60 Gila Topminnow from Phoenix Zoo's ranarium pond and transported them to AZGFD's fish health lab in Phoenix.</p>

Priority Action	Significant Accomplishments
	<p>On March 20, 2017, Department staff collected 60 Gila Topminnow from Swimming Pool Tank and 60 from Stop Sign Tank at Robbins Butte Wildlife Area, and 60 Gila Topminnow and 30 Desert Pupfish from Nina Pulliam Rio Salado Audubon Center pond for fish health assessments. Results of the assessments will not be finalized until next reporting period.</p> <p>On August 23, 2017, Department staff collected 60 Spikedace from ARCC and transported them to the Department's fish health lab in Phoenix.</p>
<a href="#">Eagle Creek repatriations</a>	<p>On November 8, 2017, Department, USFWS, and BOR staff collected eDNA samples from seven locations on upper Eagle Creek between Sheep Wash and Honeymoon Campground. Samples were sent to Rocky Mountain Research Station in Missoula Montana for analysis.</p>
West Fork Pinto native fish repatriations	<p>West Fork Pinto Creek was assessed a second time on March 28, 2017. Department staff focused survey efforts within the perennial pools that are located above and below the natural barrier to determine if Green Sunfish were present. They set eight mini hoop nets, five large hoop nets, and four minnow traps in the pools above the natural barrier, and two mini hoop nets in the pool directly below the barrier. No Green Sunfish were captured, but staff observed one larger fish (species undetermined) in the pool above the barrier. A portion of the stream about a mile above the waterfall was visited on April 10, 2017. This section consisted of riffles, shallow runs, and step pools, as well as larger pool habitat that appeared to be suitable for Gila Topminnow.</p> <p>On May 25, 2017, Department and Tonto National Forest staff stocked 705 Gila Topminnow (Sharp Spring lineage) into West Fork Pinto Creek.</p> <p>The stocking location was monitored on October 31, 2017; water levels were far lower than when stocked. Fortunately, the Gila Topminnow distributed themselves into several shallow runs and pools upstream of the stocking site. Staff conducted 13 seine hauls from the stocking pool to about 200m upstream and captured 397 Gila Topminnow (238 were <math>\leq 20</math> mm), 344 Longfin Dace (196 were <math>\leq 40</math> mm), and 136 Lowland Leopard Frogs (133 tadpoles, 3 adults).</p>
<a href="#">Red Tank Draw native fish restoration</a>	<p>During April 3-5, 2017, Department staff conducted a nonnative removal effort at Red Tank Draw. With electrofishing they captured 88 Green Sunfish, 3 Black Bullhead, 10 Roundtail (Gila) Chub (5 were <math>&lt; 50</math> mm TL), and 28 Fathead Minnow. By hoop nets they captured 89 Green Sunfish (41 – 211 mm TL) and 5 Fathead Minnow (67 – 96 mm TL). None of the Green Sunfish that were checked for ripeness produced eggs or milt.</p> <p>On April 19, 2017, Department staff backpacked electrofished and captured 111 Roundtail (Gila) Chub (68 – 212 mm TL), 4 Desert Sucker (189 – 231 mm TL), 63 Green Sunfish (42 – 185 mm TL), 7 Black Bullhead (106 – 177 mm TL), and 26 Fathead Minnow (49 – 96mm TL). All nonnative fish were checked for ripeness and 4 Green Sunfish and 5 Fathead Minnows produced eggs.</p> <p>Throughout April 2017, staff surveyed several drainages upstream of the Red Tank Draw removal site for perennial water and nonnative fish. In the upper 5.5 km of Rarick Canyon, Fathead Minnow were observed in several tinajas. Fathead Minnow were also observed above a 3.5 to 4 m high waterfall indicating that the fish are likely coming from an upstream source. During another survey, Fathead Minnow were observed further downstream in shallow, seasonal pools between to the confluence of Rarick and Mullican Canyons. Staff also hiked the main drainage of Mullican Canyon from the concrete dam at Mullican Place Tank to the confluence of Rarick and Mullican Canyons. Much of the water in this drainage</p>

Priority Action	Significant Accomplishments
	<p>appeared to be seasonal; however, there were a several pools that appeared to be perennial. Green Sunfish were observed throughout this section. Black Bullhead and Northern Crayfish were also observed. There were a several natural barriers within the section surveyed, ranging from 4 m to 30 m tall; Green Sunfish were observed below all of these barriers, indicating that they are likely coming from an upstream source. In the drainage below Purgatory Tank, several ephemeral pools were present with barriers ranging from 3 m to 10 m high. No fish were detected in the wetted section of this drainage; however, Canyon Tree Frogs, Tiger Salamanders (aquatic form), and black-necked gartersnakes were observed. Staff also hiked the drainage below Three-Jim Tank to an impassible 40 m high natural barrier that was located about 2.6 km downstream. The drainage consisted of intermittent, ephemeral pools with several small bedrock barriers (2 to 10 m high); however, no fish were observed.</p>
<p><a href="#">Sharp Spring native fish restoration</a></p>	<p>On January 26, 2017 Department and State Parks staff met to discuss eradication of Western Mosquitofish from Sharp Spring and options to attain that goal. State Parks staff indicated they would talk to upper management to determine if they would support the project.</p>
<p><a href="#">Boyce Thompson Ayer Lake native fish restoration</a></p>	<p>No work performed on this task during 2017 because the state park was waiting on funding for a new well.</p>
<p><a href="#">Aquatic Research and Conservation Center O&amp;M</a></p>	<p>The Department continued to operate the Aquatic Research and Conservation Center (ARCC). ARCC continues to maintain refuge populations of three lineages of Spikedace (Aravaipa Creek, upper Gila River, Gila River Forks) and four lineages of Loach Minnow (Blue River, Aravaipa Creek, San Francisco River, and Gila River Forks). In 2017, ARCC produced 1,341 Aravaipa Creek Spikedace, 384 upper Gila River Spikedace, 1,183 Gila River Forks Spikedace, 47 Blue River Loach Minnow, 305 Aravaipa Creek Loach Minnow, 177 San Francisco River Loach Minnow, and 7 Gila River Forks Loach Minnow. Due to limited space at ARCC in 2017, lineages were split into two or more tanks with variable densities. Culture changes for the 2017 spawning season also focused on improving the documentation of spawning and fish holding parameters in order to gather baseline data and improve future management decisions at ARCC.</p>

## New Mexico Department of Game and Fish - 2017 ACCOMPLISHMENTS

### ***Removal of Nonnative Fishes from West Fork Gila River***

-The Department ran the annual non-native removal on the West Fork of the Gila River along with Forest Service and Fish and Wildlife Service personnel from June 12 to June 16, 2017. Higher than usual numbers of Loach Minnow were observed as well as lower numbers of nonnative fishes.

### ***New Mexico T&E Fish Repatriations and Monitoring***

- **Skeleton Canyon**, a Turkey Creek tributary, was surveyed on June 1, 2017. Skeleton Canyon was the last tributary of Turkey Creek to be surveyed as part of the broader Turkey Creek inventory work which began in 2012. Skeleton Canyon was found to be mostly dry with no suitable fish habitat.

- **Little Creek** was surveyed to evaluate Loach Minnow repatriation on May 23, 2017. Loach Minnow were found in all three sites sampled (near stocking location, 0.75 miles above stocking location, and 0.75 miles below stocking location). On November 30, 2017 159 Loach Minnow from ARCC were stocked as well as 103 Loach Minnow were translocated from the West Fork Gila River. This marks the fifth year of stocking or translocations into Little Creek.

- **Saliz Canyon** was stocked with 243 Loach Minnow on November 29, 2017. This is the second year of stocking or translocations of Loach Minnow into Saliz Canyon.
- **San Francisco River** was stocked with 1000 Spikedace on November 29, 2017. This is the first stocking since 2014. Stocking began in 2008 but was thought to be reset by the Whitewater Baldy Fire. Spikedace were captured during annual fall monitoring in the San Francisco River this October for the first time ever.
- ARCC** was provided with 117 Loach Minnow to supplement its Gila Forks broodstock.

***Middle Fork Gila River Inventory and Assessment***

-Two crews comprised of Department, Fish and Wildlife Service, and Forest Service personnel surveyed the lower section of the Middle Fork Gila River from June 26 to June 30, 2017 to begin the planned inventory of the Middle Fork. Few nonnatives were found, however Smallmouth Bass, Common Carp and Yellow Bullhead were present. Native species sampled included Roundtail Chub, Loach Minnow, Spikedace, Sonoran Sucker, Desert Sucker, Speckled Dace, and Longfin Dace.

Arizona Bureau of Land Management - 2017 ACCOMPLISHMENTS

Arizona State University – Topminnow Holding 2017 Annual Performance Report



## Appendix B - 2018 Work Planned

### Arizona Game and Fish Department GRBNFCP Work Plan 2018-DRAFT

<b><u>PRIORITY ACTIONS</u></b>	<b><u>PLANNED ACTIVITIES</u></b>
<a href="#"><u>Acquire Spikedace, Loach Minnow and rare populations of other native fish</u></a>	Coordinate with USFWS to determine number of fish to remove from each remnant population. Translocate Spikedace and Loach Minnow from Aravaipa Creek to ARCC. Translocate Blue River Loach Minnow to ARCC. If an agreement is developed with White Mountain Apache Tribe, acquire White River Loach Minnow and bring to ARCC.
<a href="#"><u>Muleshoe ecosystem stream and spring repatriations</u></a>	1) Green Sunfish removal from Redfield Canyon in spring; 2) annual monitoring of the fish assemblage in Hot Springs Canyon, Bass Canyon, and Mint Spring; 3) stocking of Gila Topminnow into Double R Canyon if necessary; 4) stocking of Desert Pupfish into Mint Spring, Larry & Charlie Spring, and Secret Spring if fewer than 50 are captured during monitoring.
<a href="#"><u>Fresno Canyon repatriations</u></a>	Develop a plan with the landowner, FWS and the Department to replicate the chub population in Sheehy Spring, and to stock them into Fresno Canyon as soon as possible. Fish may be brought to ARCC for propagation. A fish health assessment will be done at least one month before bringing any chub into ARCC. Because chub abundance is too low to sacrifice 30-60 individuals, Western Mosquitofish will be assessed as a surrogate for chub. Adult chub brought into ARCC will be injected with hormones to facilitate spawning. Fish produced can be stocked into Fresno Canyon in 2018 or 2019.
<a href="#"><u>Bonita Creek renovation and repatriations</u></a>	Monitor Gila Topminnow at the Reservation Boundary and Midnight Canyon stocking sites, Desert Pupfish at the Midnight Canyon stocking site, and Loach Minnow in the reach between Midnight Canyon and Sycamore Canyon. If the multi-agency team reaches consensus about suitability of habitat for loach minnow, more loach minnow will be stocked into the reach between Midnight Canyon and Red Knolls.
<a href="#"><u>Gila Topminnow stockings</u></a>	Department staff plan to stock Gila Topminnow into at least 6 new sites in 2018. Indian Creek and Sycamore Creek in the Agua Fria River drainage on Prescott National Forest; Maternity Wildlife Pond and Oil Tank Wildlife Pond on Las Cienegas National Conservation Area Area. Second Water Spring and Reavis Creek on Tonto NF. Each of these will be monitored 6-months after being stocked. Some of these are pending federal agency environmental compliance. Also assist FS with improvements to Mud Spring and stock if new pond is ready.

<b><u>PRIORITY ACTIONS</u></b>	<b><u>PLANNED ACTIVITIES</u></b>
<a href="#"><u>Arnett Creek repatriations</u></a>	Monitor Gila Topminnow in Arnett Creek during the summer or early autumn, and if numbers are low more will be stocked. Department staff will stock Gila Topminnow into Telegraph Canyon if the oleander removal project is completed.
<a href="#"><u>Spring Creek (Oak Creek tributary) repatriations</u></a>	Monitor Spikedace and Loach Minnow in Spring Creek during summer or early autumn. Department staff will stock more Spikedace early in 2018, and may stock more Gila Topminnow in the autumn if fewer than 100 are captured during monitoring. Department staff will assist the Region II CAMP program with Green Sunfish removal.
<a href="#"><u>Blue River native fish restoration</u></a>	Department staff will perform the annual snorkeling to remove catfish and trapping to remove Green Sunfish in June. Additional Green Sunfish removals may be implemented depending on how many are captured or observed during June. Department staff will perform the annual monitoring of fishes in the lower Blue River during late summer or early autumn, and will monitor chub and Spikedace in the middle Blue River during the same period. Department staff will stock more Roundtail Chub and Spikedace below The Box if fewer than 100 individuals of each species are captured during monitoring.
<a href="#"><u>Miscellaneous stock tank surveys</u></a>	Undetermined.
<a href="#"><u>Assess potential repatriation waters</u></a>	Department staff plan to survey habitat to determine suitability for native fish repatriations in the following systems: 1) Thomas, Squaw, and Little Blue creeks in the Blue River drainage; 2) Calf Pen and Hardscrabble Creeks in the Fossil Creek drainage; 3) Deadman Creek, Reavis Creek, Second Water Spring, Davenport Wash, Fish Creek, and Seven Mile Wash on Tonto National Forest, 4) Romero Creek in Santa Catalina Mountains and tinajas in Saguaro National Park.
<a href="#"><u>Expand Gila Chub population in Harden Cienega Creek</u></a>	Department staff will monitor Roundtail (Gila) Chub upstream of the waterfall. Department staff will also translocate at least 100 more chub from the lower reach to the upper reach.
<a href="#"><u>Fish health assessments of translocation populations</u></a>	Assess Fish Health from donor sites for all planned stockings.
<a href="#"><u>Eagle Creek repatriations</u></a>	Conduct additional eDNA survey to attempt to detect Spikedace and Loach Minnow. Possibly electrofish between Marsh & Associates sites in an attempt to further document absence of Spikedace and Loach Minnow.
West Fork Pinto native fish repatriations	Department staff will conduct the first annual post-stocking monitoring in summer. If fewer than 100 Gila Topminnow are detected, more will be stocked.

<u>PRIORITY ACTIONS</u>	<u>PLANNED ACTIVITIES</u>
<a href="#"><u>Red Tank Draw native fish restoration</u></a>	Department staff plan perform at least four piscivore removals from Red Tank Draw to keep the Green Sunfish and Bullhead populations low. If the Regional NFCT Team reaches consensus to move forward with treatment of the two tanks in Rarick Canyon drainage, then staff will complete the necessary paperwork and possibly treat the tanks in autumn 2018.
<a href="#"><u>Sharp Spring native fish restoration</u></a>	The GRBNFCP staff will coordinate with the Department's Region V office, USFWS and State Parks to get approval to eradicate fish from Sharp Spring. Department staff will then complete the necessary paperwork to chemically treat Sharp Spring, and will treat Sharp Spring either later in 2018, or sometime in 2019.
<a href="#"><u>Boyce Thompson Ayer Lake native fish restoration</u></a>	Department staff will contact Boyce Thompson State Park and determine if the project can move forward in 2018. If it can move forward, Department staff will complete the necessary paperwork to chemically treat Ayer Lake.
<a href="#"><u>Aquatic Research and Conservation Center O&amp;M</u></a>	Plans for 2018 include maintaining the existing lineages, produce offspring to be used for repatriations, and to prophylactically treat and hold any fish salvaged from environmental perturbations (e.g., wildfire, drying, invasion of nonnative species). Staff will finalize an operations manual for ARCC including a bloodstock management plan for Spikedace and Loach Minnow. The ARCC staff will also provide information about number of fish produced to the GRBNFCP technical committee at the annual meeting.
Aravaipa Creek mechanical removal	Potentially Assist BLM, FWS, and UA with nonnative fish removals in Aravaipa Creek.

#### New Mexico Department of Game and Fish 2018 Planned

##### ***Removal of Nonnative Fishes from West Fork Gila River***

- Continue the nonnative removal effort on the West Fork Gila River for one week in June 2018.

##### ***New Mexico T&E Fish Repatriations and Monitoring***

- Stock or translocate Loach Minnow to Saliz Canyon for the third consecutive year.
- Stock San Francisco with Spikedace if they are available from ARCC
- Survey Burro Cienega Gila Topminnow population
- Survey Mule Creek Chub population
- Evaluate potential Loach Minnow repatriation streams for Gila Forks Loach Minnow

##### ***Middle Fork Gila River Inventory and Assessment***

- Continue inventory of Middle Fork Gila River by completing inventory of upper sites in 2018.

## Appendix C – 2019 Proposed Projects

### Arizona Game and Fish Department 2019 Proposed Projects

<b><u>PRIORITY ACTIONS</u></b>	<b><u>Recommendations</u></b>	<b><u>Comments</u></b>
Acquire Spikedace, Loach Minnow and rare populations of other native fish	Continue	
Muleshoe ecosystem stream and spring repatriations	Continue	
Fresno Canyon repatriations	Continue	
Bonita Creek renovation and repatriations	Continue	
Gila Topminnow stockings	Continue	
Arnett Creek repatriations	Merge into Gila Topminnow stockings	
Spring Creek (Oak Creek tributary) repatriations	Continue	
Blue River native fish restoration	Continue	
Miscellaneous stock tank surveys	Continue	
Assess potential repatriation waters	Continue	
Expand Gila Chub Population in Harden Cienega Creek	Continue	
Fish health assessments of translocation populations	Continue	
Eagle Creek repatriations	Continue	
West Fork Pinto native fish repatriations	Merge into Gila Topminnow stockings	
Red Tank Draw native fish restoration	Continue	
Sharp Spring native fish restoration	Continue	
Boyce Thompson Ayer Lake native fish restoration	Continue	Discuss
Aquatic Research and Conservation Center O&M	Continue	
Arizona trout stream Loach Minnow repatriations	Remove	Remove from priority list because CAMP is implementing this action.
Mineral Creek drainage renovation and repatriations.	Remove	Remove until State Land Department approves of wildlife translocations on their managed lands.
Transfer Roundtail Chub <sup>1</sup> and Gila Topminnow to New Mexico.	Remove	Remove until New Mexico is ready to request more fish.
Sands Draw repatriations.	Remove	Removed from the priority list in 2016 until BLM has the habitat ready for fish.
Post-repatriation evaluations.	Remove	Remove from the priority list because post-repatriation evaluations (monitoring) are reported under each specific priority action.

### New Mexico Department of Game and Fish - 2019 Proposed Projects

### ***Removal of Nonnative Fishes from West Fork Gila River***

- Continue the nonnative removal effort on the West Fork Gila River for one week in June 2019.

### ***New Mexico T&E Fish Repatriations and Monitoring***

- Stock or translocate Loach Minnow to Saliz Canyon for the fourth consecutive year.
- Stock San Francisco with Spikedace if they are available from ARCC
- Survey Little Creek to evaluate Loach Minnow Repatriation efforts

### ***Middle Fork Gila River Inventory and Assessment***

- Finish survey of Middle Fork Gila River if inventory is not complete.

## Appendix D – Project Updates

### Loach Minnow Recovery Plan Update

- 1) Regional Office-Assigned Deadline of June 2018 for draft recovery plan revision.
- 2) Breaking single recovery plan into new format of three pieces per the Service's new Recovery Planning and Implementation Process:
  - Biological Report – Background/Introductory Material
  - Recovery Plan – Statutorily Required Material (criteria, actions, timeline, costs)
  - Implementation Strategy – Short-term revisable document that outlines next steps in recovery
- 3) Have asked Recovery Team to revisit recovery criteria and will have meeting to discuss/revise.
- 4) Spikedace Recovery Plan draft is due June 2019

### Native Fish Barrier status as of December 2017

- **Aravaipa (Completed 2001)**
- **Cottonwood Spring (Completed 2004)**
- **Fossil Creek (Completed 2004)**
- **Bonita Creek (Completed 2008)**
- **Hot Springs Canyon (Completed 2010)**
- **Blue River Barrier (Completed 2012)**

We have one more year of post barrier construction fish monitoring on Blue River. We may want to consider extending the monitoring for another couple years as aggradation of sediment on the river left downstream end of the barrier has reduced the function of the barrier under high flows. BOR is meeting with the technical service center on Dec 8<sup>th</sup> to address the issue.

- **Spring Creek – Oak Creek Tributary (Completed 2015)**  
The Coconino Forest is addressing the erosion issue downstream of the barrier. The Arizona Fish and Wildlife Conservation Office will continue to assist AZGFD with post barrier construction monitoring through FY20.
- **West Fork Black River (Completed 2016)**  
The Arizona Fish and Wildlife Conservation Office will continue post barrier construction monitoring through FY21.
- **Eagle Creek (Projected 2019)**

FWS (lead agency), USBR and Freeport McMoRan are drafting an EA for this barrier. A notice of intent to is being produced and will take a few months to get published. We expect the EA to be completed by late summer/fall with barrier construction expected to take place in the spring of 2019.

- **Redfield Canyon (Projected 2019)**

USBR met with Arizona State Lands Department in September. State Lands seemed open to the option of an easement that would allow for barrier construction.

- **Middle Fork Gila River (Possibly 2021)**

This barrier is being investigated in the event other possible barriers fall through. In October, USBR and NMGF visited three of the sites proposed by Rob Clarkson. Other options to complete our list of 12 barriers should be pursued in the interim, as there is no guarantee this one will fly.

- **Verde River (Projected 2021 and 2022)**

We are considering two possible barriers on the Verde River. One at Hells Canyon (~20 miles downstream of the headwaters) and a second above the confluence of sycamore creek (~40 miles from the headwaters). In Sept, Staff from USBR and Prescott NF looked at road access to the Sycamore site and visited with Verde Canyon railway who seemed open to using the train tracks to move material. NEPA planning will begin once we set up a meeting with the new Forest Supervisor for the Prescott NF.

#### ARCC Facility renovation status

In April 2016, the ARCC began a multi-phase multi-year renovation project intended to increase the holding capacity of the facility, remove old military shipping containers previously used for fish rearing, and separate the individual functions of the property. Cage 1 was completed in phases 1 and 1.5 of the renovation efforts adding 20 new spawning and holding raceways each with individual collection sumps and variable speed programmable pumps to create artificial flows. Phase 1 added a new facility wide outflow sump and improved the main underground plumbing but did impacted propagation efforts in 2016 by limiting the available raceways and discharge points.

Phase 2 was completed in August of 2017 and was the largest portion of the renovation. Phase 2 added a 10' tall perimeter fence around the property, 2 new larger PVC lined ponds with individual collection sumps, a 450' long retaining wall that separates the different levels of the property and provided space for both future raceways and phase 3 depending on funding.

Projects being completed by ARCC staff between phases 2 and 3 included, renovating three 12'X32' tough sheds donated to the property by development branch. These will provide and isolated quarantine building with 6 tanks separated by walls and draw curtains, a dedicated workshop and tool storage shed, gear storage shed and an insulated air conditioned feed storage room. Also currently being installed by ARCC staff are six 12' diameter 5' deep fiberglass tanks and a previously constructed 21' diameter tank in being reconstructed as two separate tanks. Lastly a perimeter electric wire was installed around the property on the chain-link fence to limit the ability for predators to climb over and a net cover was installed above the 20 raceways added in phase 1.5.

Phase 3 is intended to add a new 40' X 70' building to the property that would provide office space, a conference room, bunk house space, a spate wet lab, storage space, dry lab space and breakroom. Phase 3 is dependent on funding and may not be completed in 2019 as originally scheduled.