United States Department of the Interior

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Memorandum

To: Implementation/Management Committee, Consultants, and Interested Parties

From: Deputy Regional Director ANNA MUNOZ

Digitally signed by ANNA MUNOZ
Date: 2023.11.16 18:25:23 -07'00'

Subject: 2022 Assessment of Sufficient Progress for the Upper Colorado River Endangered Fish Recovery Program in the upper Colorado River basin

In accordance with the Section 7, Sufficient Progress, and Historic Projects Agreement, the U.S. Fish and Wildlife Service (Service) is reviewing the January 1, 2022 – December 31, 2022 cumulative accomplishments and shortcomings of the Upper Colorado River Endangered Fish Recovery Program (Program) in the upper Colorado River basin. Per that Agreement, the Service uses the following criteria to evaluate whether the Program is making "sufficient progress" toward recovery of the four listed fish species:

1. Actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of extinction;
2. Status of the fish populations;
3. Adequacy of flows; and
4. The magnitude of the impact of projects.

This assessment provides an update of species status and a review of significant Program accomplishments and a discussion of Service concerns and recommendations (Appendix I). Program accomplishments considered here are based on the Program's annual assessment of its 2022 Recovery Implementation Program Recovery Action Plan (RIPRAP) which was approved by the Program May 2, 2023.

Service Conclusions and Recommendations

Successes in listed species recovery during the period of this assessment include: a new or expanding population of humpback chub in DeBeque Canyon and record numbers and growth of

juvenile razorback sucker from managed wetlands on the Green River. Despite good cooperation among Program partners to implement a comprehensive suite of recovery actions, the Service is concerned about recent reports of low densities of Colorado pikeminnow adults in the Green and Colorado river subbasins and particularly slow progress toward recovery of bonytail.

The Service appreciates the continued dedication of Program partners to sustain adequate flows in rivers across the basin, specifically in the 15-Mile Reach of the Colorado River, Yampa River, Duchesne River, and Price River. Drought Response Operations made additional water available in the Green River during a very dry year, allowing for implementation of experimental flow recommendations. The fact that this water could be used for multiple purposes (e.g. drought mitigation at Lake Powell and endangered species recovery) shows how recovery of species will be possible in an increasingly dry system. Experimental flow recommendations included supporting the record number of juvenile razorback sucker noted above, baseflows for Colorado pikeminnow, and a flow spike disadvantaging smallmouth bass in the Green River. The Service would like to commend Reclamation's coordination in applying emergency Drought Response Operations towards fish flow recommendations in 2022. Reclamation also successfully implemented Gunnison River flow recommendations below the Aspinall unit. Despite this dedication, the Service recognizes a continued need to identify new tools to protect and enhance flows now and into the future.

The Service appreciates the important steps the Program has taken to respond to the concerns expressed about the 15-MR in the recent PBO review in developing a study plan. While this planning effort is necessary, we continue to be concerned about the inability to meet flow recommendations and the decline of Colorado pikeminnow in the Colorado River basin. Finalizing the plan and making substantial progress towards implementation of the plan should be a priority for the Program in coming years.

Drought remained a substantial presence across the basin in 2022. Drought should not be considered narrowly as a crisis that might imply the need to abandon an effort; rather that drought is part of the Colorado River hydrologic cycle. Although likely exacerbated by climate and consumptive use, decadal wet and dry cycles can be modeled and should be considered, even in extreme conditions, to be part of expected conditions under which we continue to meet flow recommendations. The Service has maintained support for innovative, adaptive, and flexible ways to promote the Program's dual needs (water development and management and fish recovery) and therefore extreme conditions should not be construed as a reason to demote or elevate the importance of one action over another. The Service believes the drought conditions warrant increased focus on the partner-based solutions created by the Program and encourage further actions to meet the challenges the drought brings.

Providing habitat for the listed species has been a notable success for the Program: major sources of irrigation canal entrainment in the upper basin have been addressed and problematic barriers to movement for the listed species have been modified. The Service recommends continuing to improve operations at existing screens and passages as opportunities arise. The Program has developed an impressive number of floodplain wetlands that can be managed for razorback sucker and bonytail. The Service recommends continued development or restoration of riparian

and floodplain habitats where possible, both continuing ongoing efforts along the Green and Colorado rivers and identifying possible new sites along the Colorado River.

The Service believes that the recent focus on controlling off-channel sources of predatory nonnative species (smallmouth bass, northern pike, and walleye), coupled with the Program's long-standing commitment to remove spawning adults in riverine environments represents an effective strategy and should be continued for the foreseeable future. Multiple back-to-back low flow years in 2020, 2021, and 2022 exemplify the severe impacts that can occur from drought by enhancing production of nonnative fish species. While the Service acknowledges the substantial efforts of the Program to control problematic nonnative species, we also recognize the limitation of those methods. The Service commends the repeated implementation of landscape-level control activities, namely a flow spike from Flaming Gorge Dam to supplement mechanical removal and suppress in-river production of smallmouth bass and recommends the expansion of this type of landscape-level control method to other basins where feasible.

Public outreach enhances recovery actions by gaining support for these unique, endemic species in the Colorado River basin. Unique partnerships, like the Palisade High School Fish Hatchery, develop a deep appreciation for the species, while also providing students with marketable hatchery experience. The continued focus on public outreach efforts to clearly describe the detrimental and costly effects (monetary and ecological) of illicit stocking also remains a key piece of success in the future.

The Service commends their partners for continuing to meet stocking targets outlined in the Revised Integrated Stocking Plan. Considering continued low survival of bonytail, the Service encourages continued exploration of stocking and rearing techniques that could improve survival in the wild and prioritizes experimentation over numeric targets. In addition, the use of passive antennas has produced a variety of important information from across the basin. The Service recommends continued exploration of the use of this technique, which can provide data without impacting the species being studied, and development of credible methodologies for incorporating this data into population demographic analysis. The installation of a passive antenna in the Grand Valley would be particularly useful as this critically important area currently lacks an antenna (except at the top of the 15-Mile Reach at the Price-Stubbs diversion).

Recovery of these listed fish has and will continue to require consistent and predictable implementation of recovery actions. Continued implementation of recovery actions factors into the Service's determination of sufficient progress, as well as our recommendation to pursue reclassification of razorback sucker. The Service has noticed that predictable and sufficient funding to implement actions has been challenging over the last few years and that the Program is struggling to maintain its current commitments while addressing new challenges. Continued funding challenges are likely to undermine the Program's ability to make sufficient progress towards recovery.

In light of the Program's Cooperative Agreement expiration in 2023, the Service encourages its partners to finalize all documents necessary for continuation of the Program. The Program and partners continue to make substantial progress toward recovery of the four listed fishes. If the Program is not renewed, recovery progress will slow or reverse course and streamlined Section 7 compliance for water development and hydropower in the upper Colorado River basin will cease. The Program is nationally recognized as a model for Section 7(a)1 programs, which has reduced the time, cost, and risk associated with compliance. The Service strongly encourages the partners to finalize the documents necessary to seek reauthorization from Congress and provide the needed certainty for all involved to ensure compliance with Section 7 of the ESA.

Service Determination

Based on the Service's comprehensive evaluation of the status of the listed fish, provision of flows (particularly during periods of drought), the magnitude of new depletion impacts (relatively minor in the historical context), threats from nonnative fishes, and cumulative Program accomplishments and shortcomings, the Service concludes that when implemented as Conservation Measures (i.e., part of the proposed action), the Program is making sufficient progress to continue avoiding the likelihood of jeopardy resulting from depletion impacts of new projects that have an annual depletion of up to 4,500 AF[1]. New projects exceeding 4,500 AF or that have direct or indirect effects in addition to water depletion will be evaluated to determine if they jeopardize the species' continued existence on a case-by-case basis. Furthermore, that sufficient progress provides a continued avoidance of jeopardy for the water projects and depletions currently provided with ESA compliance by the Program, i.e., 2,203 projects depleting more than 2.86 million AF of water per year.

The Service's 2022 assessment of progress concludes that the Program is making sufficient progress towards recovery. Specific questions about sufficient progress should be directed to Julie Stahli, Program Director, at 720-697-4933, Julie_Stahli@fws.gov.

[1] The 15-Mile Reach programmatic biological opinion covers an average depletion of up to 1 million AF per year of existing depletions (through September 30, 1995) and up to 120,000 AF of new depletions (since September 30, (1995) in the Colorado River above the confluence with the Gunnison River. The Yampa River programmatic biological opinion covers an average depletion of up to 168,000 AF per year of existing depletions and up to 53,000 AF per year of new depletions. The Gunnison River PBO covers all existing water depletions in the Gunnison River Basin (estimated annual average of 602,700 AF/year) and future depletions up to 3,500 AF basinwide as well as future depletions up to 22,200 AF in the upper Gunnison basin in accordance with the Upper Gunnison basin Subordination Agreement and 12,200 AF in the Dallas Creek Project which has been contracted for but is not used at this time.

Appendix I: 2022 Assessment of Program Actions and Species Status

A) Status of the Species in the Upper Basin

Recovery goals for the four species (USFWS 2002a, b, c, d) provide benchmarks for the species across their ranges. Objective, measurable criteria have been established for bonytail, razorback sucker, and humpback chub in both the upper Colorado River basin (above Lee's Ferry, Arizona) and in the lower Colorado River basin. Colorado pikeminnow have criteria for the upper Colorado River and San Juan basins only, and a revised recovery plan is being reviewed by the Service. Recovery for these species depends on numerous actions implemented across both upper and lower basins by a variety of different organizations. Species Status Assessments[2], developed for three of the four species, provide a thorough review of the status of the federally listed fish, including current condition across their range. We encourage partners and interested parties to refer to those documents[3] for more information. The remainder of this document includes only actions within the scope of the Upper Colorado River Endangered Fish Recovery Program.

In the upper Colorado and Green River subbasins, Colorado pikeminnow and humpback chub exist as wild populations with no support from hatchery-reared fish. Bonytail populations were functionally extirpated when the Program was established in 1988 and razorback sucker became functionally extirpated in the 1990s; both species are being repatriated throughout the upper basin with hatchery-produced fish. Information about each species is collected through projects that address multiple life-stages throughout the upper Colorado River basin and are summarized below.

Colorado pikeminnow

Colorado pikeminnow have populations that range across both the Green and Colorado subbasins, including in most major tributaries. The species remains listed as endangered because of low abundance in the three extant populations, low recruitment of juveniles to the adult population, and the persistent threat of nonnative fishes.

An SSA for Colorado pikeminnow was completed in early 2020 and revised in 2022 based on input from a recovery team assembled to assist with revisions to the Colorado pikeminnow recovery plan. The SSA relied heavily on a population viability analysis (PVA; Miller 2018) to project future conditions for the species. The PVA provided insights on demographic rates and how those might be influenced by environmental conditions that were then incorporated into the SSA. The PVA retrospective analyses of abundance described current conditions and trends for upper basin populations, while prospective analyses projected future abundances under a range of scenarios. Those projections were then used to assess the species' viability into the future and to identify factors that might influence trends in abundance.

[2] A Species Status Assessment (SSA) is an analytical tool used by the Service to summarize biological and ecological information that can help inform a variety of decisions and activities under the ESA, including recovery planning, species status reviews, inter-agency consultations, and species reclassifications. The framework of an SSA considers species needs, species current and future conditions, and species viability. The SSA is not a decision document, but rather a document used to inform future decisions.

[3] Species Status Assessments can be found at: UCREFRP Website: Recovery Goals

The Population Viability Analysis for this species summarized threats as follows[4]:

- Large-bodied predatory species of concern (smallmouth bass, northern pike, and walleye) have spread through large segments of critical habitat, including Colorado pikeminnow nursery habitats.
- A recent summary of 30+ years of fall age-0 pikeminnow monitoring indicates that survival was better when summer base flows in the middle Green River ranged between 1,700 to 3,000 cfs.

Current densities of Colorado pikeminnow throughout the upper basin are low. Preliminary population estimates of adult Colorado pikeminnow in the Green River subbasin have declined from ~4,000 individuals in the year 2000 to less than 1,000 adults in 2018 (Bestgen *et al.* 2020). In recent years, Reclamation has been working to implement the experimental flows to support Colorado pikeminnow young-of-year, with 2021 and 2022 both staying between the recommended ranges. Adult Colorado pikeminnow abundance in the Colorado River subbasin increased from 1992 – 2005 but has declined since 2005. The most recent estimates calculated an adult population of approximately 450 individuals, with some indicators that a large year class of fish may be approaching adult size (Elverud *et al.* 2020). One of the thresholds where the Service might consider re-initiating consultation for the 15-MR PBO is when adult abundance of Colorado pikeminnow decreases below 350 adults in the Colorado River, which was termed a "negative response". The Colorado River population approached this size in 2013, followed by a slight increase in the following two years.

This species has supported itself to date through wild reproduction and natural recruitment to sexual maturity but continued declines in recruitment have prompted collection of young-of-year individuals in both the Green and Colorado subbasins. The collection efforts are designed to improve the genetic diversity of our existing broodstock held at the Service's Southwestern Native Aquatic Research and Recovery Center (SNARRC) in Dexter, NM in anticipation that hatchery augmentation of the Green River population may be necessary in the future. SNARRC is currently conducting genetic analyses to determine the composition of fish collected thus far. Once these analyses are complete, potential broodstock will be divided to ensure rare alleles or other unique lineages are duplicated at a second site and not all housed in the same facility.

Humpback chub

Humpback chub exist in four populations in the upper basin: three in the Colorado River and one in the Green River. A fifth population in Dinosaur National Monument (Green and Yampa rivers) is considered extirpated as humpback chub have not been collected in this location for more than a decade. Humpback chub was reclassified as threatened in 2021.

An SSA for humpback chub was completed in March 2018 (USFWS 2018a) and will be revised in 2023-24 based on input from a recovery team assembled this year to assist with revisions to the humpback chub recovery plan.

[4] A third threat identified in the report was the entrainment of all stages of Colorado pikeminnow in the Green River Canal. A canal screen has since been designed and installed, preventing entrainment of all life stages.

The Program implements a suite of actions to improve the resources of highest concern for humpback chub across the upper basin populations. Instream flow management has restored much of the important intra- and inter-annual variability of river flow that the humpback chub needs to breed, feed, and shelter, even during the severe drought experienced in recent years. The Program implements nonnative fish management actions to limit predation, competition, and other negative interactions. The two core actions are removing predatory fish from 966 km (600 mi) of river and screening reservoirs to prevent predators from escaping into the downstream habitats used by humpback chub. Over the last 20 years, partners have installed five fish passage structures in the Colorado, Gunnison, and Green rivers to provide ecological connectivity between the upper basin populations. Fish passages built by the Program partners allow humpback chub in all four extant upper basin populations to emigrate to any of the other three extant populations and the extirpated Dinosaur National Monument population. Unimpeded movement between all upper basin populations provided by the fish passage structures allows for genetic exchange and maintenance of genetic diversity of populations.

In the Colorado River, adult abundance estimates of the Black Rocks and Westwater Canyon populations, which comprise a single upper basin core population, indicate improved demographics over the past decade (USFWS 2018a). The most recent monitoring of the Westwater Canyon population indicates multiple demographic improvements such as increased adult abundance to over 3,300 adults, relatively high apparent annual survival, and documented recruitment (Hines et al. 2020). In fact, the Westwater population has increased to levels seen approximately 15-20 years ago. The most recent monitoring of the Black Rocks population indicates a stable population of approximately 450 adults and documented recruitment (Francis et al. 2022).

The Cataract Canyon population, located below the confluence of the Green and Colorado rivers, appears stable at low densities (Ahrens 2019). In the Green River, the Desolation and Gray canyons population mean catch rates suggest a stable population since at least 2006 (Caldwell 2021).

The Program is evaluating the feasibility of and strategies for re-introducing humpback chub to Dinosaur National Monument using fish from Desolation Canyon. Recent genetic analyses indicate that the population in Desolation Canyon is genetically distinct from all other populations and is the closest population to Dinosaur National Monument (Valdez et al. 2021). In 2022, the first collection of humpback chub from Desolation for the development of a broodstock was completed and the fish are being held at Ouray National Fish Hatchery-Randlett.

Razorback sucker

Razorback sucker have populations that range across both the Green and Colorado subbasins, including most major tributaries and Lake Powell.

An SSA for razorback sucker was finalized in August 2018 (USFWS 2018c). Based on one self-sustaining population in the lower basin, a functional genetic refuge in Lake Mohave and expanding, reproducing populations of stocked adults in the San Juan, Colorado, and Green river subbasins (including individuals captured in Lake Powell), the Service recommended (via a 5-year review signed in September 2018 [USFWS 2018d]) to pursue reclassification of razorback

sucker as a threatened species. A proposal to downlist razorback sucker (including a 4(d) rule) was published in the Federal Register in July 2021, subject to a 60-day public comment period after publication.

Hatchery-produced stocked fish form the foundation for reestablishing naturally self-sustaining populations[5] of razorback sucker in the upper Colorado and Green River subbasins (USFWS 2018d). Stocked razorback sucker are surviving in the wild, expanding their range into previously unoccupied areas, and annually reproducing in both the Green and Colorado river subbasins. Wild, juvenile razorback sucker (ages 0, 1, 2, and 3) have recently been captured in small numbers in a variety of upper basin locations, but not at rates that could sustain the populations without ongoing stocking efforts (USFWS 2018d). Since 2012, floodplain wetlands under varying degrees of management combined with experimental flow releases from Flaming Gorge Dam (La Gory et al. 2019) resulted in the annual entrainment and rearing of wild-spawned larvae, which have been tagged and released as juveniles into mainstem rivers. 2022 efforts resulted in over 4,500 wild juveniles released, setting both number and size records for the species in multiple wetlands. In 2020, two wild-recruited adults reared in Stewart Lake were documented in the Green River at and near a known spawning location (Smith & Beers 2020; Partlow et al. 2020). This is the first confirmed occurrence of wild recruitment in the upper basin since the species was extirpated in the 1990s. While this advancement is important and significant, recruitment will have to increase substantially to support self-sustaining populations.

Bonytail

Bonytail survival is currently limited, but the species is expected to be able to establish populations across the upper Colorado and Green River subbasins. The Program has been implementing an integrated stocking plan (Integrated Stocking Plan Revisions Committee, USFWS 2015) with a goal of establishing self-sustaining populations of bonytail. The Program has been successful in meeting the plan's annual stocking targets and continues to assess locations, flows, and temperatures that will promote survival of stocked fish.

Recaptures of stocked bonytail are generally rare, making long-term survival difficult to document and measure. However, increasing numbers of bonytail have been detected in recent years at passive antennas and via traditional sampling methods. The first reproduction by stocked bonytail was confirmed in floodplain habitats in the Green River in 2015, 2016 (Bestgen *et al.* 2017), 2017 and most recently in 2019. Based on lack of consistent survival of stocked bonytail and no wild populations of the species, the Service recommended maintaining bonytail as an endangered species (via a 5-year review signed in June 2019; USFWS 2019).

[5] To achieve naturally self-sustaining populations, adults must reproduce, and their young must recruit to the adult life stage in numbers sufficient to meet the demographic criteria identified in the current version of the recovery goals (USFWS 2002a–d). In addition, because of their longevity, hatchery-produced adult razorback sucker and bonytail (and Colorado pikeminnow in the San Juan River) will contribute toward recovery.

B) Program Accomplishments (January 1, 2022, through December 31, 2022)

Significant accomplishments (Section B) and concerns and recommendations (Section C) are provided in three tables each: general items pertinent to the Program as a whole, Green River subbasin items, and Colorado River subbasin items. One or more of the following criteria is included in each accomplishment or concern to provide context.

1. Actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction;
2. Status of the fish populations;
3. Adequacy of flows; and
4. The magnitude of the impact of projects.

Only *significant* accomplishments from the 2022 RIPRAP are discussed in the following tables. A complete accounting of Program accomplishments and shortcomings can be found in the signed May 2, 2023, RIPRAP.

Table 1 Significant Accomplishments (January 1, 2022, through December 31, 2022)

Significant Accomplishments - General	Sufficient Progress Criteria Affected
Razorback sucker populations continue to expand across the upper basin. Zelasko et al. (2022) found that the use of PIT tag detection data increased the precision of post-stocking survival rate estimates and produced higher estimates than previous analyses. Zelasko and Bestgen (2022) found that incorporation of antenna detection data with physical captures did not enable robust abundance estimation of stocked razorback sucker in the Green River because detections often did not overlap with the physical sampling period, and very few recaptures occurred by either method. Low recapture rates may indicate a very large population of stocked fish in the Green River. There is a possibility of successful stocked-fish abundance estimation in middle Green River reach, with intensive physical effort coupled with increased, stratified deployment of portable antennas throughout the reach during the physical sampling. Record setting first year retention and growth of wild-produced razorback sucker in managed floodplains in 2022 demonstrates the benefits of data-driven integrated flow and habitat management under the Larval Trigger Study Plan (LTSP). Recruitment of naturally produced fish to the adult life stage remains rare but has been confirmed and is expected to increase as returns from managed floodplains continue.	1 – Improve of habitat 2 – Improve status of fish populations. 3 – Adequacy of flows

Significant Accomplishments - General	Sufficient Progress Criteria Affected
USFWS proposed reclassification for razorback sucker to threatened status on July 7, 2021. The final downlisting rule, including responses to comments, is underway and scheduled to be in the FWS Region 6 Director's office by the end of fiscal year 2023.	2 – Improve status of fish populations
The Report to Congress on the Upper Colorado and San Juan River Basins Endangered Fish Recovery Programs was approved as final late in 2022 and was expected to be delivered to Congress in early March 2023.	Does not affect sufficient progress criteria, but supports continuation of the Program

Table 2. Green River Subbasin Significant Accomplishments (January 1, 2022, through December 31, 2022)

Accomplishments – Green River Subbasin	Sufficient Progress Criteria Affected
Green River	
Drought Response Operations made an additional volume of water available, which allowed for the implementation of all three requested flow experiments in 2022: LTSP spring peak timing; smallmouth bass flow spike; and experimental base flows to benefit Colorado pikeminnow (LaGory et al. 2019). 353,000 AF (of 500,000 AF total) of additional Drought Response water was delivered between April May 1 and Dec. 31, 2022.	1 – Improve habitat 1 – Reduce threat of extinction by reducing threat of nonnative fishes. 3 – Adequacy of flows 4 – Reduce magnitude of project impact
Larval razorback sucker were first detected on 21 May. LTSP flows were requested on May 23, and releases began May 25. USBR held Flaming Gorge releases at full bypass for 7 days, resulting in a peak of 17,000 cfs at Jensen. The LTSP releases filled at least 5 wetlands with water and entrained razorback sucker larvae into 4 managed sites: Stewart Lake, Stirrup, Johnson Bottom, and Old Charley Wash. All four sites had retained wild juvenile fish by the end of the summer.	1 – Improve habitat 3 – Adequacy of flows

Accomplishments – Green River Subbasin	Sufficient Progress Criteria Affected
UDWR collected 3,294 wild, age-0 razorback sucker from Stewart Lake in 2022, setting records for the number of fish produced in any floodplain, the maximum age-0 fish length (201 mm) in Stewart Lake, and mean age-0 length (152 mm) at Stewart Lake. FWS collected 117 wild, age-0 RZB from Johnson Bottom in 2022. This is the most RZB produced from this wetland in a single year. FWS collected 615 wild, age-0 RZB from Old Charley in 2022, which is the highest number collected from this wetland. This site is currently under consideration for capital improvements at the water control structure. BLM collected 551 wild, age-0 RZB from the Stirrup in 2022, its first year of operation. The site also produced the overall largest mean length (233 mm) and the largest individual fish (270 mm) collected from any of the managed wetlands since the beginning of LTSP operations.	2 – Improve status of fish populations
No PIT tags were detected in the canal downstream of the fish screen on the Tusher Diversion irrigation channel during 2022.	1 – Reduce threat of entrainment loss. 4 – Reduce magnitude of project impact
Yampa River	
Colorado and Wyoming provided updated depletion reports covering annual total and 5-year average depletions for 2016-2020. Wyoming's depletion report covers consumptive water use in the Little Snake River basin; Colorado's was for the Yampa River basin in Colorado and included the Colorado portion of the Little Snake River. Depletions were well within the new depletion envelopes specified within the PBO (30,000 AF in CO and 23,000 AF in WY by 2045). Relative to the baseline period, CO's annual depletions decreased by an average of 4,648 AF, while Wyoming's results indicated an average decrease of 4,000 AF/yr. relative to the 2005 PBO, but approximately 1,400 AF/yr. higher than the 2011-2015 results.	4 – Reduce magnitude of project impact

Accomplishments – Green River Subbasin	Sufficient Progress Criteria Affected
White River	
Smallmouth bass catch rates decreased dramatically in 2022, removing 79% less bass in targeted removal passes. Adults comprised 32% of bass captures, and sub-adults made up most of the catch. Taylor Draw Dam's hydroelectric facility was closed for maintenance during the Spring and early Summer in 2021 and 2022, pushing water over the top of the dam rather than through the hydrotubes and directing flow into habitats that may have been less conducive for smallmouth bass spawning. As part of the White River Management Plan process, the Recovery Program continues to discuss opportunities for changes to operations at Kenney Reservoir to disadvantage smallmouth bass spawning immediately below Taylor Draw Dam.	1 – Reduce threat of nonnative predation and competition. 4 – Reduce magnitude of project impact
In February 2022, CPW drained Rio Blanco Reservoir to remove northern pike from the water body and eliminate the possibility of escapement into the White River. Following draining, the dam was inspected, and repairs made to the outlet. CPW completed the outlet repairs and began refilling the reservoir in June of 2022. Once refilled, CPW will restock the reservoir with warm-cool water sportfish species that are compatible with native fish conservation and recovery efforts.	1 – Reduce threat of nonnative predation and competition

Table 3. Colorado River Subbasin Significant Accomplishments (January 1, 2022, through December 31, 2022)

Accomplishment – Colorado River Subbasin	Sufficient Progress Criteria Affected
Colorado River	
Colorado provided an updated depletion report covering annual totals and 5-year average depletions for 2016-2020. Colorado's depletion report covers consumptive water use in the Colorado River basin above the confluence with the Gunnison and compares it with prior reporting and PBO baseline depletions. Colorado's analysis also reviews updates to the depletion accounting methodology that have been incorporated into the 2006-2015 and 2016-2020 depletion estimates and used updated methodologies to re-analyze baseline PBO depletion calculations so current assessments of depletions are comparable.	4 – Reduce magnitude of project impact

Accomplishment – Colorado River Subbasin	Sufficient Progress Criteria Affected
Depletions above the Gunnison River confluence in Colorado were well within the new depletion envelopes specified within the PBO (cumulative total of 120,000 AF, in two 60.000 AF increments). The results show that the level of depletions in the Colorado River Basin above the 15-Mile Reach decreased by an average of 53,958 AF/yr compared to the baseline 1971-1995 run during the accounting period. The 10-year running average in 1995 was 1,109,434 AF/yr and in 2020 was 999,524 AF/yr, a decrease of 109,910 AF/yr compared to the baseline run.	
In October of 2022, FWS sampled a 1.5-mile reach in DeBeque Canyon and collected seven individual humpback chub. These fish were tagged, and a small caudal fin clip was collected for future genetic testing. This marks the first collection of humpback chub in this portion of the Colorado River and may represent either an expansion of the Black Rocks/Westwater population or a small newly discovered population.	2 – Improve status of fish populations
Gunnison River	
Construction of a rigid screen located on the elevated spillway apron of Ridgway Reservoir was completed during winter 2021. This screen will preclude escapement of illegally introduced smallmouth bass that would threaten the downstream native fish in the Gunnison River. Ridgway Reservoir did not spill in 2022, so the screen was not tested. CPW implemented an unlimited harvest of smallmouth bass in Ridgway Reservoir in 2015 and they have conducted a harvest tournament for smallmouth bass each summer since 2015. In 2022, the tournament resulted in the removal of 5,569 smallmouth bass, which is a record over the seven years of the tournament, most of which were subadult fish. Monitoring estimates that seven years of tournaments have reduced the population of smallmouth at Ridgway Reservoir by 93% from initial estimates.	1 – Reduce threat of nonnative predation and competition 4 – Reduce magnitude of project impact

C) Concerns and Recommendations (January 1, 2022 through December 31, 2022)

Table 4. General Concerns and Recommendations – Upper Basin-wide

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
General – Upper Basin		
Declining Colorado pikeminnow population demographics throughout the upper basin are poor and linked in part to low recruitment due to hydrologic conditions and effects of nonnative fish species.	1 – Increased threat of extinction 2 – Declining status of fish populations. 3 – Inadequacy of flows	The Program should continue to act to halt the decline wherever possible. Such actions should include: Update the RIPRAP to reflect recovery actions in the revised Colorado pikeminnow Recovery Plan (FWS 2022 unpublished). Ensure flow management supports pikeminnow recruitment. Continue and complete the effort to replace and strengthen the pikeminnow broodstock held at SNARRC. The Program should ensure that adequate numbers of fish have been collected to provide the desired representation. Holding of backup broodstock in other facilities should be planned. Continue to experiment with landscape scale nonnative fish control measures like flow spikes or sediment flushes when and where available. Complete all planned fish screens to reduce nonnative species escapement from reservoirs.

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Razorback sucker produced through natural spawning continue to see only minimal recruitment to the adult population. Current recruitment is not sufficient to maintain populations without continued stocking in either the Green or Colorado subbasin.	1 – Increased threat of extinction	Results from floodplain management are encouraging and additional modification and management of floodplain habitats to improve survival of wild age-0 and juvenile razorback sucker is recommended.
A system failure at Ouray National Fish Hatchery -Randlett (ONFH-R) resulted in loss of 1,424 razorback sucker; revised protocols and safeguards are being implemented.	1 – Increased threat of extinction	Although the loss of fish in hatcheries due to many factors is part of normal operations, issues should be diligently tracked and addressed across all Program grow-out and production facilities.
Humpback chub is considered extirpated from Dinosaur National Monument (DNM).	1 – Increased threat of extinction	In accordance with the Service, the Program prioritizes creating redundancy for all genetically distinct populations of humpback chub and is working to develop a backup population for the Desolation/Gray Canyon population. The Service appreciates the work of Utah Division of Wildlife to collect humpback chub from Desolation Canyon and ONFH-R to hold those fish in refuge.
Stocked bonytail survival continues to be low.	1 – Increased threat of extinction	Bonytail hatchery production was increased under the Revised Integrated Stocking Plan (RISP). Hatcheries should continue to stock bonytail into floodplain locations to determine the importance of this habitat and to see if survival and reproduction of stocked fish will increase. Experimentation with bonytail stocking and rearing is planned to continue as the Program strives for more complete implementation of the 2015 RISP recommendations.

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Despite multiple accomplishments since the Program's inception in 1988, it is clear that recovery of the four listed fish will not be accomplished by 2023 when the Cooperative Agreement and Congressional authorization expires.	Hampers ability to 1 – Reduce threat of extinction Hampers ability to 3 – Improve flows; Hampers ability to 4 – Reduce magnitude of project impact.	Reauthorization of the Program must be completed. As of December 2022, Program partners have negotiated a funding solution, non-federal partners have drafted reauthorization bill language and the Program Offices have made significant progress toward completing other supporting documents such as NEPA and the "Blue Book". Legislation extended Program base funding through FY 2024.

Table 5. Green River Subbasin Concerns and Recommendations

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Green River		
Colorado pikeminnow recruitment declines in the Green River basin.	1 – Increased threat of extinction 2 – Declining status of fish populations.	As hydrologic conditions dictate and in alignment with the LaGory et al. 2019 report; The Program should continue to request summer base flows in the range of 1,700 – 3,000 cfs; which is in line with Reclamation's operational flexibility defined in their 2006 Flaming Gorge Record of Decision . As annual hydrologic categories vary, the Program should request a variety of base flows within the bounds of the revised range from Flaming Gorge and monitor the response of listed and nonnative fish, channel form, and vegetation encroachment. The Program should continue to request smallmouth bass flow spike releases from Flaming Gorge.

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Yampa River		
Nonnative fish dominated the fish community in Little Yampa Canyon, comprising 99% of all fish collected with nonnative smallmouth bass and white sucker being the most abundant species collected. Fish community changes in response to nonnative fish removal in the Yampa River demonstrate that native species richness increased during the removal period compared to pre-removal sampling (2003-2004), as has native species frequency and abundance. In 2022, native fish comprised only 4.7% of all fishes captured in the control reach and 2.6% in the treatment reach. The 2022 results demonstrate that although the trend between the non-removal and removal years is positive, there is still a significant challenge to overcome. Smallmouth bass densities in Little Yampa Canyon and other reaches of the Yampa River remain a concern and northern pike remain a concern in upstream reaches.	Hampers ability to 1 – Reduce threat of extinction by reducing threat of nonnative predation and competition.	The Program should continue intensive smallmouth bass removal, focusing on disruption during the spawning period, and adjust sampling schedules to exploit post-peak flows.
In-river control efforts are compromised by unscreened upstream sources and in-river reproduction. The Program has prioritized completing a Catamount screen.	Hampers ability to 1 – Reduce threat of extinction by reducing threat of nonnative predation and competition.	We encourage CPW to continue and, if possible, expand removal efforts in the upper Yampa River reservoirs and continue to educate anglers about the impacts of illegal nonnative fish introductions. The Program should continue to work with the Catamount Metropolitan District on the installation of a net/screen to prevent northern pike escapement. In the meantime, we encourage CPW to continue their northern pike control efforts at this reservoir.

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Duchesne River		
Construction of a permanent fish containment screen below Starvation Reservoir has yet to be completed.	Hampers ability to 1 – Reduce threat of extinction by reducing threat of nonnative predation and competition;	The Service encourages the responsible parties to construct the screen in 2023. Reclamation, Central Utah Water Conservation District (CUWCD), and UDWR redesigned the Starvation Reservoir fish screen project by relocating the screen below the Primary Jurisdiction Zone. The new plan has been approved by the stakeholders. Screen fabrication, foundation install, and screen install are currently planned for 2024.
White River		
Smallmouth bass continue to successfully spawn and recruit in the White River, representing a major challenge to listed fish recovery in this subbasin. The population is characterized by a dense reproduction area in the low-sediment water below Taylor Draw Dam with the population extending downstream into Utah.	Hampers ability to 1 – Reduce threat of extinction by reducing threat of nonnative predation and competition.	The Service recommends continued mechanical removal in the White River. In addition, as part of the White River Management Planning process, the Program should continue to discuss opportunities for flow spikes or sediment releases from Kenney Reservoir to disadvantage smallmouth bass spawning immediately below Taylor Draw Dam as expected to be outlined in the White River Management Plan.

Table 6. Colorado River Subbasin Concerns and Recommendations

Concern	Sufficient Progress Criteria Affected	Recommended Action Items
Colorado River		
Although releases from designated Recovery Program firm and lease pools (30,780.5 AF) were used to augment baseflows in the 15-Mile Reach; the 810 cfs flow target was not met for 83 days between April 1 and October 30, 2022 (four days April 16-19). Monthly average flows in August, September, and October were 801 cfs, 770 cfs, and 1,105 cfs, respectively. The most recent 15-MR PBO assessment also showed that Colorado pikeminnow approached the threshold for a "negative response" in data collected through 2015, which could lead the Service to consider a re-initiation for the PBO consultation.	Hampers ability to 3 – Improve flows.	The Service appreciates the actions the Program has taken in response to the 15-Mile Reach PBO review. The Program initiated a flow target study plan to ensure the biological relevance of 15-MR flow targets, which is expected to be completed during fall of 2023. The Service understands that substantial work is needed to clarify the relationships between flows and various life-stages of all the listed species. However, the current trajectory of Colorado pikeminnow is concerning. The Service recommends continued substantial progress to resolve the issues called out in the 15-MR PBO Review prior to the established deadline of 2028.

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