



Expanded Non-Native Aquatic Species Management Plan Environmental Assessment

U.S. Department of the Interior
National Park Service

Grand Canyon National Park
Glen Canyon National Recreation Area
Intermountain Region



Expanded Non-Native Aquatic Species Management Plan below Glen Canyon Dam

Glen Canyon Dam
Technical Workgroup Meeting
January 25, 2018

NPS Project Team

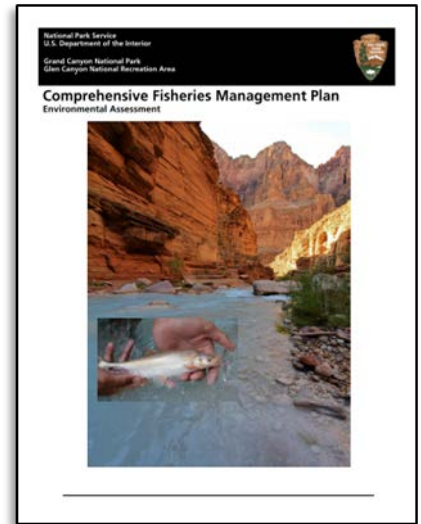
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Background

- Threats posed by aquatic non-natives were identified in:
 - Comprehensive Fisheries Management Plan (2013 CFMP)
 - Long-Term Experimental and Management Plan (2016 LTEMP)
- Increases in potentially harmful non-native species (such as Green Sunfish and Brown Trout) have been documented since 2013.
 - Rapid Response options of existing compliance
 - Short term CE's.
- Non-native aquatic species control is needed to provide for long-term management of the native aquatic system





Purpose of and Need for Action

- Purpose: The purpose of this action is to provide additional tools beyond what is available under the CFMP and the LTEMP, to allow the NPS to prevent, control, minimize, or eradicate potentially harmful non-native aquatic species, or the risk associated with their presence or expansion, in the action area
- Need: The need for this action is due to the increase of green sunfish and brown trout, and the potential expansion or invasion of other harmful non-native aquatic species that threaten downstream native aquatic species including listed species or the Lees Ferry recreational rainbow trout fishery. These non-native species have become an increasing threat due to changing conditions since the completion of the 2013 CFMP and the 2016 LTEMP.

Existing measures may be inadequate to address potentially harmful non-natives.





Cooperating Agencies

- Arizona Game and Fish Department
- Bureau of Reclamation
- Colorado River Board of California
- Colorado River Commission of Nevada
- Pueblo of Zuni
- Southern Nevada Water Authority
- Upper Colorado River Commission
- U.S. Fish and Wildlife Service
- Utah Associated Municipal Power Systems
- Western Area Power Administration



Monthly coordination calls with cooperating agencies and additional meetings per expertise and jurisdiction related to particular issues

Regular updates to Glen Canyon Dam FACA - Technical Working Group (TWG) and Adaptive Management Working Group (AMWG)



What Are Potentially Harmful Non-Native Aquatic Species?

- Fish, aquatic plants, or aquatic invertebrate species that are not native to the action area that may pose a threat to native species (including federally or state-listed species) or may pose a threat to the Lees Ferry recreational rainbow trout fishery

What non-natives are not considered potentially harmful for this project?

- Common carp would not be targeted, but may be removed incidentally as part of other removal or monitoring efforts
- Rainbow trout management would be consistent with that described in the CFMP and LTEMP
- New actions would be designed to minimize negative effects to the recreational fishery and continue to be consistent with the LTEMP goal to maintain “a healthy high-quality recreational rainbow trout fishery in GCNRA and reduce or eliminate downstream trout migration consistent with NPS fish management and ESA compliance.”

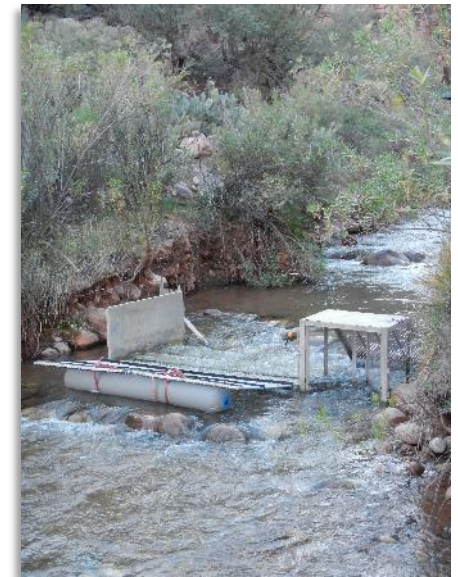
Species considered for control under the plan include, but are not limited to:

Fish	Invertebrates	Plants
Brown trout	Asian clam	Didymo
Catfish species	Quagga mussel	Eurasian watermilfoil
Black bass and sunfish species	Rusty crayfish	Hydrilla
Striped bass	New Zealand Mudsnail	
Cichlids		
Yellow perch and walleye		
Northern pike		
New carp species		



Potential Non-Native Aquatic Species Control Categories

- **Mechanical controls:** physical removal of non-native aquatic species from habitats.
 - Long-term, intensive, repeated electrofishing and trapping
 - Mechanical disruption of spawning habitats
 - Concussive devices in small backwaters
 - Dredging or harvesting of non-native plants
- **Physical controls:** prevention of habitat use by non-native aquatic species
 - Long-term fish barriers such as weirs, exclusion screens, and nets that inhibit passage into small backwaters and limited tributary areas
 - Pumps and above-ground piping to deliver cooler water to keep backwater areas below warmwater fish spawning temperatures
 - Covering small areas to increase temperature, lower dissolved oxygen, or reduce sunlight
 - Modifications of RM -12 sloughs





RM -12 Sloughs in Glen Canyon



Aerial Photo of Upper and lower slough at RM –12 in Glen Canyon
where green sunfish were found to reproduce in recent years



Small Upper Slough

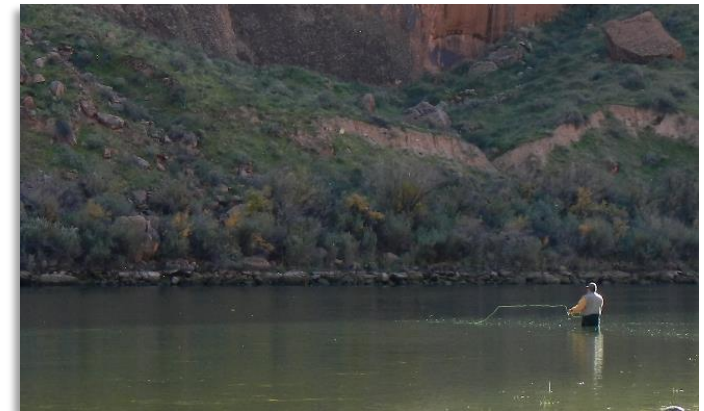


Black Plastic Cover



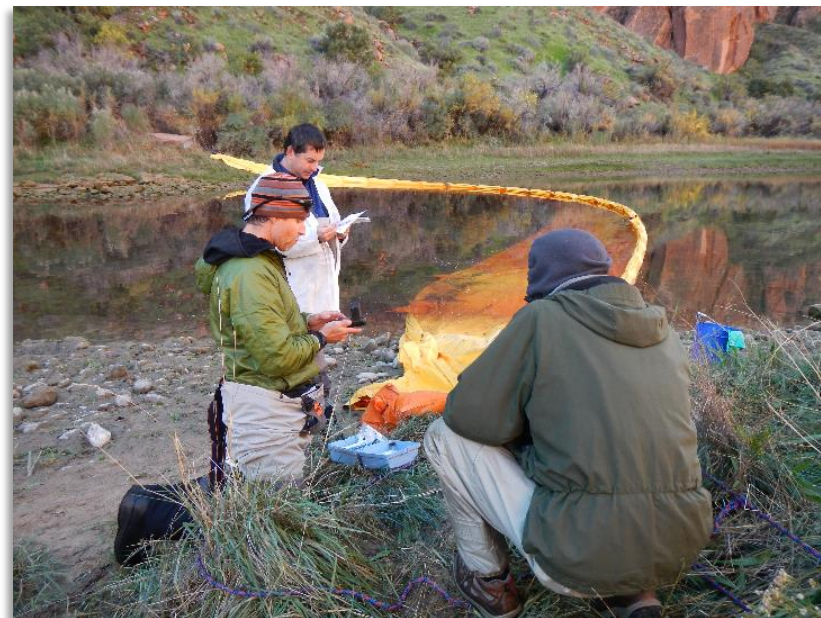
Potential Non-Native Aquatic Species Control Actions (Cont.)

- **Biological controls:** introduction of organisms to control populations of non-native aquatic species
 - Introduce YY male brown trout or other non-native species to reduce breeding success over time by creating a skewed sex ratio
 - Introduce humpback chub or Colorado pikeminnow to the upper slough at RM -12 to prey on and compete with non-natives
 - Move local non-native common carp to the upper slough to overwhelm non-natives
- **Fishing or take changes:** changing harvest rates to increase removal of non-native aquatic species
 - Bounty system, tournaments, or other incentives for anglers to catch specific non-natives.
 - Coordination between federal and state agencies to explore education and/or catch-and-keep regulations for non-natives.



Potential Non-Native Aquatic Species Control Actions (Cont.)

- **Chemical controls:** limited application to control populations of non-native aquatic species
 - Fish: rotenone, other registered piscicides, or experimental chemicals allowed under federal and state regulations, such as ammonia, would be used for a limited number of years
 - For fishery renovation purposes prior to native species translocations or introductions only in tributary locations that have a natural barrier, such as Bright Angel Creek above “Split Rock Falls” or Shinumo Creek
 - As a last resort method to address potentially harmful non-natives in backwaters, low velocity areas, or sloughs, and prevent their distribution downstream after other methods have failed
 - Chemical treatments for plants or invertebrates
 - Ribbon Falls and Deer Creek would be excluded from chemical treatment due to specific tribal concerns in these areas.





Proposed Action and Alternative Concepts

Preliminary Alternative Concepts – update based upon scoping

- Four alternatives concepts have been identified for consideration in the EA:
 - **No-action alternative (Alternative A)**
 - Continuation of existing actions and policies only
 - Actions described in CFMP
 - Actions described in LTEMP
 - **Most expanded control methods (Alternative B)**
 - Most complete combination of mechanical, physical, biological, chemical, and fishing/take actions
 - **Moderately expanded control methods (Alternative C)**
 - More limited combination of mechanical, physical, biological, chemical, and fishing/take actions relative to Alternative B
 - **Least expanded control methods (Alternative D)**
 - Mechanical actions limited to those under Alternative A only, limited set of physical controls, full set of fishing/take actions, no biological or chemical control actions



Elements Common to All Action Alternatives

- Identify when and where different control actions could be taken
 - Decision tree or matrix including condition trigger levels
 - Preferred sequence of control actions: first resort, last resort
 - More than one control action could be applied at the same time
- Identify resources of concern that would be considered prior to determining action
- Monitoring and adaptive responses that would include:
 - Off-ramps that would be used to determine when control actions stop because of unacceptable adverse effects on resources
 - Mitigation actions that would be used to address adverse impacts on other resources
- All elements of the no-action alternative



Comparison of Alternatives

Control Action	Alternative A (No-Action)	Alternative B	Alternative C	Alternative D
Mechanical Controls	Allowed under CFMP when used as a rapid response, or for brown trout within GRCA, and under the LTEMP as a long-term response for trout control in the LCR reach	Potential use of all control methods that are being considered	More selective mechanical removal of brown trout in Glen Canyon Reach, does not include concussive options	Similar to Alternative A, but plant harvesting/ dredging could occur
Physical Controls	Operation of weir at Bright Angel Creek	Same as above	Similar to Alternative B, but RM-12 options do not include channelization, underground piping or filling upper slough	Same as Alternative C
Biological Controls	None	Same as above	RM-12 options do not include using common carp, or Colorado pikeminnow introduction in upper slough	None
Chemical Controls	None	Same as above	Same as Alternative B	None
Fishing/Take Changes	None	Same as above	Same as Alternative B	Same as Alternative B



Public Scoping

- Public Scoping for this project was open from November 15, 2017 to January 5, 2018.
- We held a public webinar on November 28, and 3 public meetings in Page, Flagstaff and Phoenix, AZ on December 6, 7, and 12, 2017, respectively. Attendance was approximately 13, 10, 15 and 31 members of the public, respectively.
- We received approximately 428 comments. The majority were from angling groups or individual anglers. We also received comments from several state and federal agencies and tribes that are cooperating agencies.



Public Scoping Comments – Preliminary Summary

- Angling groups and individual anglers and Arizona Game and Fish Dept have expressed concerns about intensive long term electrofishing in Lees Ferry for brown trout. Those concerns related to potential impacts to rainbow trout, the recreational fishery, and use of the area if there is intensive large scale electrofishing. They also expressed concerns questioning the cost and efficacy of large scale electrofishing. Many comments asked that we consider dropping analysis of intensive electrofishing as a tool.
- Other commenters asked that we retain and evaluate a full range of alternatives to ensure we are making informed decisions.
- Concerns about the level of threat to downstream endangered species presented by brown trout (both that the threat level is overstated and understated).
- Some cooperators and other commenters expressed that NPS should co-lead this EA with Reclamation so that flow-based options can be considered, other suggested that this EA should be based only on non-flow options for which NPS has jurisdiction.



Public Scoping Comments – Preliminary Summary

- Several cooperators and other commenters expressed concerns about the proposal to reintroduce the endangered Colorado pikeminnow (considered extirpated) or endangered humpback chub in the Glen Canyon Reach as predators of non-native fish in the RM-12 slough. These concerns were based on uncertainty of impacts to humpback chub downstream or to the rainbow trout recreational fishery, potential efficacy of the predation on non-natives, or the question of whether these introductions were beyond the scope of the purpose and need.
- The Pueblo of Zuni expressed that they do not support lethal fish management tools in this project area of the Colorado River. We are working closely with Zuni as a cooperating agency and plan to consult with them on this process.
- Some commenters expressed concerns about the use of rotenone as a chemical piscicide in the proposed action area, about concussive methods, or the use of common carp as a biocontrol.
- Some commenters expressed support of YY males as a biocontrol.
- Reclamation and USFWS asked for clear definitions about roles and responsibilities for options and suggested adaptive approaches that can address unintended consequences and provide longer term protections for endangered fish.



EA Timeline

Date/ Timeframe	Activity or Event
Nov. 15, 2017- Jan. 5, 2018	<ul style="list-style-type: none">• Public scoping Meetings:• Nov 28 (webinar), Page, Dec. 6, Flagstaff, Dec. 7, Phoenix, Dec. 12• Review public comment/produce scoping report
Feb-April 2018	<ul style="list-style-type: none">• Collect contributing studies (Reclamation slough analysis, brown trout whitepaper, etc.)• Coordinate with cooperators on adaptive designs (suitability matrix, sequencing, triggers, mitigations/off-ramps)• Revise alternative options, dismiss some options from detailed analysis• Analyze impacts and prepare a draft EA• Coordinate with cooperating agencies on a draft prior to public release.
May 2018	EA made available for 30-day public review and comment public meetings
Summer 2018	NPS reviews and analyzes comments, prepares errata, conducts consultations with tribes and USFWS
Late Summer /Early Fall 2018	NPS issues decision document, as appropriate