

**Glen Canyon Dam Adaptive Management Work Group**  
**Agenda Item Form**  
September 20, 2017

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Agenda Item

Non-Native Fish Update

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Purpose of Agenda Item

To provide an update and opportunity for questions regarding non-native fish in Glen Canyon and Grand Canyon.

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Action Requested

Information item only; while we will answer questions, no action is requested.

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Presenters

Rob Billerbeck, Colorado River Coordinator, National Park Service

Katrina Grantz, Chief, Adaptive Management Group, Upper Colorado Region, Bureau of Reclamation

Ken Hyde, TWG Member, Chief of Science and Resource Management, National Park Service, Glen Canyon National Recreation Area

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Previous Action Taken

- ✓ By AMWG: At its February 2017 meeting, AMWG passed the following motion by consensus: The AMWG believes that in moving forward with any new actions to manage brown trout (BT) in the Lees Ferry reach of the Colorado River, it would be beneficial to work to develop a plan based on the most up to date information and that has involvement from interested members of the AMWG. Accordingly, the AMWG requests that the Secretary of the Interior direct the National Park Service and the Grand Canyon Monitoring and Research Center and request the Arizona Game and Fish Department to organize and facilitate a workshop among scientists, managers, tribes, and interested stakeholders to address: (1) the root causes of the increases in BT, (2) the risks associated with an expanding BT population to a quality rainbow trout fishery in Lees Ferry and the recovery/conservation of humpback chub and other native fish down river, (3) the pros and cons of different experimental and management options to address those risks including but not limited to mechanical removal, trout management flows, and the current High Flow Experiment protocol, (4) the research needs to support more informed decisions moving forward, and (5) management recommendations for minimizing the negative effects of brown trout. Management recommendations should take into consideration expressed tribal concerns regarding the taking of life. Results from the workshop, and any recommended actions based on them, should be reported to the TWG and presented to the AMWG at the August 2017 meeting.
  
- ✓ In 2015, when green sunfish were first found to be reproducing at RM -12 in the Glen Canyon Reach, they were considered a significant threat to downstream humpback chub and the primary reason for delaying an HFE that year.

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Relevant Science

Please see attached memorandum from David Ward, Research Fish Biologist, Grand Canyon Monitoring and Research Center, regarding a risk assessment of green sunfish in the Colorado River ecosystem.

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Summary of Presentation and Background Information

**Green Sunfish in Glen Canyon NRA Update**

Ken Hyde will provide a brief summary of continuing efforts to monitor, exclude, and control green sunfish found reproducing in the Upper Slough at RM -12. The presentation will focus on efforts conducted in 2017 by NPS staff and will include a short PowerPoint presentation including:

- Aerial pictures of the sloughs found at RM -12.
- Information on the exclusion measures currently in place.
- Monitoring information on the number and sizes of green sunfish found since 2015.
- A brief review of the temperature monitoring data and other data collected in 2017.
- Information on a black plastic experiment conducted during August 2017 and the possible chemical treatment that could occur in early October 2017.

**Brown Trout Workshop**

Katrina Grantz will provide a brief overview of the September 21-22 Brown Trout workshop, the purpose, goals and objectives, and expected outcomes.

Nonnative brown trout are an emerging issue in the Colorado River downstream of Glen Canyon Dam. The causes of the recent brown trout increases, the risks associated with an expanding population, as well as the pros, cons and effectiveness of potential management actions are not well understood. At the February 2017 AMWG meeting stakeholders expressed concerns related to brown trout and the relationship with compliance with the Endangered Species Act, tribal concerns with the taking of life, the condition of the rainbow trout fishery, and potential interactions with high flow experiments. The AMWG determined that holding a workshop prior to moving forward with brown trout management actions would be extremely beneficial to addressing stakeholder concerns and recommended that the Secretary of the Interior direct the National Park Service and the USGS Grand Canyon Monitoring and Research Center and request the Arizona Game and Fish Department to organize and facilitate a workshop among scientists, managers, tribes and interested stakeholders.

The brown trout workshop is scheduled for September 21-22 in Tempe, Arizona. Workshop coordination and planning began after Reclamation received a waiver on June 6, 2017, from the requirement to suspend FACA committee activities in order to coordinate with AMWG members on a brown trout workshop. Discussions among the workshop coordinators have centered on how to make the workshop most effective. The National Park Service has lead the coordination with the USGS Grand Canyon Monitoring and Research Center, the Arizona Game and Fish Department, as well as the Bureau of Reclamation, the Fish and Wildlife Service, and Western Area Power Administration. It is anticipated that approximately 50-80 participants will attend the workshop. Every effort to minimize costs has been made, including selecting the location as well as combining travel with the existing AMWG meeting. It was acknowledged that the desired timeline for the

proposed workshop was ambitious and it may not be implemented before August, 2017. It was also acknowledged that it would be most constructive to hold the workshop prior to November 2017, the timing of a potential high flow experiment. Workshop elements include a synthesis report of the workshop outcomes and recommendations as well as a professional facilitator to help run the workshop.

### **NPS' Non-Native Fish Environmental Assessment**

The National Park Service (NPS) intends to prepare an Environmental Assessment under the provisions of the National Environmental Policy Act for an Expanded Non-native Fish Management Plan in Glen Canyon National Recreation Area and Grand Canyon National Park below the Glen Canyon Dam.

The purpose of this action is to prevent, control, minimize, or eradicate potentially harmful nonnative fish, or the risk associated with their presence or expansion, in the action area. The need for this action is due to the increase of green sunfish, brown trout, and potential expansion or invasion of other harmful nonnative fish that threaten downstream native or endangered fish or the Lees Ferry recreational rainbow trout fishery. These species have become an increasing threat due to changing conditions since the completion of the 2013 NPS Comprehensive Fish Management Plan and the 2016 Long-Term Experimental and Management Plan. Existing measures may be inadequate to address the new species and other potentially harmful nonnative fish. The action area for this plan will be identical to the one identified in the CFMP, from the Glen Canyon Dam to Lake Mead, including the Colorado River and its tributaries in Grand Canyon National Park, and the Glen Canyon Reach of the Colorado and Paria Rivers in Glen Canyon National Recreation Area.

At the time of writing this document, NPS is planning to send invitations in late August to potential cooperating agencies, to send letters to tribes to initiate the consultation process, and to open public scoping. NPS plans to hold public scoping meetings in Flagstaff and Page in late October or early November 2017, and to initiate a monthly cooperating agency phone call in September.



## Expanded Non-Native Fish Management Project Background

In 2013, the NPS (GCNRA and GCNP) completed the Comprehensive Fish Management Plan (CFMP). The intent of that effort was to provide guidance for managing fish within the Colorado River and tributaries from Glen Canyon Dam to Lake Mead.

Since the completion of the CFMP and the 2016 Long Term Experimental and Management Plan for Glen Canyon Dam operations, increases in potentially harmful non-native fish have been documented. This plan is intended to address these concerns.



## Project Background

HFE Decision 2016

*...the Leadership Team considered the presence of green sunfish in a backwater slough in Glen Canyon, the successful chemical ammonia treatment of the population on October 20, 2016, and a Department of Interior commitment to prioritizing the development and implementation of non-native species monitoring and mitigation to be in place within the next year.*

*These efforts will be implemented by USGS Grand Canyon Monitoring and Research Center, Reclamation, and National Park Service, in collaboration with partner agencies. In particular, more targeted monitoring for potentially harmful nonnative fishes at sites with suitable habitat in Glen and Grand Canyons as well as an analysis of possible mitigation options for the backwater slough in Glen Canyon will be conducted over the next year.*



## Pre-NEPA work

- October/November 2016 – calls with AMWG stakeholders regarding an EA
- December 2016-January 2017 – Development of purpose and need, preliminary alternatives, public scoping materials prepared
- February 2017 – Based on concerns regarding brown trout, including AMWG motion, decided to recraft EA to address both
- March - July 2017 – Obtained funding to have analysis work from Argonne National Labs, Meetings with Reclamation and AGFD, Internal Scoping meetings, funding and initiation of Reclamation Assessment of Slough Options and hydrology modeling related to slough
- August/September 2017 – Invitation letters sent to cooperators and tribes, Argonne Interagency Agreement started



## Purpose of and Need

The purpose of this action is to prevent, control, minimize or eradicate potentially harmful non-native fish, or the risk associated with their presence or expansion, in the action area.

The need for this action is due to the increase of green sunfish, brown trout and potential expansion or invasion of other harmful non-native fish that threaten downstream native or endangered fish or the Lees Ferry recreational rainbow trout fishery. These species have become an increasing threat since the completion of the 2013 NPS Comprehensive Fish Management Plan (CFMP) and the 2016 Long-Term Experimental and Management Plan (LTEMP). Existing measures may be inadequate to address the new species and other potentially harmful non-native fish.

## Action Area

The action area for this plan will be identical to the one identified in the CFMP, from the Glen Canyon Dam to Lake Mead, including the Colorado River and its tributaries (primarily Bright Angel, Shinumo and Havasu creeks) in Grand Canyon National Park (GCNP), and the Glen Canyon Reach of the Colorado and Paria Rivers in Glen Canyon National Recreation Area (GCNRA).

# Expanded Non-Native Fish Management Plan Environmental Assessment

National Park Service  
U.S. Department of the Interior  
12795 W. Alameda Parkway  
Lakewood, CO 80228



## Cooperating Agency Invitations

*Bureau of Reclamation  
Arizona Game and Fish Department  
Western Area Power  
Fish and Wildlife Service  
USGS/GCMRC  
Bureau of Indian Affairs*

*Basin States (AZ, CA, CO, NM, NV, WY, UT)  
Upper Colorado River Commission  
Utah Associated Municipal Power Systems  
Salt River Project*

## Cooperating Agency Invitations & Initiation of Consultation

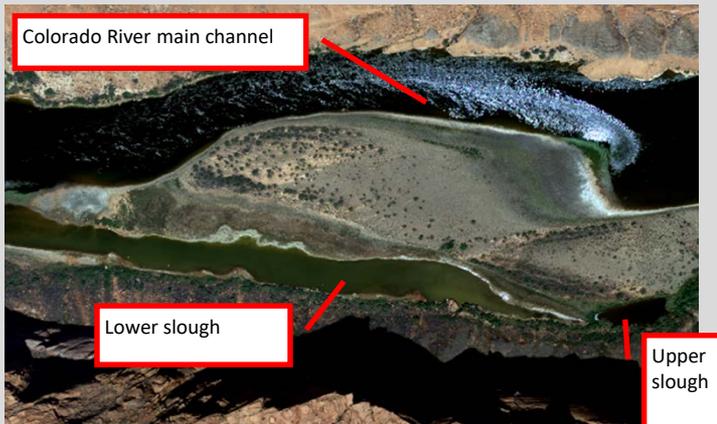
*The Pueblo of Zuni  
The Navajo Nation  
The Hualapai Tribe  
The Havasupai Tribe  
The Hopi Tribe  
The Paiute Tribe of Utah  
San Juan Southern Paiute Tribe  
Kaibab Band of Paiute Indians*

*Yavapai-Apache Nation  
Las Vegas Tribe of Paiute Indians  
Moapa Band of Paiute Indians  
Ute Mountain Ute Tribe*



## Alternative Concepts

- Physical barriers (nets, screens, etc.)
- Habitat modification (dredging or filling non-native habitat areas such as backwater sloughs)
- Biological controls (stocking with competitive species, etc.)
- Chemical treatment in limited areas (such as backwaters, sloughs, and targeted tributary locations)
- Mechanical removal methods (electrofishing, concussive, black plastic, disruption of spawning beds, etc.)



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



Photo showing mechanical non-native fish removal in Shinumo Creek (NPS)



Photo showing use of black plastic in Upper Slough at RM -12 (NPS)

# Expanded Non-Native Fish Management Plan Environmental Assessment

National Park Service  
U.S. Department of the Interior

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## NEPA Timeline

Late Oct/Early November, 2017	Public Scoping Period Begins
November 2017	Public Scoping Meetings
Late December, 2017	Public Scoping Period Concludes
Winter 2018	NPS Reviews Public Comments, Analyzes Impacts and Writes EA
Spring/Early Summer 2018	EA Available for Public Review and Comment Public Meetings
Summer 2018	NPS Reviews and Analyzes Comments and Prepares Errata
Late Summer/ Fall 2018	NPS Issues Decision Document

# Green Sunfish Risk Reduction at RM -12





Little  
Colorado  
River Mouth  
& HBC  
spawning area  
NPS is trying  
to protect

Backwater area at mouth of LCR vulnerable to GSF establishment. At flows under 17,000 cfs this is a warm backwater. At flows over 17,000, to about 20,000 cfs, the Colorado River flows around the island. At higher flows, the river backs up into the LCR creating low velocity habitat.

# A hand-sized fish weighing less than 1 pound

20+ green sunfish entered Upper Slough between November 2016 and April 2017



1 female can produce up to 10,000 young in 10 or more spawning events over a summer



# Research on Tools for the Toolbox

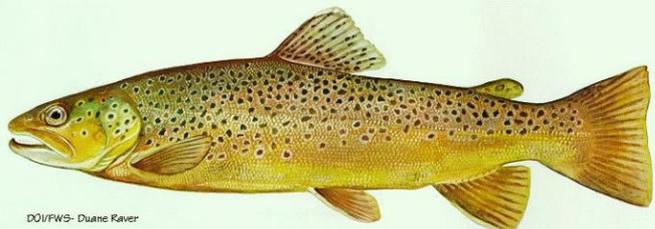
**April 2017 Exclusion Barrier**



**HFE's & daily "tidal" fluctuations affect All Options**

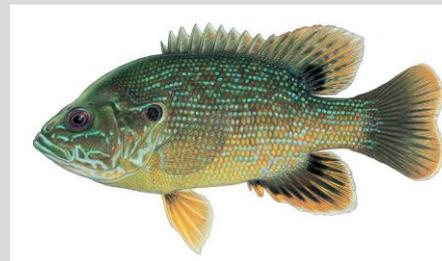


# Other Potential Threats to Glen Canyon & Grand Canyon Fisheries – Single Species Management is not an Option



DOI/FWS- Duane Raver

Brown Trout currently spawning in Lees Ferry Reach

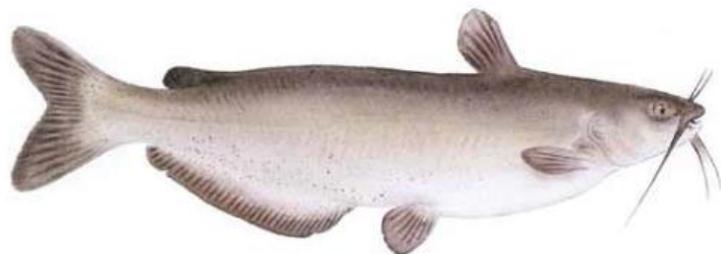


10,000+ GSF and 1  
Bluegill removed  
2015-16

Smallmouth  
bass  
considered  
high  
probability

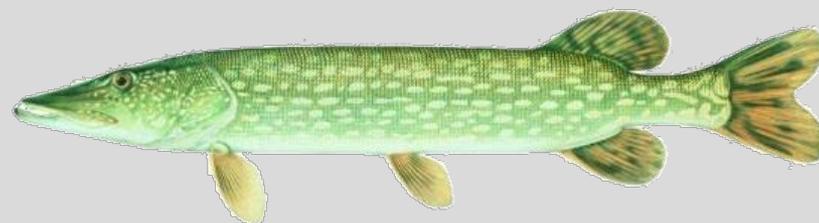


8 walleye collected by AzGFD in 2015 & 2016 at  
dam



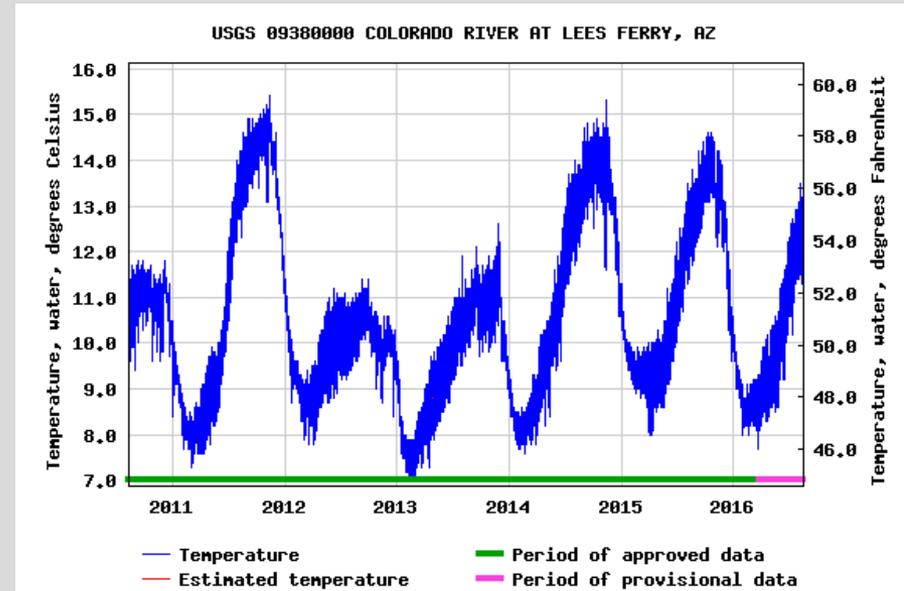
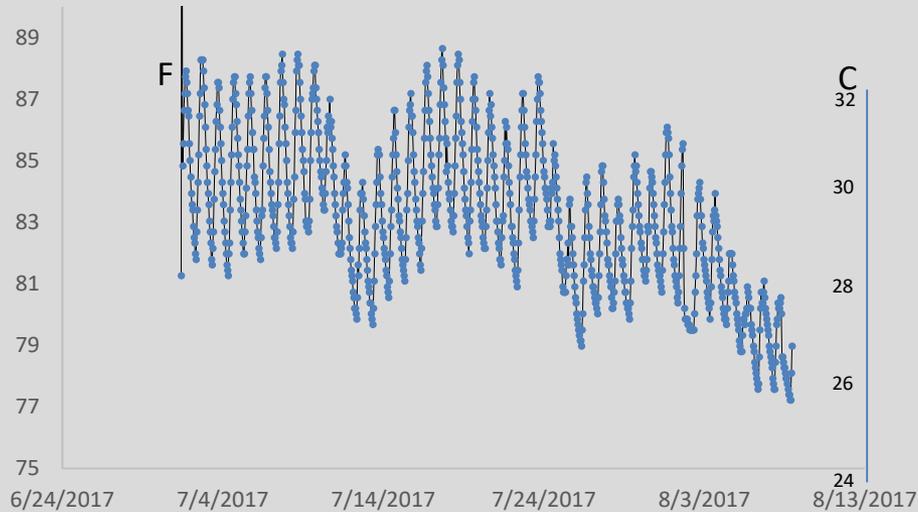
1 channel cat  
collected in 2015  
rotenone  
treatment

Northern Pike in Lake Powell & Upper Colorado



# Colorado River & Backwater Sloughs offer wide range of spawning temperatures

Upper Slough Hole (Bottom)



FISH SPECIES	Spawning (Celsius)		Growth (Celsius)	
Green Sunfish	19	31	22	31
Common Carp	18	30	14	30
Striped Bass	14	24	16	30
Smallmouth Bass	13	18	15	26
Northern Pike	8	12	10	21
Brown Trout	7	14	12	20
Walleye	6	13	12	23

# Lessons Learned in 2016-2017

- The Upper Slough exclusion barrier is effective but needs to be in place immediately following an HFE or Equalization flow
- Electrofishing and minnow traps are effective for monitoring but will not remove all fish
- Green sunfish can survive high water temperatures and low dissolved oxygen
- The Lower Slough fluctuations and colder waters do not appear to support green sunfish reproduction

# Green Sunfish Wrap-up

- Black Plastic Treatment not 100% effective this time, but good lessons learned
- Ammonia Treatment will occur in early October to remove few remaining fish
- Monitoring of Lower Slough has occurred in 2017 with no reproduction found
- We expect Green Sunfish to be treated and monitoring completed before Fall 2017 HFE decision
- Monitoring of Lower/Upper Slough in 2018 being planned with AGFD and GCMRC assistance

