

Warm Water Fisheries Investigations
A Prospectus for the October 25-26 Adaptive Management Workgroup Meeting

Background On August 11, 2004 the AMWG passed the following motion: “*That GCMRC and TWG make a recommendation to AMWG in October 2004 on warm water species studies including a plan starting in January 2005*”. Subsequently on September 27, 2004 the TWG passed an additional motion: “*GCMRC will develop a process, a schedule, and a recommended budget for suppression and control of non-native fish (warm water species) to be presented to AMWG at their October meeting*”. This brief is prepared in response to these two AMP directives relative to warm water species.

A significant concern relative to elevated water temperatures released from Glen Canyon Dam as a result of either low reservoir levels or TCD is the establishment or growth of non-native warm water fish populations in the Colorado River in Grand Canyon. Potential species of concern include: smallmouth bass, channel catfish, striped bass, common carp, and other centrarchids (basses) and ictalurids (catfishes). As above, the AMWG is concerned about this possibility and would like additional research into methods to detect, enumerate, capture, and possibly control these fishes.

Need In fisheries investigations in Grand Canyon, researchers utilize electrofishing, trammel nets, hoop nets, beach seines and minnow traps as fish sampling gear. We have found through 2 decades of work that these methods are fairly efficient for fish that occupy moderate to slow velocity habitats and are closely associated with shorelines. However, fish that tend to occupy higher velocity habitats or are not associated with shorelines are captured with unknown or very low efficiency using these gears. We suspect that there are several important native and non-native fish species that fall into this second category including: channel catfish, adult humpback chub, adult bluehead sucker, striped bass, smallmouth bass, and possibly adult flannelmouth sucker. In general, when we fail to catch a particular type of fish utilizing our current sampling techniques, we do not know if there are no fish there or our gear is simply not working. Alternatively, when we catch, for instance, one striped bass, we do not know if the abundance of striped bass is high or if we simply got lucky with our inefficient gear. There is a critical need to develop alternate detection, enumeration, and capture gears for both warm water non-native fishes and for native fishes in the mainstem Colorado River. This need exists both from the standpoint of a potential fish control and relative to core monitoring.

Potential Methodology There are essentially two issues to address relative to developing both a successful warm-water fish control program or a core monitoring program for both native and non-native fishes: 1) detection of the presence of particular fish species, and 2) capture of a particular fish species. Currently, the only methods we have at our disposal involve the detection of fish through capture. However, there are promising acoustic technologies to detect the presence of fish without actually capturing fish. These include various sonar systems (i.e. fish finders) and sophisticated acoustic imaging devices (e.g. Didson Camera; <http://www.apl.washington.edu/programs/DIDSON/DIDSON.html>). With the capability to quickly detect fish without capture, we could potentially detect, enumerate, and focus control efforts in specific river segments or habitat types. This could allow us to deploy our existing inefficient capture gear only in areas of high fish concentration. Additionally, there are alternative capture gears such as trot lines and modified electrofishing configurations that might prove much more efficient at capturing particular species of non-native fishes (e.g. channel catfish). We may also elect to utilize various radio or acoustic telemetry to better understand fish movement and use of various habitat types leading to more efficient sampling and capture methodology. Ultimately, we could employ multiple detection and capture gears in a systematic design to estimate capture efficiencies, and to determine the best methodologies for detection, enumeration, and capture for particular fish species

Potential Objectives

- 1) Evaluate feasibility of utilizing alternate detection, enumeration, and capture gears in the Colorado River including sonar enumeration and imaging, telemetry, modified electrofishing configurations, and angling (trot line).
- 2) Estimate species-specific relative capture efficiency for existing and proposed gear types.

- 3) Recommend methodologies and strategies for the development of a warm water fish removal program and modifications to core monitoring for mainstem resident native and non-native fishes.

Process and Schedule As a first step in the development of this program, the GCMRC would convene a workshop of potential collaborators to discuss strategies and to develop a study plan. This workshop would be hosted in January or early February, 2005. Following peer review of the study plan, we would identify a core group of collaborators, divide work assignments, secure logistics support, begin the permit application process, and purchase necessary gear. We anticipate this as a 3 year effort with two sampling trips occurring annually during June and July. Presentations would be given to the TWG during Fall 2005 and Fall 2006 reviewing first and second year progress. A final report with recommendations for the development of a warm water removal program and modifications to core monitoring for mainstem resident native and non-native fishes will be prepared and submitted for review no later than June 2007.

Potential Collaborators Ecometric Research, AZGFD, USFWS-Flagstaff AZFRO, SWCA

Preliminary Budget

<i>Personnel</i>	<u>2005</u>	<u>2006</u>	<u>2007</u>
GCMRC Staff	80	80	20
Collaborator Services	100	100	20
<i>Logistics</i>			
4 river trips	70	70	0
<i>Equipment</i>	80	40	0
<i>Travel and Workshop</i>	20	10	5
<i>Total</i>	350	300	45