COLORADO RIVER RECOVERY PROGRAM RECOVERY PROGRAM
FY 2006 ANNUAL PROJECT REPORT PROJECT NUMBER: _147_

I. Project Title: ***Standardization of Recovery Program Electrofishing Fleet***

II. Principal Investigator(s):

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III. Project Summary:

The Upper Colorado River Recovery Program consists of six separate field stations located in Colorado and Utah conducting electrofishing in riverine critical habitat for endangered fishes and in adjacent river reaches. Each of these stations has two to four aluminum-hull elctrofishing boats that operate on one or more rivers each year to capture endangered, native or nonnative fishes. Kolz (1989) developed a model of the transfer of power from water to fish which compensated for the power needed to deliver constant electric power to fish in waters with differing conductivities.

Standardization of electrofishing in waters having differing conductivities is now viewed as essential when monitoring temporal and spatial differences in fish assemblages (Miranda and Dolan 2003). The benefits of standardization for fisheries programs include minimizing variation in catchability, maximizing catch and reducing injury to fish (Bonar and Hubert 2002, Miranda 2005). Standardizing the electrofishing fleet within the Recovery Program would promote and facilitate comparison of catch data among rivers and reaches, and may maximize the catch of target native or nonnative fishes, thus benefiting stock assessments or removal of target fishes.

The purpose of this project is to provide a standardization protocol for the aluminum-hulled boats in the Recovery Program's electrofishing fleet, to evaluate individual boats in the fleet to determine if they conform to standardized critieria, and to make recommendations that would bring individual boats into conformance with standards set for the electrofishing fleet. The electrical resistance of the standard boat hull in combination with dual spherical anodes has been calculated. The significant parameter from this study is the 2.1 ohms of electrical resistance calculated for the boat hull. This is the first parameter that will be measured for the other boats in the Recovery Program's fleet to ensure that all the boats have equally effective hulls. Implementation of this standardization protocol and evaluation of the electrofishing fleet is scheduled for completion in 2007.

IV. Study Schedule:

FY-06 -Establish electrical resistance for “standard boat” using two spherical anodes.
-Develop guidelines to implement standard criteria for electofishing fleet.
FY-07 -Evaluate output characteristics of the Smith-Root and Coffelt pulse generators.
-Determine conformance of individual boats in fleet to standardized criteria.

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

V.A. Measure and document population parameters to determine status and biological response to recovery actions.
V.A. 2. Evaluate population estimates.
V.C. Develop and enhance scientific techniques required to complete recovery actions.
V.D. Establish sampling procedures to minimize adverse impacts to endangered fishes.
V.D.2. Implement scientific sampling protocols to minimize mortality for all endangered fish.

VI. Accomplishment of FY 2006 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

1. Establish “standard” electrofishing boat. As noted above, the standard electrical resistance to which all aluminum-hulled boats in the electrofishing fleet will be compared has been developed.

2. Recommend electrode deployment that can be accommodated by all boats in the fleet. Key measurements pertaining to electrode deployment were obtained for boats from the six field stations to assess their capacity to conform to standard guidelines.

3. Evaluate electrofishing fleet for the equivalent resistance of their electrodes and make recommendations needed for individual boats to conform to the “standard” boat. Evaluation of individual boats will commence in 2007. The implementation of standardized electrofishing techniques will require field personnel to be attentive to significant electrofishing parameters. An outline of these parameters has been prepared and will be refined as information from the generator/electroshocker output evaluation becomes available.

4. Develop model specific to conductivity range encountered by electrofishing fleet in rivers of the Upper Basin to guide selection of spherical anode diameter and electroshocker control settings. Voltage and current measurements were taken with the standard boat using paired combinations of spherical anodes having diameters of 8, 9, 10, 11, and 12

inches. The total resistance variations for the electrode arrays for each combination of the five sphere sizes in water conductivities of 100 to 1000 µS/cm have been calculated. It is not necessary, at this time, to select a standard for the size for the anode spheres, but it will be recommended that field operators experiment with the 8, 9 and 10-inch spheres to compare their effectiveness with the 11-inch anodes currently in use.

5. Identify current properties of electroshocker output at various control setting when exposed to resistors simulating changing water conductivity. In November, 2006, we will initiate an evaluation of the output characteristics of the Smith-Root and Coffelt pulse generators. These measurements will be made by operating the pulsators into fixed resistive loads. The goal is to develop a power chart that defines the limiting parameters of peak voltage, current, and power for the GPP-5.0 and VVP-15 electroshockers.

VII. Recommendations:
-Complete evaluation of electroshocker outputs and incorporate findings in standard electrofishing protocol.
-Perform electrical resistance evaluation of as many individual electrofishing boats as feasible prior to completion of 2007 sampling season, preferably under local water conditions in which individual boats typically operate.

VIII. Project Status: On track and ongoing.

IX. FY 2006 Budget Status

A. Funds Provided: $10,000 from National Fish and Wildlife Association.
B. Funds Expended: $1,425, plus approximately $600 from RIP funds for stainless steel spheres and electrical resistors and about $400 from CDOW for electrical meters and probes.
C. Difference: $8,575. Work is ongoing and evaluation of individual boat is expected to consume the majority of the budget.
D. Percent of the FY 2006 work completed, and projected costs to complete: 25%
E. Recovery Program funds spent for publication charges: None.

X. Status of Data Submission (Where applicable): N/A.

XI. Signed: *Patrick J. Martinez* November 6, 2006
Principal Investigator Date

References:

Bonar, S. A., and W. A. Hubert. 2002. Standard sampling of inland fish: benefits,

challenges, and a call for action. Fisheries 27(3):10-16.

Kolz, A. L. 1989. A power transfer theory for electrofishing. U.S. Fish and Wildlife Service Technical Report 22:1-11.

Miranda. L. E. 2005. Refining boat electrofishing equipment to improve consistency and reduce harm to fish. North American Journal of Fisheries Management 25:605-618.

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