

**Colorado River Recovery Program
Annual Report**

**Recovery Program
Project No.: 123a**

I. Title: Smallmouth Bass Control in the Green River

II. Principal Investigators:

Paul Badame
Utah Division of Wildlife Resources
Moab Field Station
1165 S. Hwy 191 – Suite 4
Moab, UT 84532
435-259-3780/fax 435-259-3785
E-mail: paulbadame@utah.gov

Mark Fuller and Sam Finney
Vernal Colorado River Fish Project
U. S. Fish and Wildlife Service
Vernal, UT 84078
Phone: (435) 789-0354; Fax: (435) 789-4805
E-mail: mark_h_fuller@fws.gov, sam_finney@fws.gov

III. Project Summary:

The Upper Colorado River Endangered Fish Recovery Program has determined that control of nonnative fish in the upper Colorado River basin is essential to the recovery of the four endangered fish species: Colorado pikeminnow, razorback sucker, humpback chub, and bonytail. Smallmouth bass abundance has dramatically increased in the Green River since 2000. This information resulted in a recommendation from the December 2003 Nonnative Fish Control Workshop (Grand Junction, CO) to attempt control of this species in the Green River. Three years of removal and Nonnative Fish Control Workshops have added to the knowledge base of the effort required to successfully remove smallmouth bass from the Green River. During the December 2006 workshop, participants discussed the importance of increasing the removal effort and reallocating effort to concentration areas, resulting in this revised scope of work for the Echo Park to Split Mountain reach of the Green River in Utah.

IV. Study Schedule: To be continued as needed

V. Relationship to RIPRAP

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

- III.A. Reduce negative interactions between nonnative and endangered fishes.
- III.A.2. Identify and implement viable active control measures.

GREEN RIVER ACTION PLAN: MAINSTEM

III. Reduce impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

III.A. Reduce negative impacts to endangered fishes from sportfish management activities.

III.A.4. Develop and implement control programs for nonnative fishes in river reaches occupied by the endangered fishes to identify required levels of control.

VI. Accomplishments of FY 2007 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

All scheduled sampling was accomplished according to the scope of work for the 2007 fiscal year. The objectives identified in the scope of work: remove smallmouth bass in the Green River from Echo Park (RM 344) to Split Mountain (RM 318), calculate an annual population estimate of adult and juvenile smallmouth bass for this reach of the Green River, and attain at least a 65% annual exploitation rate for smallmouth bass over 200 mm, were met.

Abundance Estimates, Exploitation, and Population Size Structure

The adult (>199mm total length, TL) and juvenile (100-199 mm TL) abundance estimates were 533 (20.5/mile) and 3515 (135/mile) individuals respectively in the study reach. Four hundred and ninety three and 2082 adults and juveniles respectively were removed from the population during the study period. Intra-study growth (~3mm/week; based on tag returns) was accounted for to avoid overestimation of removal effects. Exploitation rates derived from the abundance estimates vary greatly from those derived from tag returns (Table 1). Although the tag return data is likely somewhat of an underestimate due to tag loss and emigration, there is an obvious discrepancy in either the number of smallmouth in the study reach or in exploitation rates. Length frequency shows the study reach population to be lacking adults in comparison to smaller fish (Figure 1).

Abundance estimates in the study reach for 2004-2006 were 8000, 3437, and 4053 respectively.

Catch Rates and Capture Probabilities

Catch of smallmouth bass remained similar across the study period for juvenile and adult fish. However capture dramatically increased and subsequently decreased for young of year fish (Figure 2; Table 2). This is presumably recruitment of fish from spawning activity. Catch rates, when data were available, remained similar across the sampling period (Figure 3), lending further evidence towards an invalid estimate or depletion estimation. Capture probabilities for adult and juvenile smallmouth bass when estimable (pass 2) were 0.0225 and 0.0031 respectively.

Table 1. Exploitation of smallmouth bass in the study reach as determined by population estimates and tag returns. TL = total length.

ADULTS (> 200mm TL)		
Population Estimate	Number Removed	Exploitation (%)
533	493	92.50
ADULTS (> 200mm TL)		
Tags Released (pass 1)	Number Recovered (passes 2-15)	Exploitation (%)
71	41	57.7
JUVENILES (< 200 mm TL)		
Population Estimate	Number Removed	Exploitation (%)
3515	2082	59.23
JUVENILES (< 200 mm TL)		
Tags Released (pass 1)	Number Recovered (passes 2-15)	Exploitation (%)
141	40	28.4

Table 2. Total catch by pass and year class during the sampling period

	Young-of-Year	Juveniles	Adults	Total
Pass 1	0	61	71	132
Pass 2	0	296	73	369
Pass 3	0	162	50	212
Pass 4	39	202	38	279
Pass 5	112	160	26	298
Pass 6	136	130	41	307
Pass 7	198	136	33	367
Pass 8	693	133	27	853
Pass 9	842	131	28	1001
Pass 10	1061	136	35	1232
Pass 11	1601	249	42	1892
Pass 12	1395	225	32	1652
Pass 13	964	288	101	1353
Pass 14	713	162	109	984
Pass 15	279	60	70	409
Total	8033	2531	776	

Table 3. Tags retrieved in the study from outside the study area or time period

Tag Color	Tag Type	Origination
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Green	Floy	Previous Year/ Same Reach
Red	Floy	Downstream
Red	Flag	Downstream

Table 4. Ancillary fish captures in the study reach.

<u>Species</u>	<u>Number Captured</u>
Black Crappie	3
Bluegill	16
Green Sunfish	462
White Sucker and Hybrids	696
Gizzard Shad	3
Northern Pike	6
Walleye	16

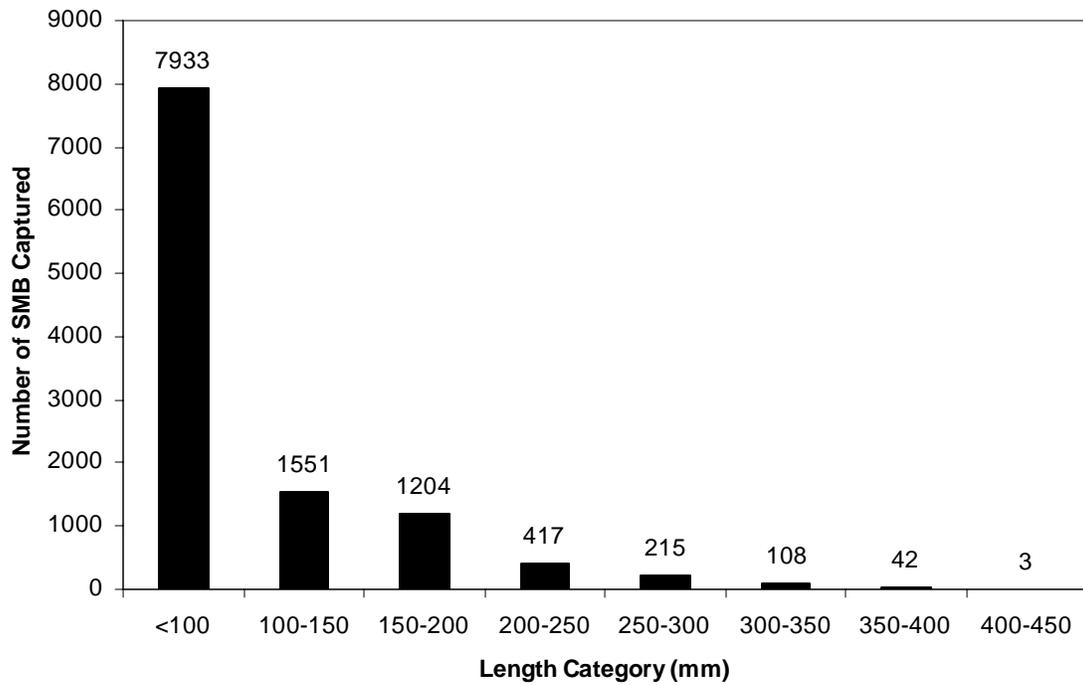


Figure 1. Length frequency of smallmouth bass captured in the study reach.

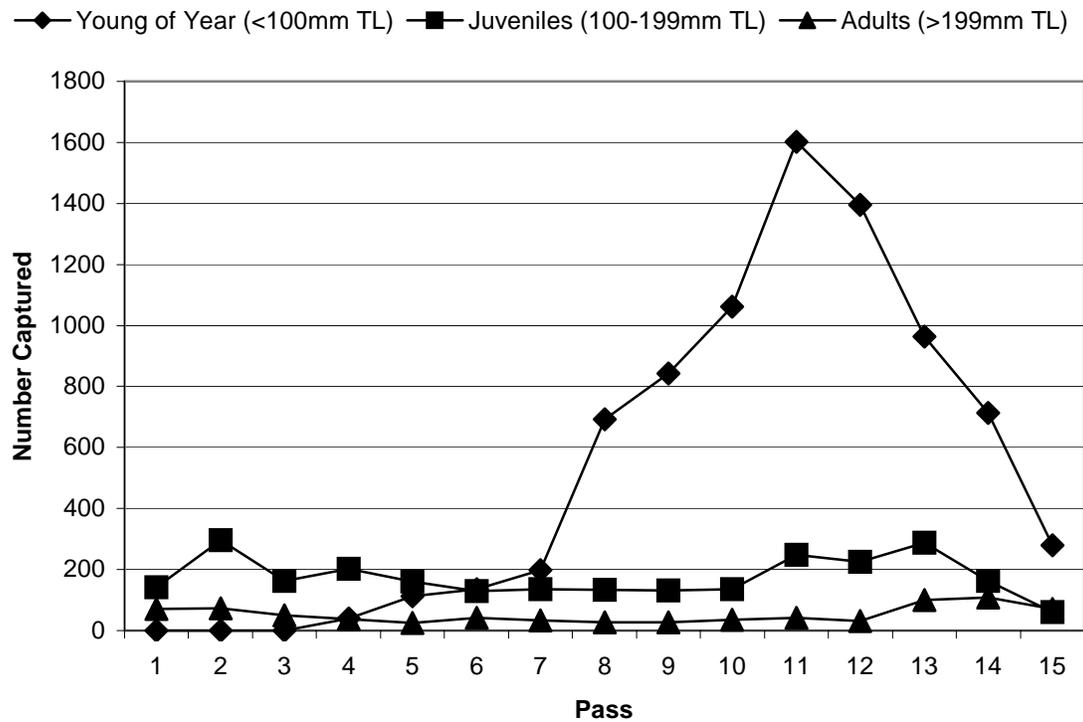


Figure 2. Number of smallmouth bass captured in each size category for each pass.

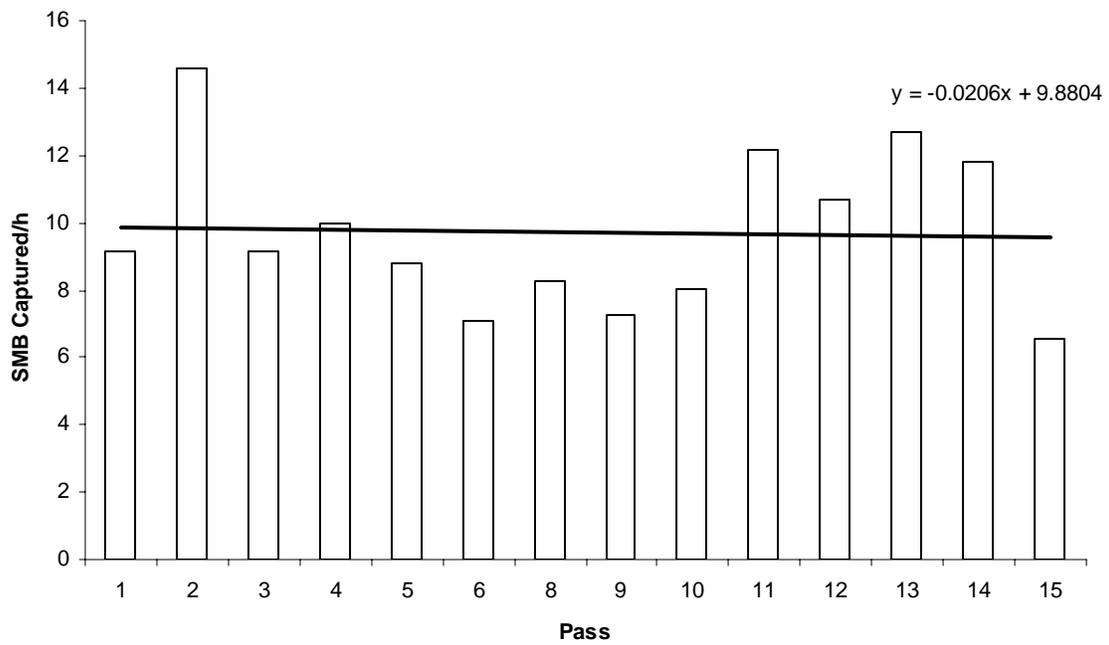


Figure 3. Smallmouth bass (juvenile and adult) catch rate by pass in the study reach where data are available.

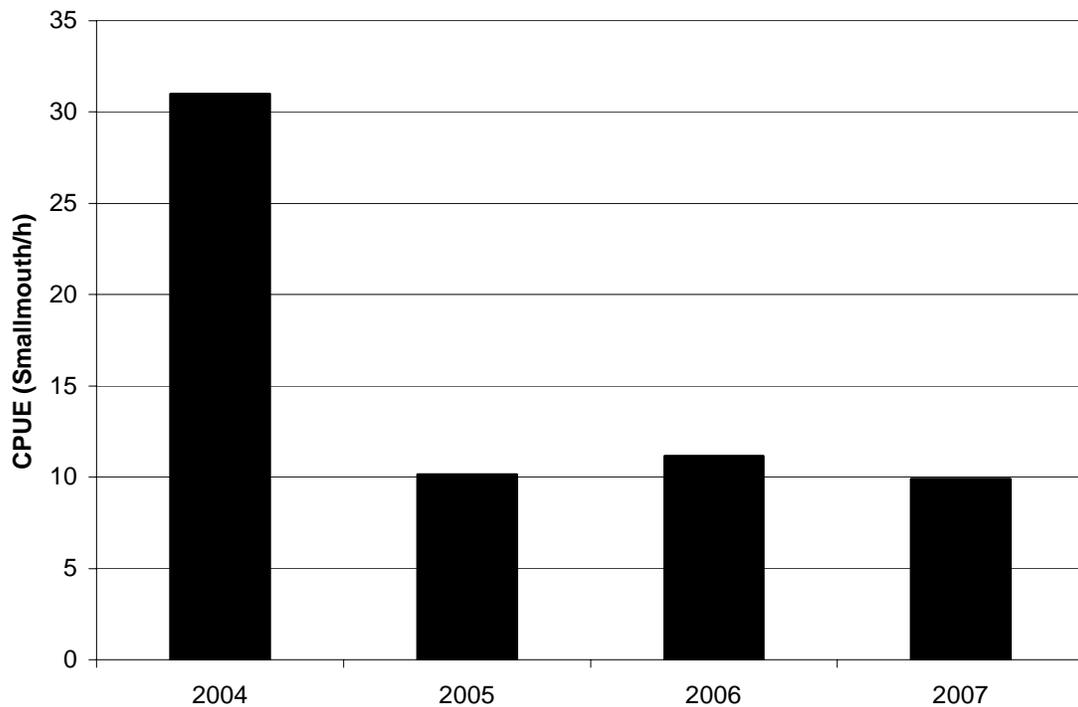


Figure 4. Smallmouth bass catch rates (juvenile and adult) in the reach for 2004-2007.