

I. Project Title: Nonnative Fish Removal, Fish Community Structure, and Riffle Habitat Measurements in the Duchesne River.

II. Principal Investigators:

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III. Project Summary:

Smallmouth bass *Micropterus dolomieu*, channel catfish *Ictalurus punctatus*, and northern pike *Esox lucius* are exotic, predatory fishes present to abundant in the Duchesne River (Tyus et al. 1982; Cranney 1993). The U.S. Fish and Wildlife Service introduced smallmouth bass into the Unita River in 1970, with concurrence from the state of Utah and the Northern Ute Indian Tribe, to provide recreational fishing opportunity (Mullan 1969, 1970). Channel catfish were introduced in the Colorado River Basin in the late nineteenth century and are established in both the mainstem and major tributaries throughout the Green River sub-basin (Karp and Tyus 1990). Northern pike were introduced as a game fish into Elkhead Reservoir in 1977 and have since become established in the Yampa and Green Rivers. Smallmouth bass have been reported to be significant predators on Colorado pikeminnow *Ptychocheilus lucius* in the middle Green River (Crowl 1995) and channel catfish have been identified as a major threat to the recovery of endangered fishes throughout the Upper Colorado River Basin (Tyus and Saunders 1996, Hawkins and Nesler 1991). Smallmouth bass, channel catfish and northern pike in the Duchesne River represent a strategic threat because they provide a source of nonnative predators to a significant portion of the Colorado pikeminnow and razorback sucker *Xyrauchen texanus* nursery habitat in the middle Green River.

The Duchesne River has suffered drought conditions during the past several years. Fish communities may have been impacted by the resulting low flows. In addition, new flow regulations have been implemented in the time since previous fish community data were collected.

Recent base flow recommendations (Haines and Modde 2003) identified passage needs for endangered fish in the Duchesne River. The goal of these recommendations was to establish Colorado pikeminnow usage of the Duchesne River at historical numbers. Flows are needed to provide ample water for passage, productivity, and habitat requirements of Colorado pikeminnow. The need to ground truth base flow model predictions (noted in the report as imprecise extrapolations) has become a concern.

IV. Study Schedule

- a. Initial year: FY05
- b. Final year: FY06

V. Relationship to RIPRAP

Green River Action Plan: Duchesne River

III.A.3. Implement and evaluate the effects of viable measures to control negative interactions from nonnative fishes.

I.G. Evaluate and revise as needed, flow regimes to benefit endangered fish populations

VI. Accomplishments of FY06 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings.

Study Area

The entire study area of the Lower Duchesne River is located on The Northern Ute (Ute) Indian Reservation (Utah) between the Myton Diversion (river mile 41.0) and the confluence of the Green River (river mile 0)(Figure 1).

The study reach was divided into four reaches: reach one begins at the Myton Diversion and extends to the mouth of the Ouray School Canal (river miles 41.0-27.5), reach two begins at the mouth of the Ouray School Canal and extends to the old Randlett gauging station (river miles 27.5-16.8), reach three begins at the old Randlett gauging station and extends to the pipeline river miles 16.8- 8.0), and reach four begins at the pipeline and ends at the confluence of the Green River (river miles 8.0-0.0).

Non-Native Fish Removal

Electrofishing rafts were used to complete two passes along each shoreline of the river when flows were greater than 500 CFS. Smallmouth bass, channel catfish and northern pike were mechanically removed from the Duchesne River and disposed of in a manner acceptable to the Ute Tribe and the Utah Division of Wildlife Resources.

All smallmouth bass, channel catfish and northern pike captured were weighed and measured (TL). Catch per unit effort was monitored in each reach to determine the efficiency of the control program. All endangered fish captured were weighed and measured (TL), scanned for PIT tags, and tagged with new PIT tags as needed and returned to the river.

Additionally, monitoring reaches were established to estimate species composition and relative abundance in the Duchesne River. Six separate river miles per pass, separated by one mile each pass, (a total of 12 river miles of the 41 miles) were sampled by collecting every fish and obtaining weight and length (TL) data. Native fish were returned to the river, and nonnative fish were removed as previously detailed.

Two hundred and five channel catfish and 99 smallmouth bass were removed from the Duchesne River in 2006 (Table 1). No northern pike were removed or identified by field crews. Length frequency of channel catfish and smallmouth bass shows an abundant smaller size classes in both species (Figure 2). Mean weight for smallmouth bass was 387g (5g - 1143g), and 333g (68g - 2124g) for channel catfish. Smallmouth bass were more abundant in upper reaches and channel catfish were more abundant in lower reaches (Table 2).

Fish composition as determined by spring electrofishing indicated a dominance of non-native common carp, white sucker, channel catfish, and smallmouth bass (Figure 3). Flannelmouth sucker comprised 8% of the adult fish population in the spring as determined by electrofishing. Additionally, seven Colorado pikeminnow, six recaptures and one untagged, were captured and released (Figure 4).

Fish Community Structure

Fish community structure was evaluated using electric seines, standard seines, and backpack electrofishing. The backpack electrofisher and standard seine were used to effectively sample all habitats and the electric seine was the primary gear used. One thousand three hundred and seventy one fish were captured in this effort of which 1,369 were nonnative (Figure 5). The electric seine captured 1,039 fish at a rate of 868 fish/h. The rate of capture for smallmouth bass was 23.12 fish/h and was not calculable for channel catfish. It is important to note however that electric seining is “logistically expensive” and the electric seine data are not directly comparable to the electrofishing data.

Of note in the fish community structure from these data is the overabundance of common carp and the lack of smallmouth bass and flannelmouth sucker (*Catostomus latipinnis*). It appears that smallmouth bass and flannelmouth sucker are moving out of the study area during low flows. The electric seine also appears to sample smaller fishes well.

Riffle Measurements

River profile data were taken at seven locations in the Lower Duchesne River using techniques described in Haines and Modde (2003). We attempted to take these measurements at seven locations previously sampled by Haines and Modde (2003) but this effort was abandoned and data were taken from suitable locations in the same reach.

The range of flows in the seven measured locations needed for passage depth (30cm) was six to >300 CFS (Table 3). This is similar to the results of Haines and Modde (2003). It is important to note, however, that field crews observed that the upstream end of the riffles (hydraulic control) measured did not necessarily represent the shallowest point in the riffle. While passage may be possible at some of the measured flows, the techniques used and the data derived do not guarantee this. It is also important to note that the highest recommended flow for passage from riffles measured in this study, and from Haines and Modde (2003), was greater than 300 CFS.

VII. Recommendations

1. Reexamine native and non-native fish populations in 2008 as a means of measuring the value of the implemented flow recommendations.
2. Evaluate passage at a subset of riffles by taking measurements at the shallowest point in the riffle and not at the hydraulic control.

VIII. Project Status
Complete

IX. FY06 Budget Status

	<u>Total</u>
A. Funds Provided:	\$38,866
B. Funds Expended:	\$38,866
C. Difference:	0
D. Recovery Program Funds for Publications:	0

X. Status of Data Transmission

Data is being entered and will be submitted to the program data base manager upon the completion of the study.

XI. Signed: Sam Finney 10/17/2006
Principal Investigator Date

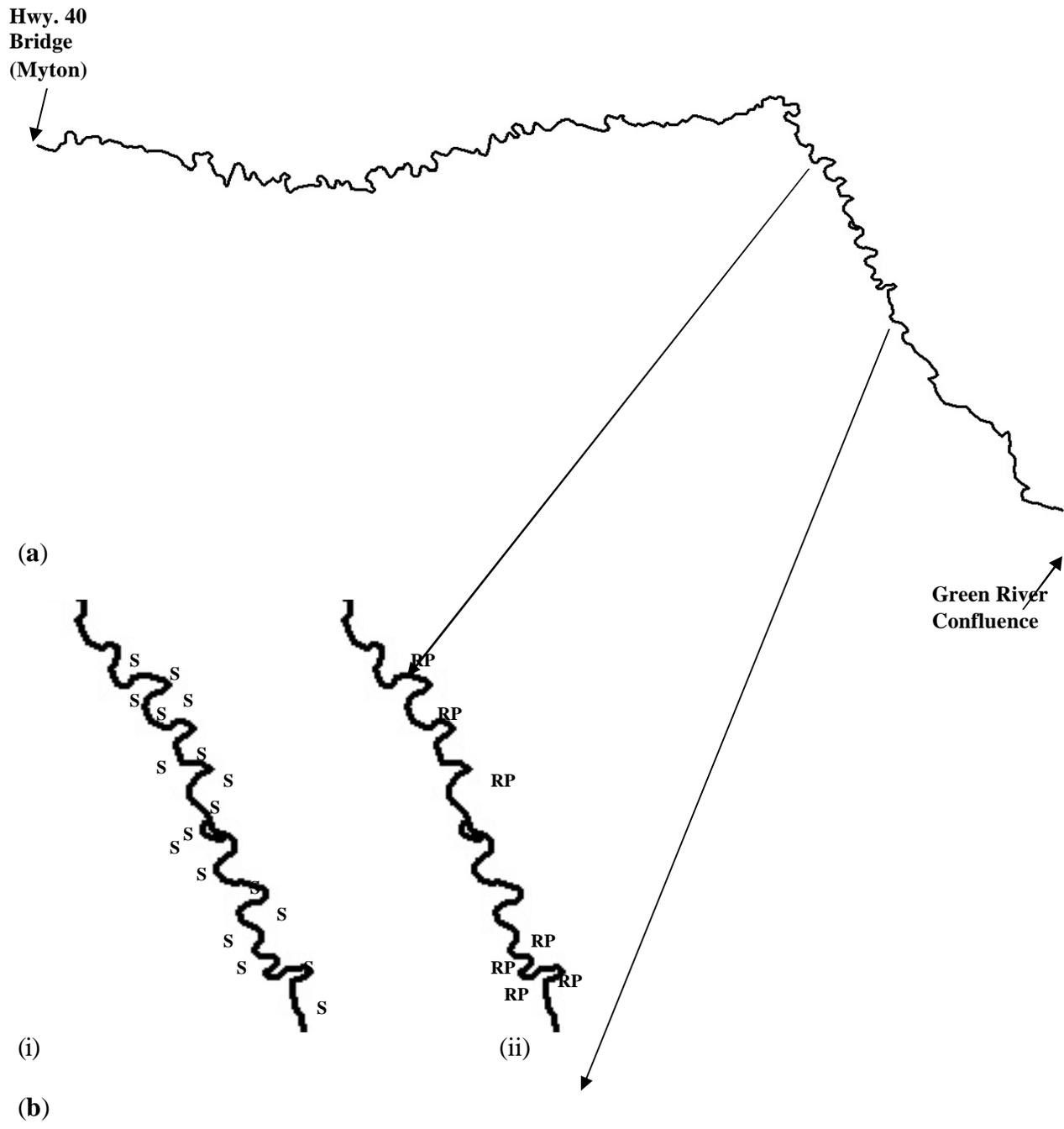
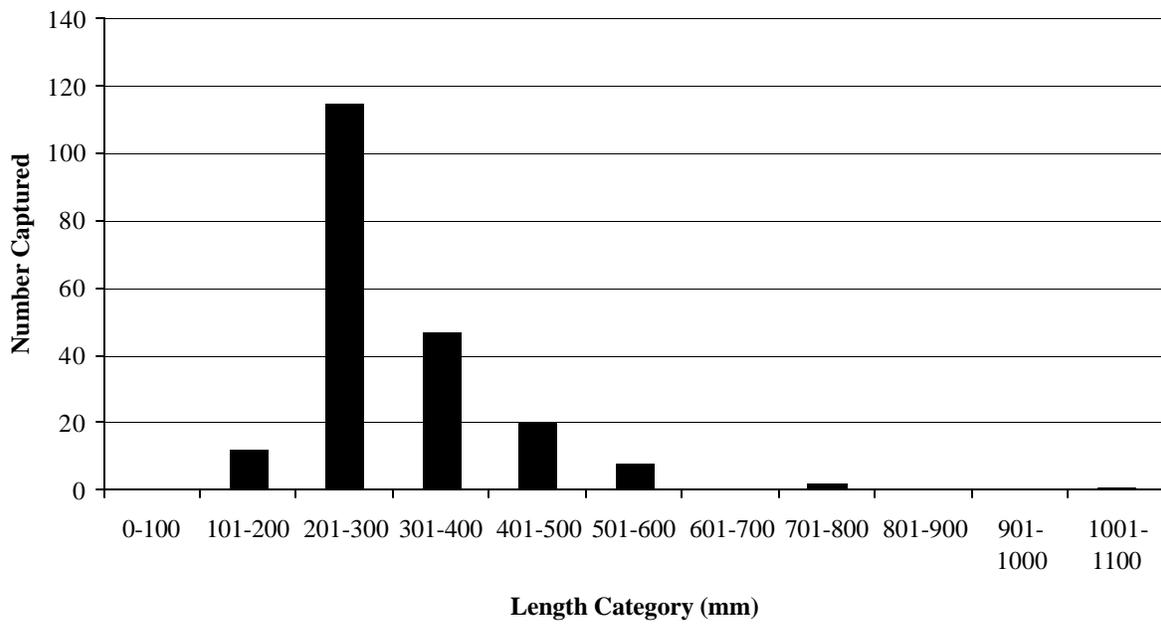


Figure 1. Study Site Map. (a) The entire portion sampled in the spring of 2006 by boat electrofishing. (b) Proportion of the study area sampled for small bodied fishes at base flow (i) and locations where river profile measurements were taken (ii); “RP” indicates river profile locations and “S” indicates small bodied fish sampling sites.

Channel Catfish Length Frequency



Smallmouth Bass Length Frequency

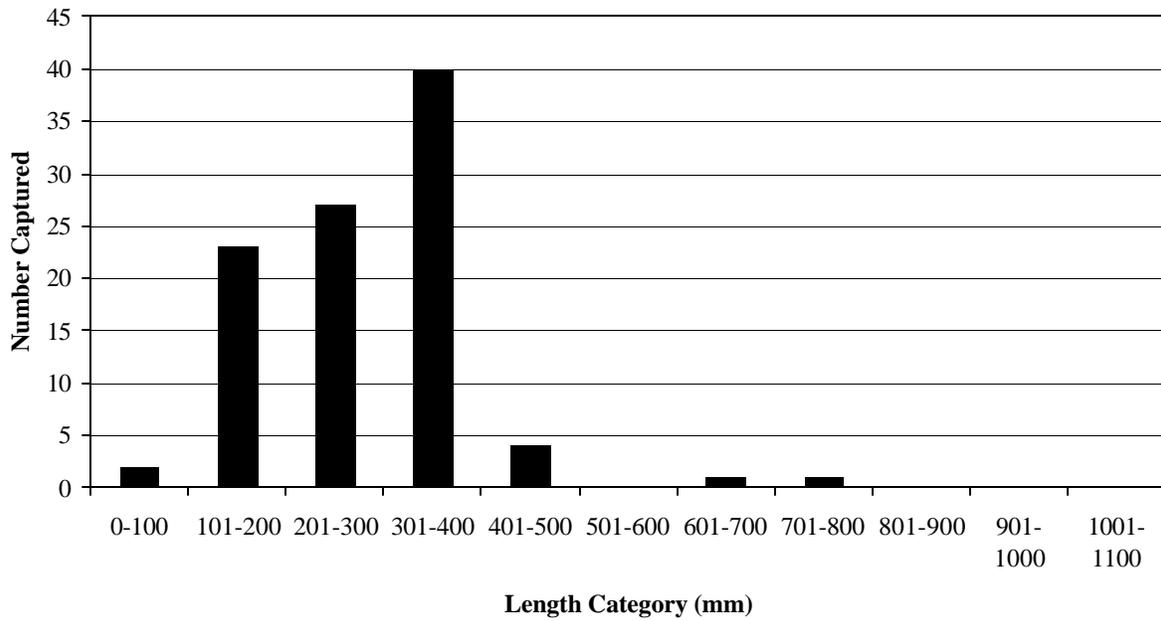


Figure 2. Length frequency of smallmouth bass and channel catfish captured in the lower Duchesne River, Spring 2006.

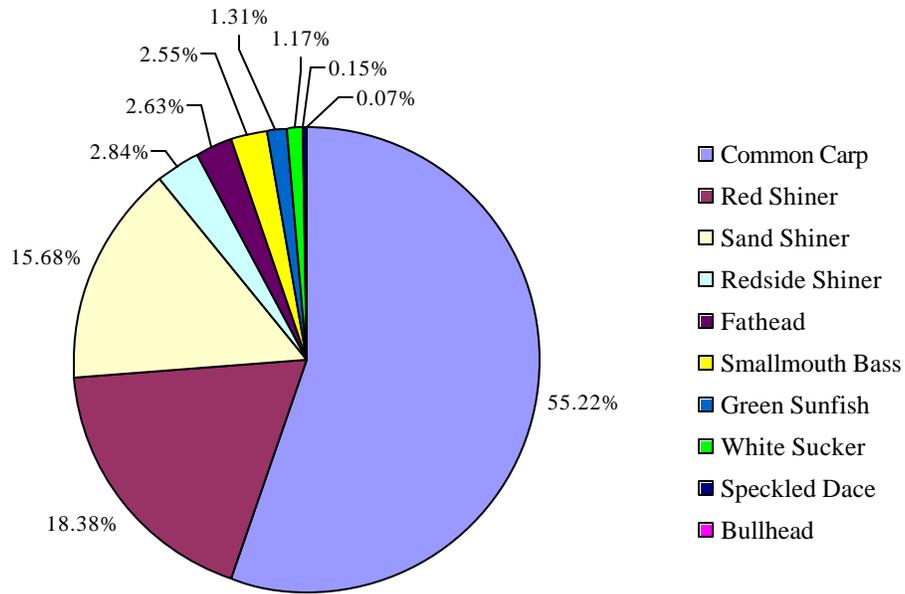


Figure 3. Fish community structure of the lower study portion of the Duchesne River, sampled for small-bodied fishes in the Summer 2006.

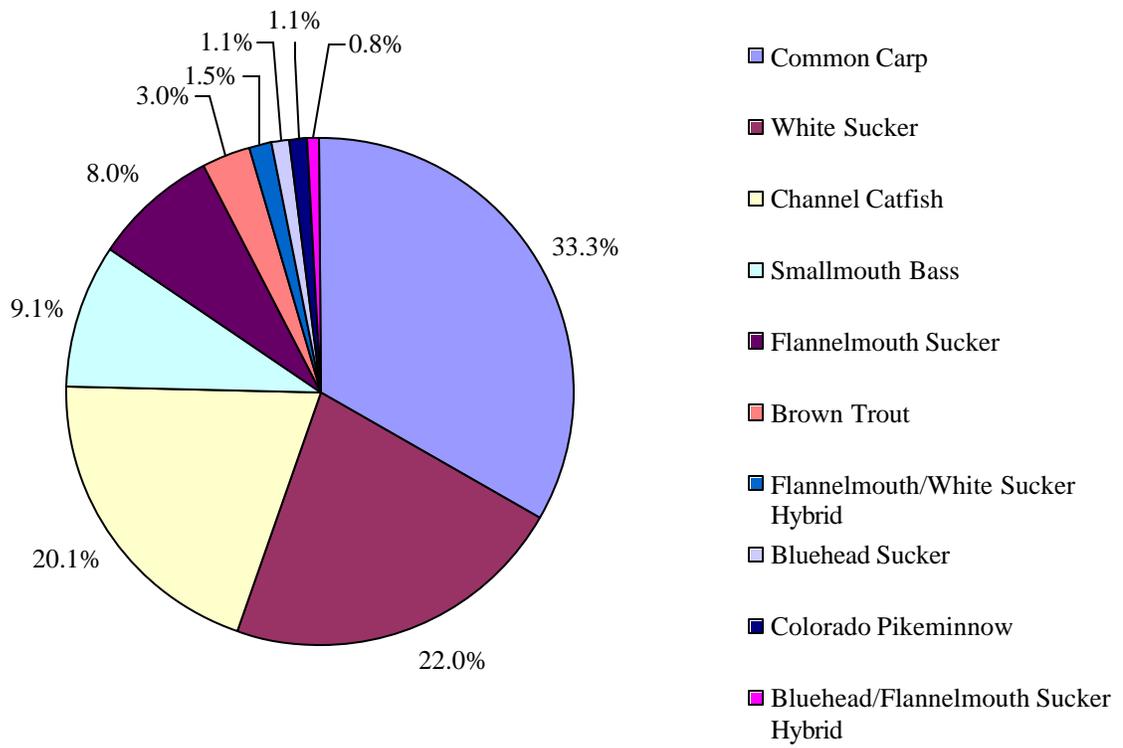


Figure 4. Adult fish community composition from the entire Duchesne River study reach, Spring 2006.

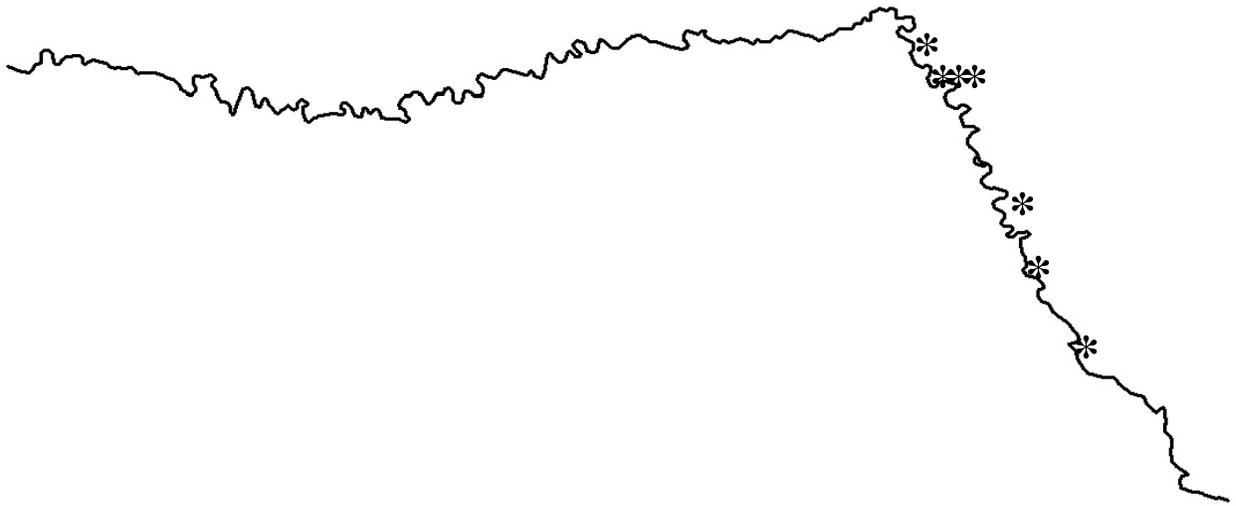


Figure 5. Colorado pikeminnow capture locations (*), Duchesne River, Spring 2006

Table 1. Target non native adult fish captured during sampling in the Duchesne River study site, Spring 2006. First set of parentheses is the first pass; the second set is the second pass.

Species	No. Captured	Effort Expended (h)	Catch Rate (Fish/h)
Channel Catfish	205 (153)(52)	37.83	5.42
Smallmouth Bass	99 (69)(30)	37.83	2.62

Table 2. Capture locations of smallmouth bass and channel catfish in the Duchesne River, Spring, 2006.

	Reach RMI 41-27.5	Reach RMI 27.5-16.8	Reach RMI 16.8-8	Reach RMI 8-0
Smallmouth Bass	35	37	29	10
Channel Catfish	16	73	96	20

Table 3. Discharge for thalweg depth of 0.3m, Duchesne River 1999 (from Haines and Modde 2003) and 2006. Cross section numbers do not correspond to the same location between years.

Cross Section (1999)	Discharge (1999)	Cross Section (2006)	Discharge (2006)
3	50	1	6
5	80	2	28
7	200	3	25
9	105	4	29
13	39	5	>300
13b	90	6	40
15	45	7	30
17	33		
19	29		
21	33		
23	100		
25	111		
27	90		
28	53		
29	40		
31	20		
33b	115		
37	112		
39	115		
41	94		
43	60		
45	275		
47	63		
49	65		
51	48		
53	20		
55	>300		

Literature Cited

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