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Leatherside Chub (*Gila copei*) Distributional Surveys in Northern Utah, 2002

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Utah Division of Wildlife Resources
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Introduction

The leatherside chub (*Gila copei*) is a small cyprinid native to Utah and parts of Idaho and Wyoming (Hubbs and Miller 1948; Sigler and Miller 1963; Baxter and Simon 1970; Simpson and Wallace 1982). The State of Utah considers the leatherside chub a "species of special concern" due to decreases in population levels (UDWR 1998). Historically, leatherside chub in the Utah Division of Wildlife Resources (UDWR) Northern Region were distributed throughout parts of the Bear and Provo River drainages and likely Goose Creek, a tributary to the Snake River (Figure 1). Leatherside chub have experienced declines due to habitat degradation through current water management practices and predation from nonnative fish species. Many areas of northern Utah needed to be surveyed to gain a more accurate description of the leatherside chub's current distribution.

Objective

The objective of the 2002 surveys was to begin determining the current distribution of leatherside chub in northern Utah. Population estimates were completed at all locations where leatherside chub were encountered.

Location

Electrofishing surveys were completed at fourteen stream locations in the Bear and Great Salt Lake drainages (Table 1). Population estimates were completed at nine stream locations on the Bear River drainage (Table 2).

Methods

Electrofishing survey sites were measured with a 100 meter (m) tape. A block net was placed at the lower and upper ends of the survey site. Universe Transverse Mercator (UTMs) coordinates were recorded for each stream survey location with a hand held Global Positioning System. Electrofishing was completed using battery powered backpack electrofishing units manufactured by Smith-Root Inc. Electrofishing settings varied depending upon levels of conductivity within the stream. In general, the pulse was set at J (70 Hz), the frequency was set at 4 (4 ms), and the voltage was set at 300 V. Electrofishing commenced with a crew ranging from 2-6 people. Two electrofishing passes were completed and all fish encountered were removed and placed into live cages. Fish collected in the first pass were kept separate from the fish collected in the second pass. All fish were identified to species, weighed to the nearest gram (g), and measured to the nearest millimeter (mm) total length and released into the stream alive.

A modified Zippin multiple pass depletion estimate electrofishing formula (Zippin 1958) was used to calculate the population estimates and ninety-five percent confidence intervals for each site surveyed. Population estimates were not completed for mottled sculpin (*Cottus bairdi*), longnose dace (*Rhinichthys cataractae*), and speckled dace (*Rhinichthys osculus*). Criteria of abundance for these species was estimated as follows: 0-10 individuals / 100 m = sparse, 10-50 individuals / 100 m = common, and >50 individuals / 100 m = abundant. The formulas used to calculate the population estimates were:

$N = C_1^2 / C_1 - C_2$

Where

N = estimated fish population,

C_1 = the number of fish captured from the first pass, and

C_2 = the number of fish captured on the second pass

$SE = [C_1 * C_2 / (C_1 - C_2)^2] * (C_1 + C_2)^{1/2}$

95% C.I. = 2 * SE

Results

Leatherside chub were observed at five of the fourteen localities that were surveyed, including four localities on Yellow Creek and one locality on Thief Creek (Table 1; Figure 2). Population estimates were completed at all four localities on Yellow Creek (Table 2) and all age classes of leatherside chub were observed at most localities (Figure 3). Although low densities of leatherside chub were encountered in Thief Creek, population estimates were not completed due to low water conditions. Leatherside chub were not observed in Bull Creek, Spring Creek, Willow Creek, Deep Creek (High and Low), Rock Creek, Left Hand Fork of Blacksmith Fork (High and Low), and the South Fork of Little Bear (High and Low). Fish species encountered during the 2002 stream surveys included: leatherside chub (LSC), mottled sculpin (MSC), speckeled dace (SPD), longnose dace (LND), Bonneville cuthroat trout (*Oncorhynchus clarki utah*; BCT), brown trout (*Salmo trutta*; BNT), mountain whitefish (*Prosopium williamsoni*; MWF), brook trout (*Salvelinus fontinalis*; BKT), mountain sucker (*Catostomus platyrhynchus*; MTS), Utah sucker (*Catostomus ardens*; UTS), and redside shiner (*Richardsonius balteatus hydroflox*; RSS).

Discussion

Based on electrofishing surveys in 2002, leatherside chub occupied approximately 5.5 stream miles in Yellow Creek within Utah state boundaries. The lower reaches of Yellow Creek section 01 in Utah were intermittent, with most water being diverted by late summer. There were considerable differences in habitat conditions between the upper and lower reaches of Yellow Creek. Yellow Creek sections 01 and 02 (Low) experienced heavy cattle grazing which had resulted in eroding banks with minimal vegetation. Substrate materials consisted primarily of mud and silt in the grazed reaches of Yellow Creek. The headwater reaches of Yellow Creek section 02 were not as heavily grazed and the riparian community consisted of willows, grasses, and aspens. The stream substrate of Yellow Creek section 02 (Med and High) was comprised primarily of boulders, cobble, and gravel. Leatherside chub populations were strong throughout the Utah portion of Yellow Creek with the smallest population estimate being in the headwaters of section 02 (Table 3). This portion of the population was comprised primarily of adult fish (Figure 3), which indicated that this reach of Yellow Creek was likely an important spawning area with recruitment occurring in the lower reaches. Colder temperatures and a larger population of Bonneville cutthroat trout in the headwaters of Yellow Creek also may limit leatherside chub in this reach.

Recommendations

Continue stream surveys in northern Utah to determine the current distribution of leatherside chub.

Table 1. Leatherside chub stream surveys, 2002.

Stream	Date Sampled	H_20 ID # / Section #	UTM's
Yellow Creek section 01	07/11/02	IV AQ 220 / 01	0496180E, 4557902N
Yellow Creek section 02 (Low)	06/27/02	IV AQ 220 / 02	0503056E, 4538302N
Yellow Creek section 02 (Med)	06/27/02	IV AQ 220 / 02	0504460E, 4534688N
Yellow Creek section 02 (High)	06/28/02	IV AQ 220 / 02	0504943E, 4532745N
Thief Creek	07/11/02	IV AQ 220O / 02	0495685E, 4546857N
Bull Creek	06/27/02	IV AQ 220G / 01	0507878E, 4538399N
Willow Creek	06/27/02	IV AQ 220J / 01	0510064E, 4536521N
Spring Creek	08/01/02	IV AQ 220M / 01	0494720E, 4552637N
Rock Creek	10/16/02	IV AQ 040A03B / 01	0455233E, 4609995N
Left Hand Fork Blacksmith Fork (High)	07/02/02	IV AQ 040A03A / 02	0453616E, 4613594N
Left Hand Fork Blacksmith Fork (Low)	07/02/02	IV AQ 040A03A / 01	0441156E, 4609876N
South Fork Little Bear (High)	07/01/02	IV AQ 040E / 01	0430597E, 4587873N
South Fork Little Bear (Low)	07/01/02	IV AQ 040E / 01	0432130E, 4595279N
Deep Creek (High)	08/16/02	IV AR 105 / 01	0357380E, 4647300N
Deep Creek (low)	08/16/02	IV AR 105 / 01	0355334E, 4545429N

Table 2. Lower Bear River drainage population estimates for all species encountered.

Stream / Section	Species	Population estimate (# individuals per mile)
Left Hand Fork of the Blacksmith Fork / 01	BCT	416 ± 69
	BNT	787 ± 1
	MWF	14 ± 0
	MSC	abundant
Left Hand Fork of the Blacksmith Fork / 02	BCT	110 ± 0
	BNT	1579 ± 29
	BKT	370 ± 389
	MSC	abundant
Rock Creek / 01	BCT	121 ± 17
	BNT	829 ± 51
	MSC	abundant
South Fork of the Little Bear (Low) / 01	BCT	6 caught
	BNT	745 ± 696
	MWF	101 ± 34
	MTS	16 ± 0
	MSC	abundant
South Fork of the Little Bear (High) / 01	BCT	258 ± 48
	BNT	894 ± 32
	MSC	abundant

Table 3. Upper Bear River drainage population estimates for all species encountered.

Stream / Section	Species	Population estimates (# individuals per mile)
Yellow Creek / section 01	LSC	624 ± 219
	MTS	1035 ± 284
	UTS	676 ± 1420
	SPD	abundant
	LND	common
	RSS	3676 ± 269
	MSC	abundant
Yellow Creek /section 02 (Low)	LSC	1504 ± 135
	MTS	331 ± 781
	RSS	331 ± 781
	MSC	abundant
	SPD	abundant
Yellow Creek / section 02 (Med)	BCT	84 ± 0
	LSC	486 ± 56
	MTS	sparse
	SPD	sparse
	MSC	common
Yellow Creek / section 02 (High)	BCT	247 ± 33
	LSC	197 ± 131
	MTS	247 ± 33
	SPD	Sparse
	MSC	common
Thief Creek	LSC	sparse
	SPD	abundant

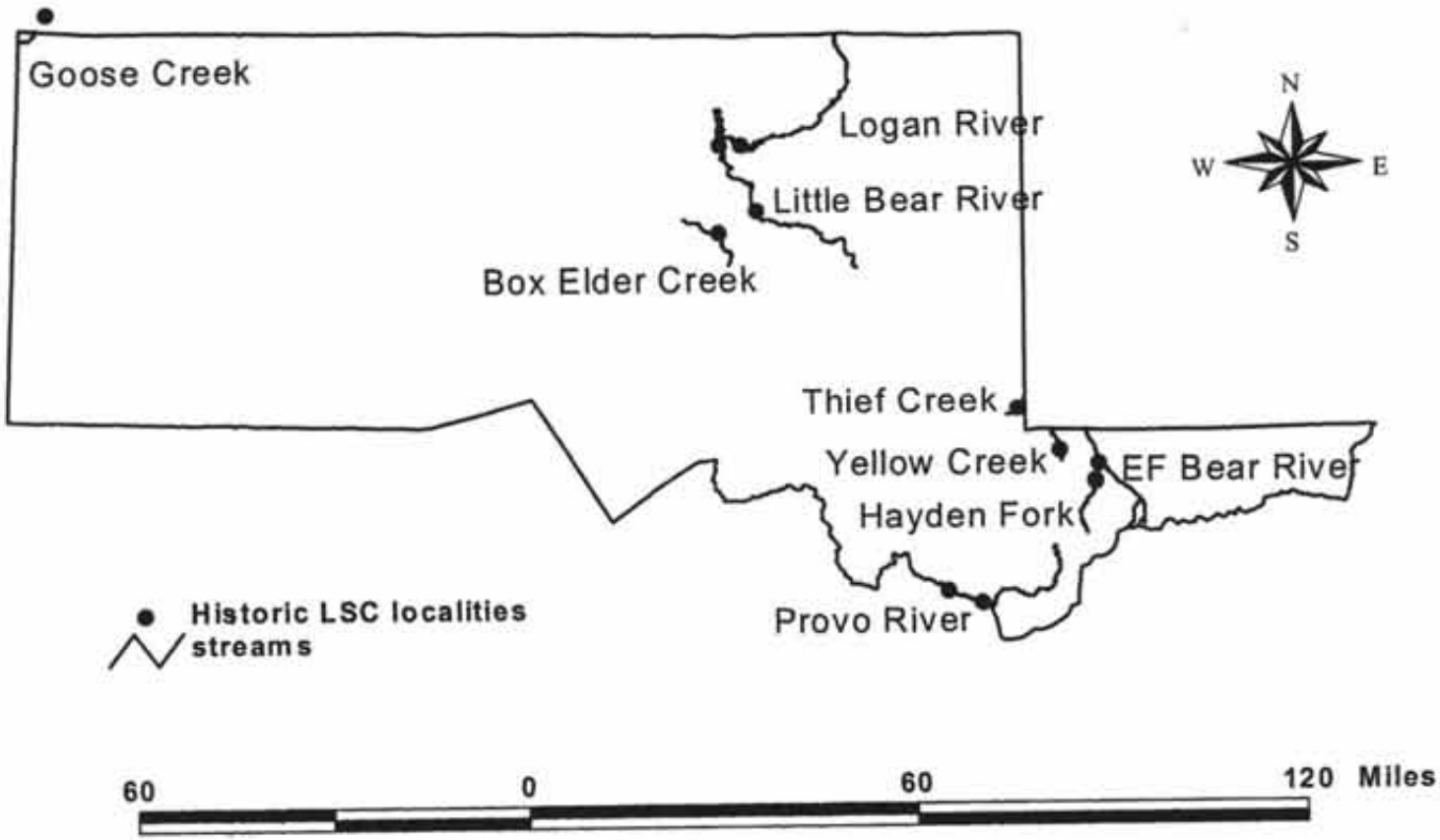


Figure 1. Historic leatherside chub localities in the Northern Region of the UDWR.

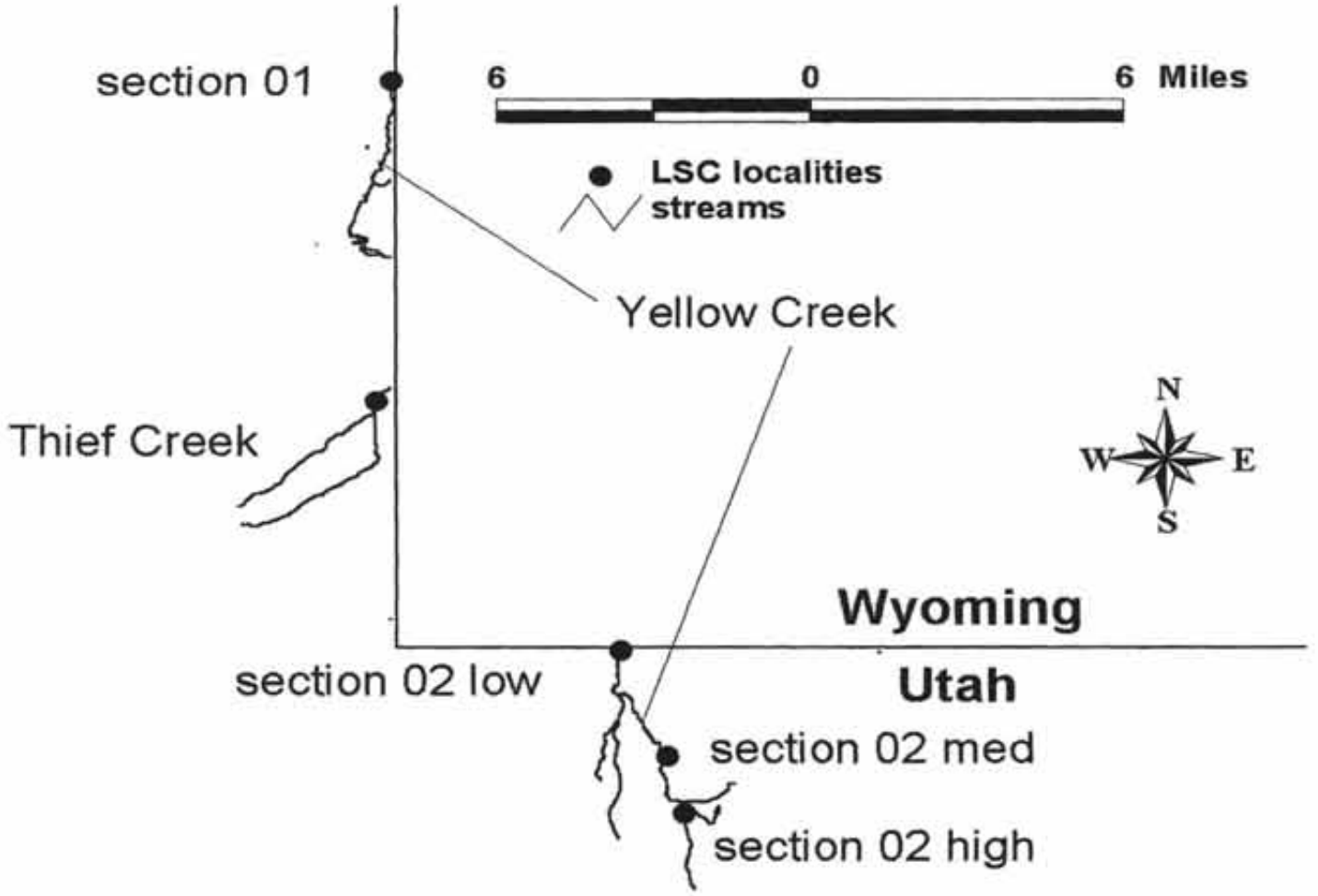
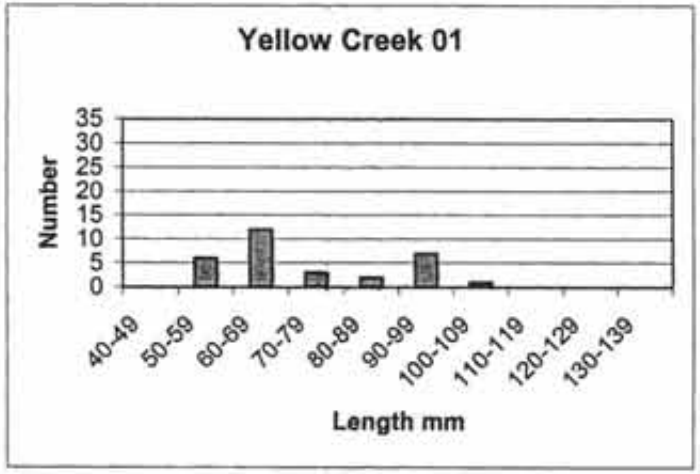
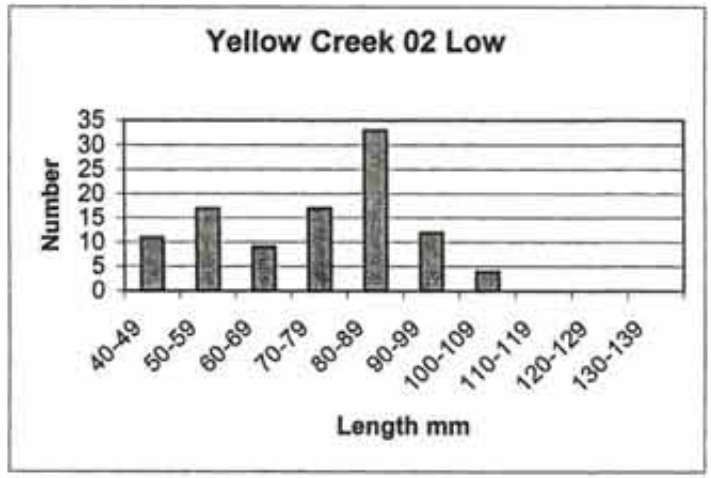
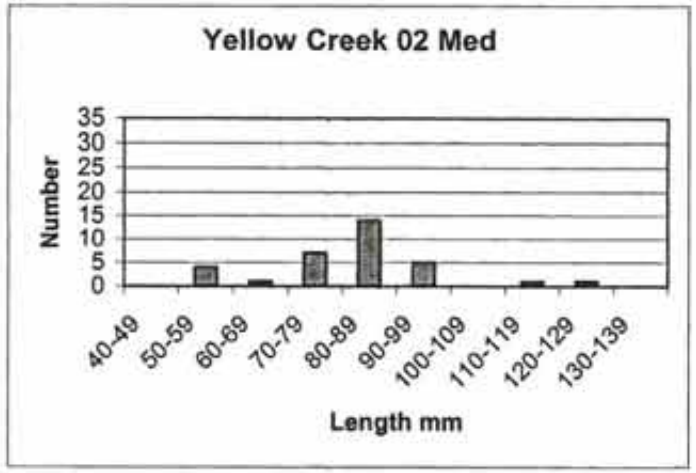


Figure 2. Leatherside chub localities in the Bear River drainage, 2002.







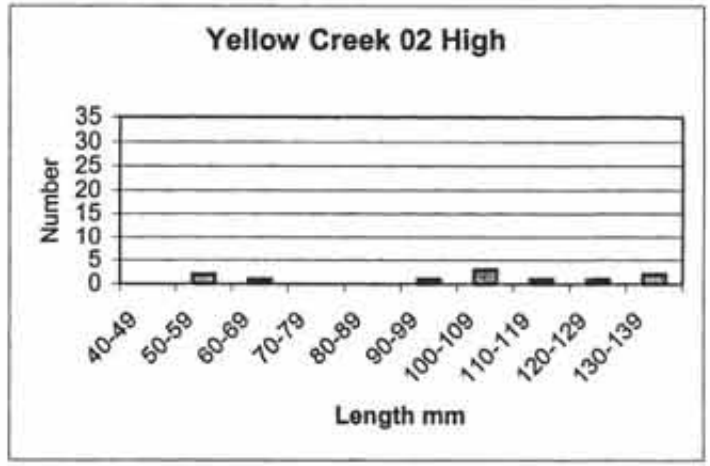


Figure 3. Size distribution of leatherside chub sampled in Yellow Creek sections 01-02 (Low-High), 2002.

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