FISHERY MANAGEMENT INVESTIGATIONS

IDAHO DEPARTMENT OF FISH AND GAME
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Cal Groen, Director

SOUTHEAST REGION
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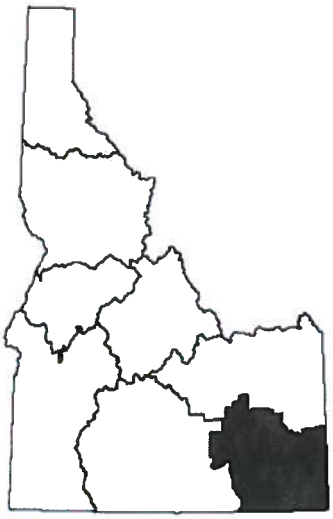

St. Charles Creek Rainbow Trout Removal

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2008 Southeast Region Fishery Management Report

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2008 Southeast Region Fishery Management Report

Lowland Lake and Reservoir Investigations

ABSTRACT

Warmwater fishery evaluations were completed on three reservoirs. The primary goals of these surveys were to collect relative abundance information for pan fish species and monitor largemouth bass *Micropterus salmoides* proportional stock densities (PSD). The surveys are part of a monitoring program completed every two to three years. Largemouth bass PSD estimates ranged from 19 to 96. Largemouth bass populations in southeast Idaho appear to follow a boom-bust cycle. The cycles occur in both general and conservative harvest regulation waters. The exception to the boom-bust cycle has been Glendale Reservoir, where the quality of the largemouth bass population has remained relatively constant over the past decade. Condie, Devils Creek, and Glendale reservoirs are poised to provide excellent largemouth bass angling over the next few years.

Coldwater fishery evaluations were completed on two southeast Idaho reservoirs. Both of the reservoirs (Treasureton and Daniels) are currently managed under trophy trout regulations: 2 trout, none under 20" (508 mm), no bait and barbless hooks only. The primary goal of the surveys was to collect baseline data for biennial evaluation of the trophy trout regulation. A second goal was to evaluate the extent of the fish kill that occurred in Treasureton Reservoir during the winter of 2007-2008. The results of the surveys indicate that both reservoirs are currently performing below expectations. Low reservoir water levels going into the winter from 2004 to 2007 is likely the mechanism suppressing these populations of rainbow trout *Oncorhynchus mykiss.* The results of the survey also indicate that the fish kill affected all age classes but in particular those classes that were below 325 mm. However, due to the fast growth rate experienced by rainbow trout stocked into the reservoir, we expect the fishery to be restored by fall 2009.

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Warmwater Fishery Investigations

Introduction and Methods

In the early 1990s a comprehensive research study was initiated to better understand the biology of largemouth bass (LMB) in Idaho (Dillon 1991). A conclusion of that work indicated that water temperature was a key factor controlling LMB productivity. Several other studies described growth potential of LMB across their natural range (McCauley and Kilgour 1990; Beamesderfer and North 1995). Those studies coupled with Dillon (1991) identify the maximum growth potential for LMB in the predominately cold water lakes and reservoirs in Idaho. However, many other factors can contribute to the population structure and success of a LMB fishery. Most importantly are harvest, lake productivity, and interaction among fish species (i.e., competition and predation). Monitoring of those variables is necessary to maintain or improve LMB fisheries in southeast Idaho.

Since 1990, several changes have been implemented in southeast Idaho's largemouth bass fisheries. Some of those changes include: 1) restricting harvest; 2) introducing tiger muskellunge *Esox lucius x E. masquinongy*, yellow perch *Perca flacescens*, and crappie sp. *Pomoxis sp.*; and 3) increases in the number of competitive angling tournaments. To evaluate the impact of those changes, the Department monitors the LMB populations at approximately 2 - 3 year intervals.

Electrofishing surveys were completed on three southeast Idaho reservoirs. All of the reservoirs are small (< 200 ha), shallow, and productive. Table 1 shows reservoir name, elevation, surface area, species composition, and current LMB harvest regulations.

LMB and potential prey species abundance were evaluated using shoreline electrofishing. Target species for electrofishing included LMB, bluegill *Lepomis macrochirus*, crappie, and yellow perch. Sampling goals were to collect enough LMB to estimate PSD.

Catch-per-unit-effort (CPUE) was used to compare the relative abundance of LMB among the different reservoirs. The CPUE data were collected using night-time shoreline electrofishing with boat-mounted equipment. All electrofishing was completed between 2100 and 0400 hours. Netting effort varied depending on catch rates. The first priority was to obtain a random sample of all species. In some waters, bluegill (BG) or yellow perch (YP) densities were too high to continually net those species and achieve the sample goal for LMB. In such cases, selective netting for LMB was implemented. Size selective netting periods for LMB were not included in CPUE or PSD analysis. Fish were weighed to the nearest 10 g and measured for total length (mm).

Results and Discussion

Catch rates of warmwater species varied markedly among reservoirs. Bluegill were most abundant in Glendale Reservoir followed by Condie Reservoir. Largemouth bass were most abundant in Devil Creek Reservoir followed by Glendale and Condie reservoirs. Crappie were only observed in Glendale Reservoir (Table 2).

PSDs for LMB were greatest in Condie and Devil Creek reservoirs. PSDs for LMB from Glendale were the lowest since 1993. The decrease in PSD at Glendale Reservoir can be explained by the presence of a strong cohort of fish in the 200 – 300 mm range rather than an absence of LMB over 300 mm (Figure 1). PSDs for LMB from Devil Creek Reservoir showed the largest change from 7 in 2006 to 65 in 2008.

PSD trends for most of the southeast reservoir fisheries are highly variable (Table 3). Protective harvest regulations may moderate the fluctuations in PSDs, but do not appear to guarantee quality fishing. For example, Condie Reservoir is managed using the trophy bass rule of no harvest of LMB under 508 mm. Despite the conservative harvest rule, the PSD in 2003 was only 14 (Table 3). It is also possible that reservoir water levels going into the winter play a role as well.

Table 1. Species composition and harvest regulations for reservoirs included in the 2008 warmwater fishery investigations.

Water	Elevation (m)	Surface Area (ha)	Species Composition	LMB Harvest Regulations
Glendale	1,509	93	LMB,BG,CR,YP, RBT	2 none under 16"
Condie	1,500	47	LMB,BG,YP,TM	2 none under 20"
Devil	1,570	142	LMB, KOK, RBT	6 none under 12"

BG = bluegill, YP = yellow perch, TM = tiger muskellunge, KOK = kokanee salmon, CR = crappie, RBT = rainbow trout.

Table 2. Catch per hour of electrofishing effort in three southeast Idaho reservoirs in 2008. Proportional stock density values for largemouth bass are shown in parenthesis.

Reservoir	BG	CR	LMB	YP	Grand Total
Condie	0.4	0.0	27.3 (90)	0.0	122.1
Devil	0.0	0.0	84.0 (65)	0.0	18.8
Glendale	15.3	20.1	62.0 (23)	0.0	49.6

BG = bluegill, YP = yellow perch, CR = crappie, LMB = largemouth bass

Table 3. Trends in proportional stock density (PSD) for select largemouth bass populations in reservoirs of southeast Idaho. Values in parentheses were based on data obtained from largemouth bass fishing tournaments. Lamont, Twin Lakes, and Winder were not sampled in 2008.

Year	Condie	Devil	Glendale	Lamont	Twin Lakes	Winder
1986				13		
1987						
1988	30		9		25	10
1989						
1990						
1991						
1992				3		
1993	21		6	1		25
1994	58					
1995	(76)		(86)	1		
1996						
1997	(73)		(94)			
1998			83			
1999	43		(75)		0	
2000			(97)			
2001						
2002	97		56	8	0	0
2003	14					
2004						
2005			(100)			
2006	20	7	56	13	48	78
2008	90	65	23			

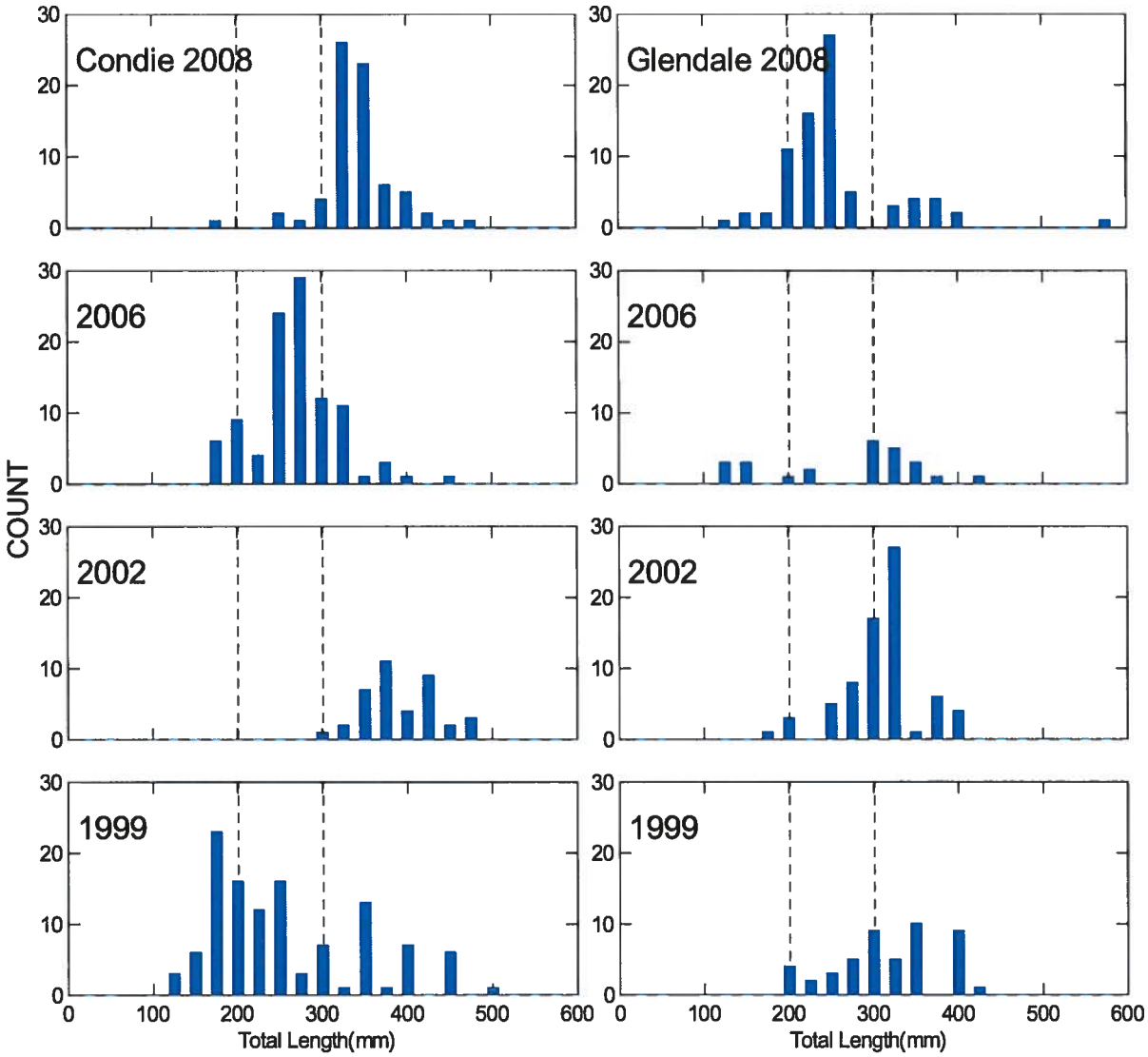

Figure 1. Largemouth bass length frequency distributions from Condie and Glendale Reservoirs. The vertical dashed lines represent largemouth bass stock length (200 mm) and quality length (300 mm).

Coldwater Fishery Investigations

Introduction and Methods

Daniels Reservoir is a 152 ha reservoir situated at an elevation of 1,573 m. Located in Oneida County, Daniels Reservoir is owned by the St John's Irrigation Company and was constructed in 1970. As with all new reservoirs, it enjoyed high productivity during the first few years after construction. Anglers remember abundant, fast-growing trout caught in the 1970s. Non-game fish, notably Utah suckers *Catostomus ardens*, then colonized the reservoir. Department personnel chemically renovated Daniels Reservoir in 1988. It currently has a trophy trout regulation of two trout, none under 20" (508 mm), combined with a barbless hook no-bait restriction.

Treasureton Reservoir is located on Battle Creek in Franklin County. Its primary function is irrigation storage and flood control. Secondarily, the reservoir provides excellent sportfishing opportunities. The dam and reservoir are owned and operated by the Strongarm Reservoir Company. At full capacity, the reservoir is at 1,645 m elevation, covers 58 ha and contains 2,280,000 m^3 of water. The reservoir had been managed as a year-round fishery based on stocking of hatchery catchable rainbow trout. In 1994, the reservoir management changed to quality management with a two trout (none between 12 (305 mm) and 16 (408 mm) inches) limit. In 2008, management again changed to a two trout (none < 20" (508 mm)). Both Treasureton and Daniels reservoirs contain a monoculture of triploid rainbow trout.

Electrofishing surveys were completed on both reservoirs in 2008. We used a boat mounted electrofishing unit to survey both bodies of water. Surveys were conducted from 2100 to 0400 hours at each location. Daniels Reservoir was sampled on June 22nd and Treasureton Reservoir on April 21st. The goals of the surveys were to collect rainbow trout from both bodies of water to assess the size structure of each population and to establish a baseline for biennial evaluation of the trophy trout regulation. One additional goal was to collect rainbow trout from Treasureton Reservoir to assess the extent of a fish kill that occurred there during the winter of 2007-2008.

Results and Discussion

Rainbow trout size structure has declined in both reservoirs over the past few years. At the end of the last decade and at the beginning of this one, both reservoirs boasted large populations of rainbow trout over 400 mm in length regardless of which angling regulation was in play (Figure 2). It is likely that low reservoir levels going into the winter season drive the size structure of these populations more so than angling regulations. For example, Daniels has been under the same angling regulation for many years. During this time, the fishery has experienced both wet (late 1990s) and dry (mid 2000s) years. In wet years (1999 and 2000) the trophy component of the fishery has been maintained but in dry years (2005 and 2008) catch of fish over 500 mm declines (Figure 2).

Treasureton Reservoir experienced a significant fish kill during the winter of 2007-2008. The result of the electrofishing survey indicates that most of the younger cohorts were lost. Of the 20 rainbow trout captured none were less than 325 mm (Figure 2). However, increased growth rates observed by trout stocked in Treasureton Reservoir should result in a restored fishery by fall 2009.

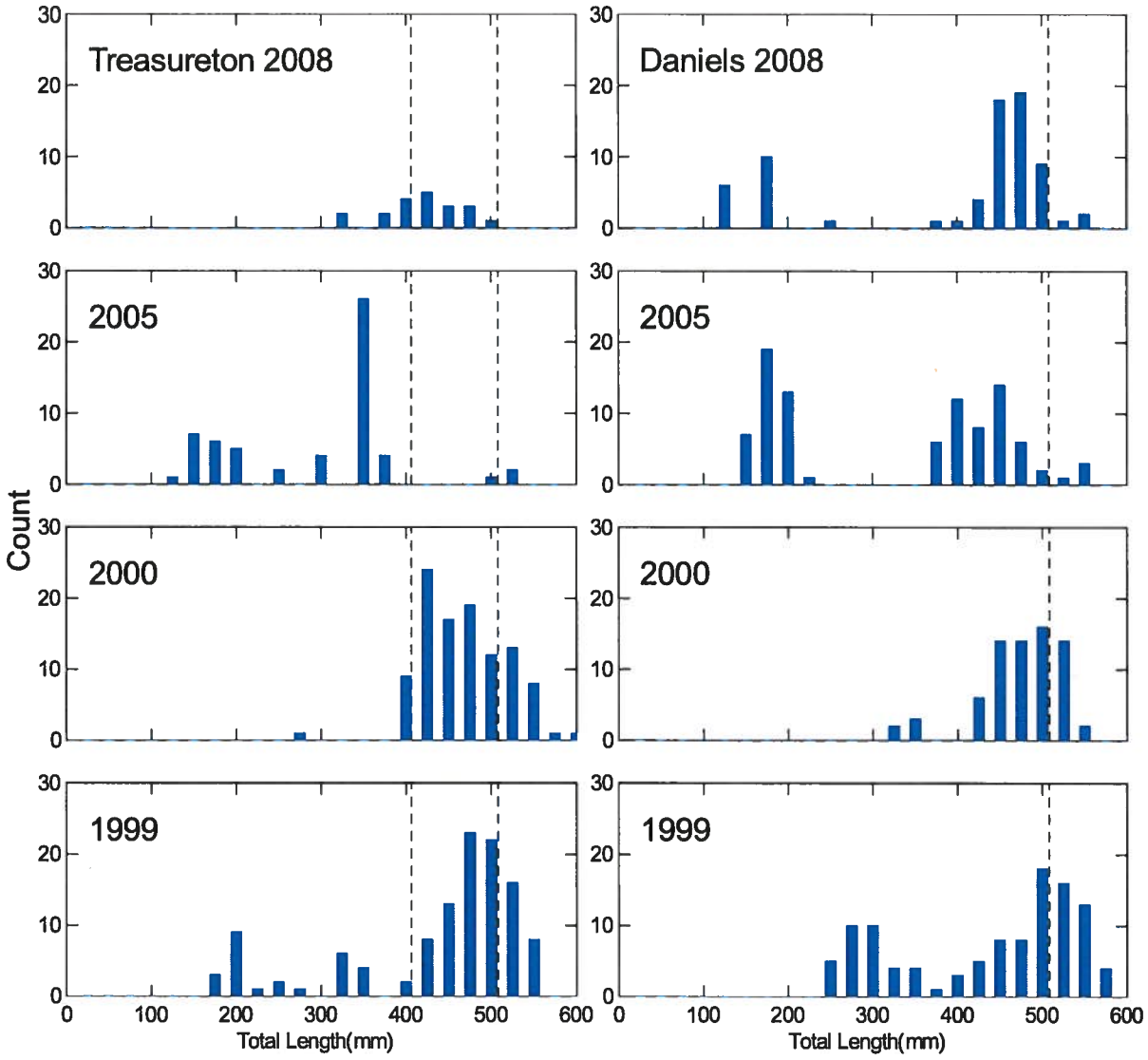

Figure 2. Length frequency distribution of rainbow trout collected from Treasureton and Glendale Reservoirs. Both reservoirs are managed under a trophy trout regulation (2 trout, none < 20" (508 mm), no bait, barbless hooks). The left dashed line in the Treasureton plots represents the 16" (406 mm) minimum length regulation that the reservoir was previously managed under and the right, the new trophy trout size limit of > 20" (508 mm). The vertical dashed line in the Daniels plots also represents the trophy trout minimum length limit of 20" (508 mm).

2008 Southeast Region Fishery Management Report

Rivers and Streams Investigations

ABSTRACT

A rainbow trout removal effort was initiated on Saint Charles Creek, Idaho, in 2006 and continued through 2008. The purpose of the project was to reduce the standing stock of rainbow trout in Saint Charles Creek to allow Bonneville cutthroat trout *O. clarkii utah* (BCT) to naturally increase in abundance. A total of 580 rainbow trout were removed over the course of the project. Length frequency distribution of rainbow trout was heavily skewed toward older age classes at the beginning of the project but transitioned to a more normal frequency distribution at the conclusion of the program. BCT showed a modest increase in abundance as a result of rainbow trout removal but not enough to deem the effort a success.

A long-term monitoring program for BCT was initiated in 2006. The streams chosen for the monitoring program were selected so that all of the management units identified in the state management plan were represented. The Thomas Fork tributary monitoring program has been included in the comprehensive monitoring program. Bonneville cutthroat trout abundance in the Thomas Fork tributaries were similar to those observed in 2006.

The adfluvial stock of Yellowstone cutthroat trout *O.clarkii bouvieri* (YCT) in the Blackfoot River continues to suffer from drought and predation by American white pelicans *Pelecanus erythrorhynchos*. The total run in 2008 was 548 fish. No bird lines were set to reduce pelican predation at the mouth of the river because the water levels in the reservoir were rising during the cutthroat trout migration. Hazing combined with limited shooting of 10 adult pelicans was employed to reduce predation loss. The lethal methods did not reduce the concentration of birds feeding at the mouth of the reservoir. Estimated density of YCT in the upper Blackfoot River (2008) was 287/km, which was down from the 2006 estimate of 400 YCT/km.

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Saint Charles Creek Rainbow Trout Removal Efforts

Introduction and Methods

Saint Charles Creek is the largest Bear Lake tributary. This stream supports excellent spawning and rearing habitat. Despite excellent potential, production of adfluvial BCT from Saint Charles Creek is limited due to several factors. Saint Charles Creek's confluence becomes impassible to adult BCT at lake elevations below 5,912 feet. During 2003 and 2004, peak lake elevations were below 5,907 feet. As a result, juvenile production in the stream was very poor. Previous survey work showed that Saint Charles Creek's fish community was dominated by resident rainbow trout, brook trout *Salvelinus fontinalis* (EBT), and rainbow X cutthroat hybrids which compete directly with BCT for limited spawning and rearing habitat (Utah Division of Wildlife Resources and Idaho Department of Fish and Game, in preparation). In an effort to make more of these resources available to BCT, a rainbow trout removal project was initiated on Saint Charles Creek in 2006.

Rainbow trout were removed from Saint Charles Creek over a three year period. During the fall of 2006, 2007, and 2008 rainbow trout were removed from the creek using a Smith-Root backpack electrofishing unit. A portion of the fish removed in 2006 and 2008 were measured to the nearest mm (TL). In addition to being measured, a sub-sample of rainbow trout removed in 2008 were also weighed to the nearest gram using a 1000 gram Pesola spring scale. Fish captured in 2007 were enumerated but not weighed or measured. Both EBT and BCT were measured but not weighed in 2006. However, in 2008 both lengths and weights were recorded for all three species. Length of stream treated (rainbow trout removed) varied between years. In 2006, 9 km was treated but because of low rainbow trout catch rates, the length of stream treated was reduced to 4.6 km in 2007 and 2008. For the purpose of analysis, catch was compared using the standardized 4.6 km reach (Figure 3).

Results and Discussion

The number of rainbow trout removed each year from the standardized section of Saint Charles Creek varied. The highest number of rainbow trout removed from Saint Charles Creek occurred during the first year of the project (253). The number removed in 2007 fell to a low of 130 but rebounded to 197 in 2008 (Table 4.). The average length of rainbow trout removed in 2006 was 269 mm. However in 2008, mean length of rainbow trout decreased significantly to 187 mm ($t = 1.987$; $P = 0.008$).

Length frequency distribution of rainbow trout changed over the course of the project. In 2006, the distribution favored the older age classes while the younger age classes (age 0 or 1+) were virtually absent. However, the length distribution observed in 2008 was dominated by younger age classes. In 2008, 75% of the removed rainbow trout were less than 200 mm compared to 10% in 2006 (Figure 4).

The number of BCT encountered varied over the life of the project. In 2006, only three BCT were captured. However, over the next two seasons, total catch leveled at about 100 fish per year. The plot of length frequencies of BCT captured in 2008 showed all year classes were

present in the appropriate proportions but the total number of BCT encountered was well below the expectation of 500 (250 females) individuals (Figure 5). The escapement goal of 500 was based on the estimated carrying capacity of Saint Charles Creek (Bear Lake Management Plan, Utah Division of Wildlife Resources and Idaho Department of Fish and Game, in preparation).

The results of the removal effort are clear. We were able to affect the size structure of the rainbow trout population, but not reduce the population size. The intent of the removal effort was to create space for BCT. However, it appears that by removing the larger rainbow trout all that has been accomplish was to provide more space for younger age classes. It is likely the only cost effective way to reestablish a robust population of BCT in Saint Charles Creek is via a renovation project followed by a reintroduction of BCT.

Table 4. Number of rainbow trout caught and removed from Saint Charles Creek, Idaho, in 2006 and 2008.

	2006				2008			
Species	Number Removed	Number Caught	Avg. Length	Avg. Weight	Number Removed	Number Caught	Avg. Length	Avg. Weight
RBT	253	253	269	ND	197	197	177	99
EBT	0	62[1.]	186	81.8	253	253	187	93
BCT	0	3	ND	ND	0	101	157	61

RBT=Rainbow trout; EBT=Brook trout; BCT=Bonneville cutthroat trout

[1.] Represents a subsample, additional EBT were caught but not enumerated.

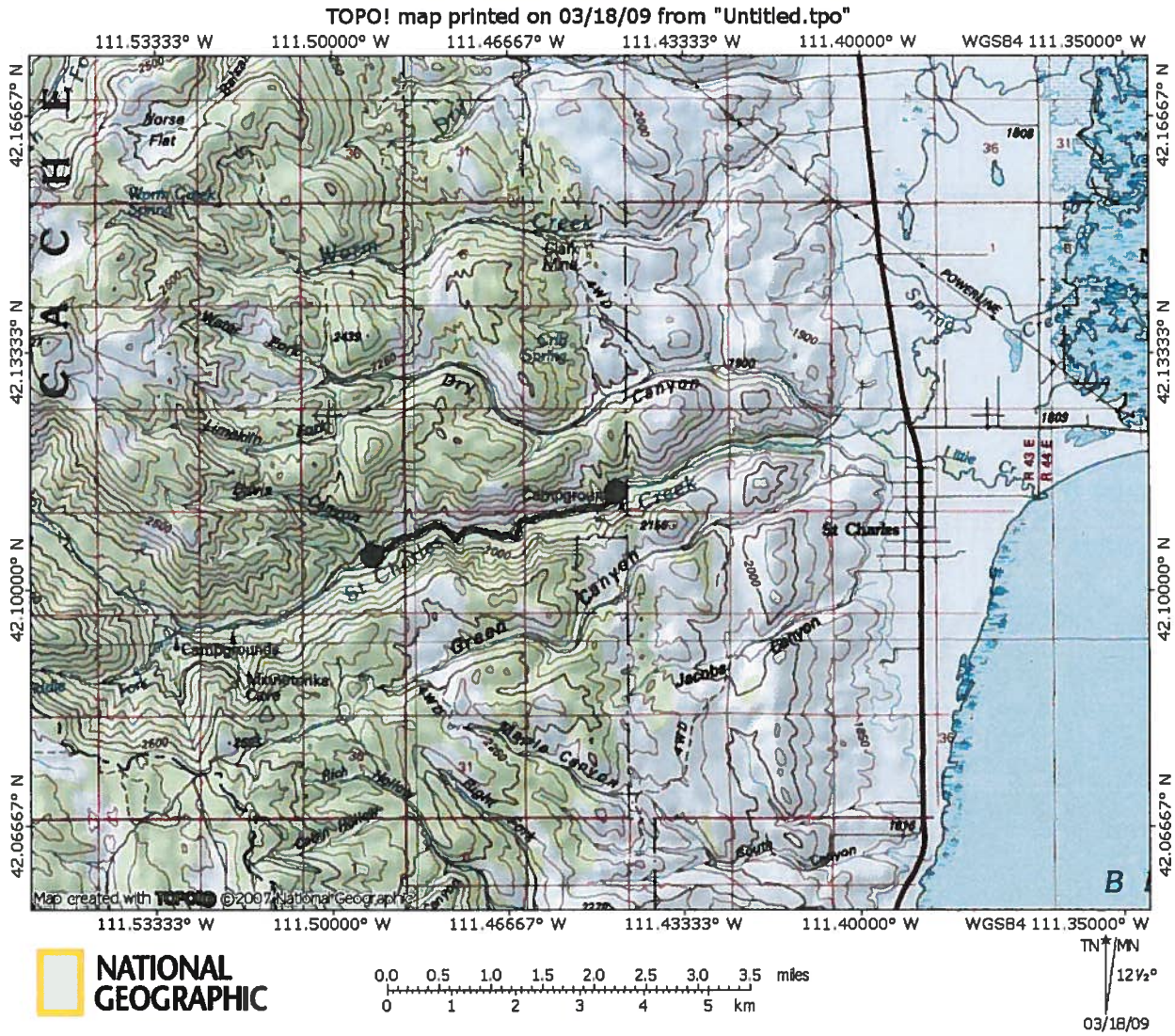

Figure 3. Standardized location and section of Saint Charles Creek, Idaho, from which rainbow trout were removed during the fall of 2006, 2007, and 2008.

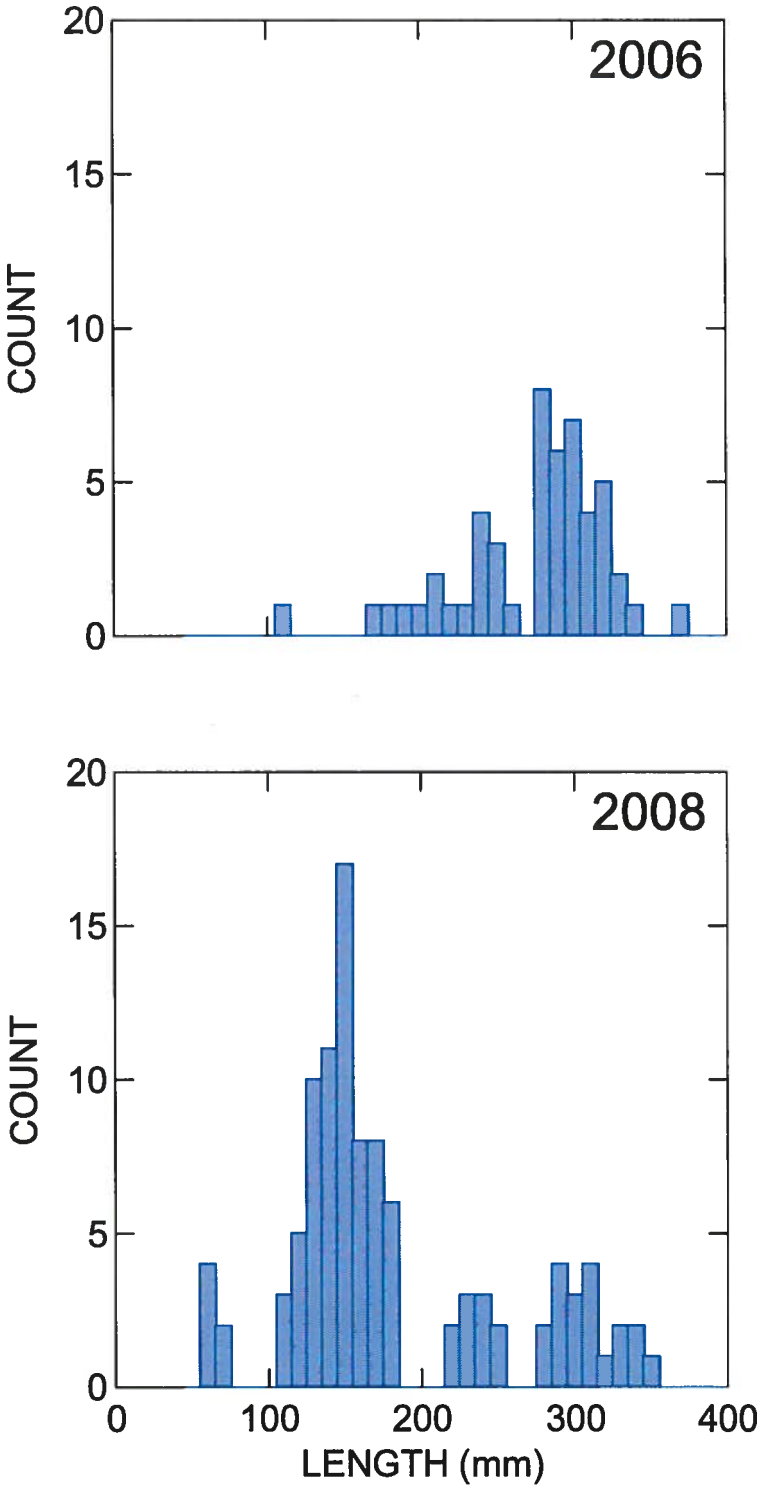

Figure 4. Length frequency distribution of rainbow trout collected from Saint Charles Creek, Idaho, in 2006 and 2008.

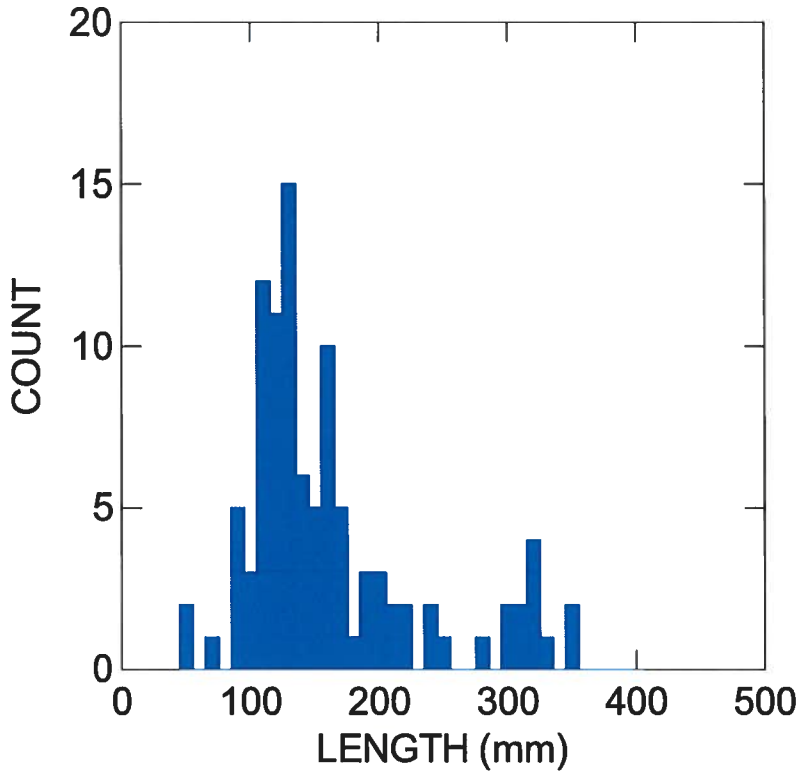

Figure 5. Length frequency of Bonneville cutthroat trout collected from Saint Charles Creek, Idaho, during the fall of 2008.

Monitoring Program for Bonneville Cutthroat Trout

Introduction and Methods

BCT are one of three native cutthroat trout sub-species in Idaho and only occur in the Bear River Drainage. In the early 1980s, distribution and abundance data for this native trout were lacking. To better understand population trends and the potential impacts of land use practices on the sub-species, a long-term monitoring program was initiated for three tributary streams of the Thomas Fork Bear River (Preuss, Giraffe, and Dry Creeks). In addition to those streams, a broader monitoring program has been developed that includes populations from across BCT range in Idaho. The additional Bear River drainage monitoring sites include Eightmile, Bailey, Georgetown, Beaver, Whiskey, Montpelier, Maple, Cottonwood, Snow slide, First, Second, and Third creeks, and the Cub River. During 2008, several personnel changes occurred within the regional fisheries staff which left the group understaffed for much of the field season. Therefore, only 9 of 16 of the BCT monitoring locations were sampled in 2008 (Figure 6).

Department personnel have monitored age-1 and older cutthroat trout densities in the Thomas Fork tributaries since 1981. Annual monitoring was completed during the mid 1980s, but was reduced to alternate year sampling in 1991. In general, cutthroat trout densities were estimated using multiple pass removal techniques sampled with backpack electrofishing equipment. In these streams, fish catch from the first pass explained 96% of the variation in total fish densities (Teuscher and Scully 2003). Therefore, to optimize use of personnel time, sampling effort was reduced to single pass runs. Sample sites were approximately 100 m long. Measurements of length, width, and depth were made for each site. Because population data from the other 10 tributaries are limited, density estimates were made using multiple pass depletion methods.

Results and Discussion

Mean BCT densities were less than 10 fish/100 m^2 for all three tributaries. Mean densities observed in 2008 were similar to those recorded in 2006. However, mean densities of BCT remained well below those observed in the 1980s (Table 5).

Population trends in the Thomas Fork tributaries appear to follow variations in water cycles. Rainfall totals were above average in the mid 1980s and 1990s and fish densities peaked during those periods. Given the sensitive status of BCT and recent petitions to list the species under the Endangered Species Act, it is very important to include variation that appears to be associated with changes in annual precipitation. For example, population status reviews completed in 1986 or 2000 would yield very different conclusions than if a status review was based on densities observed in 1991 (Figure 7).

Fish abundance estimates for streams included in the BCT monitoring program are reported in Table 6. The information is intended for use in a population monitoring program for BCT. This is the second year of the monitoring program. The monitoring program was initiated as prescribed in the BCT management plan (Teuscher and Capurso 2007).

Table 5. Bonneville cutthroat trout densities (numbers/100 m^2) in Preuss, Giraffe, and Dry Creeks from 1981 through 2008. Only fish greater than 75 mm are shown. The 2004, 2006, and 2008 densities were estimated based on catch from a single electrofishing pass.

Year	min	max	mean	SE
Preuss Creek				
1981	6.2	16.3	**11.3**	5.1
1985	20.5	31.6	**26.1**	5.5
1986	15.0	17.5	**16.3**	1.3
1987	9.7	21.0	**15.2**	3.3
1988	22.0	22.0	**22.0**	
1989	1.0	2.6	**1.9**	0.5
1990	3.1	3.5	**3.3**	0.2
1991	0.3	3.6	**2.3**	0.8
1993	0.3	6.3	**3.4**	1.5
1995	1.7	5.9	**3.2**	0.9
1997	4.9	14.0	**8.8**	2.2
1998	3.2	3.2	**3.2**	
2000	5.6	10.7	**7.9**	1.5
2002	1.6	4.6	**3.1**	0.6
2004	0.9	21.4	**9.1**	3.3
2006	0.0	14.1	**6.0**	2.4
2008	1.8	10.3	**4.0**	1.1
Giraffe Creek				
1981	0.2	4.2	**2.2**	2.0
1986	19.1	21.4	**20.3**	1.2
1987	32.7	41.5	**37.1**	4.4
1989	19.0	33.9	**26.5**	7.5
1990	5.5	14.1	**9.8**	4.3
1993	0.0	0.5	**0.3**	0.3
1995	0.0	5.0	**3.4**	1.2
1998	5.9	17.3	**11.0**	2.4
2000	3.1	38.6	**16.9**	8.2
2002	0.0	3.7	**1.8**	1.0
2004	2.4	5.4	**4.0**	0.8
2006	0.0	11.3	**4.2**	2.7
2008	3.4	6.8	**5.0**	0.8

Table 5. (cont.)

Dry Creek				
Year	min	max	**mean**	SE
1987	14.4	14.4	**14.4**	
1990	4.3	4.3	**4.3**	
1993	0.0	0.0	**0.0**	
1998	11.2	24.8	**16.8**	4.1
2000	22.6	27.2	**24.9**	2.3
2002	0.3	0.9	**0.6**	0.3
2004	0.0	0.0	**0.0**	
2006	0.0	5.2	**3.1**	1.2
2008	1.4	1.5	**1.4**	0.1

Table 6. Bonneville cutthroat trout density estimates and percent composition of all salmonids for 6 of 13 streams selected for long-term BCT monitoring program. Only streams sampled in both 2006 and 2008 are reported here. Ninety-five percent confidence intervals are in parenthesis. Only fish over 75 mm total length are included in the estimates.

Stream name	UTM Coordinates (NAD 83) Easting	Northing	2006 Fish/100m^2	2006 % Comp.	2008 Fish/100m^2	2008 % Comp.
Eightmile Cr	452586	4709013	1.0 (1.0-1.0)	2.0	2.6 (2.1-3.3)	11.0
Bailey Cr	452073	4713444	0	0	2.8 (2.3-3.4)	12.0
Cottonwood Cr	435085	4687405	7.8 (7.3-8.3)	100.0	22.9 (20.8-24.9)	90.0
Cottonwood Cr	430529	4689173	1.9 (1.7-2.1)	100.0	0	0
Cottonwood Cr	424942	4690515	1.1 (0.9-1.3)	100.0	2.5 (2.4-2.7)	100.0
Montpelier Cr	485856	4690688	1.0 (1.0-1.0)	10.0	0.6 (0.4-0.8)	42.0
Montpelier Cr	485237	4694406	0.2 (0.2-0.2)	16.0	2.8 (2.5-3.1)	45.0
Whiskey Cr	485263	4697376	0	0	0	0
Georgetown Cr	476614	4705326	0	0	0	0
Georgetown Cr	475098	4704903	0	0	0	0

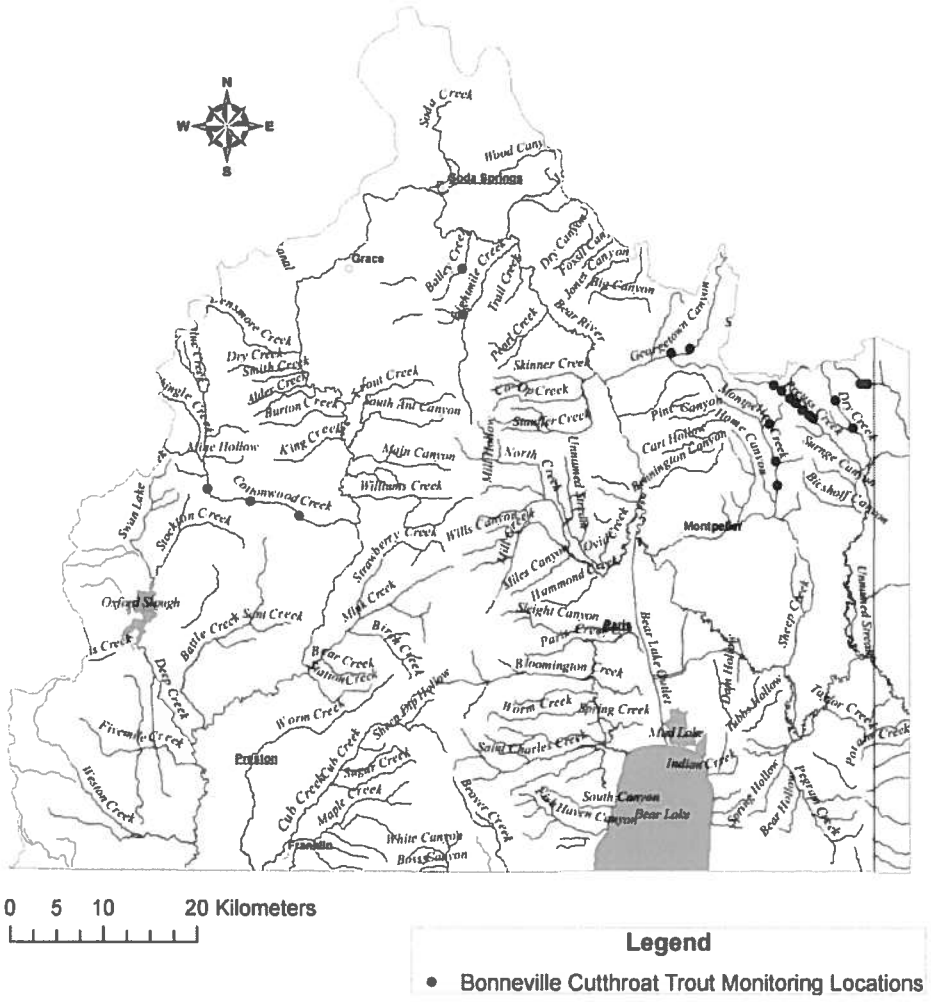

Figure 6. Streams sampled for Bonneville cutthroat trout during the summer of 2008.

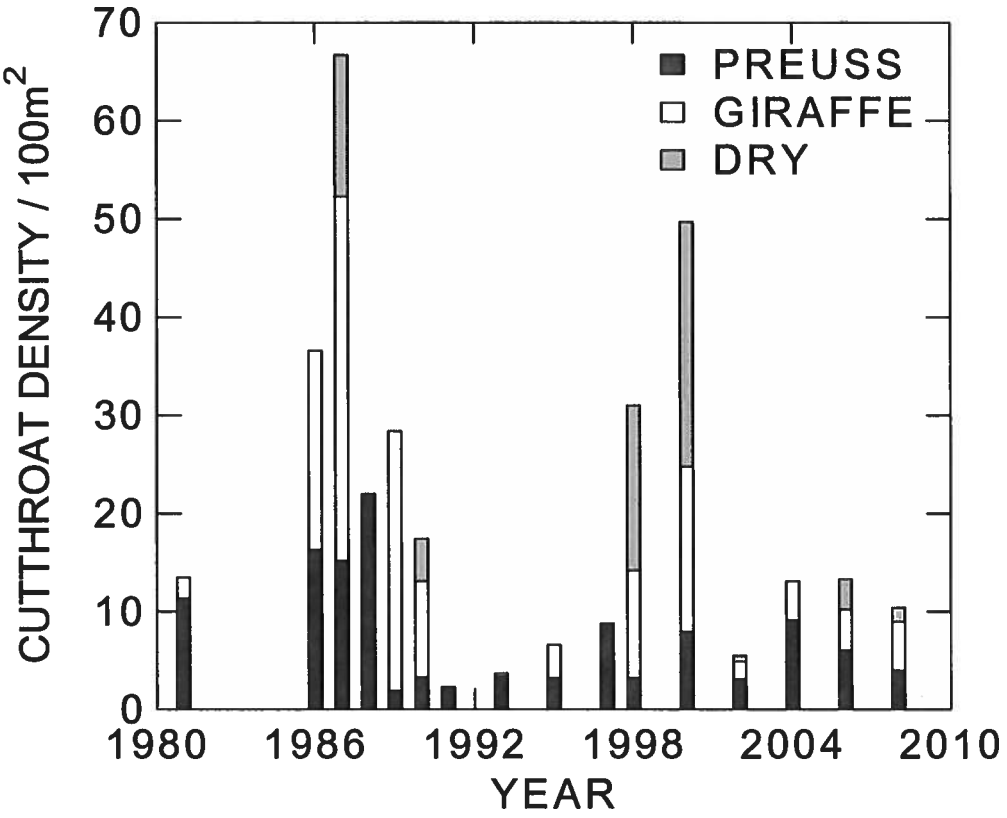

Figure 7. Bonneville cutthroat trout population trends in the Thomas Fork tributaries.

Yellowstone Cutthroat Trout Monitoring in the Blackfoot River System

Introduction and Methods

There are two monitoring programs in place for YCT in the upper Blackfoot River. They are adult spawning counts and population estimates within the Blackfoot River Wildlife Management Area located about 51 km above the reservoir. The spawning counts have been completed every year since 2001. The population surveys are completed less frequently.

An electric fish migration barrier was installed in the Blackfoot River in 2003. The barrier includes a trap box designed using Smith Root Inc. specification. The barrier components include four flush mounted electrodes embedded in Insulcrete, four BP-1.5 POW pulsators, and a computer control and monitoring system. The computer system can be operated remotely, records electrode outputs, and has an alarm system that triggers during power outages. Detailed descriptions of these components and their function can be obtained at www.smith-root.com.

The electric barrier was operated from May 5th to June 12th. Prior to observing fish at the trap, field crews checked the live box several times a week. Once fish began entering the trap, it was checked at least once a day. Fish species and total lengths (mm) were recorded. YCT were visually checked for bird scars. Bird scar monitoring began in 2004. Scar rates were associated with increases in pelicans feeding in the Blackfoot River downriver of the trap.

In 1994, the Idaho Department of Fish and Game (IDFG), with assistance from the Conservation Fund, purchased the 700-ha ranch and began managing the property as the Blackfoot Wildlife Management Area (BWMA). The BWMA straddles the upper Blackfoot River, with an upper boundary at the confluence of Lanes, Diamond, and Spring creeks and a lower boundary at the head of a canyon commonly known as the upper narrows. Approximately, 9 km of river meander through the property along with 1.6 km of Angus Creek, which is a historical YCT spawning and rearing stream. Since purchasing the BWMA, IDFG has completed periodic population estimates to monitor native YCT abundance.

In 2008, we estimated YCT abundance within 8.7 km of the BWMA reach of the Blackfoot River. The estimate was completed using mark-recapture methods. Fish were sampled with drift boat-mounted electrofishing gear. Fish were marked on July 9th and recaptured July 15th. Data were analyzed using Fish Analysis + software package (Montana Fish Wildlife and Parks 2004). All YCT caught were measured for total length (mm) and weighed to the nearest gram.

Results and Discussion

In 2008, a total of 548 adult YCT were collected at the migration trap. The escapement count was similar to what was observed in 2003 and was the highest observed in the past five years. About 10% of the YCT observed in the trap had fresh bird scars (open wounds) and another 12% had old bird scars (wounds that were healed or nearly so). Fish that exhibited old bird scars probably acquired them while in the reservoir prior to their spawning run. Scarring rates have varied from no visible scars on fish collected in 2002 to a high of 70% scarred in

2004. Scarring rates may be related to the predation rate by pelicans, but no information is available to determine the relationship. Variation in scarring rates is likely impacted by the overall number of pelicans feeding on the river below the migration trap, water levels and clarity, and hazing efforts exerted on the birds to reduce predation impacts. The hazing efforts were described by Teuscher and Scully (2008). Escapement and bird scar trends are shown in Table 7.

A total of 409 cutthroat trout were sampled during the mark and recapture electrofishing surveys. The total YCT population estimate for the BWMA was 2,500 ± 673 which translated to approximately 287 YCT/km. The estimate from 2006 was 3500 ± 700 YCT (400 YCT/km). Mean length of YCT in 2008 was 325 mm which was significantly larger than observed in 2006 ($t = 1.964$; $P = 0.000$). Abundance estimates by size class are reported in Table 8.

Even though YCT abundance remains high on the BWMA, a downward trend is immerging. The lowest abundance of YCT in this decade occurred in 2002. In 2005, estimated abundance jumped to 4,092. However, over the next two sampling events, abundance and biomass has declined (Figures 8 and 9).

In past surveys of the BWMA reach, juveniles (< 300 mm) dominated catch. Thurow (1981) reported that about 80% of the fish caught during population surveys were less than 300 mm total length. Results from 1995, 2005, and 2006 surveys show similar ratios of juvenile cohorts (Figure 10). However in 2008, fish < 300 mm comprised about 63% of the total catch, well below what has been observed in recent years. These results suggest a shift in frequency distribution from previous years in that large fish dominated the catch. The paucity of small fish may have been related to drought conditions we have been experiencing during most of this decade.

MANAGEMENT RECOMMENDATIONS

1. Renovate Saint Charles Creek and reestablish a robust population of Bonneville cutthroat trout in 2011.

2. Continue monitoring stream populations as prescribed in the Idaho Bonneville cutthroat trout management plan.

3. Pursue management goals for American white pelicans and Yellowstone cutthroat trout that balance conservation and recreation needs for both.

Table 7. Yellowstone cutthroat trout escapement estimates for the Blackfoot River 2001-2008.

Year	Weir Type	YCT Count	Mean Length(mm)	% Bird Scars	Mean May River Discharge (cfs)	Adult Pelican Count
2001	Floating	4,747	486	No data	74	No data
2002	Floating	902	494	0	132	1,352
2003	Electric	427	495	No data	151	1,674
2004	Electric	125	478	70	127	1,748
2005	Electric	16	Na	6	388	2,800
2006	Electric	19	Na	38	453	2,548
2007	Electric	98	445	15	115	3,416
2008	Electric	548	485	10	409	2,390

Table 8. 2008 Yellowstone cutthroat trout abundance and biomass estimates by size class collected from the Wildlife Management Area of the Blackfoot River, Idaho.

Size Class (mm)	Fish Marked	Fish Captured	Fish Recap'd	Pop Est	Pop Est SD	Biomass (kg)	Relative Wt Avg
75 - 149	8	0	0	315	67.4	9.0	101.4
150 - 224	57	23	2	1,089	293.2	86.5	97.1
225 - 299	45	41	6	479	125.2	80.0	86.8
300 - 374	49	66	6	333	70.6	124.3	82.0
375 - 449	39	31	7	193	34.7	121.5	78.5
450 - 674	25	25	7	96	29.6	137.7	84.0
Totals:	223	186	28	2,504	336.5	559.0	86.2

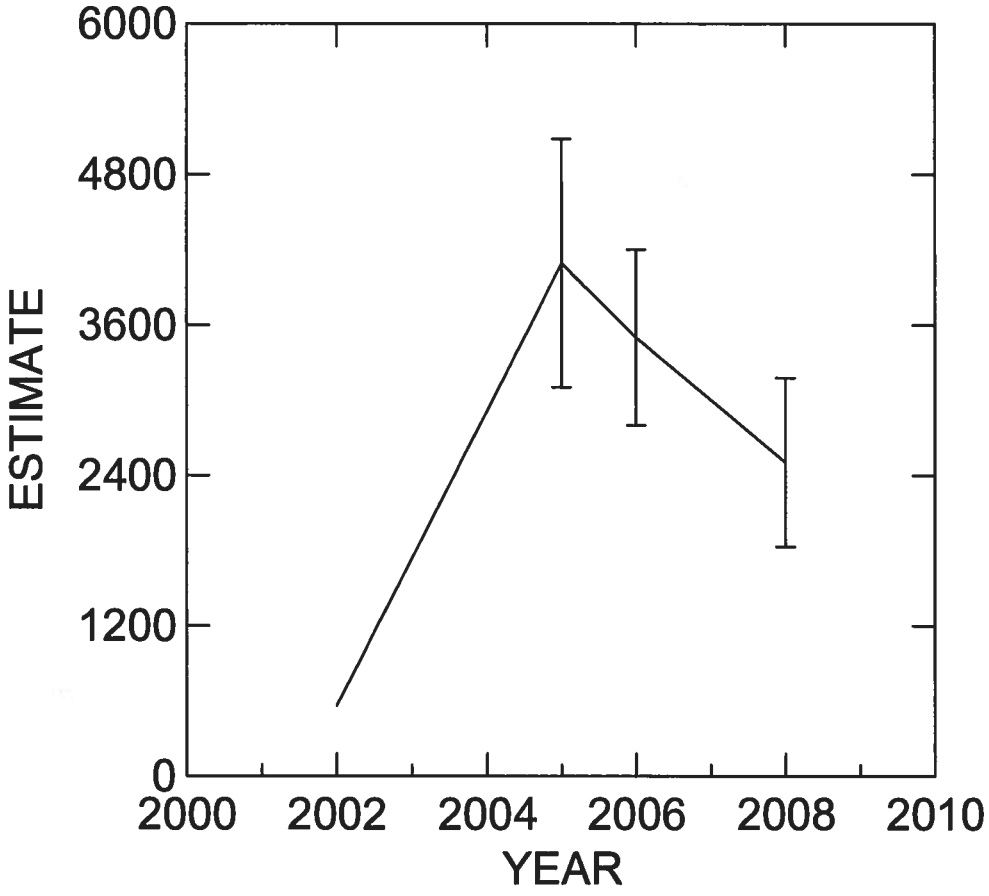

Figure 8. Abundance and 95% CI of Yellowstone cutthroat trout collected from the Blackfoot River within the boundaries of the Blackfoot Wildlife Management Area, Idaho.

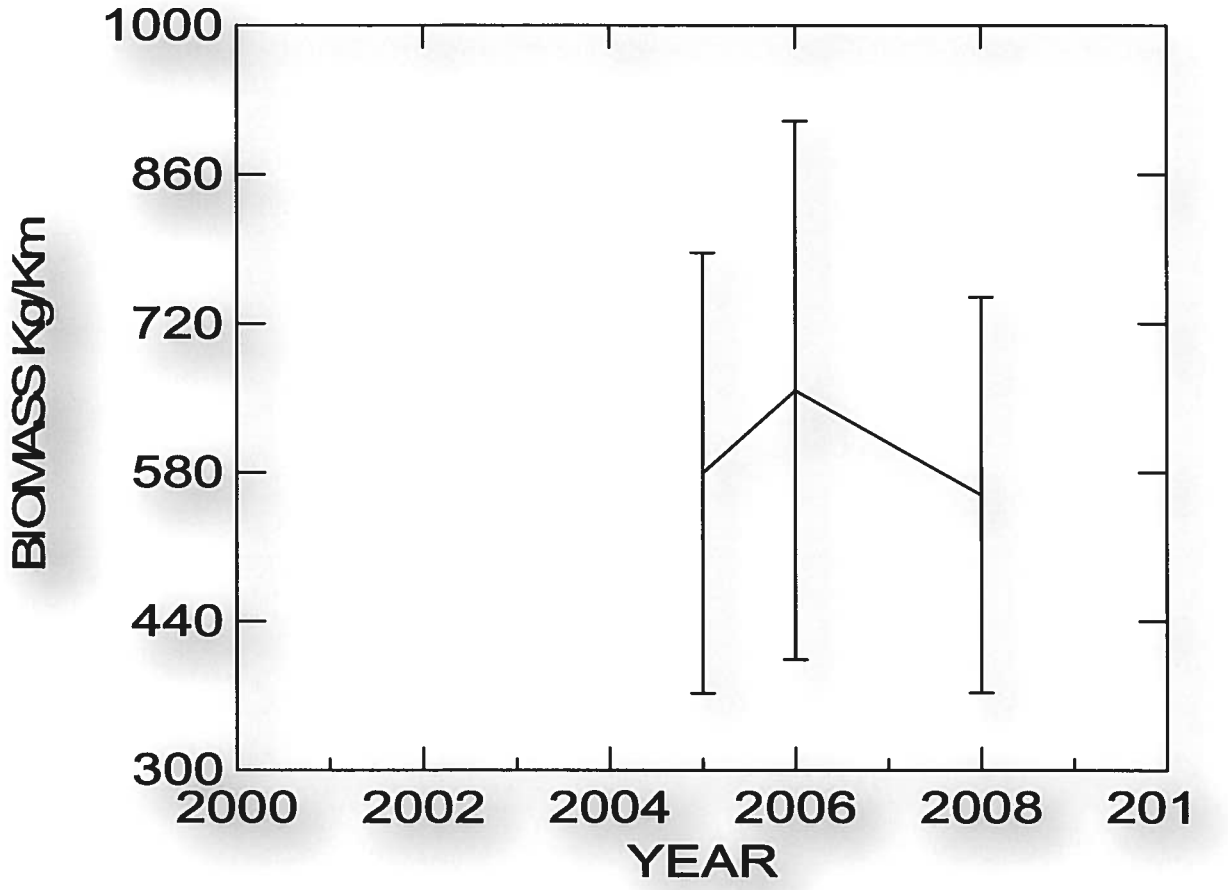

Figure 9. Biomass and 95% CI of Yellowstone cutthroat trout collected from the Blackfoot River within the boundaries of the Blackfoot Wildlife Management Area, Idaho.

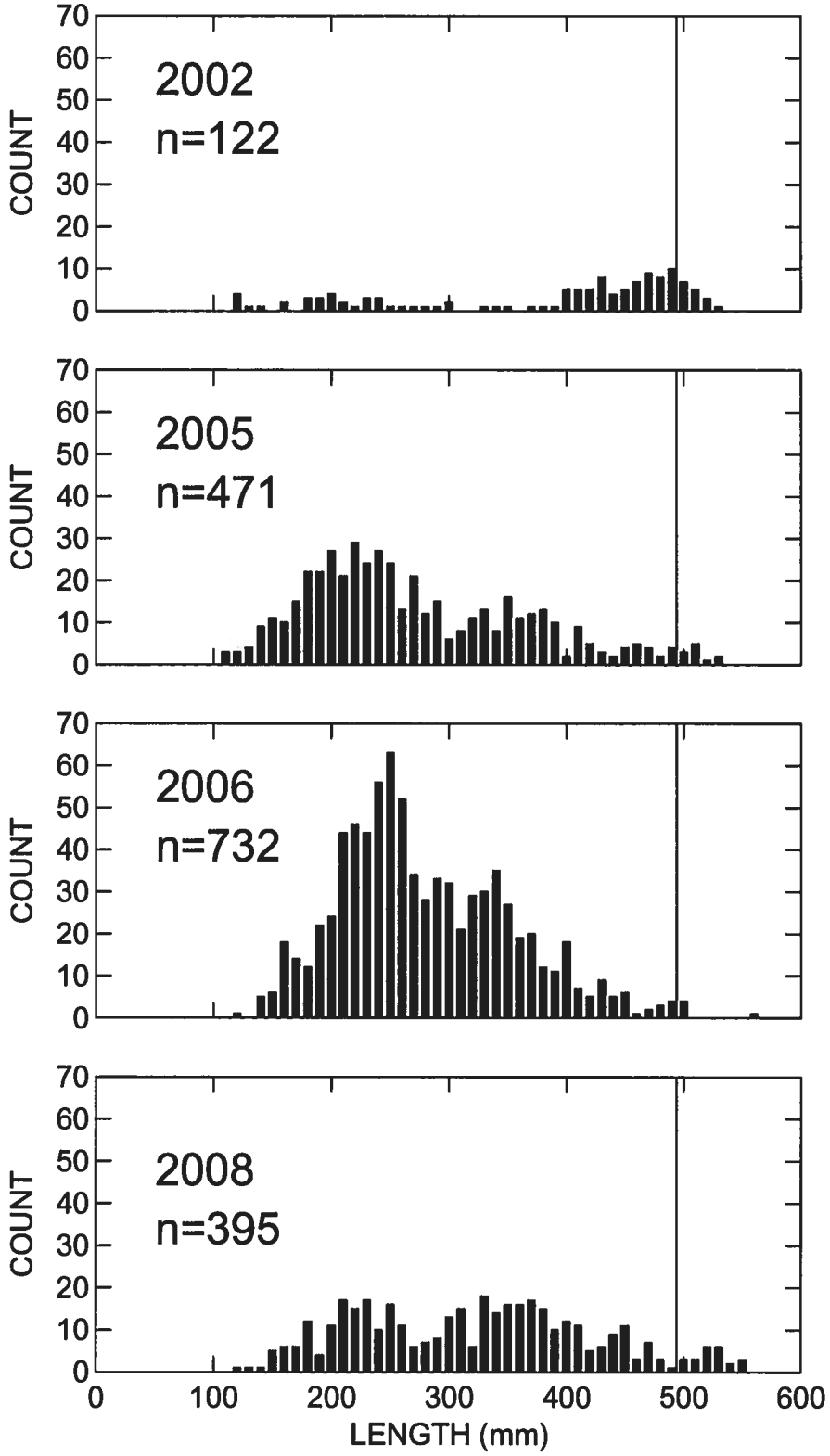

Figure 10. Length frequency distributions of Yellowstone cutthroat trout caught from the Blackfoot Wildlife Management Area of the Blackfoot River, Idaho.

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