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REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
MAGIC VALLEY REGION (SUBPROJECTS I-E, II-E, III-E, IV-E)

PROJECT I. SURVEYS and INVENTORIES
- Job a. Magic Valley Region Mountain Lakes Investigations
- Job b. Magic Valley Region Lowland Lakes Investigations
- Job c. Magic Valley Region Rivers and Streams Investigations

PROJECT II. TECHNICAL GUIDANCE
PROJECT III: HABITAT MANAGEMENT
PROJECT IV. POPULATION MANAGEMENT

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State of: Idaho

Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job:

Title: Mountain Lakes Investigations

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

Mountain lakes were not surveyed in the Magic Valley Region during 2001.

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2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

Kokanee *Oncorhynchus nerka* in Anderson Ranch Reservoir were monitored with nighttime midwater trawl samples and spawning run trend counts. Total population estimates of kokanee for the entire reservoir were 33,702 ±23,245 age 0 fish, 64,570 ±61,034 age 1 fish, and 28,736 ± 18,606 age 2 fish. Low reservoir water levels and poor water quality are suspected to be the cause of a partial fish kill in the reservoir and restricted kokanee access into the South Fork Boise River resulting in a count of only eight adult kokanee during the trend monitoring survey of spawning fish.

Results of nighttime electrofishing the large south pond in Bruneau Sand Dunes State Park indicate the presence of bluegill *Lepomis macrochirus,* largemouth bass *Micropterus salmoides,* pumpkinseed *Lepomis gibbosus* and common carp *Cyprinus carpio.* In an effort to eradicate the common carp, rotenone-laced fish feed was experimentally dispersed into four feeding enclosures. This experiment was unsuccessful as only one carp was documented as killed by the rotenone.

Carey Lake was sampled with four sinking gill nets, two trap nets and 40 minutes of nighttime electrofishing. Results indicate numerous bluegill, largemouth bass, brown bullhead *Ameiurus nebulosus,* and yellow perch *Perca flavescens.* Small numbers of pumpkinseed and rainbow trout *Oncorhynchus* mykiss were also sampled.

Brown trout *Salmo trutta* redds were counted as part of an annual survey on the Big Wood River to document trends in the Magic Reservoir population. The count was made from the mouth of Rock Creek upstream to a site upstream of Stanton Crossing. A total of 111 redds were counted, which is below the 15-year average count of 157 redds.

There was a total of 66 hours of gillnetting effort at Mormon Reservoir in the spring. Fish sampled included 152 rainbow trout, five bridgelip sucker *Catostomus columbianus* and 21 yellow perch.

Other monitoring efforts at several reservoirs included measurements of daytime temperature and dissolved oxygen profiles and zooplankton size and abundance.

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OBJECTIVES

To obtain current information for fishery management decisions on lowland lakes and reservoirs, including angler use, success, harvest and opinions, fish population characteristics, stocking success, return-to-the-creel for hatchery trout, limnology and to develop appropriate management recommendations.

ANDERSON RANCH RESERVOIR

Introduction

Anderson Ranch Reservoir is a Bureau of Reclamation (BOR) impoundment on the South Fork Boise River with a maximum storage capacity of 493,180 acre-feet, of which 28,980 acre-feet is considered dead storage (USGS 1996). Anglers fishing Anderson Ranch Reservoir target mostly kokanee *Oncorhynchus nerka,* rainbow trout O. *mykiss,* smallmouth bass *Micropterus dolomieu* and yellow perch *Perca flavescens.* Several other nongame fish species and bull trout *Salvelinus confluentus* are also known to be present. Kokanee are managed as a consumptive fishery with a daily bag limit of 25 fish and a possession limit of 50 fish.

There were several objectives to the various types of sampling that was done in Anderson Ranch Reservoir in 2001. The midwater trawl was used as part of an annual survey to estimate abundance and densities of the kokanee population. Vertical gill nets were used to determine species composition, size and age distribution of the pelagic fish community. Spawning kokanee were monitored as part of an annual survey to measure long term trends in the spawning population and to forecast future recruitment of fish. Temperature and dissolved oxygen profiles were measured to determine the amount of useable fish habitat within the water column and the zooplankton survey was done to estimate the amount of zooplankton available to fish in the pelagic zone of the reservoir for future stocking requests.

Methods

Kokanee abundance and age structure were estimated in Anderson Ranch Reservoir using a nighttime midwater trawl on the night of June 19, 2001 following methods described by Rieman (1992). Population estimates from trawl data were made using a Microsoft© Excel spreadsheet developed by fishery research (Bill Harryman, Idaho Department of Fish and Game, personal communication). All kokanee sampled were classified into three age class groups; fish up to 99 mm in total length were classified as age 0+ fish; fish from 100 to 199 mm long were classified as age 1+ fish; and fish at least 200 mm long were classified as age 2+ fish. Active reservoir volume at the time of the trawl was 102,000 acre feet which is 25% of the total active storage capacity of the reservoir and 26% of the 30 year average (provisional data provided by the U.S. Bureau of Reclamation Hydromet information system). During normal water years kokanee are sampled with 14 to 15 trawls partitioned into three strata, but due to low reservoir volume this year they were sampled with seven trawls in two strata. Strata 1 included the area from the dam up reservoir to, and including, the Fall Creek arm. Strata 2 included the rest of the reservoir from the Fall Creek Arm to the Curlew boat ramp. See Appendix A for Universal Transverse Mercator (UTM) locations of each trawl.

The pelagic fish community was sampled using six single mesh gill nets that were set vertically overnight on August 7, 2001 in Anderson Ranch Reservoir near the Fall Creek arm in water 43 m deep. The nets measured 30 m long and 3 m wide with a mesh size of 1.9 cm, 2.5 cm, 3.8 cm, 5.0 cm, 6.4 cm, and 7.6 cm. The UTM locations of sites sampled are given in Appendix A.

Spawning kokanee numbers were counted at 13 sites along the South Fork Boise River upstream of Anderson Ranch Reservoir and at one site on lower Trinity Creek to track population trends (Appendix A). These are the same sites at which kokanee have been counted on a weekly basis during the run since 1989. This year counts began on August 17 and ended September 21, 2001.

Usable fish habitat within the water column was determined by measuring water temperature and dissolved oxygen profiles. Measurements were made in situ during daylight hours on July 20 at three locations using a Yellow Springs Instruments model 57 temperature/dissolved oxygen meter from a boat. Zooplankton ratio measurements were taken in June, July and August. Methods used to obtain zooplankton ratio estimates are described by Teuscher (1999).

Results

A total of 72 kokanee were sampled with the nighttime midwater trawl to provide a population estimate of approximately 34,000 age 0 kokanee, 65,000 age 1 kokanee and 29,000 age 2 kokanee in the reservoir (Table 1).

There were 187 kokanee and one yellow perch sampled with the vertical gill nets (Table 2). Total length frequency analysis indicate that some age 0+ kokanee may have been sampled, but the majority of fish sampled were age 2+ (between 200 mm and 300 mm long) and probably some age 3+ (greater than 300 mm).

There were a total of eight spawning adult kokanee counted at all 13 sites on the South Fork Boise River August 17-September 21, 2001. Counts generally run until the end of September, but the decision was made to cancel all further counts due to the low number of fish being observed.

Dissolved oxygen levels were less than 5 mg/l below the thermocline, and surface water temperatures exceeded 20°C at the three measured locations on July 20, 2001 (Table 3). Results of zooplankton monitoring are reported in the Regional Zooplankton Surveys section in this report.

Table 1. Anderson Ranch Reservoir kokanee population and density estimates based on nighttime midwater trawl samples from July 19, 2001.

	Estimate	Age 0+	Age 1+	Age 2+	Age 3+
Strata 1	Population ±95% CI	19,821± 25,541	64,570± 67,710	28,736± 20,641	0
	Density (#/ha)	45	147	65	0
	SE	46	123	37	
Strata 2	Population ±95% CI	13,881± 17,086	0	0	0
	Density (#/ha)	36	0	0	0
	S.E.	4		-	
Entire Reservoir	Population ±95% CI	33,702± 23,245	64,570± 61,034	28,736± 18,606	0

Table 2. Total length frequency and average weights of kokanee sampled with six vertical gill nets set overnight at Anderson Ranch Reservoir on August 7, 2001.

Total length (mm)	Number sampled	Average weight (g)	S.D. of wt.
110 / 140	1	26	-
150	1	28	-
160	1	46	-
170	3	45	1
180	1	48	-
190	4	69	7
200	1	65	-
210	2	90	2
220	6	99	10
230	21	111	8
240	28	130	14
250	34	148	15
260	31	160	14
270	20	184	15
280	19	201	16
290	9	220	16
300			
310	1	232	-
320	2	285	29
330	1	255	-
340			
350			
380	1	340	-
Total sampled	187		

Table 3. Temperature and dissolved oxygen profiles measured at three locations on Anderson Ranch Reservoir on July 20, 2001.

Near the dam		
Depth (m)	Temp (°C)	DO_2 (mg/l)
S	22	8.4
1	22	8.8
2	21	8.4
3	21	9.0
4	21	9.0
5	21	8.8
6	21	8.7
7	21	8.6
8	21	8.5
9	21	8.0
10	19	5.1
11	18	5.3
12	18	5.3
13	17	5.3
14	17	5.4
15	16	6.5
16	16	5.3
17	16	5.3
18	15	5.3
19	15	5.2
20	15	5.0
25	13	4.4
30	11	4.2
35	6	5.5
40	6	5.8
45	6	6.1
50	5	5.0

East of Fall Creek Arm		
Depth (m)	Temp (°C)	DO_2 (mg/l)
S	22	8.9
1	22	9.0
2	22	9.2
3	22	9.2
4	22	8.7
5	21	7.8
6	**21**	3.5
7	20	3.2
8	19	3.1
9	18	3.0
10	18	3.1
11	18	2.8
12	18	2.7
13	17	2.8
14	17	2.5
15	16	2.6
16	16	2.4
17	15	2.5
18	15	2.4
19	15	2.2
20	15	1.9

Table 3. Continued.

East of Fall Creek Arm		
Depth (m)	Temp (°C)	DO_2 (mg/l)
22	14	1.8
24	14	1.1
26	13	0.7
28	12	0.7
30	11	0.8
32	9	1.2
33(B)	8	1.8

Near Confluence of Lime Creek Arm		
Depth (m)	Temp (°C)	DO_2 (mg/l)
S	23	9.7
1	23	9.8
2	23	9.7
3	22	8.2
4	21	7.8
5	21	6.8
6	20	6.7
7	20	**4.9**
8	19	3.6
9(B)	19	3.1

Discussion

Results of the midwater trawl indicate that the population of age 0 kokanee is smaller than the population of age 1 kokanee. This may be an indication of a weak year-class of kokanee recruited from the year 2000 spawning adult run.

Due to dropping water levels in August and September, many of the kokanee were not able to migrate upstream of the low water delta into the South Fork Boise River. Although there were only eight adult kokanee observed at all of the 13 spawning survey sites combined for the year, there were approximately 200 kokanee observed in Lime Creek on September 21, 2001. There were also several kokanee observed in the South Fork Boise River near Pine, Idaho when the bull trout trap was put into operation in November, which is much later than the normal timing of the kokanee run and after the spawner trend count ended for the year.

By the end of July kokanee in the reservoir were beginning to show signs of stress with dead fish beginning to appear at various locations. This was a partial die-off with 200 or less dead fish observed near the shoreline by regional fishery personnel. Most of the dead fish appeared to be one and two year old kokanee. Total reservoir volume at the end of July was 91,661 acre-feet, which is 22% of active storage capacity, and by the end of August was 63,992 acre-feet, which is 16% of active storage capacity. The low recruitment of age 0 fish, poor water quality in the reservoir, and a low spawning run may necessitate supplementation with hatchery fish over the next few years to speed up recovery of the population.

BRUNEAU DUNES STATE PARK - SOUTH POND

Introduction

The Bruneau Dunes State Park south pond is located at the base of the large sand dune within Bruneau Dunes State Park. The fishery is managed for largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus* with fishing rules that allow for the harvest of two bass, none less than 20 inches long. Fish were previously sampled with one unit of lowland lakes sampling protocols in July 1994 (Warren and Partridge 1996). Results of the survey indicated the presence of common carp *Cyprinus carpio* that year. Angler comments and observations concerning carp in the last few years indicate that they may be adversely impacting the game fish population.

Objectives of this year's sampling were to determine the species composition, relative abundance, and size structure of the fish population in the pond. The objective of the poisoning effort was to selectively remove carp without significantly affecting gamefish.

Methods

The Bruneau Dunes south pond fishery was sampled in June 18, 2001 using a Peterson mark-recapture population estimate of gamefish and common carp on for the marking run and on June 25 for the recapture run. Both samples were taken during nighttime hours using a Smith-Root SR-18 electrofishing boat. Electrical settings for the marking run were 30 pulses per second, approximately 200 volts, and 10 amps of DC power. Electrical settings for the recapture run were 60 pulses per second, approximately 100 volts, and 10 amps of DC power. Population and variance estimates were based on the modified Petersen estimate without replacement on the recapture sample (Ricker 1958):

$$N = \{(M+1)(C+1) / (R+1)\} - 1$$

$$\text{Variance} = \{(M+1)(C+1)(M-R)(C-R)\} / \{(R+1)2(R+2)\}$$

Where:

M = Number of fish captured, marked then released in the initial sample
C = Number of fish captured in the second sample
R = Number of fish captured in the second sample that are recaptured marked fish belonging to the original marked sample, M.

The proportional stock density (PSD) was calculated from minimum lengths for stock and quality sizes of largemouth bass and bluegill as defined by Anderson and Gutreuter (1983).

The 2001-2006 Fisheries Management Plan calls for the control of common carp in the Bruneau Dunes State Park ponds. In an effort to comply with this edict, carp in the south pond were experimentally treated with rotenone by baiting them into four feeding areas then fed pelleted, rotenone-laced feed. The objective of this procedure was to administer rotenone only to common carp without significantly affecting other species. Each of the four prebaited feeding areas were made of ten 6.1 m long sections of floating 0.1 m PVC pipes joined together creating a 296 m^2 circle. These feeding pens were anchored at various locations around the lake likely to be inhabited by carp (Figure 1, Appendix A). Beginning on September 8, 2001, carp were baited daily into each of the four feeding pens by scattering 0.5-1.0 kg of pelleted non-toxic Common

co

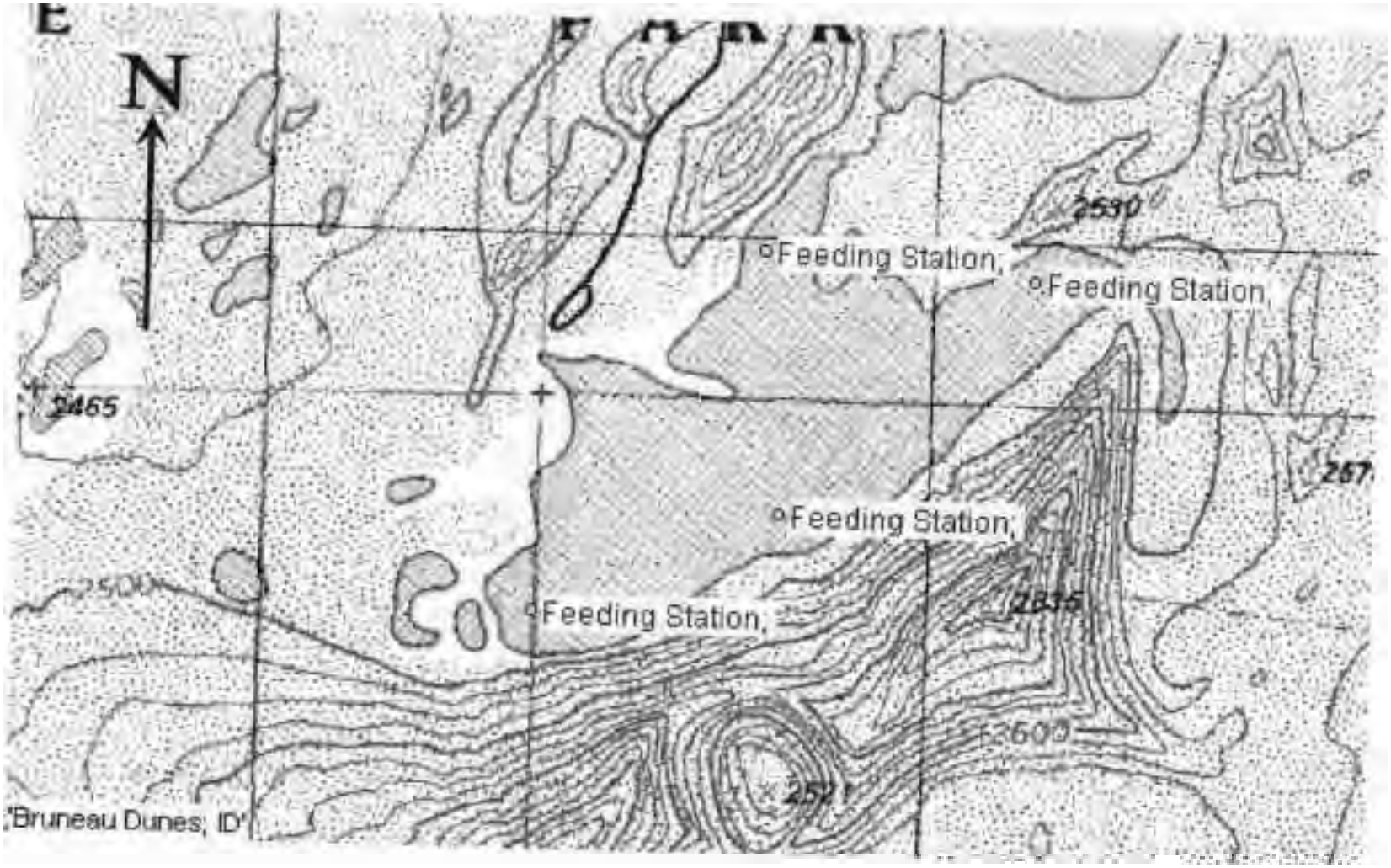

Figure 1. Map of the South Pond at Bruneau Dunes State Park denoting feeding locations for baiting and treating common carp with rotenone-laced pellets.

Carp Management Bait Trainer (Pentiss Incorporated, C.B. 2000, Floral Park, NY 11002-2000). On September 18 the pelleted feed was replaced with a rotenone-laced feed supplied by Pentiss Incorporated. The poisoned feed contained 2.64% rotenone and was fed at a rate of about one kilogram of feed per feeding pen.

Results

Total amount of time electrofished was 5,868 seconds for the marking run and 8,162 seconds for the recapture run. Specific conductivity was 1,340 µSiemens/cm. Fish species sampled include largemouth bass, bluegill, pumpkinseed *Lepomis gibbosus,* and common carp (Table 4). The bluegill and largemouth bass populations appear to have a bimodal length frequency distribution, a population estimate was therefore made on each of the two size classes of both species separately. The number of recaptured fish was low so either no population estimate was made for some size groups or the 95% confidence intervals were greater than 50% of the population estimate (Table 5). The proportional stock density (PSD) was 62 for largemouth bass and 15 for bluegill and pumpkinseed combined.

Results of feed training carp and subsequent feeding of rotenone-laced pellets appeared to have killed only one common carp.

Discussion

Total numbers of bluegill and pumpkinseed sampled and the overall size structure of the two species combined appear to be suitable for providing a good forage base for largemouth bass, but the PSD was too low for providing a quality fishery for anglers. No bluegill or pumpkinseed that reached 200 mm long were sampled. The PSD of largemouth bass in the sample was high enough to provide anglers a reasonable opportunity to catch fish at least 300 mm long, although none were sampled that approached the minimum length limit of 508 mm long.

The lack of success of the carp eradication project may be due to low water temperatures, which was 17.8°C-18.3°C when the feed training began on September 8, 2001, or due to the short time span during which carp were baited into the feeding areas. Future attempts to feed train carp in the Bruneau Dunes pond should begin when water temperatures are higher and training should continue for several contiguous weeks. Smaller pens would likely prove less vulnerable to wind and wave action.

Table 4. Total length frequencies and average weights of fish sampled by nighttime electrofishing on the Bruneau Dunes State Park south pond, June 18 and 25, 2001. Table does not include recaptured fish in the June 25 sample.

Total length (mm)	Bluegill			Pumpkinseed	Common carp		Largemouth bass		
	Number sampled	Average weight (g)	S.D. of weight[a]	Number sampled	Number sampled	Average weight (g)	Number sampled	Average weight (g)	S.D. of weight[a]
30	8								
40	75			1					
50	63			4					
60	65			3					
70	178			16			1		
80	146	10		24			1		
90	60			19			4		
100	40	27	5	27			3	33	26
110	99	29	2	36			4	22	
120	120	45	2	32			4		
130	80			11			10	33	2
140	80	72	2	9			10	41	1
150	68	91	13	7			16		
160	23	101	2	7			24		
170	18	127	4	1			18		
180	15	147	9				5	81	
190	4	162	10				10	91	9
200							3		
210							2		
220							3		
230							2		
240							5		
250							6		
260							18		

Table 4. Continued.

Total length (	Bluegill Number sampled	Bluegill Average weight (g)	Bluegill S.D. of weight[a]	Pumpkinseed Number sampled	Common carp Number sampled	Common carp Average weight (g)	Largemouth bass Number sampled	Largemouth bass Average weight (g)	Largemouth bass S.D. of weight[a]
							21		
							35	246	
							18	340	
							32		
							34	351	
							24		
							25	520	
							16	521	
							15	579	2
							14	600	
							9		
							5	710	
							2	965	49
					1				
							2	1,100	
							3	1,100	
							1	1,500	
							2	1,650	
							1	1,750	
					1				
					1				

Table 4. Continued.

Total length (mm)	Bluegill			Pumpkinseed	Common carp		Largemouth bass		
	Number sampled	Average weight (g)	S.D. of weight[a]	Number sampled	Number sampled	Average weight (g)	Number sampled	Average weight (g)	S.D. of weight[a]
530					1				
540					2				
550					1				
560					1				
570					1				
580					2				
590					2				
600					3				
610					2				
620									
630					3	3,400			
640					7				
650					2				
660					1				
670					1				
680					2				
690									
700									
710									
720					2	4,900			
730									
740					1				
750					1				
Total sampled:	1,142			197	38		408		

[a] Standard deviation of weight when sample size exceeds one.

Table 5. Results of the Peterson Mark-Recapture population estimates of fish sampled on the South Bruneau Dunes State Park Pond in June 2001.

Fish Species	Size class	M[a]	C[b]	R[c]	N_{est}[d]
Bluegill	< 100 mm	121	258	4	6,319 ± 4,904
Bluegill	100 mm	289	268	11	6,522 ± 3,394
Pumpkinseed	All sizes	75	125	3	No estimate
Largemouth bass	< 220 mm	39	81	0	No estimate
	220 mm	149	149	11	1,874 ± 938
Common carp	All sizes	25	13	0	No estimate

[a] Number of fish marked and released in first run.
[b] Number of fish caught during recapture run.
[c] Number of fish marked fish caught in recapture run.
[d] Population estimate +1-95% CI.

CAREY LAKE

Introduction

Carey Lake is a warmwater fishery located east of Carey, Idaho. It has approximately 214 ha of water with a maximum depth of 5.0 m when full, although most of the lake is less than one meter deep (IDFG 1999). The lake receives its water from several sources, most of it in the form of spring run-off from the Little Wood River. It also receives water from a hot spring located in the northeast section of the management area, which keeps 0.4 to 0.8 ha of the lake from freezing over during the winter. The fishery is managed as a warmwater fishery that has been stocked with approximately 13,000 fingerling sized channel catfish *Ictalurus punctatus* since 1996. There have been reports of partial fish kills during the winter and spring on intermittent years. These have been attributed to either low dissolved oxygen levels under the ice or a "turning over" of nutrients during the spring.

The objectives of sampling in 2001 were to determine the status of the fish population and success of previous channel catfish fingerling plants. Temperature and dissolved oxygen profiles were measured to determine the amount of useable fish habitat within the water column.

Methods

Carey Lake was sampled with two units of lowland lakes sampling protocols on May 31, 2001. Four separate sites were electrofished varying in effort from 128 seconds to 1,017 seconds for a total of 2,393 seconds. Four sinking gill nets and two trap nets were set overnight. The proportional stock density (PSD) was calculated from minimum lengths for stock and quality sizes of largemouth bass and bluegill as defined by Anderson and Gutreuter (1983).

Table 6. Fish sampled with four gill nets, two trap nets and 2,393 seconds of electrofishing at Carey Lake, May 2001.

	Bluegill						
Total length (mm)	Electrofishing	Sinking gill net	Trap net	Total sampled	Average weight (g)	S.D. of weight[a]	Relative Weight
40	1			1	2		
50	3			3	2	0	
60	3			3			
70	4			4	9	1	162
80	8			8	12	1	139
90	6			6	17	2	135
100	2	1		3	23	2	129
130	1			1	60		139
150	2			2	110	14	158
160	3			3	113	11	132
180	2			2	165	7	130
190	2			2	205	7	135
200	1			1	200		111
220	1			1	400		162
240	1			1	390		118
Total number sampled	40	1		41			

	Brown bullhead					
Total length	Electrofishing	Sinking gill net	Trap net	Total	Average	S.D. of weight[a]
90	1			1		
220	1			1		
230			1	1	180	
240	1				310	
250	1			1	310	
260		5		5	312	20
270		3	1	4	358	27
280		4	1	5	408	37
290	1	3	1	5	445	37
300	4	3	2	9	463	45
310	1	2	2	5	511	81
320	3	5	1	9	530	55
330	5	3		8	634	39
340	1	6	1	8	643	40
350	1	2	1	4	723	240
360		1		1	735	
Total number	20	37	11	68		

Daytime temperature and dissolved oxygen profiles were measured in situ at three locations using a Yellow Springs Instruments model 57 temperature/dissolved oxygen meter from a boat on May 31, 2001.

UTM locations of sites sampled with nets are given in Appendix A.

Results

The most abundant fish sampled following lowland lakes sampling protocols were bluegill, brown bullhead *Ameiurus nebulosus,* largemouth bass and yellow perch (Table 6). Other fish sampled include two pumpkinseed (70 mm and 90 mm) and two rainbow trout (270 mm and 290 mm). The proportional stock density for largemouth bass in the sample was 43 and 38 for bluegill. No channel catfish were sampled.

Daytime dissolved oxygen levels ranged from 3.6 to 5.9 mg/l and water temperatures ranged from 16°C to 26°C (Table 7).

Discussion

The lack of channel catfish in the sample may be an indication that the stocking program may need to be either adjusted to increase densities or discontinued. A review of the literature indicates that size of channel catfish at time of stocking is positively correlated to harvest and survival when largemouth bass are present (Storck and Newman 1988 and Shaner et al. 1996). The greatest cost:benefit ratio for size at stocking in the study by Shaner et at. (1996) occurred at 254 mm, and the minimum recommended size at stocking was 203 mm. In the same study, channel catfish stocking rates at 18 study lakes ranged up to 494 catfish/ha and averaged 175 catfish/ha, and total weight of stocked catfish ranged up to 134 kg/ha and averaged 22 kg/ha. Since harvest rates increased linearly with stocking density, an optimal stocking density did not exist in the study. Assuming 100% survival of stocked channel catfish in Carey Lake, if the overall population of fish averaged 0.23 kg, the average standing crop of channel catfish would be 15 kg/ha, which is lower than the average stocking rates in the study. Length of fish at time of stocking (76 mm to 152 mm) was also lower than recommended minimum sizes in both studies since largemouth bass are present.

Table 6. Continued.

Total length (mm)	Largemouth bass Electrofishing	Sinking gillnet	Trap net	Total sampled	Average weight (g)	S.D. of weight[a]	Relative Weight
120	1			1	24		115
140	5			5	37	3	109
150	7			7	46	4	108
160	1	1		2	58	2	111
170	9			9	68	3	107
180	1	3		4	89	3	117
190	1			1	100		111
210	1			1	135		109
220	1			1	140		97
240		1		1	200		105
260	3			3	255	18	104
270	11	1		12	280	33	101
280	17	4		21	311	23	100
290	19	2		21	337	10	97
300	10	1		11	386	28	100
310	6	2		8	451	27	105
320	3	1		4	485	51	102
330	3			3	523	30	100
340	7	1		8	515	30	89
350	6			6	598	46	94
360		2		2	640	70	92
390	1			1	830		93
410	1			1	800		76
430	1			1	1,200		98
Total number	115	19	0	134			

Total length (mm)	Yellow perch Electrofishing	Sinking gill net	Trap net	Total	Average	S.D. of weight[a]
80	4			4	6	1
90					6	
110	3			3	15	1
120	2			2	22	3
130	2			2	29	1
140		2		3	38	2
150	7			7	45	5
160	3			3	49	1
170		1		2	68	3
180	2			2	80	
190	2			2	91	9
200	5			5	118	18
210					140	
220		3		3	172	12
230	6	4		10	195	23
240	6	5	1	12	212	18
250	2	3		5	238	11
260	2	1		3	249	24
270	1				320	
280		1		1	340	
290	1	3		4	356	11
Total number	52	23	1	76		

[a] Standard deviation of weight when sample size exceeds one.

Table 7. Temperature and dissolved oxygen profiles measured at three locations on the north half of Carey Lake, May 31, 2001.

Depth (m)	South Side		Near Springs on East Side		West Side	
	Temp (°C)	DO_2 (mg/l)	Temp (°C)	DO_2 (mg/l)	Temp (°C)	DO_2 (mg/l)
Surface	22	4.7	26	3.6	22	4.7
0.5	20	5.2	22	5.1	22	5.1
0.75 (B)	20	5.3				
1.0 (B)			21	5.3		
1.0					20	5.9
1.5					18	5.7
2.0					17	5.7
2.5					16	5.9
3.0 (B)					16	4.8

MAGIC RESERVOIR

Introduction

Magic Reservoir has approximately 1,528 ha of water when full but has been drawn down to less than 61 ha, which has resulted in partial fish kills and entrainment through the outlet in the past. The reservoir provides a year-round fishery for rainbow trout, brown trout *Salmo trutta* and yellow perch with smallmouth bass caught on occasion. Most of the rainbow trout are of hatchery origin, some are of wild origin, and all of the brown trout are of wild origin. Most of the wild trout originate from the Big Wood River where spawning occurs. Objectives this year were to continue monitoring the annual brown trout spawning with redd counts and use electrofishing to determine the feasibility of relocating fish to another water and to measure temperature and dissolved oxygen profiles to determine the amount of useable fish habitat as the reservoir dropped in volume. We also were concerned that low water combined with poor water quality conditions could result in a fish kill.

Methods

Redds were counted on the Big Wood River upstream of Magic Reservoir to monitor spawning activities of brown trout. The stream segment surveyed on November 16, 2001 included the reach from the mouth of Rock Creek upstream to the outflow of a private pond on the east side of the Big Wood River approximately 1.5 km upstream of the Stanton Crossing bridge. Redds were counted by visually identifying them as we walked upstream through the reach.

The reservoir was electrofished with the Smith-Root SR-18 electrofishing boat on June 21. Total time electrofished was 1,543 seconds (power on) with 8 amps at 60 cycles per second and with 6 amps at 30 cycles per second.

Daytime temperature and dissolved oxygen measurements were made at two locations on June 14, June 21 and July 12, 2001. Measurements were made in situ using a Yellow Springs Instruments model 57 temperature/dissolved oxygen meter from a boat. Zooplankton ratio estimates were made based on methods described by Teuscher (1999). The UTM locations of sample sites are given in Appendix A.

Results

A total of 111 brown trout redds were counted during the spawning ground surveys in November (Table 8). A total of 62 fish were sampled by electrofishing during the transplant operation. Species include bridgelip sucker *Catostomus columbianus,* brown trout, rainbow trout, redside shiner *Richardsonius balteatus,* smallmouth bass and yellow perch (Table 9). No fish were relocated from the reservoir due to the low numbers of fish sampled.

Water temperatures and dissolved oxygen profiles are given in Table 10. Results of zooplankton monitoring are reported in the Regional Zooplankton Surveys section in this report.

Discussion

Water temperatures remained within tolerable ranges for rainbow trout until July 12, 2001, when they reached or exceeded 20°C at all depths. Dissolved oxygen levels remained at reasonable levels, exceeding 6 mg/l throughout most of the water column on that date. Water levels were not dropped to their lowest possible levels, and a fish kill was never observed in the reservoir, although numerous fish were killed downstream of the reservoir in the Big Wood River canyon after flows were shut off from Magic Dam in July.

MORMON RESERVOIR

Introduction

Mormon Reservoir covers 1,093 ha when full with a capacity to hold 0.026 km^3 of water for an average depth of 2.4 m. The eutrophic status of Mormon Reservoir is attributed to its shallow characteristics and its propensity to retain nutrients. This has resulted in a dense stand of water smartweed *Polygonum sp.* and other macrophytes over a significant proportion of its surface area. The reservoir is managed as an irrigation impoundment releasing water only on demand from the water rights holders. Demands for water have approached total reservoir storage capacity several times over the past decade resulting in a shallow pool to carry fish through the winter. The fishery is managed for rainbow trout and yellow perch with a two trout daily bag limit. Concerns about the survivability of the fish through the winter were the impetus for sampling the fishery in 2001.