

2010 Fisheries Surveys on the Rosebud Indian Reservation

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INTRODUCTION

Rosebud Indian Reservation lies in south central South Dakota in Todd County. The Rosebud Sioux Tribe additionally has extensive lands and populations in Gregory, Lyman, Mellette, and Tripp counties all in South Dakota. The Reservation in Todd County has a land area of 1,388 mi² and a population of 9,050 in the 2000 census. Total Tribal land area in all five counties is 1,970 mi². The terrain consists of rolling grassland prairie dissected by streams forming deep canyons. Ponderosa pine covered canyons, spring fed streams, and broad expanses of mixed grass prairie across the prairie. The area is semi-arid with temperatures that range from 100 °F in the summer to -30 °F during the winter (Bernhard and Yarger 1975). The growing season averages 130 days and average rainfall is 16 inches. Primary land use in the area is for livestock grazing with some dry land farming.

The Rosebud Indian Reservation has two primary drainage systems including the Little White River, which bisects the Reservation flowing south to north and the Keya Paha River headwaters, which originates within the Reservation and drains to the southeast. Most streams are low gradient, silt laden, and generally unsuitable for game fish. However, these streams contain numerous native cyprinid and catostomid species.

Since 1951, the fish management program had been a cooperative effort involving the U.S. Fish and Wildlife Service, The Rosebud Sioux Tribe, and Bureau of Indian Affairs (Haines 1981). Currently, most game fish populations are found in reservoirs scattered across the reservation (Figure 1) with a majority of them within the Little White River basin. Fish management on the Rosebud Indian Reservation was intensive from the 1950's until early 1990's. During that time fish management activities consisted primarily of stocking fish, conducting fish population surveys, collecting baseline data for developing a fish management plan, and conducting workshops in fish management techniques (Haines 1981).

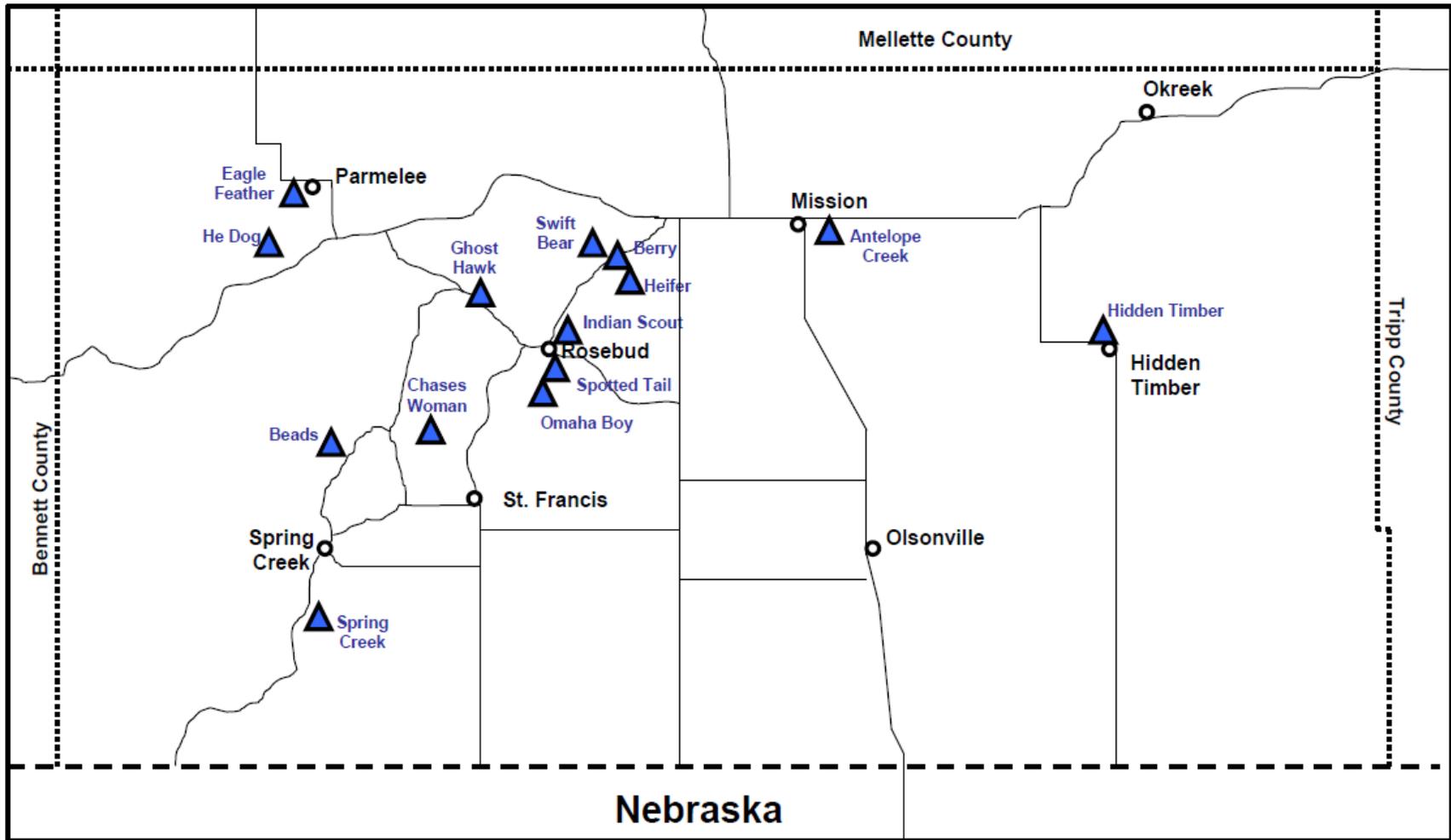


Figure 1. Map of the Rosebud Indian Reservation identifying reservoirs managed for fishery recreation.

METHODS

Data collection

Night time electrofishing was conducted on 8 June 2010 in Beads, Chases Woman, and Rosebud (Spotted-Tail) reservoirs and 9 June 2010 in Antelope Creek and Eagle Feather reservoirs with a Smith and Root 5.0 GPP electrofishing system using pulsed DC, 5-6 amps, and a pulse frequency of 60 cycles per second (cps). Electrofishing was conducted along the entire length of the shoreline for the smaller reservoirs (≤ 8 acres; Chases Woman and Rosebud reservoirs) and in 15 minute transects along the shoreline for the larger reservoirs. All fish captured were measured to total length (TL; mm) and five fish per centimeter length group were weighed (g) at each reservoir.

A list of common names, scientific names, and abbreviations for fish mentioned in this report is presented in Appendix A.

Water quality parameters measured at each reservoir are presented in Table 1.

Table 1. Rosebud Indian Reservation surface water quality parameters.

Date	Time (military)	Depth (m)	Water temp. (°C)	D.O. (mg/L)	Secchi depth (cm)	pH	Salinity (ppt)	Pheno. alkalinity (mg/L)	Total alkalinity (mg/L)	Cond. (μ S/cm)	Specific cond. (μ S/cm)
Antelope Creek Reservoir											
9 June 2010	0120		21.0	9.4		8.7		0	188	441	
Beads Reservoir											
8 June 2010	0230		21.3	15.7		9.0		0	103	241	
Chases Woman Reservoir											
8 June 2010	2340		21.3	11.4		8.8		0	154	236	
Eagle Feather Reservoir											
9 June 2010	2040		21.8	13.4		9.1				371	
Rosebud (Spotted Tail) Reservoir											
8 June 2010	2030		21.4	12.5		8.7		0	137	324	

Data analysis

Relative abundance of fish species were expressed as mean catch per unit effort (CPUE) as fish/hr for electrofishing. Proportional size distribution (PSD; Anderson 1976) and relative size distribution (RSD; Gabelhouse 1984) were calculated for largemouth bass, bluegill, black crappie, pumpkinseed, and yellow perch. Length categories used to calculate PSD and RSD for each fish species is presented in Appendix B. Relative weights (W_r ; Wege and Anderson 1978) were calculated using a standard weight (W_s) equation for each fish species and summarized in Appendix C. A glossary of fishery terms and data analysis is summarized in Appendix D. Fish stocking history for Rosebud Indian Reservation reservoirs is presented in Appendix E.

ANTELOPE CREEK RESERVOIR

Introduction

Antelope Creek Reservoir (T38N, R28W, NE sec. 3) (Figure 2) is located on Antelope Creek, which forms the headwaters of the Keya Paha River. The reservoir is located immediately adjacent on the southeast corner to the city of Antelope near Mission, South Dakota. In 1951, The reservoir was 151.2 acres and had a maximum depth of 27 ft (Mack 1989) but was described as 136 acres with a maximum depth of 25 ft in 1982 (Goudreault 1982). Siltation has likely substantially decreased the depth of the reservoir since then. The major water quality concerns for Antelope Creek Reservoir is nutrient enrichment from seepage and overflow from nearby sewage lagoons. The area has sandy soils and a shallow water table, which allows for rapid seepage. Nutrients from sewage and runoff have created a highly eutrophic lake increasing vegetation and algae growth (Goudreault 1982).

Antelope Creek Reservoir has a long history of fisheries management beginning in 1951. Those first surveys found black bullhead, black crappie, common carp, creek chubs, golden shiners, green sunfish, and largemouth bass. Throughout the 1950's, fingerling largemouth bass was the only species stocked. In 1959, the lake was renovated twice as common carp and channel catfish were detected following the first renovation. From 1960 to 1990 the reservoir was stocked with channel catfish, largemouth bass, northern pike, and walleye. Additionally, 6,000 muskellunge were stocked in 1987. The reservoir was surveyed with electrofishing, gill nets, and/or trap nets nearly every year from 1960 to 1993 with the largest gap of four years between surveys during that time. Since the 1950's during these surveys, black bullhead, black crappie, bluegill, common carp, golden shiners, largemouth bass, northern pike, and yellow perch were consistently sampled. Occasionally, white suckers were collected (Mack 1989). Walleye were nearly never captured during the surveys indicating that survival may have been low for this species in Antelope Creek Reservoir. The most recent fish survey was conducted in July 1991 (Table 2)

Table 2. Historical fishery data for Antelope Creek Reservoir. Mean catch per unit effort (CPUE) for fish \geq stock length, mean relative weights (*Wr*), proportional and relative size distribution (PSD and RSD) data from July 1991 fishery assessment. Mean CPUE calculated as fish/hr for electrofishing and fish/net night for gill and trap nets. Mean *Wr*, PSD, and RSD-P was calculated for fish collected in all three gears.

Species	N	Electrofishing mean CPUE	Gill net mean CPUE	Trap net mean CPUE	Mean <i>Wr</i>	PSD	RSD-P
Black bullhead	6	?	?	?	73	73	0
Black crappie	43	?	?	?	90	53	3
Bluegill	47	?	?	?	100	94	4
Common carp	21	?	?	?	84	95	86
Golden shiner	7	?	?	?			
Largemouth bass	3	?	?	?	124	100	100
Northern pike	16	?	?	?	92	86	21
Yellow perch	17	?	?	?	93	42	0



Figure 2. Antelope Creek Reservoir on the Rosebud Indian Reservation. White line indicates electrofishing transect conducted during June 2010. Aerial image from www.bing.com/maps.

Results and Discussion

Antelope Creek Reservoir was sampled by night-time electrofishing on 9 June 2010 in three 15-min transects. Nearly two thirds of the shoreline was sampled during the survey (Figure 2).

Black bullhead

No bullheads were collected in 2010. Six black bullheads were collected during surveys in 1991, most likely in gill nets or trap nets (Table 2). Black bullheads are likely still present in Antelope Creek Reservoir, but in low abundances.

Black crappie

In 2010, most black crappie sampled in Antelope Creek Reservoir were of stock to quality length with few fish > 200 mm (Figure 3). Proportional size distribution has decreased to 17 in 2010 since the last survey conducted in 1991 where PSD = 53. Preferred length black crappies continue to be mostly absent in this reservoir. Mean relative weights (Wr) of black crappie were normal indicating an adequate supply prey within the reservoir (Table 3). Mean Wr was similar to mean Wr found in the black crappie population during the surveys in 1991 (Table 2). Additionally, mean Wr was similar to those found in Kyle Reservoir on the Pine Ridge Indian Reservation (Wanner and Goodman 2010) and substantially higher than those found in Eagle Feather Reservoir (Table 10).

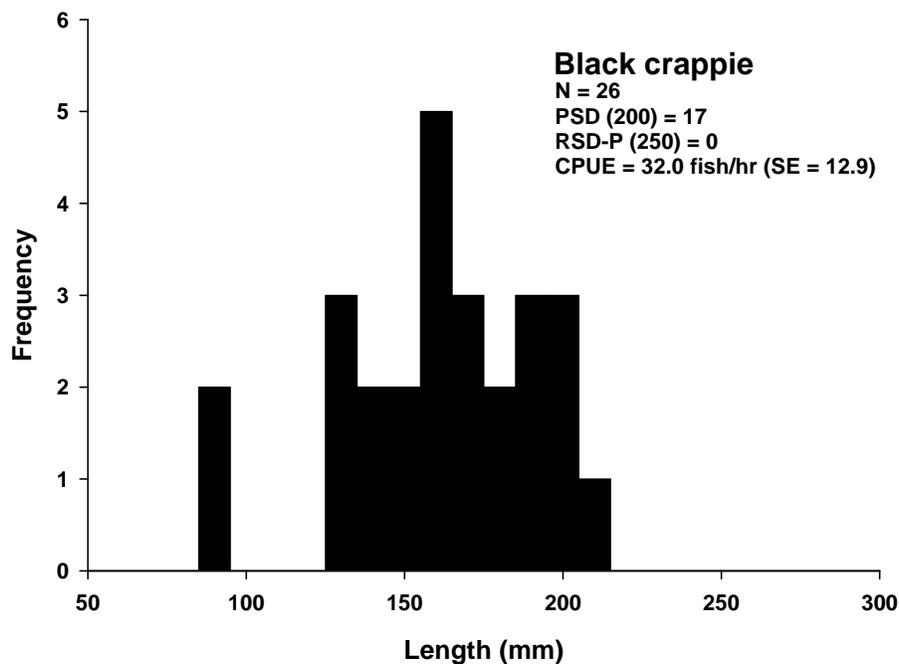


Figure 3. Length frequency distribution (10-mm length groups) for black crappie captured by electrofishing in Antelope Creek Reservoir in 2010. Black crappie proportional size distribution (PSD; ≥ 200 mm) and relative size distribution (RSD) of preferred length (≥ 250 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for black crappie \geq stock length (130 mm) only.

Table 3. Black crappie mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Antelope Creek Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	91 (2)	94 (2)	78 (2)	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Bluegill

The bluegill population in Antelope Creek Reservoir is dominated by stock to quality length fish with a few quality length fish for a PSD = 21, and no preferred length fish (Figure 4). This is a substantial decrease in the size structure as PSD = 94 in 1991 with few preferred length (≥ 200 mm) fish found then (Table 2). Mean CPUE (77.3 fish/hr; SE = 28.9) was relatively low compared to Beads, Eagle Feather, and Rosebud reservoirs. However, mean W_r was high indicating an abundance of prey for bluegill in Antelope Creek Reservoir (Table 4) and is similar to the mean W_r found in 1991 (Table 2).

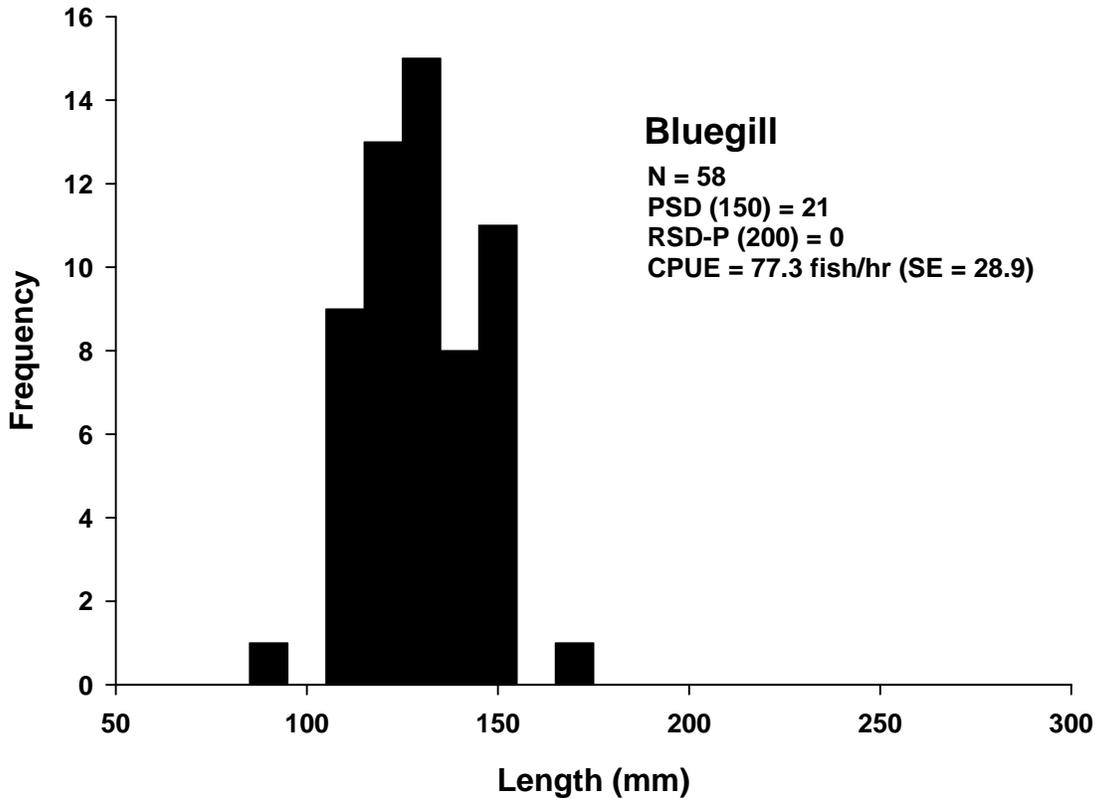


Figure 4. Length frequency distribution (10-mm length groups) for bluegill captured by electrofishing in Antelope Creek Reservoir in 2010. Bluegill proportional size distribution (PSD; ≥ 150 mm) and relative size distribution (RSD) of preferred length (≥ 200 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for bluegill \geq stock length (80 mm) only.

Table 4. Bluegill mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Antelope Creek Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	103 (1)	105 (1)	95 (3)	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Common carp

Common carp appeared to be in high abundance with a mean CPUE of 21.3 fish/hr (SE = 4.8) with the population dominated by preferred length (≥ 530 mm) fish (Figure 5), similar to the population found in 1991. The population is dominated by a high abundance of large fish and likely has highly variable recruitment. Common carp are likely reducing the water quality by mobilizing nutrients and increasing turbidity; therefore, increasing phytoplankton biomass and reducing zooplankton biomass and rooted aquatic vegetation (Lougheed et al. 1998).

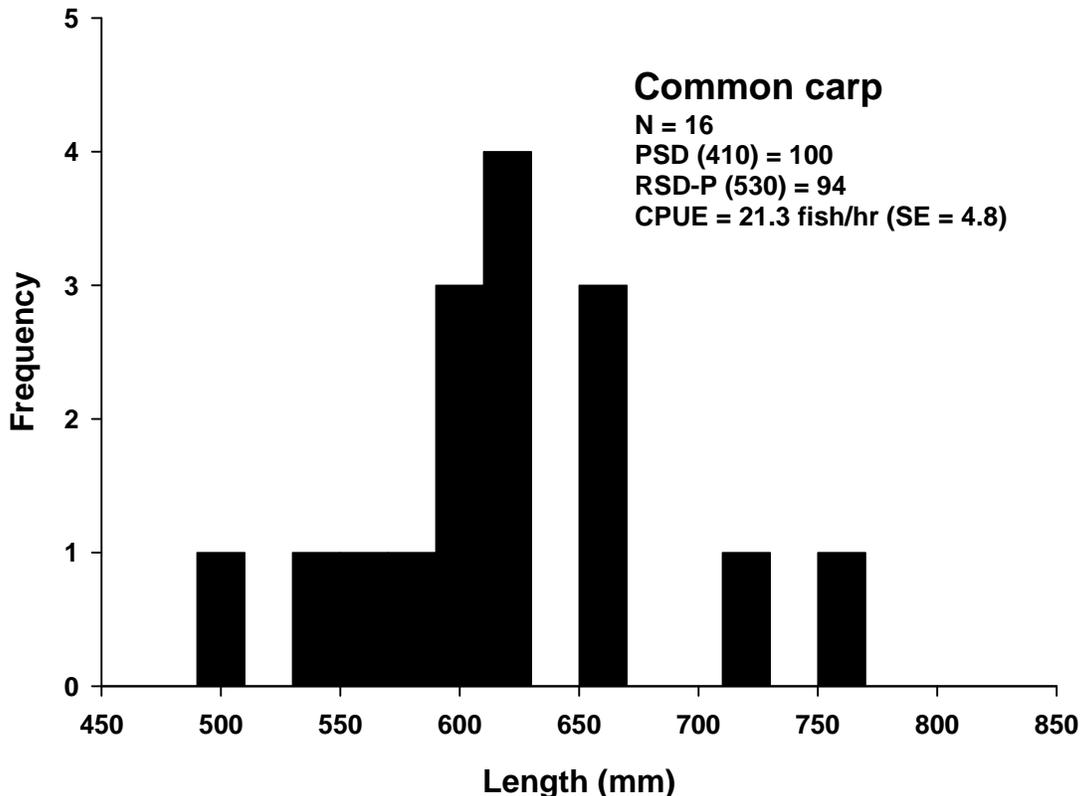


Figure 5. Length frequency distribution (20-mm length groups) for common carp captured by electrofishing in Antelope Creek Reservoir in 2010. Common carp proportional size distribution (PSD; ≥ 410 mm) and relative size distribution (RSD) of preferred length (≥ 530 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for common carp \geq stock length (280 mm) only.

Freshwater drum

Two freshwater drum (435 and 440 mm) were captured while electrofishing Antelope Creek Reservoir in 2010.

Golden shiner

Two golden shiners (120 and 125 mm) were captured while electrofishing Antelope Creek Reservoir in 2010 providing an additional prey source for predators.

Largemouth bass

Seven largemouth bass (150 - 465 mm) were collected while electrofishing Antelope Creek Reservoir in 2010. Mean W_r was high indicating adequate prey available for largemouth bass (Table 5). Few, large fish were also collected in the 1991 survey (Table 2). The largemouth population in Antelope Creek Reservoir likely has low spawning success and/or recruitment. The silted in reservoir may only provide marginal spawning habitat and low nursery habitat is available due to the lack of submergent vegetation

Table 5. Largemouth bass mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Antelope Creek Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	108 (5)	103 (7)	b	106 (9)	

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Northern pike

One northern pike (585 mm) was collected while electrofishing Antelope Creek Reservoir in 2010. Although, electrofishing is not the preferred gear for sampling northern pike, there is evidence that the population has few, large fish in the reservoir. This is similar to what was found in the 1991 surveys (Table 2).

Yellow perch

Of the five reservoirs surveyed on Rosebud Indian Reservation in 2010, Antelope Creek Reservoir had the highest density of yellow perch with a mean CPUE = 10.7 fish/hr (SE = 10.7). However, most fish collected were of sub-stock length (Figure 6). Additionally, mean W_r = 80 (SE = 2) was low (Table 6) compared to the 1991 survey (Table 2), to reservoirs on Pine Ridge

Indian Reservation (Wanner and Goodman 2010), and Sandhill lakes on the Valentine National Wildlife Refuge (Wanner 2010) located less than 40 miles south of Rosebud Indian Reservation.

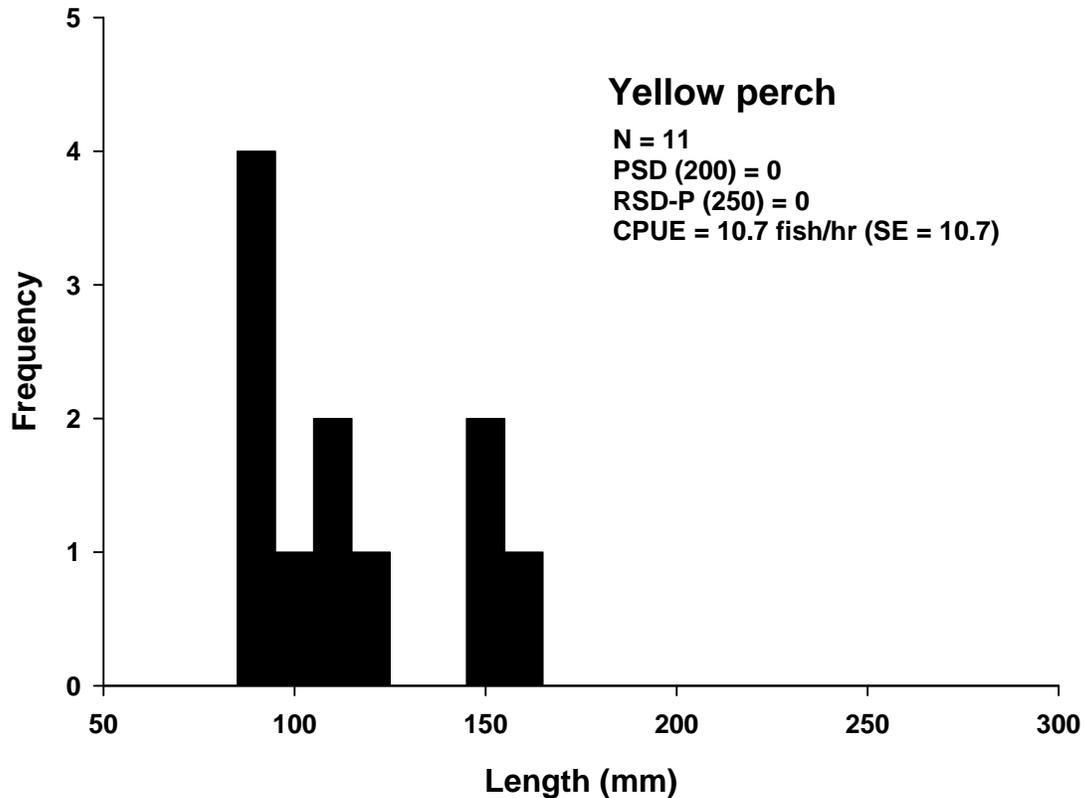


Figure 6. Length frequency distribution (10-mm length groups) for yellow perch captured by electrofishing in Antelope Creek Reservoir in 2010. Yellow perch proportional size distribution (PSD; ≥ 200 mm) and relative size distribution (RSD) of preferred length (≥ 250 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for yellow perch \geq stock length (130 mm) only.

Table 6. Yellow perch mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Antelope Creek Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	80 (2)	82 (5)	b	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

BEADS RESERVOIR

Introduction

Beads Reservoir (T37N, R31W, NW sec. 8) is located in a canyon (Figure 7) approximately two miles west of the Little White River off BIA Highway 5 between the cities of Rosebud and St. Francis. The lake has 42 surface acres with a maximum depth of 33 ft.

Fisheries management on Beads Reservoir has been extensive beginning in the 1950's. The original survey in 1951 (unknown gear used) found black bullhead, black crappie, bluegill, green sunfish, largemouth bass, and pumpkinseed. Only one stocking of fingerling largemouth bass occurred in 1951 until channel catfish were stocked in 1987 through 1989 and largemouth bass were again stocked in 1989. Additionally, brook trout were stocked in 1988. Throughout the 1960's and 1970's, Beads Reservoir was the primary fishing location on the Reservation for largemouth bass, black crappie, and pumpkinseed (Haines 1981). In 1979, the dam structure was washed out during a severe storm and the next fishery survey was conducted in 1982. Since the 1950's, fish species found with electrofishing, gill nets, and trap nets include black bullhead, black crappie, bluegill, channel catfish, largemouth bass, northern pike, pumpkinseed, and yellow perch. The most recent fish survey conducted on Beads Reservoir was in June 1992 (Table 7).

Table 7. Historical fishery data for Beads Reservoir. Mean catch per unit effort (CPUE) for fish \geq stock length, mean relative weights (*Wr*), proportional and relative size distribution (PSD and RSD) data from June 1992 fishery assessment. Mean CPUE calculated as fish/hr for electrofishing and fish/net night for gill and trap nets. Mean *Wr*, PSD, and RSD-P was calculated for fish collected in all three gears.

Species	N	Electrofishing mean CPUE	Gill net mean CPUE	Trap net mean CPUE	Mean <i>Wr</i>	PSD	RSD-P
Black bullhead	9			2.2 fish/net		0	0
Black crappie	75			18.8 fish/net		0	0
Bluegill	640	358.3 fish/hr		53.8 fish/net		7	0
Channel catfish	1				90	100	0
Largemouth bass	39	32.5 fish/hr				30	15
Pumpkinseed	316	127.5 fish/hr		40.8 fish/net		27	0
Yellow perch	1				118	100	0



Figure 7. Beads Reservoir on the Rosebud Indian Reservation. White line indicates electrofishing transect conducted during June 2010. Aerial image from www.bing.com/maps.

Results and Discussion

Beads Reservoir was sampled by night-time electrofishing on 8 June 2010 in two 15-min transects. Approximately half of the shoreline was sampled (Figure 7).

Black crappie

Surprisingly, no black crappie were found in the electrofishing surveys in 2010, while 75 fish were collected in trap nets in 1992 (Table 7). The stocking of 15,000 fingerling black crappie in 2009 initially appears to be unsuccessful. Either black crappies are at such low abundance that they were not detected or they have been extirpated from this reservoir.

Bluegill

The highest abundance of stock length (≥ 80 mm) bluegill on Rosebud Indian Reservation was found in Beads Reservoir with a mean CPUE = 310 fish/hr (SE = 50) in 2010. Most fish in the bluegill population were stock to quality and quality to preferred length fish (Figure 8). Bluegill mean $W_r = 97$ (SE = 2) (Table 8) indicated adequate supplies of prey and were similar to bluegill relative weights in other populations across the Reservation. Beads Reservoir continues to be a premiere fishery for panfish as the abundance of both bluegills and pumpkinseeds remains high since the surveys conducted in 1992 (Table 7).

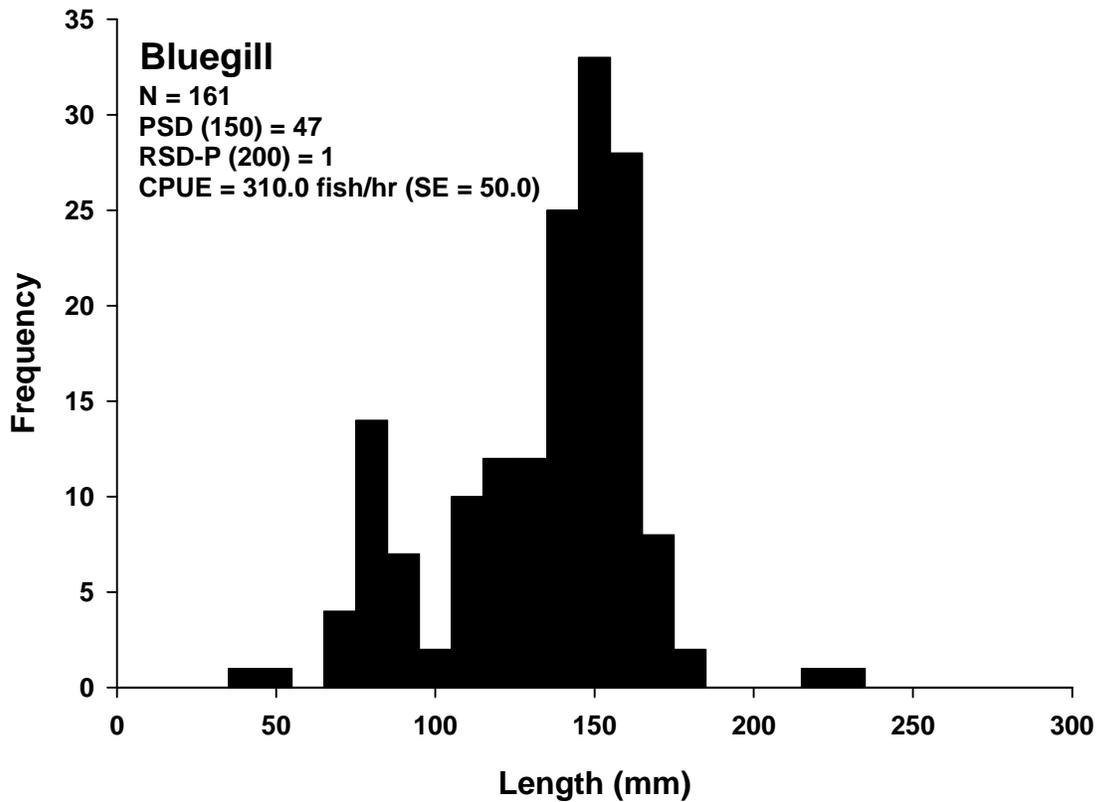


Figure 8. Length frequency distribution (10-mm length groups) for bluegill captured by electrofishing in Beads Reservoir in 2010. Bluegill proportional size distribution (PSD; ≥ 150 mm) and relative size distribution (RSD) of preferred length (≥ 200 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for bluegill \geq stock length (80 mm) only.

Table 8. Bluegill mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Beads Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	97 (2)	100 (3)	90 (2)	109 (5)	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Largemouth bass

The largemouth bass population in Beads Reservoir had multiple year classes evident based on lengths (Figure 9). Mean CPUE (46 fish/hr; SE = 22) was average compared to the other reservoirs surveyed on the Reservation. The overall largemouth bass mean W_r was low compared to the other reservoirs on the Reservation (Table 9). However, it appears that the larger fish have normal relative weights while the smaller fish are likely competing with bluegill and pumpkinseed for available prey resources. As with bluegill, the largemouth population has remained similar in terms of abundance and size structure of the bass population surveyed in 1992 (Table 7).

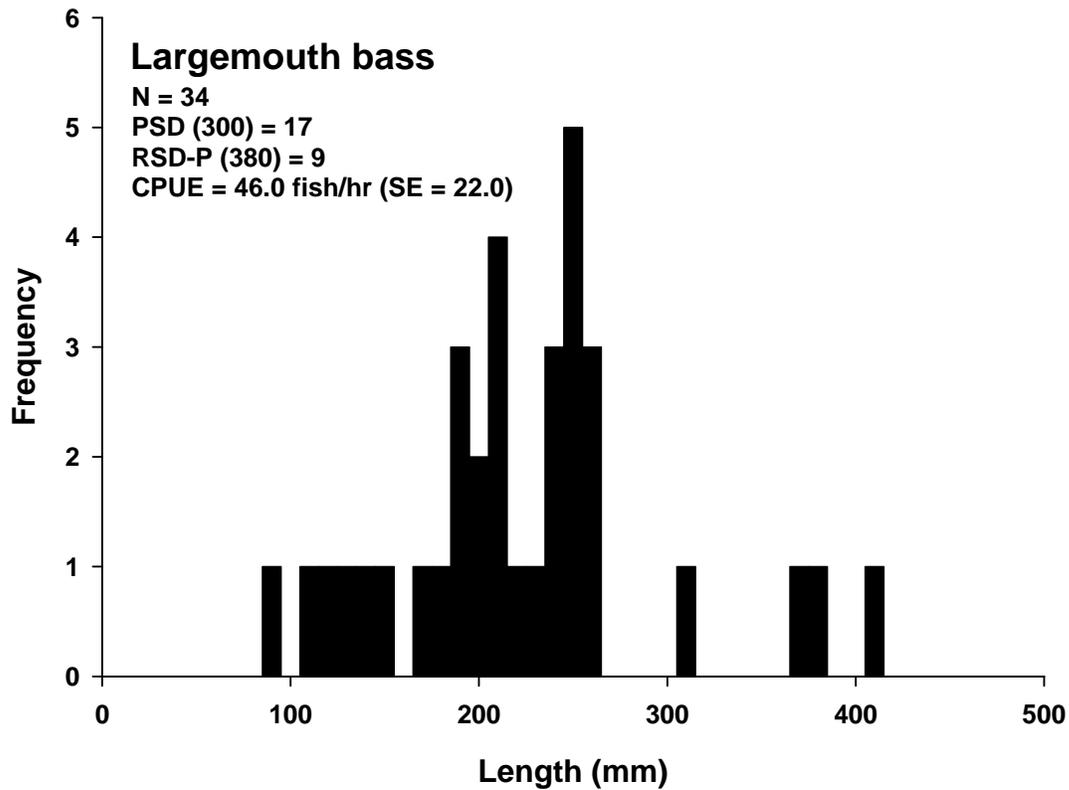


Figure 9. Length frequency distribution (10-mm length groups) for largemouth bass captured by electrofishing in Beads Reservoir in 2010. Largemouth bass proportional size distribution (PSD; ≥ 300 mm) and relative size distribution (RSD) of preferred length (≥ 380 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for largemouth bass \geq stock length (200 mm) only.

Table 9. Largemouth bass mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Beads Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	87 (2)	84 (2)	90 (12)	95 (18)	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Pumpkinseed

The highest density of pumpkinseed on the Rosebud Indian Reservation were found in Beads Reservoir with a mean CPUE of 50 fish/hr (SE = 26.0). The relative abundance of pumpkinseed has declined by over 60% since the surveys conducted in 1992 (Table 7). Nearly the entire population was quality to preferred length (Figure 10) with high relative weights (Table 10) similar to the population found in 1992 (Table 7).

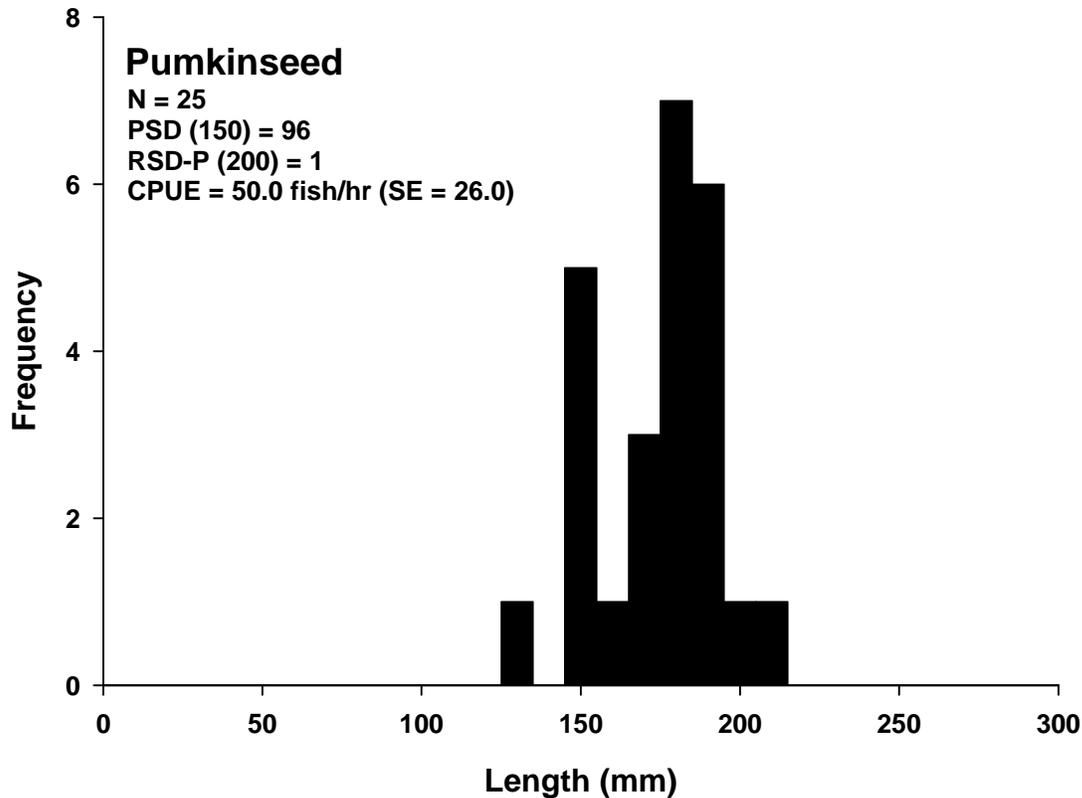


Figure 10. Length frequency distribution (10-mm length groups) for pumpkinseed captured by electrofishing in Beads Reservoir in 2010. Pumpkinseed proportional size distribution (PSD; ≥ 150 mm) and relative size distribution (RSD) of preferred length (≥ 200 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for bluegill \geq stock length (80 mm) only.

Table 10. Pumpkinseed mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Beads Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	101 (2)	b	100 (2)	104 (5)	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Walleye

No walleye were collected during the 2010 electrofishing surveys. 3,500 walleye were stocked in 2009 and 4,200 were stocked in 2010. Currently, there is no evidence that the 2009 stocking was successful. However, further evaluation is needed to conclude if stocking should continue.

Yellow perch

The yellow perch population remains an insignificant fishery as only two yellow perch (95 and 230 mm) were collected by electrofishing in Beads Reservoir in 2010 and only one fish was collected in 1992 (Table 7). 21,000 fingerling yellow perch were stocked in Beads Reservoir in 2010. Continued monitoring of the perch population will be necessary to investigate the success of this stocking attempt in Beads Reservoir.

CHASES WOMAN RESERVOIR

Introduction

Chases Woman Reservoir (T37, R31, SW sec. 11) is located in a canyon approximately one mile east of the Little White River off BIA Highway 5 between the cities of Rosebud and St. Francis. The lake has a surface area of 8 acres and a maximum depth of 19 ft (Figure 11). The dam structure was completed in 1964.

Fish management in Chases Woman Reservoir began shortly after completion of the construction of the dam with 2,000 rainbow trout and 1,000 brown trout stocked in 1965. Rainbow trout were consistently stocked nearly on an annual basis since the initial stocking until 1990. Additionally, cutthroat trout were stocked in 1986. The dam structure was washed out in 1979 during the same severe storm that washed out the dam structure at Beads Reservoir. Fish management in Chases Woman Reservoir resumed in 1983. Fish species collected during electrofishing, gill net, and trap net sampling included black bullhead, golden shiner, rainbow trout, white sucker, and yellow perch. The most recent survey on Chases Woman Reservoir was conducted in 1987 with electrofishing. Nearly 99% of the fish collected during that survey were yellow perch followed by golden shiners, and rainbow trout.

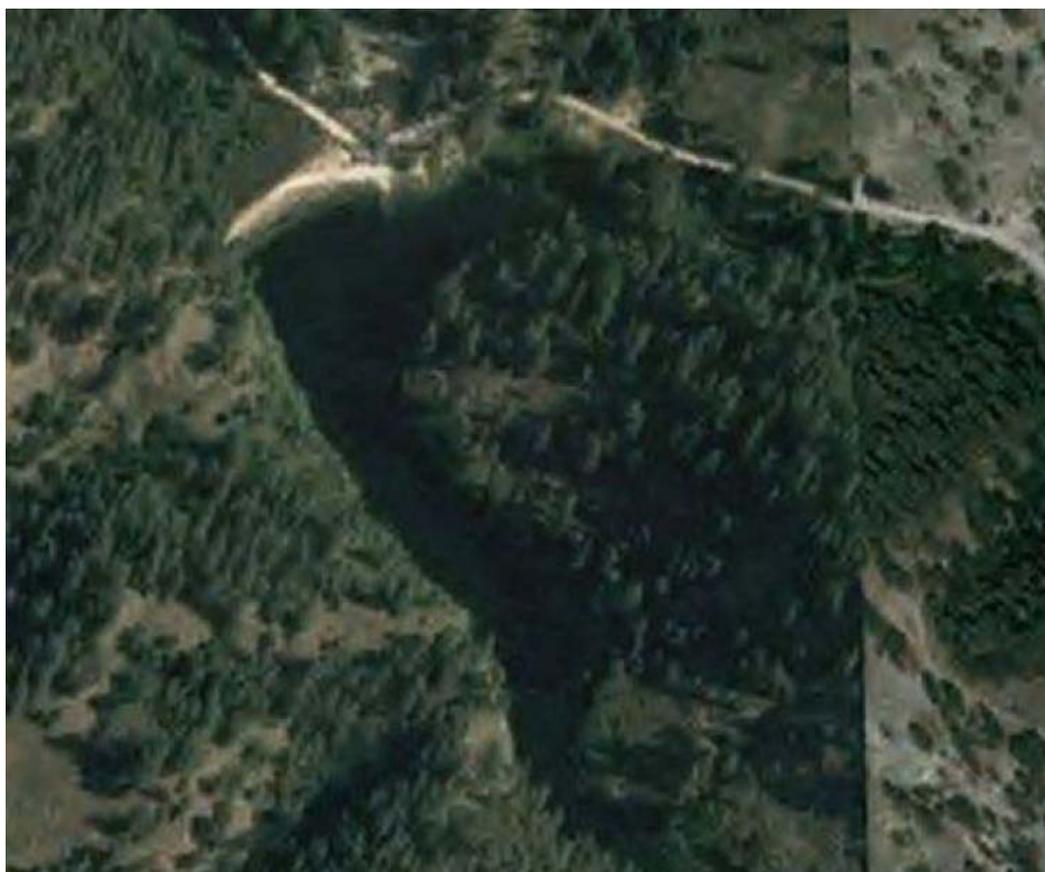


Figure 11. Chases Woman Reservoir on the Rosebud Indian Reservation. Aerial image from www.bing.com/maps.

Results and Discussion

Black crappie

One black crappie (72 mm) was collected while electrofishing Chases Woman Reservoir in 2010. This fish was likely part of the stocking that occurred in 2009 (N = 1,500)

Largemouth bass

Chases Woman Reservoir had the highest abundance (Mean CPUE = 359 fish/hr) of stock length (≥ 200 mm) largemouth bass compared to the other Reservation reservoirs surveyed in 2010. However, the population was dominated by stock to quality length fish and no fish were > 280 mm (Figure 12). The high density of “small” largemouth bass is likely controlling and possibly eliminating other fish species in Chases Woman Reservoir. This population does not appear to be stunted as mean $W_r = 103$ (SE = 2) indicates an abundance of prey (Table 11).

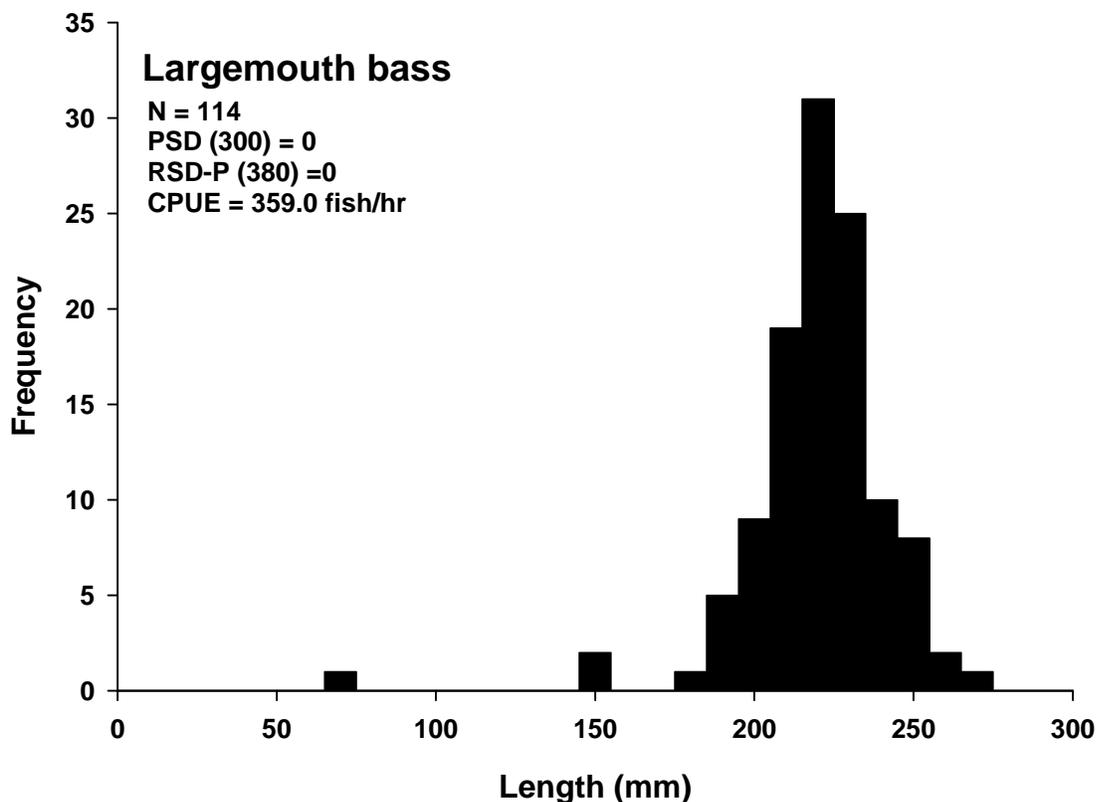


Figure 12. Length frequency distribution (10-mm length groups) for largemouth bass captured by electrofishing in Chases Woman Reservoir in 2010. Largemouth bass proportional size distribution (PSD; ≥ 300 mm) and relative size distribution (RSD) of preferred length (≥ 380 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for largemouth bass \geq stock length (200 mm) only.

Table 11. Largemouth bass mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Chases Woman Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	103 (2)	102 (2)	b	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Northern pike

One northern pike (530 mm) was collected while electrofishing Chases Woman Reservoir in 2010.

Yellow perch

In 1992, the fishery in Chases Woman Reservoir was dominated by a stunted yellow perch population. However, none were collected in the electrofishing surveys in 2010 indicating that the population is at such low abundances that they were not detected or have become extirpated from the reservoir.

EAGLE FEATHER RESERVOIR

Introduction

Eagle Feather Reservoir (T39N, R31W, NW sec. 16) is located 0.5 miles west of the community of Parmelee and receives considerable fishing pressure due to its location. It has a 44.5 surface acres and has a maximum depth of 24 ft (Goudreault 1982). Eagle Feather Reservoir is on Cutmeat Creek, which drains over 40 mi² (approximately 25,000 acres) of pasture land. The creek flows through the communities of Upper Cutmeat, He Dog, and Pamalee. The flow is regulated by White Horse and He Dog dams upstream of Eagle Feather Reservoir. The creek and reservoirs are used extensively to water livestock (Goudreault 1982). Excess nutrients from the nearby community produce excessive aquatic vegetation growth along with the possibility of a severe winter kills of the fish population (Goudreault 1982).

In 1953, the reservoir was completely drained. Information regarding fish stocking during the 1950's is limited; however, during a fish survey in 1968, black bullhead, bluegill, green sunfish, largemouth bass, northern pike, and white suckers were collected. Subsequent surveys during the 1970's through 1992 found multiple species of fish including black bullhead, bluegill, green sunfish, golden shiners, largemouth bass, northern pike, pumpkinseed, walleye, white suckers, and yellow perch. In 1990, a 5-10 gallon diesel fuel spill occurred in the reservoir where bluegill and crayfish were found dead. Since its original stocking of fish in 1968, Eagle Feather Reservoir has remained a popular fishery for the Rosebud Sioux Tribe. The most recent fish survey conducted on Eagle Feather Reservoir was in June 1992 (Table 12).

Table 12. Historical fishery data for Eagle Feather Reservoir. Mean catch per unit effort (CPUE) for fish \geq stock length, mean relative weights (*Wr*), proportional and relative size distribution (PSD and RSD) data from June 1992 fishery assessment. Mean CPUE calculated as fish/hr for electrofishing and fish/net night for gill and trap nets. Mean *Wr*, PSD, and RSD-P was calculated for fish collected in all three gears.

Species	N	Electrofishing mean CPUE	Gill net mean CPUE	Trap net mean CPUE	Mean <i>Wr</i>	PSD	RSD-P
Black bullhead	1		0.3 fish/net			89	22
Black crappie	132	58.9 fish/hr		3.2 fish/net		6	2
Bluegill	585	45 fish/hr		11.2 fish/net		19	0
Golden shiner	21		7.0 fish/net				
Largemouth bass	23	12.8 fish/hr				78	22
Northern pike	4		0.3 fish/net	0.1 fish/net		?	?
Pumpkinseed	82	19.4 fish/hr		5.9 fish/net		39	0
Walleye	2		0.6 fish/net		84	?	?
Yellow perch	54		14.0 fish/net	1.5 fish/net		13	0



Figure 13. Eagle Feather Reservoir on the Rosebud Indian Reservation. The white line indicates electrofishing transect conducted during June 2010. Aerial image from www.bing.com/maps.

Results and Discussion

On 9 June 2010, nearly the entire shoreline was sampled with night-time electrofishing with three 15-min transects (Figure 13).

Black crappie

The relative abundance and size structure (Figure 14) of black crappie population in Eagle Feather Reservoir was similar to the black crappie population found in Antelope Creek Reservoir. Black crappie relative abundance has declined slightly since surveys were conducted in 1992 (Table 12). Mean W_r was substantially lower in Eagle Feather Reservoir (Table 13) compared to other reservoirs on the Rosebud Indian Reservation. Competition with similar length bluegill may be adversely affecting the condition of black crappie in this reservoir. 20,000 black crappie were stocked in Eagle Feather Reservoir in 2009. The fish collected during this survey were likely from that successful stocking.

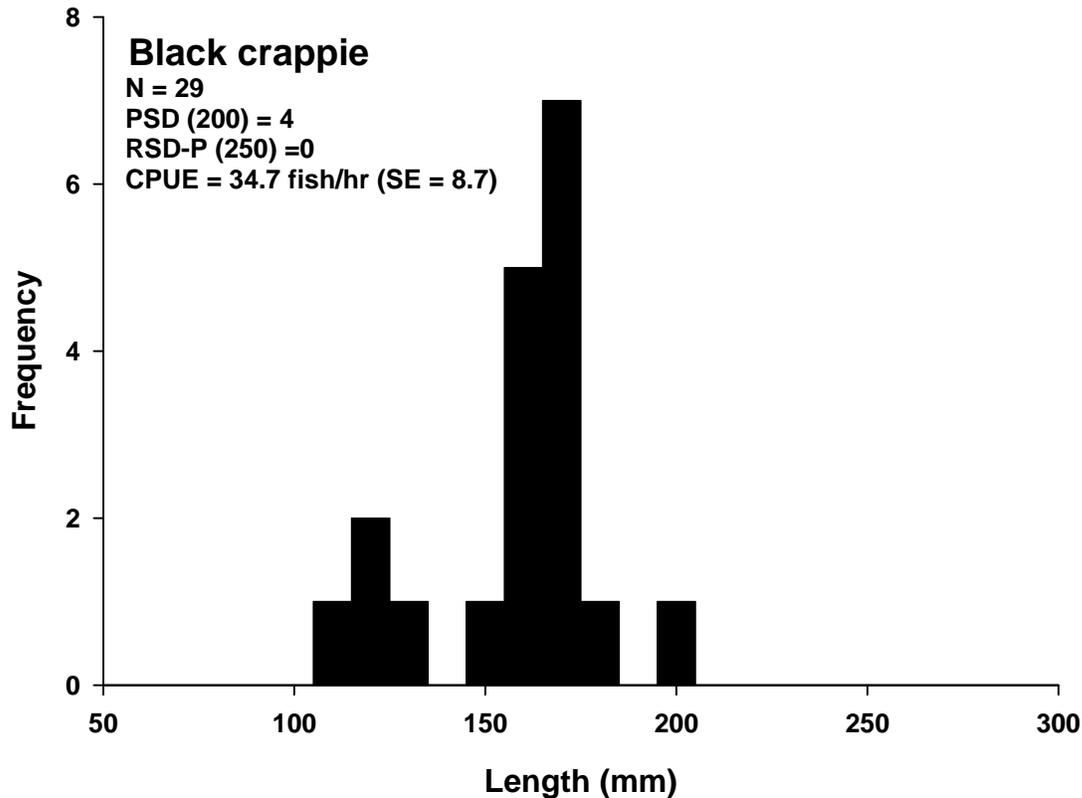


Figure 14. Length frequency distribution (10-mm length groups) for black crappie captured by electrofishing in Eagle Feather Reservoir in 2010. Black crappie proportional size distribution (PSD; ≥ 200 mm) and relative size distribution (RSD) of preferred length (≥ 250 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for black crappie \geq stock length (130 mm) only.

Table 13. Black crappie mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Eagle Feather Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	73 (4)	76 (2)	b	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Bluegill

Eagle Feather reservoir had the second highest abundance of bluegills among the reservoirs sampled on Rosebud Indian Reservation in 2010. The bluegill population is dominated by stock to quality length (80 - 150 mm) fish (Figure 15). Bluegill mean $W_r = 95$ (SE = 3) (Table 14) indicated adequate supplies of prey for bluegill and maybe out competing black crappie for these resources. Relative weights were similar to other bluegill populations across the Reservation.

Relative abundance of bluegill has substantially increased since 1992 (Table 12), while the size structure remained similar with no preferred length (≥ 200 mm) fish.

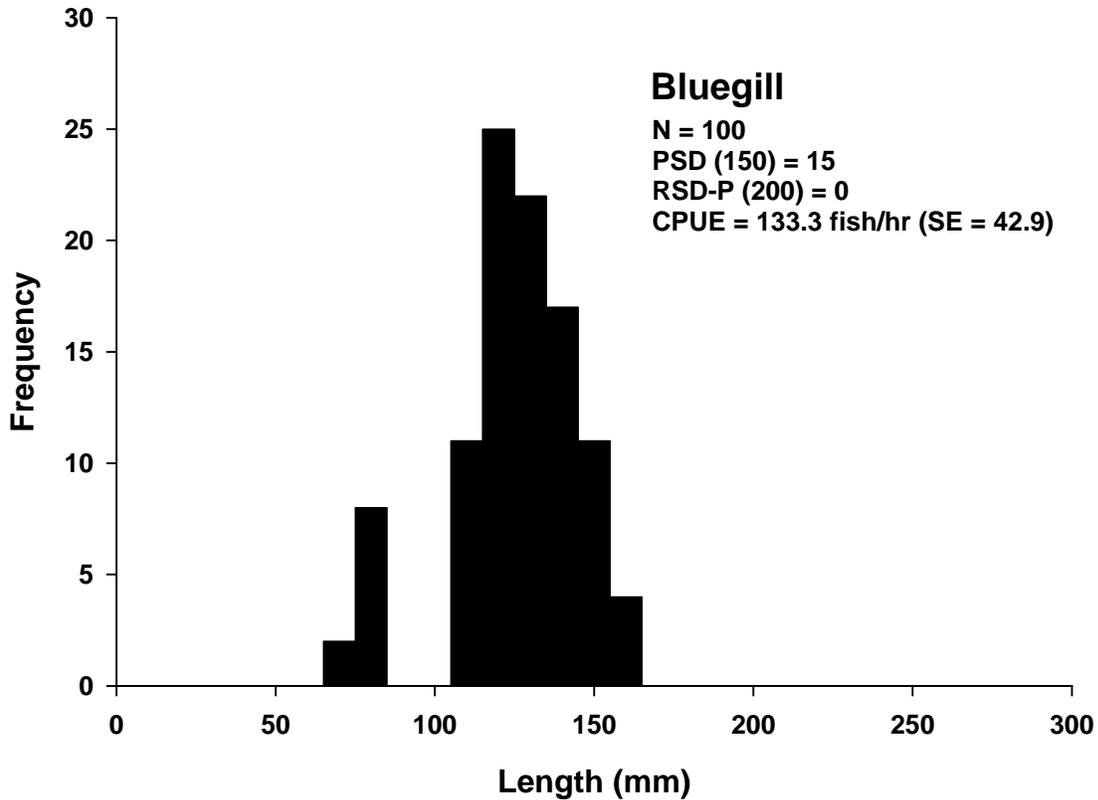


Figure 15. Length frequency distribution (10-mm length groups) for bluegill captured by electrofishing in Eagle Feather Reservoir in 2010. Bluegill proportional size distribution (PSD; ≥ 150 mm) and relative size distribution (RSD) of preferred length (≥ 200 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for bluegill \geq stock length (80 mm) only.

Table 14. Bluegill mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Eagle Feather Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	95 (3)	97 (3)	89 (2)	b	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Golden shiner

One golden shiner (178 mm) was collected while electrofishing Eagle Feather Reservoir in 2010.

Largemouth bass

The relative abundance of largemouth bass was one of the lowest among the Reservation reservoirs sampled in 2010. However, among all the reservoirs, the population of largemouth bass in Eagle Feather Reservoir was the most balanced with a PSD = 69 and RSD-P = 38 and the largest bass were found in this reservoir (Figure 16). Additionally, the mean W_r was high for all lengths of largemouth bass (Table 15). Results from the 2010 electrofishing survey are similar to the survey conducted in 1992. The relative abundance of largemouth bass has slightly increased since then, while the size structure has remained similar. Given the abundance of larger largemouth bass in this reservoir, they are likely affecting the size structure of panfish; however, panfish > than 200 mm are likely being removed by anglers as well.

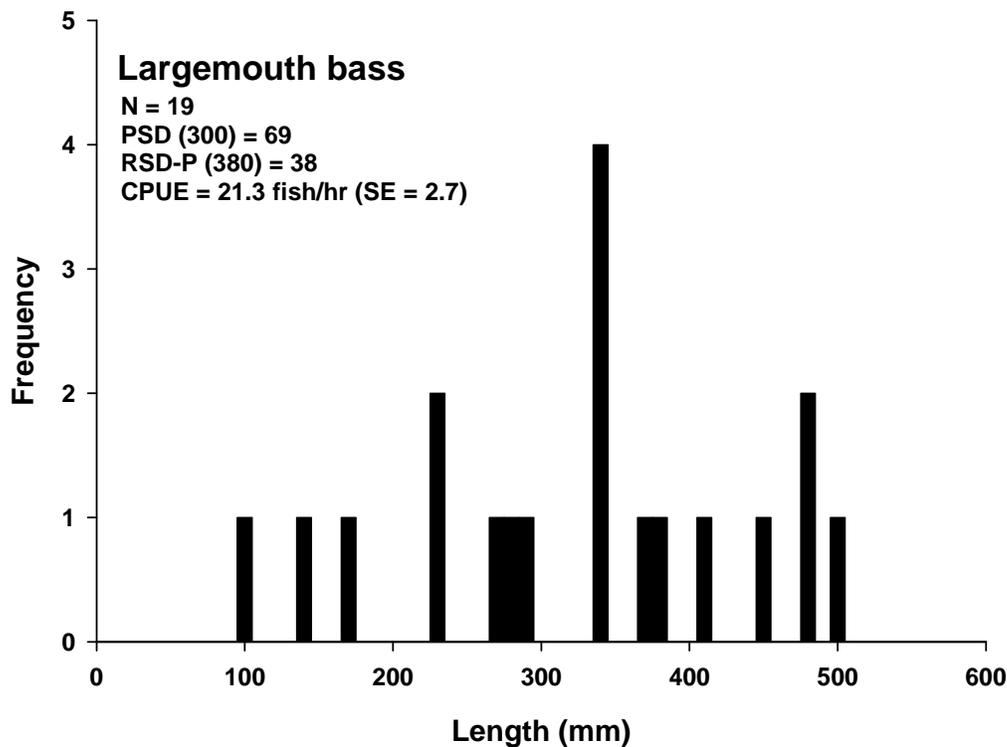


Figure 16. Length frequency distribution (10-mm length groups) for largemouth bass captured by electrofishing in Eagle Feather Reservoir in 2010. Largemouth bass proportional size distribution (PSD; ≥ 300 mm) and relative size distribution (RSD) of preferred length (≥ 380 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for largemouth bass \geq stock length (200 mm) only.

Table 15. Largemouth bass mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Eagle Feather Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	104 (3)	112 (5)	100 (3)	102 (5)	

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Pumpkinseed

Five pumpkinseed (95 - 170 mm) (mean CPUE = 8.0 fish/hr; SE = 4.0) were collected while electrofishing Eagle Feather Reservoir in 2010. Pumpkinseed relative abundance in Eagle Feather Reservoir decreased by over 50% since 1992 (Table 12).

Yellow perch

Four yellow perch (85 - 170 mm) were collected while electrofishing Eagle Feather Reservoir in 2010. Yellow perch were never at high densities in this reservoir (Table 12) and remain as a low significance to this fishery. 22,000 yellow perch were stocked in 2010. Further surveys will be needed to investigate the success of this stocking.

ROSEBUD (SPOTTED-TAIL) RESERVOIR

Introduction

Rosebud Reservoir (occasionally referred to as Spotted-Tail Reservoir) (T38N, R20W, NE sec. 34) is located immediately adjacent to the city of Rosebud. Due to its location, it is an important water to the fisheries program. The lake covers 8 acres with a maximum depth of 13 ft. (Goudreault 1982). The reservoir has a drainage area of 36,000 acres. Siltation and extensive vegetation of the reservoir has been a common problem.

The first record of fish management occurred in 1951 with a rotenone treatment and was initially stocked with brown trout. During the 1950's to the 1970's, the reservoir was managed as a put-and-take trout fishery. Additionally, northern pike and channel catfish were stocked in the 1960's and 1970's. However, the lake has become too shallow and warm to support trout. As a result, the reservoir is managed for warmwater fish such as largemouth bass and bluegill. However, rainbow trout stocking continued occasionally during the 1970's and 1980's along with walleye. During electrofishing, gill net, and trap net surveys since the 1950's, black bullhead, bluegill, brown trout, creek chubs, fathead minnows, green sunfish, largemouth bass, northern pike, pumpkinseed, rainbow trout, and white suckers have been collected. Rosebud Reservoir continues to be a popular fishery due to its location near the community of Rosebud. The most recent fish survey conducted on Beads Reservoir was in June 1992 (Table 16).

Table 16. Historical fishery data for Rosebud Reservoir. Mean catch per unit effort (CPUE) for fish \geq stock length, mean relative weights (*Wr*), proportional and relative size distribution (PSD and RSD) data from June 1992 fishery assessment. Mean CPUE calculated as fish/hr for electrofishing and fish/net night for gill and trap nets. Mean *Wr*, PSD, and RSD-P was calculated for fish collected in all three gears.

Species	N	Electrofishing mean CPUE	Gill net mean CPUE	Trap net mean CPUE	Mean <i>Wr</i>	PSD	RSD-P
Black bullhead	5			1.2 fish/net		100	100
Bluegill	291	322.8 fish/hr		16.3 fish/net		28	0
Channel catfish	1					100	100
Largemouth bass	58	82.8 fish/hr				58	11
Pumpkinseed	171	35.7 fish/hr		36.5 fish/net		69	0
White sucker	6		3.0 fish/net				



Figure 17. Beads Reservoir on the Rosebud Indian Reservation. Aerial image from www.bing.com/maps.

Results and Discussion

Black crappie

Two black crappie (250 and 260 mm) were collected while electrofishing Rosebud Reservoir in 2010. 4,000 black crappie were stocked in Rosebud Reservoir in 2009. The two fish were likely not from this stocking. Further surveys will be needed to evaluate the stocking program.

Bluegill

Although the relative abundance of bluegill in Rosebud Reservoir was lower than most reservoirs sampled in 2010, the population had the best size structure with a PSD = 68 and a few preferred length (≥ 200 mm) fish (Figure 18). Additionally, the highest mean W_r for bluegill were found in Rosebud Reservoir (Table 13). The relative abundance of bluegill has

substantially decreased since 1992; however, the size structure has improved since then (Table 12 and Figure 18).

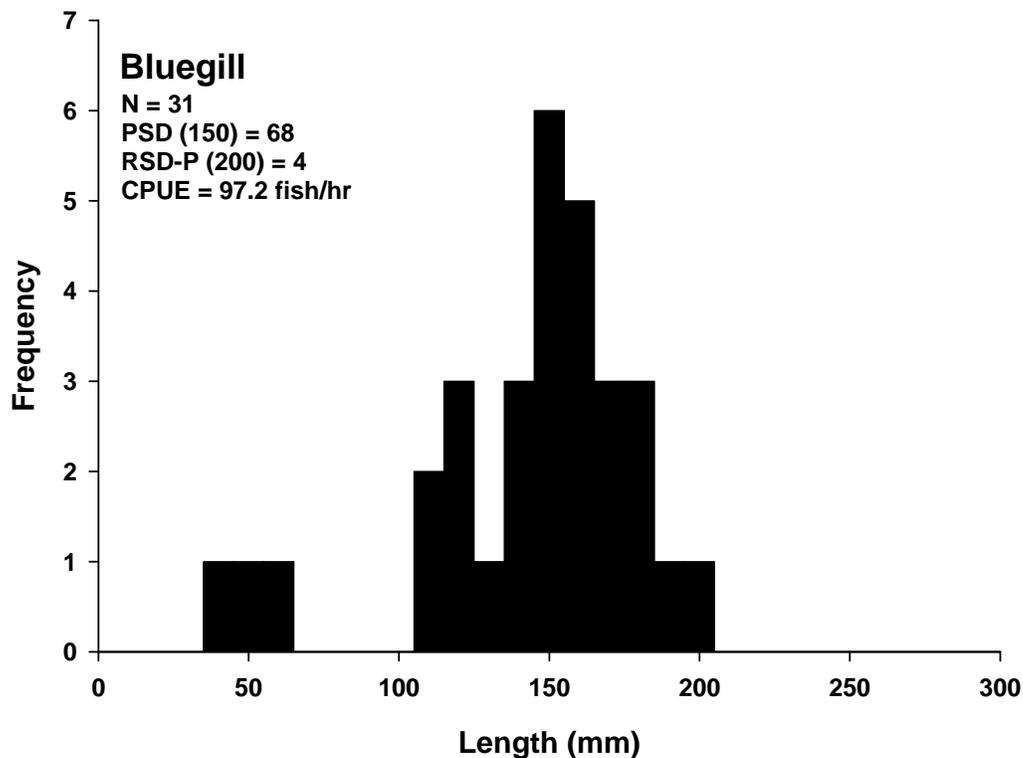


Figure 18. Length frequency distribution (10-mm length groups) for bluegill captured by electrofishing in Rosebud Reservoir in 2010. Bluegill proportional size distribution (PSD; ≥ 150 mm) and relative size distribution (RSD) of preferred length (≥ 200 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for bluegill \geq stock length (80 mm) only.

Table 13. Bluegill mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Rosebud Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	111 (2)	114 (4)	109 (3)		

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Largemouth bass

Of the electrofishing surveys conducted in 2010, the second highest relative abundance (mean CPUE = 72.9 fish/hr) of largemouth bass was found in Rosebud Reservoir. The population was dominated by stock to quality length fish (200 - 300 mm) in 2010 (Figure 19). Overall mean W_r was good (mean $W_r = 103$) indicating adequate prey available (Table 14). Overall, the relative abundance of largemouth bass has not changed since the last surveys conducted in 1992, while the size structure has slightly decreased since then (Table 16).

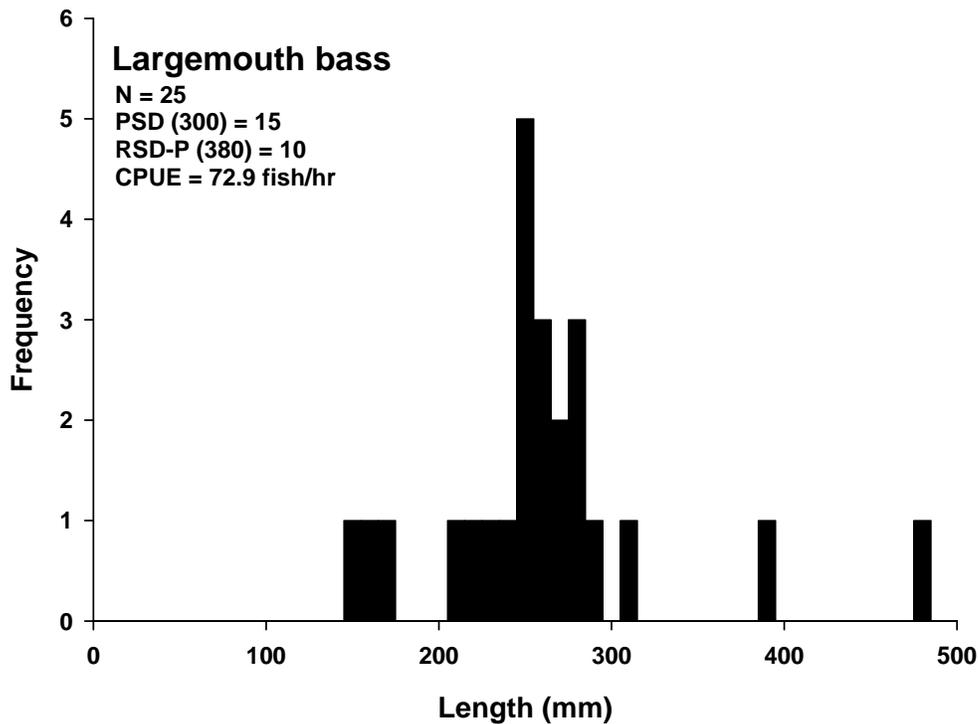


Figure 19. Length frequency distribution (10-mm length groups) for largemouth bass captured by electrofishing in Rosebud Reservoir in 2010. Largemouth bass proportional size distribution (PSD; ≥ 300 mm) and relative size distribution (RSD) of preferred length (≥ 380 mm) fish were calculated. Mean catch per unit effort (CPUE) calculated for largemouth bass \geq stock length (200 mm) only.

Table 14. Largemouth bass mean relative weight (W_r) with standard errors (SE) in parenthesis by length category captured by electrofishing in Rosebud Reservoir in 2010.

Year	Overall W_r	Stock - Quality (130-200 mm) (5-8 in)	Quality - Preferred (200-250 mm) (8-10 in)	Preferred - Memorable (250-300 mm) (10-12 in)	Memorable - Trophy (300-380 mm) (12-15 in)
2010	103 (2)	102 (2)	b	107 (21)	b

a = Sampling did not occur during that year.

b = Category had less than two samples for mean and SE calculations, but may have been calculated in overall W_r .

Rainbow trout

One rainbow trout (270 mm) was collected while electrofishing Rosebud Reservoir in 2010.

Yellow perch

No yellow perch were collected during the surveys in 2010. Over 37,000 yellow perch were stocked in 2010. Further surveys will be required to evaluate the stocking program in Rosebud Reservoir.

MANAGEMENT RECOMMENDATIONS

Overall Rosebud Indian Reservation Fisheries Management Recommendations

1. Work with landowners above reservoirs to control silt and nutrients entering the reservoirs. Increase fencing around streams to protect vegetation which will reduce excessive silt loading to the reservoirs.
2. Survey reservoirs every two years with electrofishing.
 - Spring Creek and Ghost Hawk reservoirs will be priorities in 2011. Additionally, consider sampling Berry, Heifer, Indian Scout, Omaha Boy, and Hidden Timber reservoirs.
 - Antelope Creek, Beads, Chases Woman, Eagle Feather, and Rosebud reservoirs in 2012.
3. Continue put-and-take trout fishery in reservoir with cold water habitat (deeper, cold water inputs from springs).
4. Begin construction of handicap access at popular fishing areas such as wheel chair accessible docks that extend out into the body of water past emergent and submergent vegetation.
5. Construct boat ramps at reservoirs to increase angling opportunities.
6. Investigate darkhouse spearfishing for northern pike and non-game fish through the ice on Antelope Creek and Spring Creek reservoirs to provide additional opportunities to harvest fish for Tribal and non-Tribal anglers.

Antelope Creek Reservoir Management Recommendations

1. During the next drought cycle (low water year), draw down Antelope creek reservoir and renovate the lake (rotenone) to remove the common carp population. This would need to include removing all carp from upstream reservoirs and the creek. This effort would require considerable finances to effectively remove all common carp from this reservoir.
2. Manage the reservoir as a northern pike/panfish fishery. Northern pike will have some (limited) biological control on the common carp population.
3. Consider stocking northern pike (100 fish/acre), largemouth bass (100 fish/acre), and yellow perch (500 fish/acre).

Beads Reservoir Management Recommendations

1. Continue supplemental stocking of walleye fry or fingerlings.
2. Continue stocking black crappie and yellow perch fingerlings.
3. Do not stock largemouth or bluegills.
4. Construct boat ramp with handicap accessible dock to increase angling opportunities.

Chases Woman Reservoir Management Recommendations

1. Do not stock largemouth bass as the population is currently dominated by “small” largemouth bass that is likely putting pressure on the entire fishery. Encourage harvest of largemouth bass.
2. Only stock adult rainbow trout. Smaller rainbow trout will be susceptible to largemouth bass predation.
3. Construct a handicap accessible dock.
4. Improve road conditions to Chases Woman Reservoir to increase angler access.

Eagle Feather Reservoir Management Recommendations

1. Continue to stock walleye, perch, and black crappie in Eagle Feather Reservoir.
2. Construct fishing docks for handicap/disabled access.
3. Improve existing dock and boat ramp near the town of Parmelee. Current boat ramp was unusable in 2010 due excessive water runoff during high precipitation events. Improve road grade to boat launch site. Add gravel and concrete structure to improve access.

Rosebud (Spotted-tail) Reservoir Management Recommendations

1. Continue stocking of yellow perch and black crappie.
2. Construct fishing docks for handicap/disabled access.

ACKNOWLEDGMENTS

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APPENDICES

Appendix A. Common and scientific names of fishes mentioned in this report.

Common name	Abbreviations	Scientific name
Black bullhead	BLB	<i>Ameiurus melas</i>
Black crappie	BLC	<i>Pomoxis nigromaculatus</i>
Bluegill	BLG	<i>Lepomis macrochirus</i>
Brook trout	BKT	<i>Salvelinus fontinalis</i>
Brown trout	BNT	<i>Salmo trutta</i>
Channel catfish	CCF	<i>Ictalurus punctatus</i>
Common carp	CAP	<i>Cyprinus carpio</i>
Creek chub	CRC	<i>Semotilus atromaculatus</i>
Cutthroat trout	CUT	<i>Oncorhynchus clarki</i>
Fathead minnow	FHM	<i>Pimephales promelas</i>
Golden shiner	GOS	<i>Notemigonus crysoleucas</i>
Green sunfish	GSF	<i>Lepomis cyanellus</i>
Largemouth bass	LMB	<i>Micropterus salmoides</i>
Northern pike	NOP	<i>Esox lucius</i>
Pumpkinseed	PND	<i>Lepomis gibbosus</i>
Rainbow trout	RBT	<i>Oncorhynchus mykiss</i>
Walleye	WAE	<i>Sander vitreum</i>
White sucker	WHS	<i>Catostomus commersoni</i>
Yellow perch	YEP	<i>Perca flavescens</i>

Appendix B. Minimum total lengths (TL; mm) of length categories for fish species found on Rosebud Indian Reservation.

Species	Stock	Quality	Preferred	Memorable	Trophy	Reference
Black bullhead	150	230	300	380	450	Gabelhouse 1984
Black crappie	130	200	250	300	380	Gabelhouse 1984
Bluegill	80	150	200	250	300	Gabelhouse 1984
Green sunfish	80	150	200	250	300	Gabelhouse 1984
Largemouth bass	200	300	380	510	630	Gabelhouse 1984
Northern pike	350	530	710	860	1,120	Gabelhouse 1984
Pumpkinseed	80	200	250	300	380	Gabelhouse 1984
Yellow perch	130	200	250	300	380	Gabelhouse 1984

Appendix C. Intercept (a) and slope (b) parameters for standard weight (Ws) equations and the minimum total lengths (TL; mm) recommended used to calculate relative weight (Wr). Metric equations are in millimeters and grams. Summary for fish species found on Rosebud Indian Reservation.

Species	Intercept (a)	Slope (b)	Minimum total length	Reference
Black crappie	-5.618	3.345	100	Neumann and Murphy 1991
Bluegill	-5.374	3.316	80	Hillman 1982
Largemouth bass	-5.528	3.273	150	Henson 1991
Northern pike	-5.437	3.059	100	Willis 1989
Pumpkinseed	-5.179	3.237	50	Liao et al. 1995
Yellow perch	-5.386	3.230	100	Willis et al. 1991

Appendix D. Glossary of fishery terms and data analysis.

Alkalinity: Alkalinity is a measure of a waters ability to resist a change in pH expressed in mg/l or ppm. Because alkalinity is dependent on minerals such as calcium (Ca), and this relates to aquatic vegetation production, alkalinity is a good indicator of a water bodies potential to produce fish. Less than 40 mg/l is considered soft water; greater than 40 mg/l is hard water.

Catch per Unit Effort (CPUE): CPUE is the catch per unit of sampling effort that is used as an index of abundance to document population changes over time. The formula is:

$$CPUE = \frac{\text{number of fish in a length class, length category, or sample}}{\text{net night or hour of electrofishing}}$$

Conductivity: Conductivity is a measure of a water bodies ability to conduct electricity, which is dependent on the amount of ions in the water. Total dissolved solids (TDS) is equal to 0.5 X Conductivity. Conductivity is a good measure of a water bodies productivity because of the relation between minerals and productivity.

Effort: The effort is the total amount of time expended in collecting a sample. The time may be in hours, minutes, or net days. The effort is used to calculate CPUE.

Memorable length: The memorable length is a standard category unique for each species. The memorable length is the length that most anglers remember catching and is 59 to 64% of the world record length.

Net days: A unit of time used to describe the effort required to collect a sample using Gill nets or Trap nets. For example, if 5 Gill nets were left for a 24 hour period, then 5 Gill nets days worth of effort were expended.

pH: a measure of how basic or acidic a body of water is. This information is important as many species of game fish have narrow pH tolerances.

Preferred length: The preferred length is a standard category unique for each species. The preferred length is the length that most anglers prefer to catch and is usually within a range of 45 to 55% of the world record length.

Proportional Stock Density (PSD): PSD is the number of fish greater than or equal to a minimum quality length in a sample divided by the number of fish greater than or equal to a minimum stock length. The formula is: $PSD = (\text{number of fish} \geq \text{"quality" length} / \text{number of fish} \geq \text{"stock" length}) \times 100$.

Quality length: The quality length is a standard length category unique for each species of fish. The Quality length is usually within a range of 36 to 41% of the world record length and generally the minimum size that most anglers will keep.

Relative Stock Density (RSD): The RSD is the number of fish greater than a minimum preferred length in a stock divided by the number of fish greater than or equal to a minimum stock size. The formula is: $RSD = (\text{number of fish} \geq \text{"preferred" length} / \text{number of fish} \geq \text{"stock" length}) \times 100$.

Relative weight (W_r): The relative weight of a fish or group of fish is referred to as a " W_r " value. The relative weight is a comparison of the condition of the fish in a sample and the condition of a theoretical optimum sample. The formula is: $W_r = (W/W_s) \times 100$; where " W " is the weight of an individual and " W_s " is a length specific standard weight.

Stock length: The stock length is the smallest of the standard length category unique for each species of fish. The stock length is usually within a range of 20 to 26% of the world record length and at or near which a species reaches sexual maturity.

Trophy length: Trophy length is a standard length category unique for each species of fish. The Trophy length is size worthy of acknowledgment and is greater than 74% of the world record length.

Appendix E. Fish stocking history for Rosebud Indian Reservation reservoirs in 2009 and 2010. Stocking size: Fry (FY; Hatch to 1.49 in); Fingerlings (FG; 1.5 to 5.49 in); Sub-adult (SA; ≥ 5.5 in, not sexually mature); Adult (AD; sexually mature, regardless of size); Mixed (MX; transplanted from natural sources).

Reservoir	Year	Largemouth bass			Bluegill			Northern pike			Yellow perch			Rainbow trout			Black Crappie			Walleye		
		Month	N	Size	Month	N	Size	Month	N	Size	Month	N	Size	Month	N	Size	Month	N	Size	Month	N	Size
Antelope Creek	2010		13,600	FG																		
Beads	2010										21,000	FG									4,200	FG
	2009		3,500	FG													15,000	FG			3,500	FG
Chases Woman	2010													800	AD							
	2009		400	FG										400	AD							
Eagle Feather	2010										22,000	FG									4,400	FG
	2009		4,000	FG													20,000	FG			4,000	FG
Ghost Hawk	2010													900	AD							
	2009		1,200	FG							5,000	FG										
Indian Scout	2010										1,250	FG										
Rosebud	2010										4,000	FG										
	2009		800	FG													4,000	FG				
Spring Creek	2010										37,500	FG										