# **Fisheries Investigations in the Yellowstone and Shields River Basins, Park County, Montana**

Annual Report for 2010

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### Abstract

This report documents current trends for rainbow trout *Oncorhynchus mykiss*, brown trout *Salmo trutta* and Yellowstone cutthroat trout *Oncorhynchus clarkii bouvieri* populations in the Yellowstone River and the Shields River. Results from netting of Dailey Lake are presented for rainbow trout, yellow perch *Perca flavescence*, and walleye *Sander vitreum*. Overall, fish populations continued to be in good shape.

# **Objectives**

Funds for this project are provided through the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777k) supporting the Montana Statewide Fisheries Management Program. This program consists of two elements: Fisheries Management in Montana and Statewide Program Coordination. The Fisheries Management element includes four activities, each with associated objectives:

#### State Program Activities and Objectives

1. Survey and Inventory

To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters.

2. Fish Population Management

To implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors.

#### 3. Technical Guidance

To review projects by government agencies and private parties that have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources.

#### 4. Aquatic Education

To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment.

Statewide activities and objectives are addressed locally by ongoing fisheries investigations and management activities intended to enhance aquatic habitats and recreational fisheries in the upper Yellowstone and Shields River basins.

#### **Local Project Objectives**

In fiscal year 2010 (July 1, 2009 to June 30, 2010), project objectives for state project number 3350 (the Yellowstone and Shields drainage areas) were identical to the statewide objectives listed above. Project objectives are intended to guide continuing efforts to maintain and enhance local fisheries. In support of these efforts, the following data collections, compilations, and analyses are reported here under separate headings:

- A. Monitoring of trout abundance in one section of the Yellowstone River based on spring sampling in 2010.
- B. Monitoring of trout abundance in one section of the Shields River based on spring sampling in 2010.

C. Summary of stocking at Dailey Lake: 2010.

State survey, inventory, and fish population management objectives are addressed under headings A through C. Technical guidance and aquatic education objectives are addressed on an ongoing basis by meetings with various angler groups, school groups, journalists, and the public. In fiscal year 2010, these meetings included work supporting the Shields Valley Watershed and the Upper Yellowstone Watershed Basin, educational seminars for local school children, and meetings with local angling groups such as Trout Unlimited, Upper Yellowstone Walleyes Unlimited, and Livingston Schools to discuss a variety of fisheries topics. Landowner contacts and consultations occurred routinely each month in conjunction with administration of the Montana Natural Streambed and Land Preservation Act and the Montana Stream Protection Act.

### **Electrofishing Procedures**

We used the mark-recapture method of electrofishing to sample trout populations in the Yellowstone and Shields Rivers. This method consists of a marking run and a recapture run. Both the marking and recapture run consist of electrofishing the entire section or reach of river. This is typically done in subsections to prevent overstressing fish. During the marking run all fish that are collected in the section are given a fin clip, which can be detected later. The fish are then released back into the section and allowed to redistribute themselves for 7-10 days. After this redistribution period the recapture run is completed. The entire section is electrofished again. Fish are examined and those that have the first fin clip are noted as recaptured. All fish collected during the recapture run are given a second fin clip on a different fin so they are not counted twice if they are captured again during the recapture run.

### Yellowstone River Procedures

In spring 2010, trout were sampled in the 9<sup>th</sup> Street and Corwin Springs Sections of the Yellowstone River (Table 1and Figure 1). These sections are long-term monitoring sections on the Yellowstone River.

Electrofishing of the 9<sup>th</sup> Street and Corwin Springs section was completed through the use of a raft and a drift boat mounted with boom electrofishing equipment. The raft was a 16-foot Maravia with a Coffelt 22-M VVP and a 5,000-watt Honda EV5000 generator. The drift boat had a Coffelt VVP-15 with a 5,000-watt Honda EV5000 generator. The anodes on both boats were steel droppers suspended from twin booms at the bow and steel droppers off the rear of the raft and a steel band around the bottom of the drift boat served as the cathode. An aluminum john boat with a 35 Honda outboard jet was used on the Corwin Springs Section as well. The anodes were steel droppers suspended from twin booms at the bow and the boat itself served as the cathode.

A mark-recapture, without replacement, effort was made on the Corwin Springs section. Fish were netted and held in live cars. After anesthetizing the fish were identified to species, measured to the nearest 0.1 inch, and weighed to the nearest 0.01 pound. Trout were marked with a fin clip and returned to the river. Seven days after the first marking run, the recapture effort was made in this section.

An attempt was made to sample the 9<sup>th</sup> Street Section in spring 2010 as described above. Only one marking run was completed in this section due to lack of fish and navigation issues for the boats because of exposed bedrock shelves and low flows.

• Table 1: Survey Sections where trout abundance was sampled in the Yellowstone River in 2010.

Section Name	Survey Date	Length (ft)	Approximate Location			
Corwin Springs	04/20/10	29,040	Upper North		45.10827	
		Bou	Boundary	West	110.78957	
			Lower	North	45.16649	
			Boundary	West	110.85159	
9 <sup>th</sup> Street	04/5/10	24,024	Upper	North	45.64994	
		Boundary		West	110.56211	
			Lower	North	45.69826	
			Boundary	West	110.51517	

• Coordinates in decimal degrees are NAD83 datum.

#### **Corwin Springs Section**

We completed our marking runs in the Corwin Springs Section on April 20, 21 and 22, 2010. The drift boat was used to mark the right bank on April 20<sup>th</sup>. On April 21 one boat sampled the left bank and the other boat sampled the right bank. The boats then switched banks on April 22. All captured trout were given a left pelvic fin clip. Scale samples were taken from trout for aging. Genetic samples were collected from Yellowstone cutthroat trout for later analysis. The sample consisted of a small clip of one of the pelvic fins that was stored in 100% denatured ethanol. Captured Yellowstone cutthroat, twelve inches and longer in total length, were tagged with a yellow, numbered floy tag to allow for large-scale monitoring of movement.

The recapture runs in this section were completed on April 28 and 29, 2010. One boat sampled the left bank and the other boat sampled the right bank on April 28. The boats then switched banks on April 29.

#### 9<sup>th</sup> Street Section

One marking run was made on the 9<sup>th</sup> Street Section on April 5, 2010. The raft sampled the right and left bank on the upper 2.4 miles and the drift boat sampled the right bank on the lower 2.1 miles. Scale samples were taken from trout for aging. Genetic samples were collected from Yellowstone cutthroat trout for later analysis. The sample consisted of a small clip of one of the pelvic fins that was stored in 100% denatured ethanol. Captured Yellowstone cutthroat, twelve inches and longer in total length, were tagged with a yellow, numbered floy tag to allow for large scale monitoring of movement.

No further efforts were made to get an estimate on this section as a result of limited ability to navigate the boats due to exposed bedrock shelves and poor flow regimes.



• Figure 1: Map of the Upper Yellowstone River drainage displaying the location of the 2010 sampling sections.

## **Yellowstone River Results**

#### Yellowstone River Trout Abundances

Abundance estimates were made for rainbow, brown, and Yellowstone cutthroat trout in Corwin Springs section. Abundance estimate data are presented by species and section below (Figure 2).

Trout population abundance was estimated in the Corwin Springs Section using FA+ (MFWP 2004). The partial log-likelihood model was used for all estimates. For the partial log-likelihood model, fish were separated into one-inch length groups for analysis and estimate reliability was evaluated at alpha = 0.05. The population estimate is for fish  $\geq$  7 inches in total length.

• Table 2: Population abundance model results for the Corwin Springs Section of the Yellowstone River for 2010. N represents the number of fish (≥7 inches) per mile for all.

Section (mark date)			Overall model			Pooled model		
Fish Species	Ν	SD	DF	Chi- square	Ρ	DF	Chi- square	Ρ
Corwin Springs (4/2	20)							
Brown Trout	218	15.8	8	11.63	0.17	6	7.88	0.25
Rainbow Trout	525	20.0	7	4.99	0.66	7	4.99	0.66
Yellowstone Cutthroat Trout	296	34.5	2	0.81	0.67	2	0.81	0.67

#### Yellowstone Cutthroat Trout

#### **Corwin Springs Section**

In 2010, the abundance estimate for Yellowstone cutthroat trout in the Corwin Springs Section was 296 fish/mile ( $\geq$  7 in.). This is down from 363 fish/mile ( $\geq$  7 in.) in 2009, but still above the estimate of 248 fish/mile in 2004 (Figure 2). It should be noted that the 2010 estimate is negatively biased as a result of fish in the 7.0 – 7.5 inch range not being used in the estimate due to lack of recaptured fish in the length group.



Figure 2: Abundance estimates for Yellowstone cutthroat trout (≥ 7 in.) in the Corwin Springs Section
of the Yellowstone River from 2001-2010. Error bars represent +/- 2 SD. No abundance estimates
were made in 2006 and 2008. The section was not sampled in 2003, 2005, and 2007.

The length-frequency histograms show that abundance of fish is still weighted toward larger fish although abundance in individual length groups had decreased slightly. Abundance in the 4 to 9 inch range increased greatly from 2009 to 2010 (Figure 3). This may be a result of good reproduction and recruitment into this population related to the good water year in 2009. These fish should continue to recruit into larger length groups in the future and with good water conditions in 2010 good reproduction and recruitment is expected for 2011.



 Figure 3: Length-frequency distributions for Yellowstone cutthroat trout sampled in the Corwin Springs Section of the Yellowstone River during 2009 and 2010.

#### 9<sup>th</sup> Street Section

In our limited sampling of this section only one Yellowstone cutthroat trout was captured. It had a total length of 15.6 inches. It should be noted that this was not a complete and thorough sampling effort and this low capture rate for cutthroat trout should not be considered reflective of the true population in this section. More thorough monitoring will be required to determine the true population abundance in this section.

#### **Rainbow Trout**

#### **Corwin Springs Section**

In 2009, the abundance estimate for rainbow trout in the Corwin Springs Section was 681 fish/mile ( $\geq$  7 in.). This dropped slightly to 525 fish/mile ( $\geq$  7 in.) in 2010, but remained above the estimate of 365 fish/mile ( $\geq$  7 in.) in 2004 (Figure 4). No abundance estimates were produced in 2006 and 2008 because of limited data. This section was not sampled in 2003, 2005, or 2007.



 Figure 4: Abundance estimates for rainbow trout (≥ 7 in.) in the Corwin Springs Section of the Yellowstone River from 2001-2010. Error bars represent +/- 2 SD. No abundance estimates were made in 2006 and 2008. The section was not sampled in 2003, 2005, and 2007.

The length-frequency histograms show that abundances for larger fish remain high and have increased for fish in the 13 to 16 inch range. Abundances for fish in the 6 to 9 inch range decreased from 2009 to 2010 (Figure 5**Error! Reference source not found.**). The decrease in abundance of smaller fish may to be the result of poor recruitment and spawning. Future sampling will determine if this is indeed the case.



• Figure 5: Length-frequency distributions for rainbow trout sampled in the Corwin Springs Section of the Yellowstone River during 2009 and 2010.

#### 9<sup>th</sup> Street Section

In this section, a total of 71 rainbow trout were captured through in the limited sampling in 2010. These fish ranged in length from 6.0-16.6 inches in total length (Figure 6). It should be noted that these length frequencies are the results of limited sampling and may not be truly representative of the population.



• Figure 6: Length-frequency distributions for rainbow trout sampled in the 9<sup>th</sup> Street Section of the Yellowstone Riverin 2010.

#### **Brown Trout**

#### **Corwin Springs Section**

In 2010, the abundance estimate for brown trout in the Corwin Springs Section was 218 fish/mile ( $\geq$  7 in.). This is below the estimate of 318 fish/mile ( $\geq$  7 in.) in 2009 and is the lowest estimate since 2001 (Figure 7). It should be noted that the 2010 abundance estimate is biased by limited numbers of recaptured fish from 7.0 to 11.99 inches in total length. No abundance estimates were made in 2006 and 2008 because of limited data. The section was not sampled in 2003, 2005, or 2007.



 Figure 7: Abundance estimates for brown trout (≥ 7 in.) in the Corwin Springs Section of the Yellowstone River from 2001-2010. Error bars represent +/- 2 SD. No abundance estimates were made in 2006 and 2008. The section was not sampled in 2003, 2005, and 2007.

The length-frequency histograms for brown trout reveal very little change in size structure from 2009 to 2010 (Figure 8). The changes observed are likely a result of improved sampling efficiency. In 2010 a jet boat was used for part of the sampling and allowed for multiple passes in areas with higher number of fish. A jet boat was not used in 2009 and did not allow for multiple passes.



• Figure 8: Length-frequency distributions for brown trout sampled in the Corwin Springs Section of the Yellowstone River for 2009 and 2010.

#### 9<sup>th</sup> Street Section

In 2010, 31 brown trout were captured during the limited sampling completed in this section. Sampled brown trout ranged in length from 9.4 - 20.6 inches in length (Figure 9). Because of limited sampling these length frequencies may not truly represent the population of brown trout in this section.



<sup>•</sup> Figure 9: Length-frequency distribution for brown trout sampled in the 9<sup>th</sup> Street Section of the Yellowstone River for 2010.

#### **Eastern Brook Trout**

#### **Corwin Springs Section**

One Eastern brook trout (total length of 10.1 inches) was captured in 2010. In 2009, five Eastern brook trout were captured in this section. They ranged in total length from 7.6 to 11.0 inches. Eastern brook trout are rare in this section.

### **Shields River Procedures**

In spring 2010, we surveyed the Convict Grade and Tomschin Sections of the Shields River (Table 3 and Figure 10).

A drift boat mounted with mobile electrofishing gear was used to sample the Convict Grade Section of the Shields River. For the marking effort the gear included a fiberglass drift boat with a 3,500-watt Honda EG3500X generator and a Leach direct current rectifying unit. The cathode was a steel plate attached to the bottom of the drift boat and the anode was a single hand-held (mobile) electrode connected to the power source by 30 feet of cable. The recapture effort included a plastic drift boat with a Coffelt VVP-15 and a 5,000-watt Honda EV5000 generator. The anode was a single hand-held (mobile) electrode connected to the power source by 30 feet of the power source by 30 feet of cable and a steel band around the bottom of the drift boat served as the cathode.

A Coleman Crawdad boat mounted with mobile electrofishing gear was used to sample the Tomschin Section. The gear included a 3,500-watt Honda EG3500X generator and a Coffelt VVP-15. The cathode consisted of two braided steel cables that were hung over each side of the boat and the anode was a single hand-held (mobile) electrode connected to the power source by 30 feet of cable.

In all cases, fish were collected in live cars, identified to species, measured to the nearest 0.1 inch, and weighed to the nearest 0.01 pound. Trout were marked with fin clips and returned to the stream. Recapture sampling in the Convict Grade section occurred 7 days after the marking effort. No recapture sampling was

Abundance estimates were produced for trout in the Convict Grade Section using FA+, a computer program developed by FWP for processing electrofishing data (MFWP, 2004). The partial log-likelihood model was used for all estimates. For the partial log-likelihood model, fish were separated into one-inch length groups for analysis and estimate reliability was evaluated at alpha = 0.05.

Section Name	Survey Date	Length (ft)	Approximate Location				
Convict	03/17/10	6,758	Upper	North	45.74036		
			Boundary	West	110.48224		
			Lower North	North	45.72618		
			Boundary	West	110.46231		
Tomschin	04/15/10	5,499	Upper	North	46.0766		
			Boundary	West	110.62128		
	Low		Lower	North	46.07198		
			Boundary	West	110.63355		

• Table 3: Survey Section where trout abundance was estimated in the Shields River in 2010.



• Figure 10: Map of the Shields River drainage displaying the 2010 sampling locations

#### **Convict Grade Section**

On March 17 and 18, 2010, we completed our marking run on the Convict Grade Section. Captured trout were marked with a left pelvic fin clip and a scale sample was collected for aging trout. Genetic samples were collected from Yellowstone cutthroat for later analysis. The sample consisted of a small clip of one of the pelvic fins that was stored in 100% denatured ethanol. Captured Yellowstone cutthroat, twelve inches and longer in total length, were tagged with a red, numbered floy tag to allow for large-scale monitoring of movement.

The recapture run was conducted in the section on March 25, 2010 and all captured trout were marked with an anal fin clip.

#### **Tomschin Section**

A one-pass survey was all that was completed on this section. The section was initially marked with the intention of returning to complete a mark-recapture estimate, but spring flow regimes prevented the completion of a recapture run. The marking effort was completed on April 15, 2010 after the upper river had become free of ice. Captured trout were marked with a left pelvic fin clip and a scale sample for aging was collected from trout. Genetic samples were collected from Yellowstone cutthroat for later analysis. The sample consisted of a small clip of one of the pelvic fins that was stored in 100% denatured ethanol. Captured Yellowstone cutthroat, twelve inches and longer in total length, were tagged with a red, numbered floy tag to allow for large scale monitoring of movement.

### **Shields River Results**

#### Shields River Abundances

Electrofishing data was used to calculate trout abundance estimates and monitor population trends. Population abundance was estimated using FA+ (MFWP 2004). The partial log-likelihood model was used for all estimates. For the partial log-likelihood model, fish were separated into one-inch length groups for analysis and estimate reliability was evaluated at alpha = 0.05. Population estimates were calculated for brown and rainbow trout  $\geq$  7 inches for in the Convict Grade Section. Results, by species, are presented below (Table 4).

Section (mark date)			Overall model			Pooled model		
Fish Species	Ν	SD	DF	Chi- square	Ρ	DF	Chi- square	Ρ
Convict Grade (3/1)	Convict Grade (3/17)							
Brown Trout	388	12.1	15	21.66	0.117	14	21.31	0.094
Rainbow Trout	170	12.6	5	6.51	0.260	3	6.11	0.106

• Table 4: Population abundance model results for the Convict Grade Section of the Shields River by species for 2010. N represents the number of trout (≥7 inches) per mile.

#### **Brown Trout**

#### **Convict Grade Section**

In 2010, the abundance estimate for brown trout in the Convict Grade Section was 388 fish/mile ( $\geq$  7 in.) This estimate remained the same as the 2009 estimate, still down from 646 fish/mile ( $\geq$  7 in.) in 2008 and 875 fish/mile ( $\geq$  7 in.) in 2007(Figure 11).



Figure 11: Abundance estimates for brown trout (≥ 7 in.) in the Convict Grade Section of the Shields River from 2006-2010. Error bars represent +/- 2 SD.

The length-frequency distribution for brown trout in the Convict Grade Section shows some dramatic changes from 2009 to 2010. Fish in the 8 to 11 inch range showed an increase in abundance while fish in the 12 to 15 inch range showed a decrease in abundance (Figure 12**Error! Reference source not found.**). These data indicate an increase in recruitment of brown trout to the population, and a decrease in survival of the older aged brown trout. The decrease on the upper end is not likely habitat related given the good water year in 2009.



• Figure 12: Length-frequency distributions for brown trout sampled in the Convict Grade Section of the Shields River in 2009 and 2010.

#### **Tomschin Section**

The length-frequency distribution for brown trout in the Tomschin section is displayed below. Lengths of captured fish ranged from 5 to 17 inches. The capture fish were weighted toward

fish in the 12.5 to 16 inch range (Figure 13Figure 11). Since a mark-recapture estimate was not completed, information on population trend is not available for 2010.



• Figure 13: Length-frequency distributions for brown trout sampled in the Tomschin Section of the Shields River in 2010.

#### **Rainbow Trout**

#### **Convict Grade Section**

The 2010 abundance estimate for rainbow trout in was 170 fish/mile ( $\geq$  7in.). This continued the downward trend from a high of 852 fish/mile ( $\geq$  7in.) in 2006, and is lower than the 2005 estimate of 328 fish/mile ( $\geq$  7in.;Figure 14).

Abundance estimates for this section include rainbow trout that are moving from the Yellowstone River into the lower Shields River to spawn. This movement biases the abundance estimate and is expected to be variable among years. The influx of fish from the Yellowstone River and the fish movement out of the sampling section, indicated by the large number of marked fish compared to captured fish and the low numbers of recaptured fish, likely explain most of the variation in the estimates.



 Figure 14: Abundance estimates for rainbow trout (≥ 7in.) in the Convict Grade Section of the Shields River from 2005-2010. Error bars represent +/- 2 SD. Data were insufficient in 2007 to conduct a population estimate.

Length-frequency distributions from 2009 and 2010 show there was a decrease in abundance of rainbow trout in the 3 to 4 and 10 to15 inch range (Figure 15). This suggests that this population has experienced a decline in recruitment and possibly a reduction in survival of 10 to 15 inch fish.



• Figure 15: Length-frequency distributions for rainbow trout sampled in Convict Grade Section of the Shields River in 2009 and 2010.

#### Yellowstone Cutthroat Trout

#### **Convict Grade Section**

In 2010, twelve Yellowstone cutthroat trout was captured in the Convict Grade Section. This is the highest value since 2006 (Figure 16). Capture of Yellowstone cutthroat trout in this section have ranged from 1 to 12 fish during this time period.



• Figure 16: Number of Yellowstone cutthroat trout sampled in the Convict Grade Section of the Shields River for 2006-2010.

The 2009 and 2010 length frequencies for Yellowstone cutthroat trout are presented below. The fish captured in 2009 was 11.3 inches in total length. Twelve Yellowstone cutthroat trout were captured in 2010. They ranged from 8.3 to 12.2 inches in total length (Figure 17).



• Figure 17: Length-frequency distributions for Yellowstone cutthroat trout sampled in the Convict Grade Section of the Shields River in 2009 and 2010.

#### **Tomschin Section**

In 2010, eight Yellowstone cutthroat trout were captured in the Tomschin Section. Captured Yellowstone cutthroat trout in this section ranged from 2.6 to 14.4 inches (Figure 18Figure 16).



• Figure 18: Length-frequency distributions for Yellowstone cutthroat trout sampled in the Tomschin Section of the Shields River in 2010.

#### Eastern Brook Trout

#### **Tomschin Section**

In 2010, thirty eastern brook trout were captured in the Tomschin section. These fish ranged in length from 4.2 to10.6 inches (Figure 19). Further monitoring is required to fully assess the status of this population.



• Figure 19: Length-frequency distribution for all eastern brook trout sampled in the Tomschin Section of the Shields River in 2010.

# **Dailey Lake Procedures**

#### **Trap Netting**

Trap netting was used to sample Dailey Lake in 2010. This was done as part of an effort to see if capture efficiency could be improved over that observed in gill nets.

We set the trap nets the afternoon of June 28, 2010. The set consisted of five trap nets located in the four corners of the lake and just off of the northern point in the lake (Figure 20).

We checked the nets on the morning of June 29 and pulled the nets the morning of July 1, 2010. We recorded lengths of all fish to the nearest 0.1 inch and weights were recorded to the nearest 0.01 pound. All fish were released back into the lake.



• Figure 20: Map of Dailey Lake showing locations of trap nets in 2010.

### **Dailey Lake Results**

#### **Rainbow Trout**

Only five rainbow trout were captured in all of the trap nets combined during this effort. Four were captured in the trap that was set in the North West corner of the lake and one was

captured in the trap on the point. The fish ranged in total length from 3.8 to 5.8 inches (Figure 21). No mature fish were captured in these traps.



• Figure 21: Length frequency of rainbow trout sampled in trap nets in Dailey Lake in 2010.

#### **Yellow Perch**

A total of five yellow perch were captured in all of the trap nets during this effort. Two were capture in the trap in the North East corner and the South East corner. One was captured in the trap set on the point. The perch ranged in total length from 6.8 to 8.9 inches (Figure 22).



• Figure 22: Length frequency of yellow perch sampled in trap nets in Dailey Lake in 2010.

#### Walleye

No walleye were captured in any of the trap nets during this effort. Walleye are one of the primary game species in the lake and trap nets initially appear to be very ineffective at capturing them. Further sampling will be required to determine if this is the result of low number of walleye, poor trap location, or some other factor.

#### Yellowstone Cutthroat

One Yellowstone cutthroat trout was captured in the trap net in the North West corner and one was captured in the trap set on the point. These fish were 10.0 and 10.3 inches in total length.

#### **Brook stickleback**

Brook stickleback *Culaea inconstans* were only captured in the trap net set in the South East corner of the lake. Thirteen brook sticklebacks were captured and ranged in length from 1.4 to 2.5 inches (Figure 23). Documentation of brook stickleback by using trap nets was informative, as gill nets (typical annual sampling technique) are not effective in capturing this small bodied fish. Previous to this sampling technique, brook stickleback were known to be present in Dailey Lake but had not been sampled.



• Figure 23: Length frequency of brook stickleback that were sampled in trap nets in Dailey Lake in 2010.

### **Fish Stocking**

Dailey Lake has been stocked annually with rainbow trout, Yellowstone cutthroat trout, and walleye in order to maintain a fishery for these species.

Dailey Lake was stocked with approximately 20,000 rainbow trout and 5,000 Yellowstone cutthroat trout in 2010. Official numbers, average lengths, and stocking dates for these plants were not available at the time of this report. This information will be presented in the 2011 annual report.

In 2010, approximately 10,000 walleye were stocked in Dailey Lake. The fish were from the Miles City Fish Hatchery (egg source: Fort Peck Lake). Official numbers, average lengths, and stocking dates for these plants were not available at the time of this report. This information will be presented in the 2011 annual report.

#### Walleye

On July 1, 2009, Dailey Lake was stocked with 5,000 young-of the-year (YOY) fish from the Miles City Fish Hatchery. The fish averaged 1.6 inches in length. An additional 5,500 YOY walleye were stocked on September 22, 2009. These fish averaged 2.9 inches in length (Table 5).

Year	Date	Strain	Lengt	h (in.)	Number
2005	June 15	Fort Peck	1.3		5,000
	Sept. 8	Fort Peck	3.7		4,856
				Total	9,856
2006	June 21	Fort Peck	1.4		5,000
	Aug. 26	Fort Peck	3.6		5,000
				Total	10,000
2007	June 22	Fort Peck	1.5		5,000
	Oct. 3	Fort Peck	3.8		5,000
				Total	10,000
2008	July 1	Fort Peck	1.5		5,000
	Sept. 19	Fort Peck	3.4		3,650
				Total	8,650
2009	July 1	Fort Peck	1.6		5,000
	Sept. 22	Fort Peck	2.9		5,500
				Total	10,500
2010	July	Fort Peck	N/A		5,000*
	Sept.	Fort Peck	N/A		5,000*
				Total	10,000*

 Table 5: Walleye stocking information from 2005-2010. \* = numbers are approximate and actual numbers will be reported in the 2011 annual report

#### Rainbow and Yellowstone Cutthroat

On April 17, 2009, Dailey Lake was stocked with 10,000 young-of-the-year (YOY) Arlee rainbow trout from Giant Springs Trout Hatchery. The rainbow trout averaged 3.5 inches in length. Eagle Lake strain YOY rainbow from Bluewater Springs Trout Hatchery were stocked on May 18, 2009. There were 10,037 rainbow trout in this plant that had an average length of 2.9 inches. On September 23, 5,000 Yellowstone cutthroat trout were stocked from the Yellowstone River Hatchery. These fish had an average length of 4.1 inches (Table 6). Exact numbers for the plants for 2010 were not available at the time of this report and will be reported in the 2011 report.

Year	Date	Strain	Lengtl	h (in.)	Number
2005	May 10	Eagle Lake	3.5		10,000
	May 10	Arlee	5.0		10,850
	June 10	Eagle Lake	4.8		5,002
				Total	25,852
2006	May 09	Eagle Lake	3.0		10,028
	Apr. 12	Arlee	3.2		11,000
	Apr.12	Wild	7.4		5,861
				Total	26,889
2007	Apr. 25	Arlee	3.5		10,000
	Apr. 25	Wild	5.8		5,000
	May 22	Eagle Lake	3.9		9,660
				Total	24,660
2008	Apr. 29	Arlee	3.4		10,044
	Sept. 8	Yellowstone	4.4		5,000
	May 14	Eagle Lake	3.1		10,000
				Total	25,044
2009	N/A	Arlee	3.5		10,000
	N/A	Yellowstone	4.1		5,000
	N/A	Eagle lake	2.9		10,037
				Total	25,037
2010	N/A	Arlee	N/A		10,000*
	N/A	Yellowstone	N/A		5,000*
	N/A	Eagle lake	N/A		10,000*
				Total	25,000*

• Table 6: Trout stocking information from 2005-2010. \* = numbers are approximate and actual numbers will be reported in the 2011 annual report

# **Literature Cited**

Chapman, D. G. 1951. Some properties of the hypergeometric distribution with applications to zoological censuses. University of California Publications in Statistics 1:131-160.

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