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

Annual Report for 2006
Federal Aid Project F-113-R-6

Scott Opitz

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Montana Fish, Wildlife & Parks
1400 South 19th Ave.
Bozeman MT 59715

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Abstract

This report documents current trends for trout populations in the Yellowstone River and the Shields River. Results from netting of Dailey Lake are presented for rainbow trout, yellow perch, and walleye. Overall, fish populations are in good shape. Impacts of continued drought appear to minimal at this time. The one exception is the Yellowstone cutthroat trout population in the Springdale section that has continued to decline and drought is a likely factor.

Objectives

Funds for this project are provided by grants from 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 2006 (July 1, 2005 to June 30, 2006), 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 two sections of the Yellowstone River based on spring sampling in 2006.

B. Monitoring of trout abundance in three sections of the Shields River based on spring sampling in 2006.

C. Summary of gillnet catches at Dailey Lake: spring 2006.

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 2006 these meetings included work supporting the Upper Shields Watershed and Southern Crazy Mountain Watershed Associations and the Upper Yellowstone Watershed Basin, educational seminars for local school children, and meetings with local angling groups such as Trout Unlimited and Upper Yellowstone Walleyes Unlimited 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 electorfishing 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 14 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 2006, trout were sampled in the Corwin Springs and Springdale sections of the Yellowstone River (Table 1and Figure 1). Both of these sections are long-term monitoring sections on the Yellowstone River.

Electrofishing of these sections was completed through the use of jet boats mounted with boom electrofishing equipment. Both sections were completed with a 22-foot aluminum Wooldridge outboard jet boat, a Coffelt VVP-15, and 7,000-watt Honda EM7000is generator. The anodes were stainless steel droppers suspended from twin booms at the bow and the hull served as the cathode.

Fish were netted and held in live cars. After anesthetizing the fish we identified 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. About fourteen days later each section was sampled again.

I was unable to estimate fish abundance because we were unable to collect enough data to produce a valid estimate for the Springdale section and the Corwin Springs Section was only partially surveyed. Sampling in both sections was limited by boat repair and availability.

• Table 1: Survey Sections where trout abundance was sampled in the Yellowstone River in 2006.

Section Name	Survey Date	Length (ft)	Approximate Location		
Corwin Springs	04/26/05	8,762	Upper Boundary	North West	45.10795 110.78938
			Lower Boundary	North West	45.45718 110.62505
Springdale	04/04/06	25,212	Upper Boundary	North West	45.69482 110.53682
			Lower Boundary	North West	45.72894 110.23812

• Coordinates in decimal degrees are NAD83 datum.

Corwin Springs

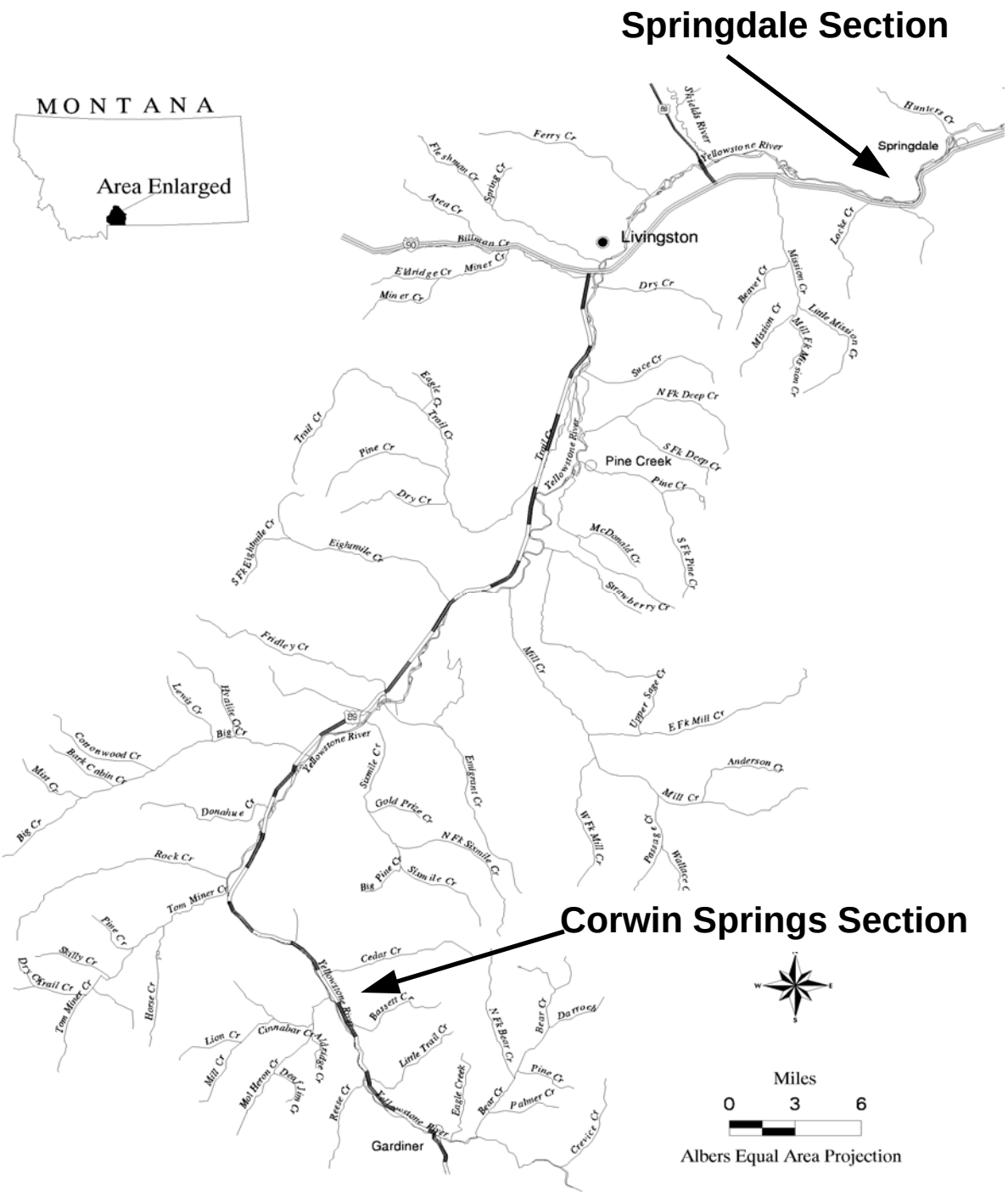
We sampled trout in the Corwin Springs section on April 26, 2006. The intent of sampling this section was to tag as many Yellowstone cutthroat trout, 10 inches and larger, with floy tags as possible to begin monitoring movement. Genetic samples were collected from Yellowstone cutthroat trout for later analysis. We only sampled the upper portion of this long-term section. This was a result of a boat breakdown, limited access to another boat, and varying flows in the section.

The Corwin Springs section was not recaptured as a result of the issues described above.

Springdale

The Springdale Section was sampled on April 4 and 5, 2006. We did multiple passes (4-8) in each sub-section during the marking and recapture efforts rather than sampling one entire bank and then the other. We did this to reduce the number of days fish were exposed to electricity and limit multiple captures of the same fish. Scale samples were taken from trout for aging. Genetic samples were collected from Yellowstone cutthroat trout for later analysis. Yellowstone cutthroat trout, 10 inches and larger, were also tagged with floy tags as possible to begin monitoring movement.

On April 17, 18, and 25, 2006, we recaptured the Springdale section using the methodology described above. All captured trout received an anal fin clip. We were unable to complete the recapture effort as a result of a boat breakdown, limited access to another boat, and varying flows in the section.



- Figure 1: Map of the Upper Yellowstone River drainage displaying the location of the 2006 sampling sections.

Yellowstone River Results

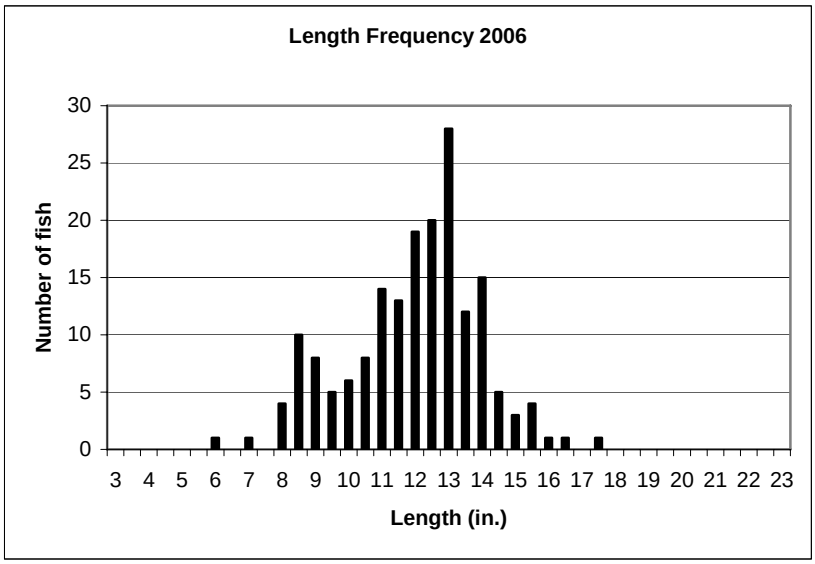
Yellowstone River Trout Abundances

Limited data prevented the production and analysis of trout abundance estimates. Summary data was collected and is presented by section and species below.

Corwin Springs Section

Yellowstone Cutthroat Trout

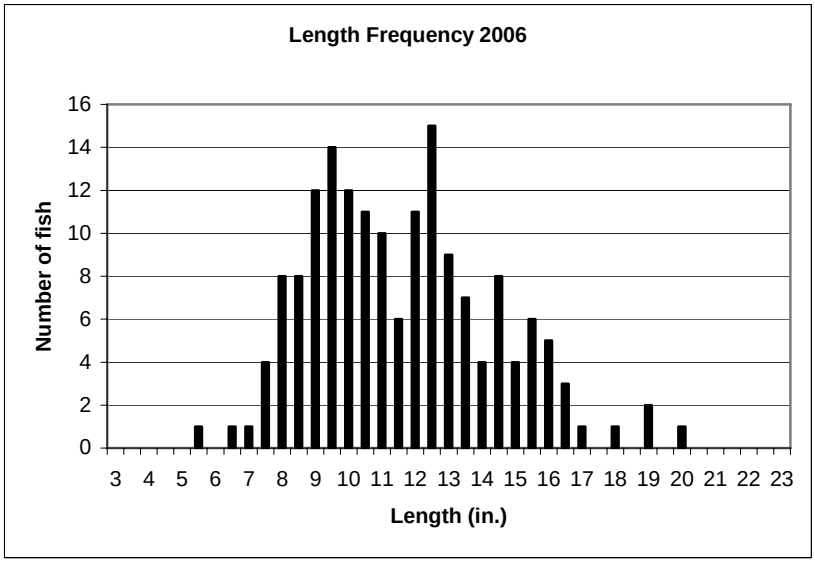
We captured a total of 179 Yellowstone cutthroat trout that ranged from 6.4-17.6 inches in total length. The length-frequency histogram of Yellowstone cutthroat captured in 2006 had a typical distribution with the exception of lacking an abundance of small fish. Small fish are not sampled efficiently and are not well represented in the sample. The bulk of the captured fish were in the 11.0 to 14.5 inch range (Figure 2).



- Figure 2: Length-frequency distribution for all captured Yellowstone cutthroat in the Corwin Springs Section in 2006.

Rainbow Trout

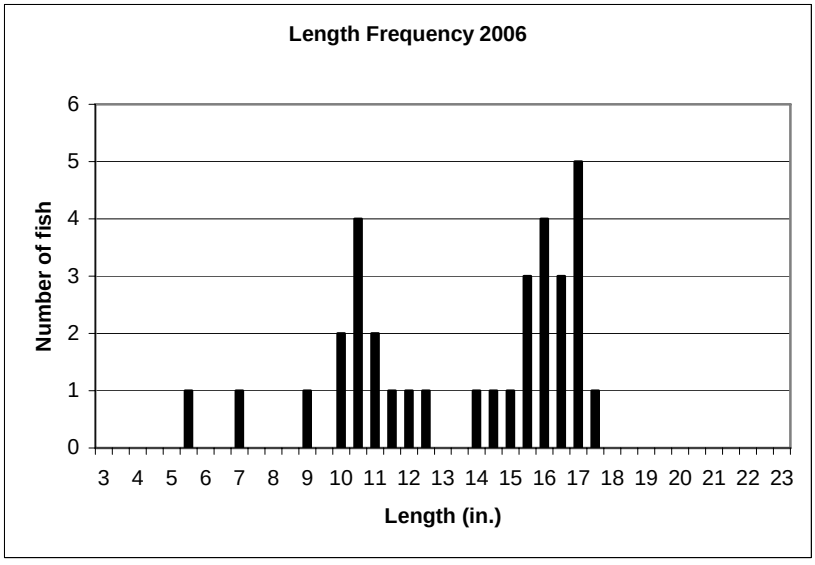
We captured 165 rainbow trout in the Corwin Springs Section that ranged from 5.9-20.2 inches in total length. The length frequency histogram for rainbow reflects what we would expect to see in a healthy population (Figure 3).



- Figure 3: Length-frequency distribution for all captured rainbow trout in the Corwin Springs Section in 2006.

Brown Trout

A total of 33 brown trout were collected in the Corwin Springs Section. They ranged from5.8-17.5 inches in total length. The length-frequency histogram for brown trout shows a wide distribution of fish length with low frequencies and missing length groups. It also heavily weighted toward fish from 14-17.5 inches in length (Figure 4).



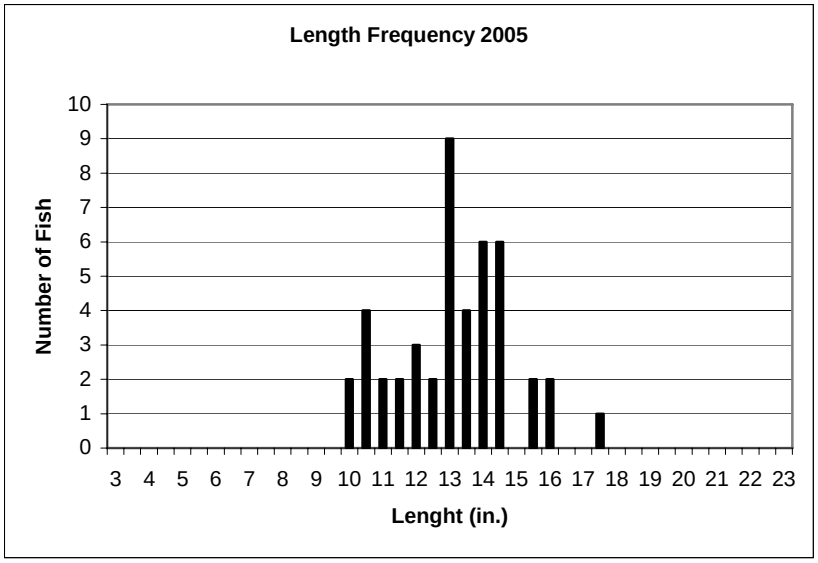
- Figure 4: Length-frequency distribution for all captured brown trout in the Corwin Springs Section in 2006.

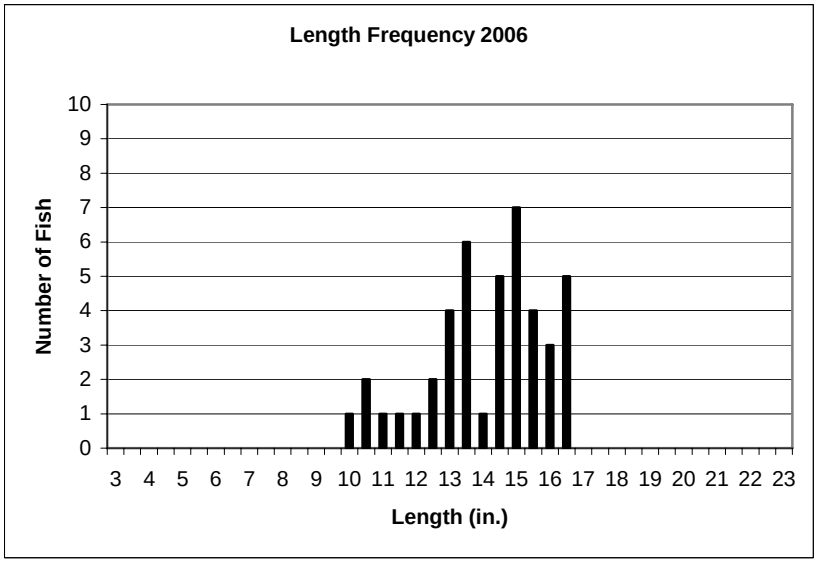
Springdale Section

Yellowstone Cutthroat Trout

I was unable to produce an abundance estimate for Yellowstone cutthroat trout in the Springdale section in 2006. We captured a total of 43 cutthroat that ranged from 10.2-16.6 inches in total length. By comparison, in 2004, a total of 64 cutthroat were captured. They ranged in total length from 5.8-15.9 inches. In 2005, 45 cutthroat were collected that ranged from 10.0-17.6 inches in total length. It should be noted that in 2004 and 2005 we were able to complete our sampling effort, unlike 2006. The decline in abundance that began in 1999 appears to be continuing and is cause for concern. This decline coincides with ongoing severe drought.

The length-frequency distribution is similar to that of 2005 and indicates a lack of fish less than 9 inches and greater than 16 inches in total length (Figure 5). The lack of these smaller fish could be a result of sampling efficiency, continued drought, poor spawning success, or a combination of any of these factors.



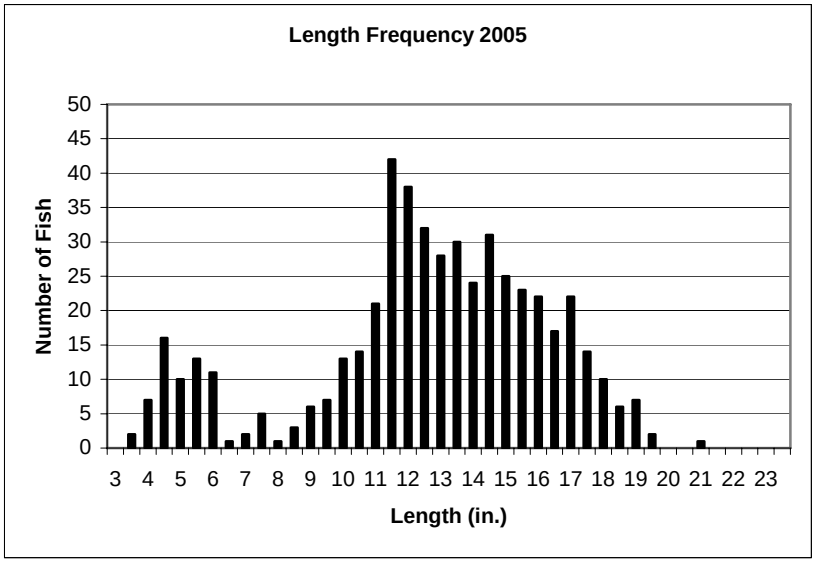


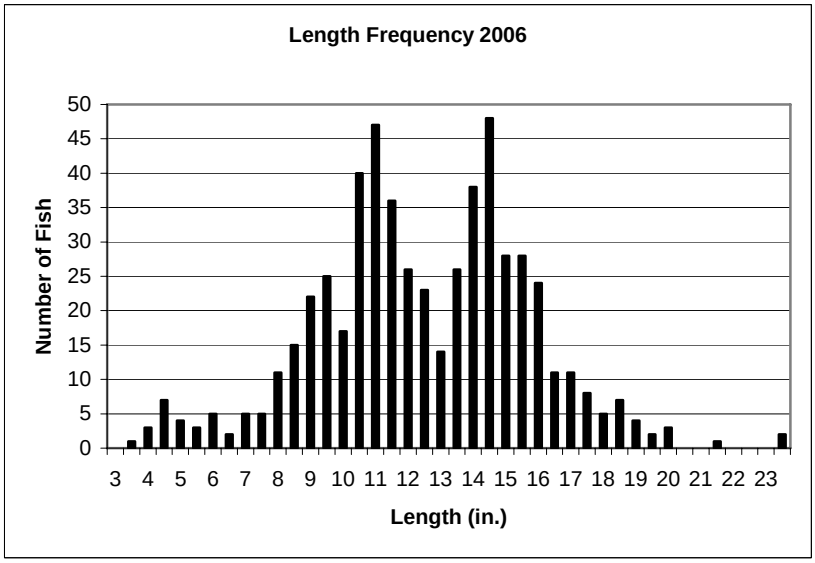
- Figure 5: Length-frequency distribution of all captured Yellowstone cutthroat in the Springdale Section in 2005 and 2006.

Rainbow Trout

I was unable to produce an abundance estimate for Yellowstone cutthroat trout in the Springdale Section in 2006. In this section, 545 rainbow trout were collected in 2006. They ranged from 3.9-23.8 inches in total length.

The length-frequency distributions for rainbow trout indicate good recruitment of 4-7 inch fish from 2005 into larger length groups. There are two strong cohorts of fish centered around 11 and 14.5-inch fish (Figure 6).



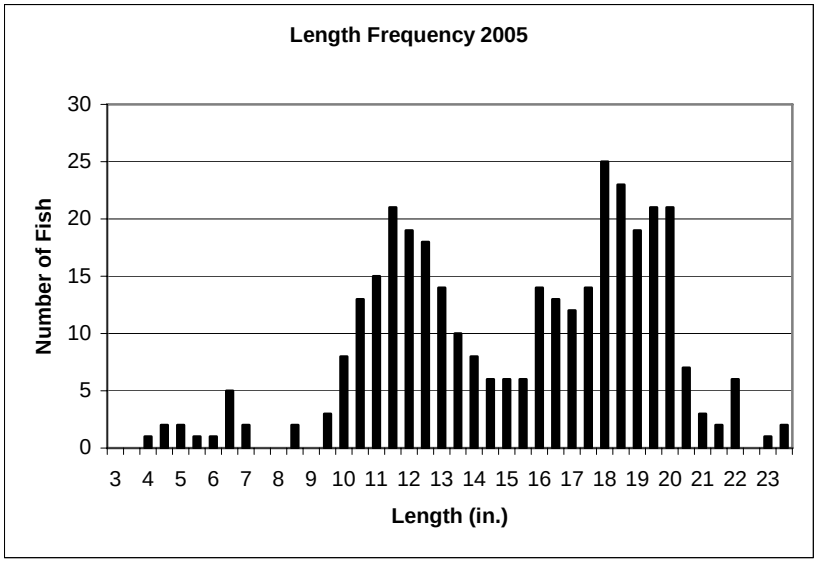


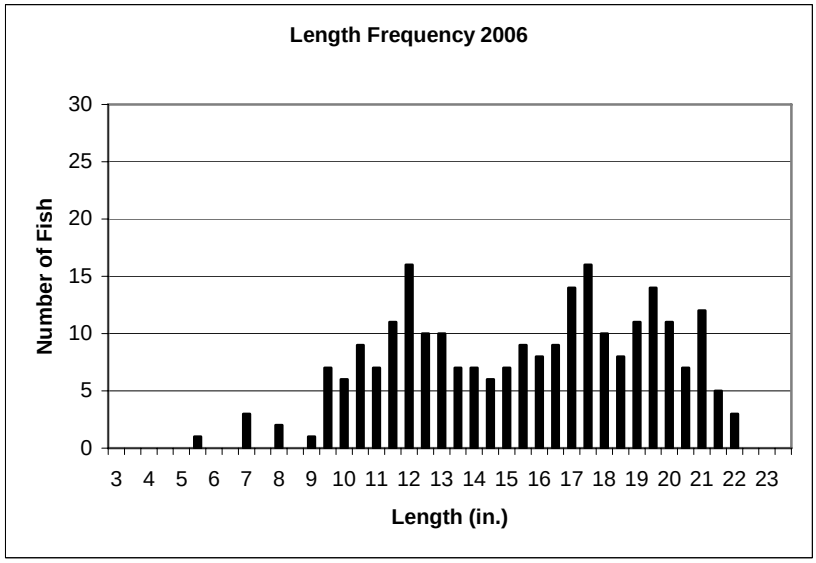
- Figure 6: Length-frequency distributions for all captured rainbow trout in the Springdale Section in 2005 and 2006.

Brown Trout

For the Springdale Section in 2006, a total of 247 brown trout were collected. They ranged from 5.5-22.4 inches in total length. No abundance estimate was produced for brown trout in this section in 2006.

The length-frequency distribution of brown trout shows reduced frequencies across all lengths. There is still a fair numbers of fish from 9.5-22 inches (Figure 7).





- Figure 7: Length-frequency distributions for all captured brown trout in the Springdale Section in 2005 and 2006.

Shields River Procedures

In spring 2006, we electrofished the Convict Grade, Todd, and Zimmerman sections of the Shields River (Table 2 and Figure 2).

A fiberglass drift boat mounted with mobile electrofishing gear was used to sample the Convict Grade and Todd sections of the Shields River. The gear included 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.

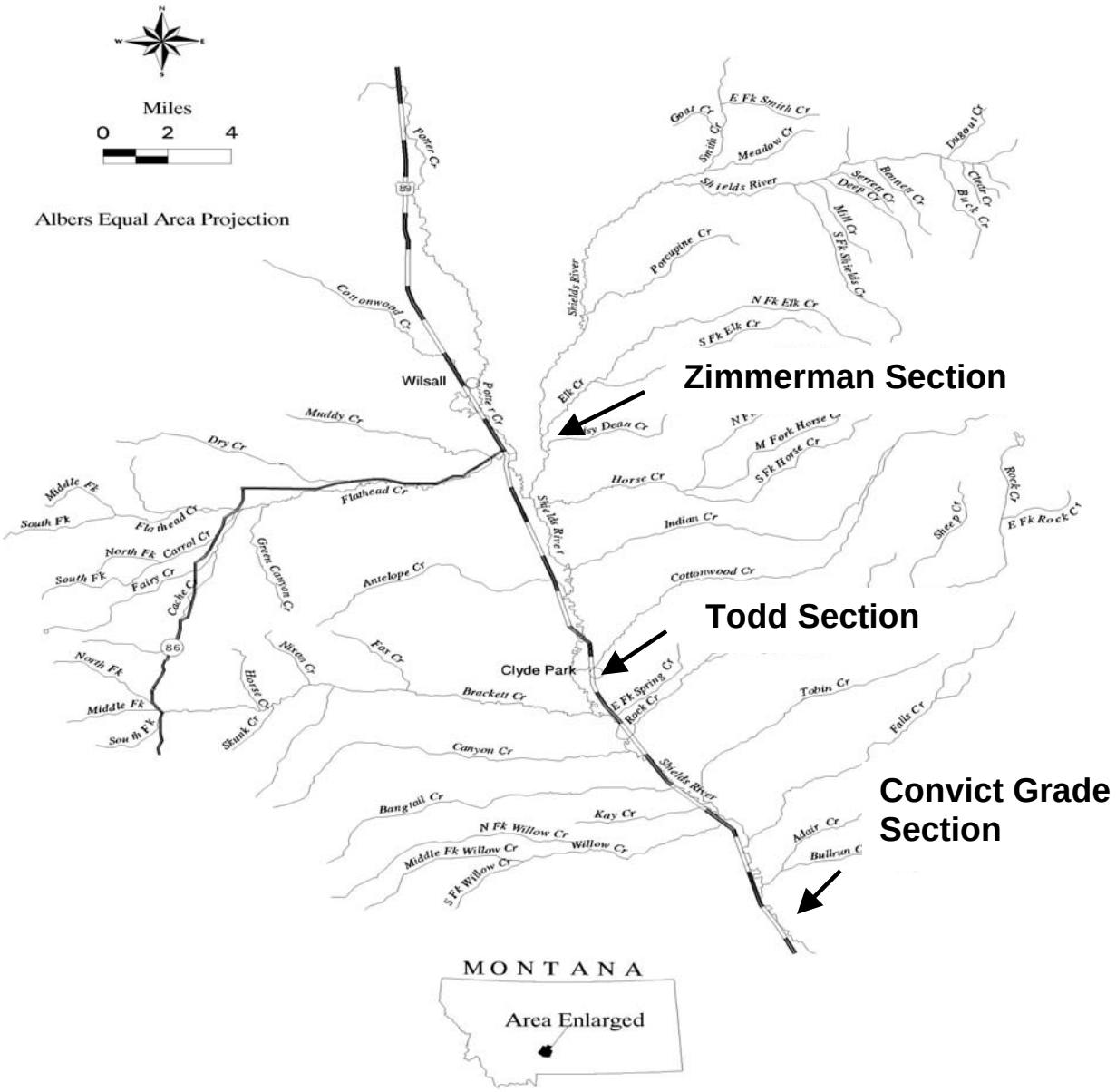
We used a Coleman Crawdad boat mounted with mobile electrofishing gear to sample the Zimmerman section. The gear included a 3,500-watt Honda EG3500X generator and a Coffelt VVP-15. The cathode consisted of two braided steel cables that were hung over each side of the boat and the anode was a single hand-held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

In all cases, fish were collected in live cars, identified, 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 each section occurred 14 days after the marking effort.

I produced trout abundance estimates using FA+, a computer program developed by FWP for processing electrofishing data (MFWP, 2004). Brown trout abundance in the Convict Grade Section was estimated using the modified Peterson model (Chapman 1945). The partial log-likelihood model was used for the remaining estimates. For the partial log-likelihood model, I separated fish into one-inch length groups for analysis and evaluated estimate reliability at alpha = 0.05.

- Table 2: Survey Sections where trout abundance was sampled in the Shields River in 2006.

Section Name	Survey Date	Length (ft)	Approximate Location		
Zimmerman	03/23/06	4,224	Upper Boundary	North West	46.02599 110.64086
			Lower Boundary	North West	46.01728 110.64012
Todd	03/14/06	7,500	Upper Boundary	North West	45.88690 110.61777
			Lower Boundary	North West	45.87044 110.60698
Convict	03/13/06	6,758	Upper Boundary	North West	45.74036 110.48224
			Lower Boundary	North West	45.72618 110.46231



• Figure 8: Map of the Shields River drainage displaying the location of the 2006 sampling locations

Convict Grade

We electrofished the Convict Grade Section March 13, 2006. Captured trout and whitefish 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. This consisted of a small clip of one of the pelvic fins. Captured Yellowstone cutthroat were tagged with a floy tag to monitor movement.

We recaptured the section on March 27, 2006 and marked all captured trout and whitefish with an anal fin clip.

Todd

We sampled the Todd Section on March 14, 2006. Fish were collected using the previously described protocol. Trout and whitefish were marked with a right pelvic clip and a scale sample for aging was collected from trout. Genetic samples were taken from all Yellowstone cutthroat trout for later analysis. This consisted of a small clip of one of the pelvic fins.

We recaptured the section on March 28, 2006. All captured trout and whitefish were marked with an anal clip.

Zimmerman

The Zimmerman Section was marked on March 23, 2006. We marked captured trout and whitefish with a left pelvic clip and took a scale sample from trout for aging. Genetic samples were collected from Yellowstone cutthroat for later analysis. This consisted of a small clip of one of the pelvic fins. Captured Yellowstone cutthroat were tagged with a flow tag to monitor movement.

We completed the recapture on March 31, 2006. Captured trout and whitefish were marked with an anal fin clip.

Shields River Results

Shields River Trout Abundances

I used electrofishing data to calculate trout abundance estimates and monitor population trends. I estimated population abundance using FA+ (MFWP 2004). This program uses partial log-likelihood to calculate estimates. If the electrofishing data does not fit the partial log-likelihood model a Modified Peterson (Chapman 1945) estimate is used. I used the partial log-likelihood model for rainbow trout from the Convict Grade Section and brown trout from the Todd Section and the Zimmerman Section (Table 3). A Modified Peterson (Chapman 1954) was used to produce an abundance estimate for brown trout in the Convict Grade section. The Convict Grade data did not fit the partial log-likelihood model, as a result of low numbers of recaptured fish. Rainbow trout estimates for 2006 do not include fish that visually appeared to be hybrid crosses between rainbow and Yellowstone cutthroat trout.

• Table 3: Population abundance model results for the Shields River by section and species for 2006. N represents the number of fish per mile. * indicates that the Modified Peterson estimator was used.

Section (mark date)			Overall model			Pooled model		
Fish Species	**N**	**SD**	**DF**	**Chi-square**	**P**	**DF**	**Chi-square**	**P**
Convict Grade (3/13)								
Brown Trout	773	149.7	*	*	*	*	*	*
Rainbow Trout	852	100.5	4	5.06	0.281	3	3.14	0.371
Todd (3/10)								
Brown Trout	218	26.2	8	9.59	0.295	6	7.55	0.273
Zimmerman (3/8)								
Brown Trout	99	12.9	8	8.57	0.380	6	7.82	0.252

Convict Grade Section

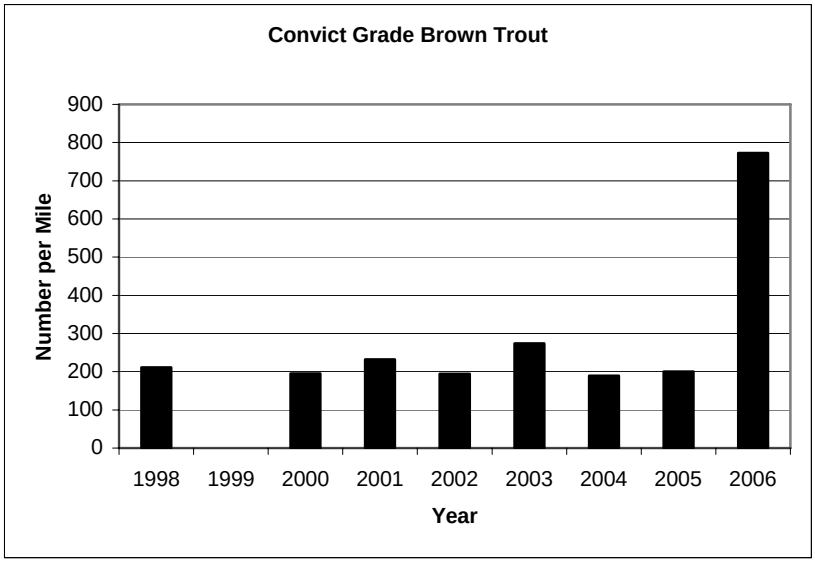
We sampled the Convict Grade Section in March 2006 to assess population trends in Yellowstone cutthroat, rainbow and brown trout. I used the partial log-likelihood model to produce an abundance estimate for rainbow trout and a Modified Peterson to produce a brown trout estimate. Fish seven inches and larger were used to produce abundance estimates. Rainbow and brown trout abundance estimates both increased and Yellowstone cutthroat were captured in this section this year. Results, by species, are presented below.

Brown Trout

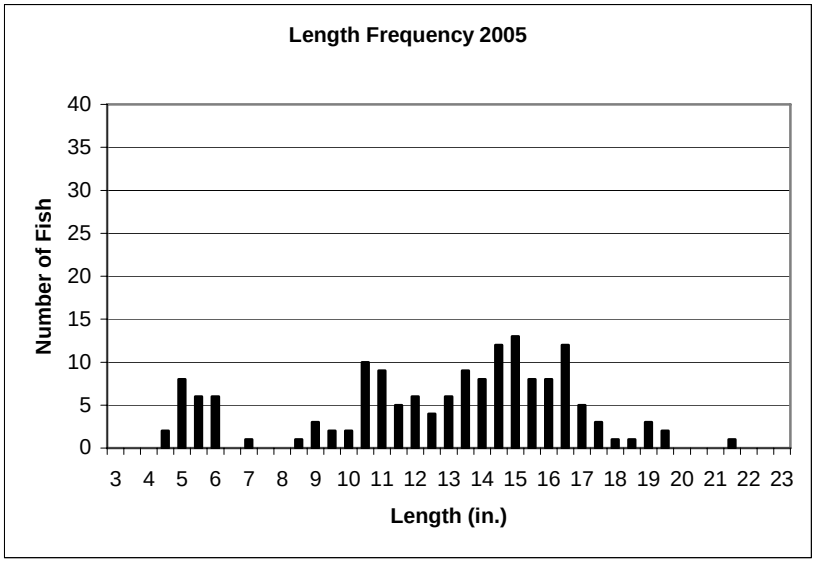
In 2006, abundance of brown trout in the Convict Grade Section was 773 fish/mile (≥ 7 in.) (Figure 9). Abundance increased from 200 fish/mile (≥ 7 in.) in 2005. This population has fluctuated around the long-term average of 214 fish/mile (≥ 7 in.) for the seven previous sample years.

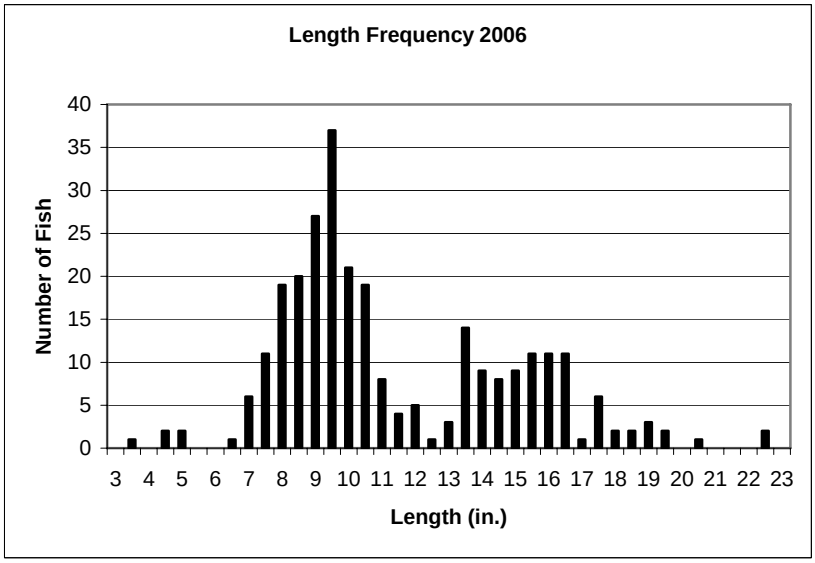
The length-frequency distribution for brown trout in the Convict Grade Section suggests strong numbers of fish in the 7-11 inch range in 2006. There are also strong numbers between 13 and 17 inches (Figure 10). An increase in frequency of many length groups occurred in 2006.

In general, brown trout populations in the Convict Grade Section appear stable with the exception of the increase in the abundance seen this year.



- Figure 9: Abundance estimates for brown trout (≥ 7 in.) in the Convict Grade section from 1998-2006. The section was not sampled in 1999.





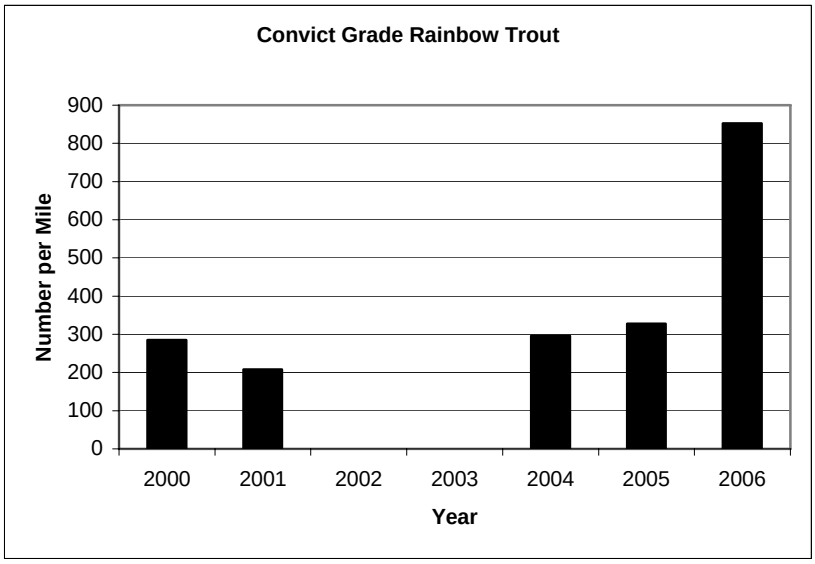
- Figure 10: Length-frequency distributions for all captured brown trout in the Convict Grade Section in 2005 and 2006.

Rainbow Trout

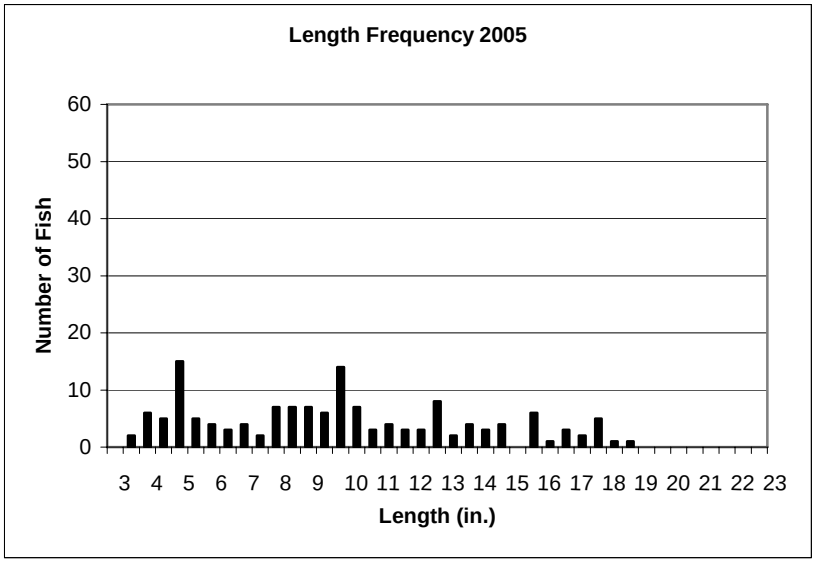
Rainbow trout abundance in 2006 increased to 852 fish/mile (≥ 7 in.) from 328 fish/mile (≥ 7 in.) in 2005 (Figure 11). Abundance of rainbow trout in this section is very difficult to estimate. This is likely a function of rainbow movement during spring spawning migrations. Rainbow trout present in the Convict Grade section are likely a combination of migrant fish from the Yellowstone River and resident fish.

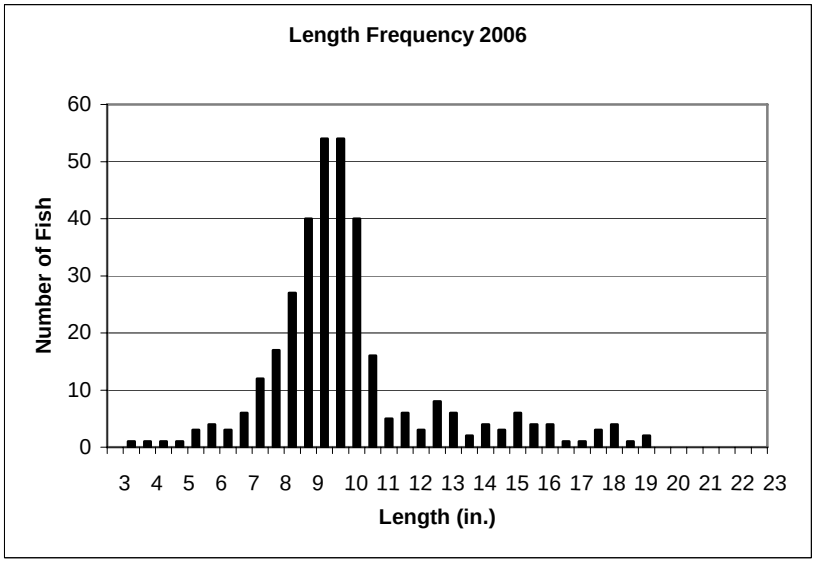
There was a large increase in the length frequency distribution of rainbow trout in 2006. There is a large number of fish in the 7-11 inch range that should contribute to the population in the future. The rainbow length-frequency distribution indicates numbers of larger fish similar to those seen in 2005 (Figure 12).

The Convict Grade rainbow population increased and shows potential to increase more in the future.



- Figure 11: Abundance estimates for rainbow trout (≥ 7in.) in the Convict Grade section from 2000-2006. There was not enough data to produce estimates for 2002 and 2003.

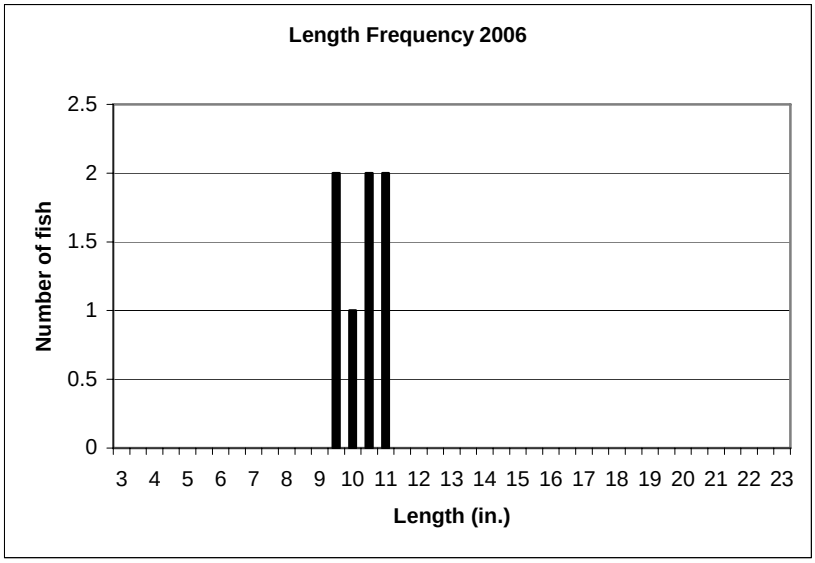




- Figure 12: Length-frequency distributions for all captured rainbow trout in Convict Grade in 2005 and 2006.

Yellowstone Cutthroat Trout

In 2006, seven Yellowstone cutthroat trout were captured in the Convict Grade Section. They ranged from 9.5 to 11.1 inches in total length (Figure 13). There were not enough captured fish to produce an abundance estimate. There were no Yellowstone cutthroat captured in this section in 2004 or 2005 and only one was captured in 2003.



- Figure 13: Length-frequency distributions for all captured Yellowstone cutthroat trout the Convict Grade Section in 2006.

Todd Section

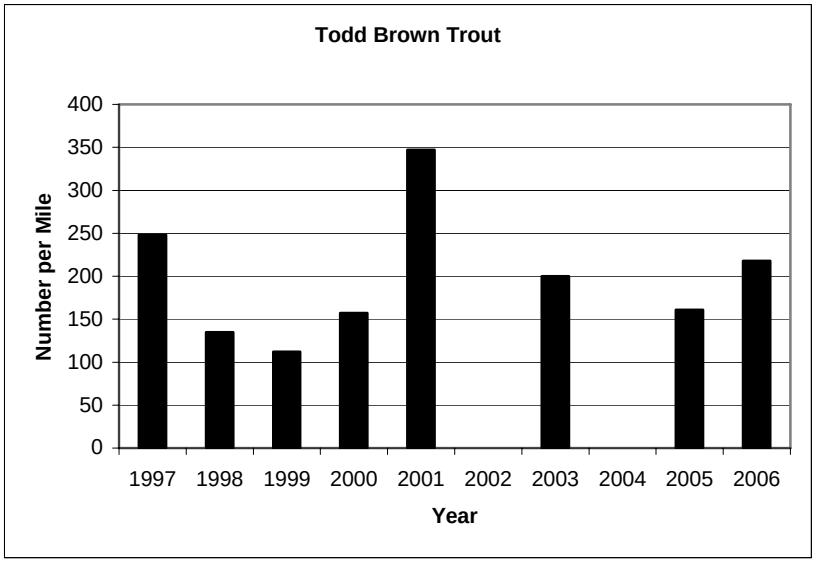
In 2006, the log-likelihood model was used to produce an estimate of brown trout from the Todd Section. Fish seven inches and larger were used to produce abundance estimates. Brown trout have increased in abundance, while rainbow and Yellowstone cutthroat continue to be scarce. Results, by species, are presented below.

Brown Trout

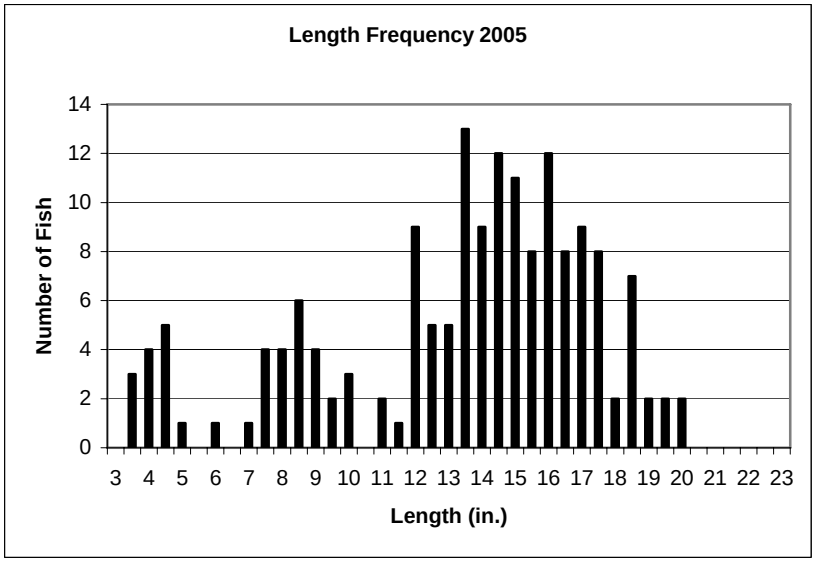
Brown trout abundance in the Todd section was 218 fish/mile (≥ 7in.) in 2006. This is an increase from 161 fish/mile (≥ 7in.) in 2005 and 200 fish/mile (≥ 7in.) in 2004 (Figure 14). The downward trend in brown trout abundance from 2000 through 2005 has ended. The population continues to fluctuate around the average of 194 fish/mile for the 8 previous sampled years.

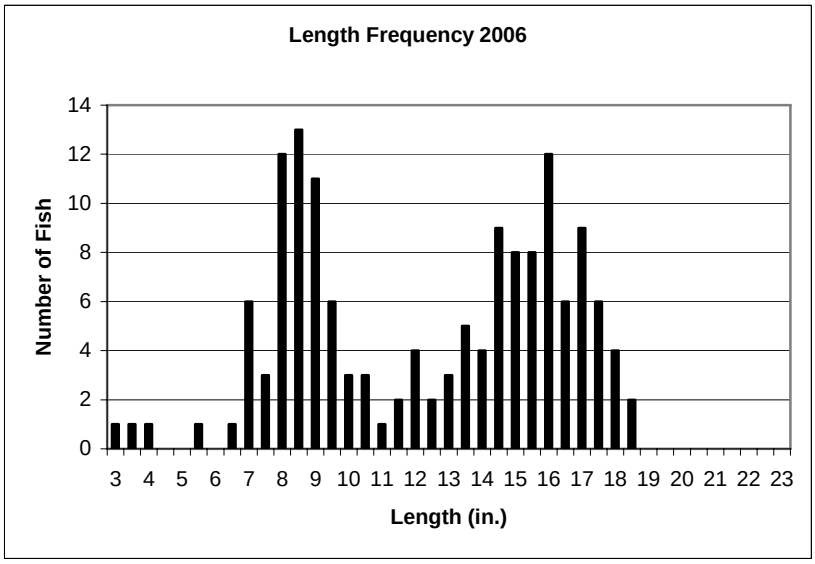
The length-frequency distribution of brown trout shows a strong cohort of fish in the 7-10 inch range. This cohort should contribute to an increase in abundance in the future (Figure 15).

Brown trout in the Todd Section appear to be stable and has increased slightly this year.



- Figure 14: Abundance estimates for brown trout (≥ 7 in.) in the Todd Section from 1997-2006. The section was not sampled in 2002 and 2004.

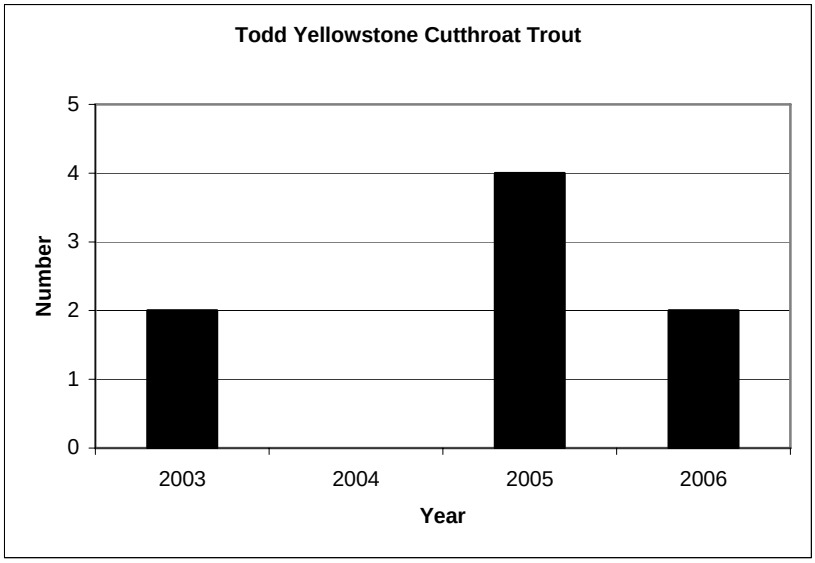




- Figure 15: Length-frequency distribution of all captured brown trout in the Todd Section in 2005 and 2006.

Yellowstone Cutthroat Trout

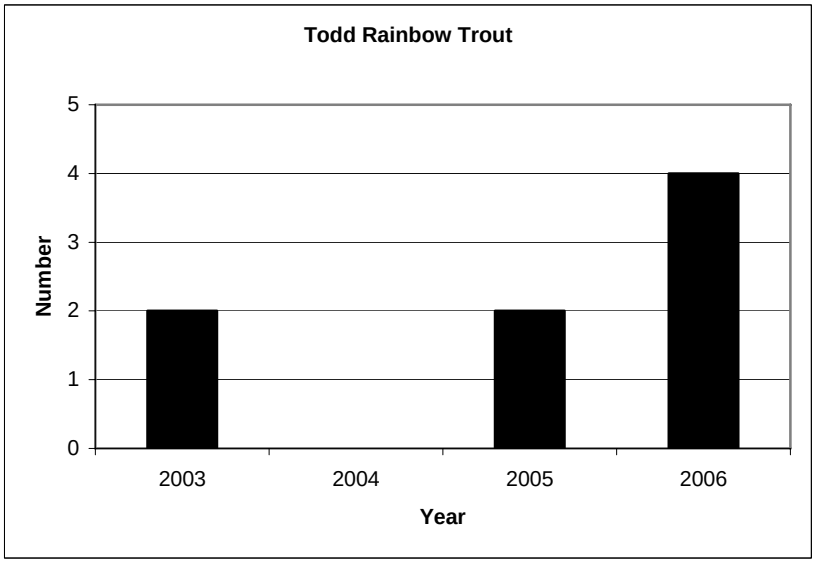
In the Todd Section, only two Yellowstone cutthroat trout were captured in 2006 (Figure 16). They were 9.2 and 10.8 inches in total length. There were four cutthroat captured in 2005. It is apparent that this section supports very low numbers of Yellowstone cutthroat trout in late winter/early spring.



- Figure 16: Total number of Yellowstone cutthroat captured in the Todd Section from 2003 through 2006. This section was not sampled in 2004.

Rainbow

In 2006, four rainbow trout were captured in the Todd Section (Figure 17). They ranged from 12.0 to 14.0 inches in total length. Only two rainbow were captured in 2005. Rainbow are rare in the Todd Section in late winter/early spring.



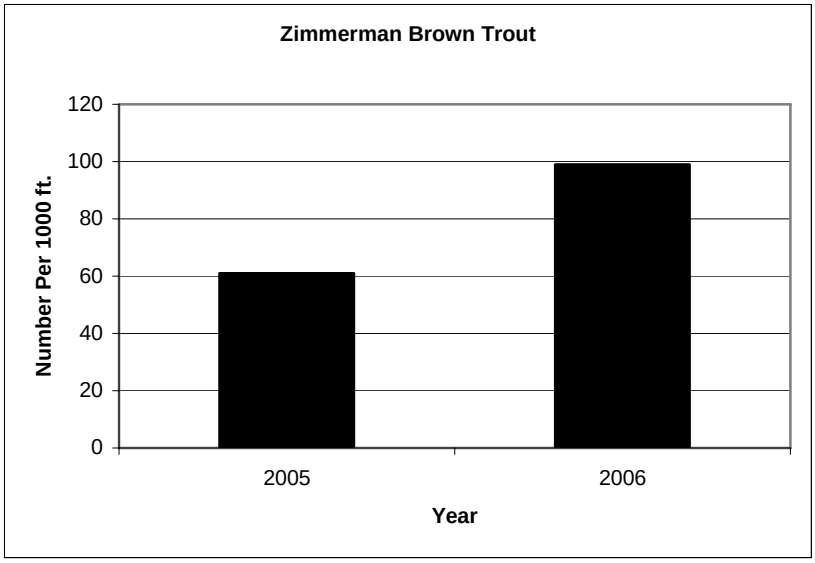
- Figure 17: Total number of rainbow trout captured in the Todd Section from 2003 through 2006. This section was not sampled in 2004.

Zimmerman Section

We sampled the Zimmerman Section in March 2006 to assess population trends in Yellowstone cutthroat, brook and brown trout. I used the partial log-likelihood model to produce abundance estimates for brown trout. Fish seven inches and larger were used to produce an abundance estimate. Brown trout abundance appears to be increasing. Yellowstone cutthroat and brook trout are rare. Results, by species, are presented below.

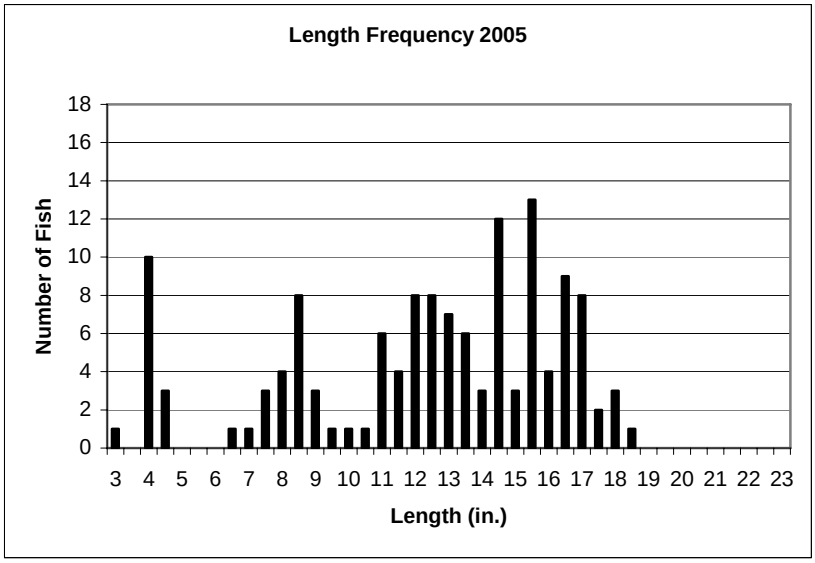
Brown Trout

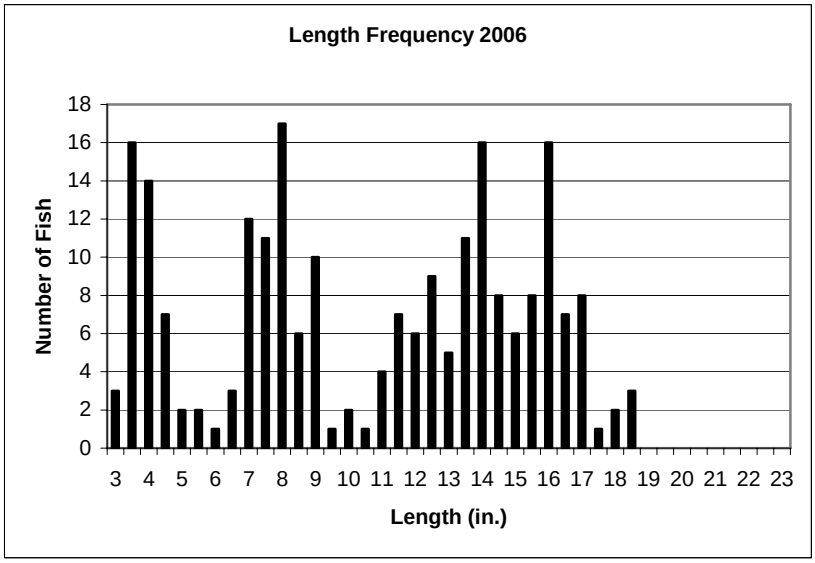
The abundance estimate for brown trout in the Zimmerman Section was 99 fish/1,000 feet (≥7 in.) (Figure 18). This is up from 61 fish/1,000 feet (≥ 7 in.) in 2005. This section has not been sampled since 1995. In 1995, the abundance estimate for brown trout was 102 fish/1,000 feet (≥ 7 in.). More data needs to be collected to determine what the current trends in abundance of brown trout in this section really are.



• Figure 18: Abundance estimates for brown trout (≥ 7 in.) in the Zimmerman Section in 2005 and 2006.

The length frequency distribution for brown trout in the Zimmerman Section displays good distribution of fish indicating the presence of multiple year classes. There are groups of smaller fish present in relatively strong numbers that indicate potential for good recruitment next year to larger size classes (Figure 19). Numbers of fish in many length groups are higher than in 2005.





- Figure 19: Length-frequency distribution for all captured brown trout in the Zimmerman Section in 2005 and 2006.

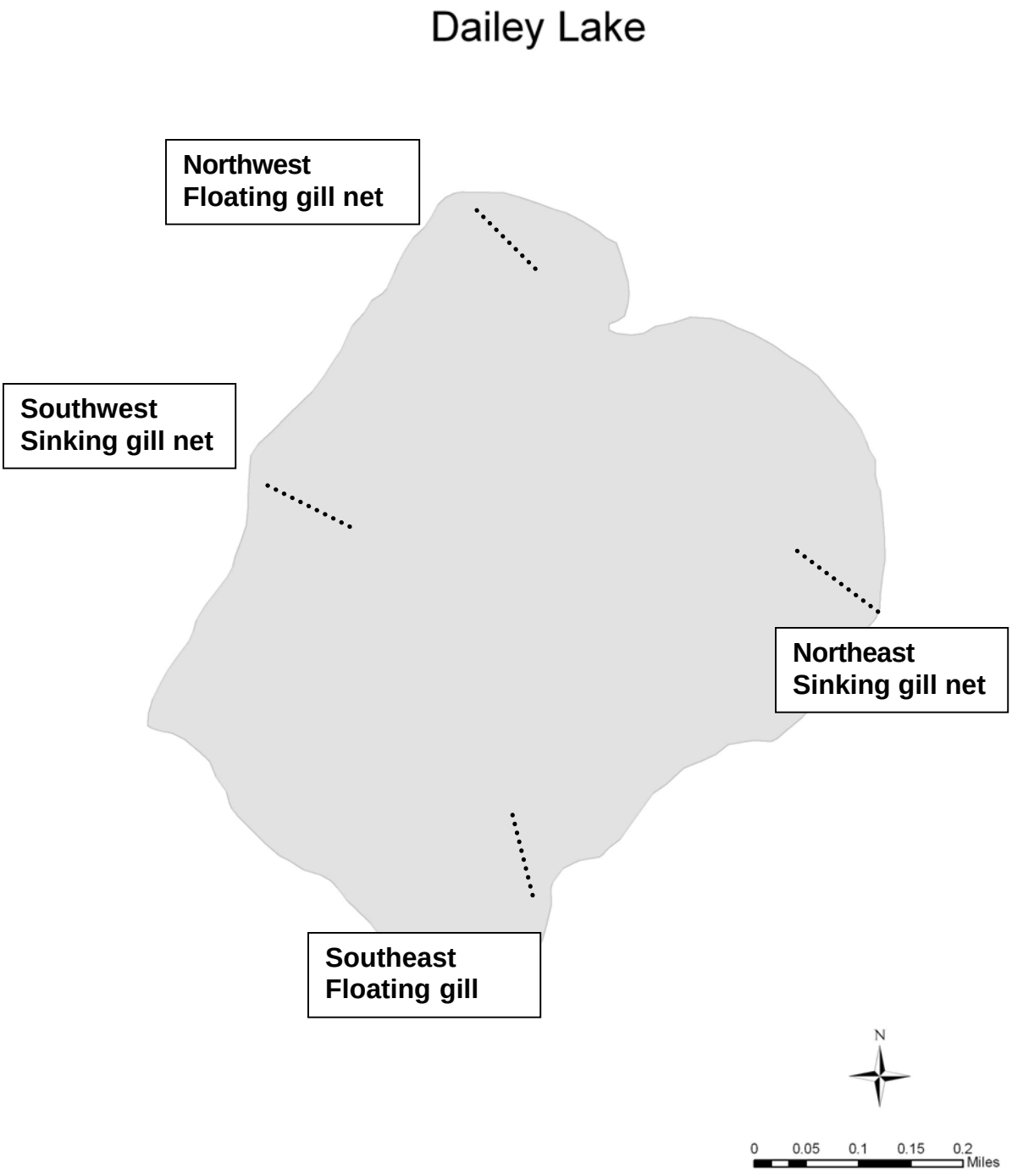
Yellowstone Cutthroat Trout

In 2006, only two Yellowstone cutthroat trout were captured in the Zimmerman Section. They were 9.2 and 10.8 inches in total length. This number is down from seven that were captured in 2005. Yellowstone cutthroat in the Zimmerman Section are rare in late winter/early spring.

Dailey Lake Procedures

Gillnetting

Gillnet sampling in 2006 was similar to previous years in regard to timing and location of nets in the lake (Figure 20).



• Figure 20: Map of Dailey Lake showing locations of floating and sinking gill nets in spring 2006.

We set the gill nets the evening of May 22, 2006. The set consisted of two sinking and two floating experimental gill nets. The southeast floating gill net that was set about 100 ft. off shore because of the large number of cattails in that area.

We pulled the nets on the morning of May 23, 2006. We recorded lengths of all fish to the nearest 0.1 inch and weights were recorded to the nearest 0.01 pound. All live fish were released back into the lake.

Dailey Lake Results

Gillnetting

Fisheries in Dailey Lake are primarily sampled using gill nets. This technique is prone to wide variability in sampling efficiency.

Fish populations in Dailey Lake in 2006 appear to have increased in abundance with the exception of yellow perch. Average lengths remain similar to previous years.

Catch-per-unit-effort

Rainbow Trout

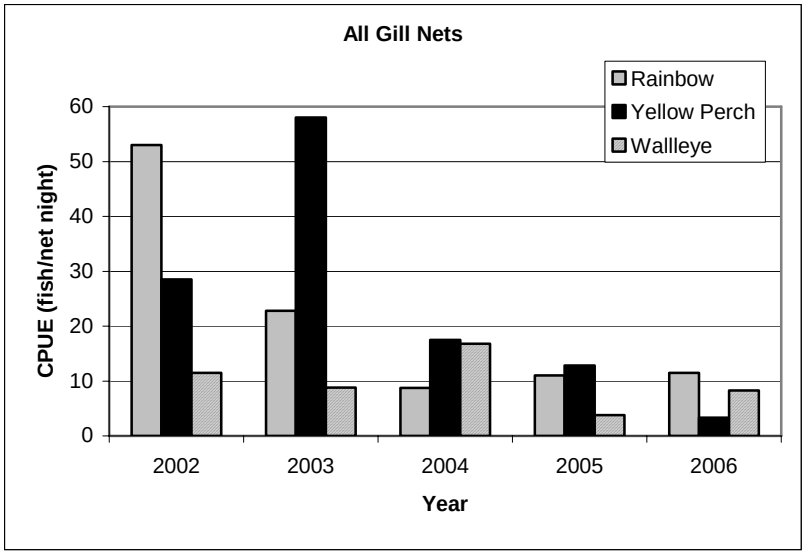
Catch-per-unit effort (CPUE) for rainbow trout in all nets was 11.5 fish/net night. This is up slightly from 11fish/net night in 2005 (Figure 21). The average CPUE for rainbow trout in all nets was 24 fish/net night for 2002-2005. The CPUE of 9 fish/net night for rainbow in floating nets was higher than 8.5 fish/net night in 2005, but still lower than 9.5 fish/net night in 2004 (Figure 22). CPUE in sinking nets increased slightly to 14 fish/net night from 13.5 fish/net night in 2005 (Figure 23).

Yellow Perch

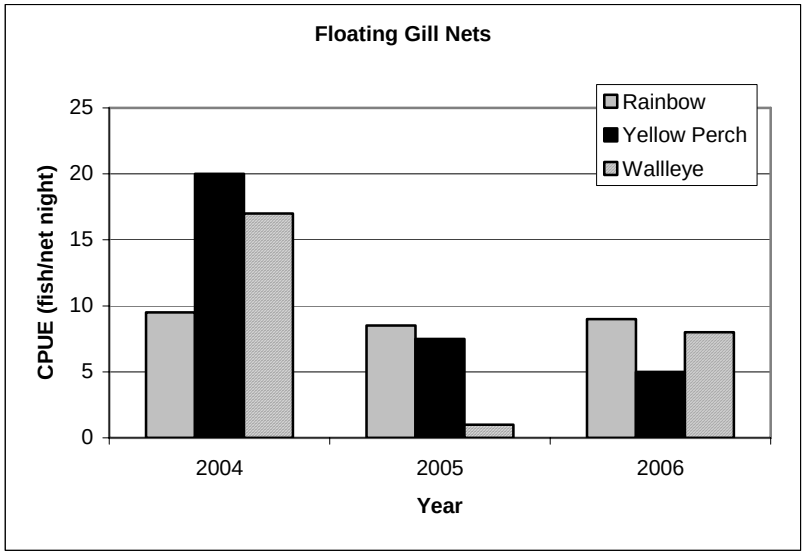
The CPUE of 3.3 fish/net night for yellow perch in all nets was down dramatically from 17.5 fish/net night in 2004 and 12.8 fish/net night in 2005. This continues the decline that occurred between 2003 and 2004 (Figure 21). The average CPUE for yellow perch in all nets was 29 fish/net night for 2002-2005. In 2006, CPUE for yellow perch was lower for the floating nets at 5 fish/net night compared to 20 fish/net night and 7.5 fish/net night in 2004 and 2005, respectively (Figure 22). The CPUE for sinking gill nets was 15 fish/net night in 2005 and decreased to 1.5 fish/net night in 2006 (Figure 23).

Walleye

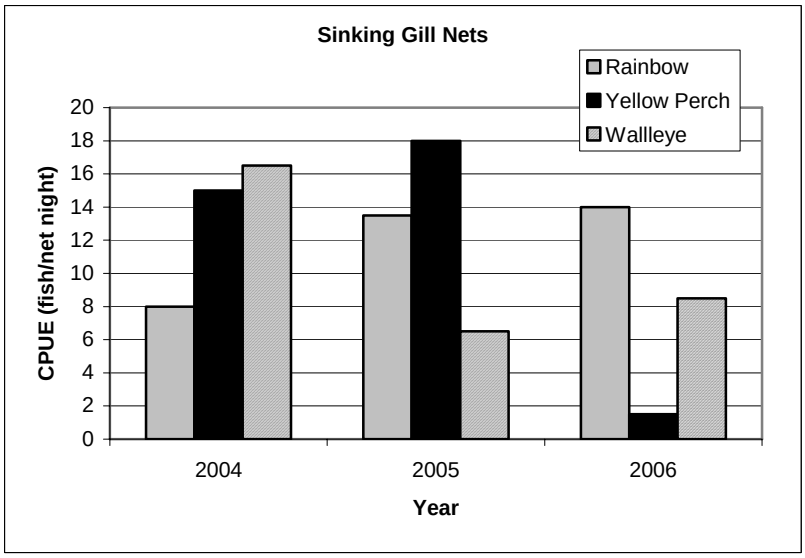
CPUE for walleye in all nets in 2005 was 3.8 fish/net night and increased to 8.3 fish/net night in 2006. This is still lower than 16.8 fish/net night in 2004 and 8.8 fish/net night in 2003 (Figure 21). The average CPUE for walleye in all nets is 10 fish/net night for 2002-2005. In 2006, CPUE in floating nets was 8 fish/net night, an increase from 1fish/net night in 2005, and still lower than 17 fish/net night in 2004 (Figure 22). The CPUE of 8.5 fish/net night for the sinking nets was up from 6.5 fish/net night in 2005 and still below 16.5 fish/net night in 2004 (Figure 23).



- Figure 21: Catch-per-unit-effort for rainbow, yellow perch, and walleye in all gill nets for 2002 through 2006



- Figure 22: Catch-per-unit-effort for rainbow, yellow perch, and walleye in floating gill nets for 2004 through 2006.



- Figure 23: Catch-per-unit-effort for rainbow, yellow perch, and walleye in sinking gill nets for 2004 through 2006.

Average Length

Rainbow trout

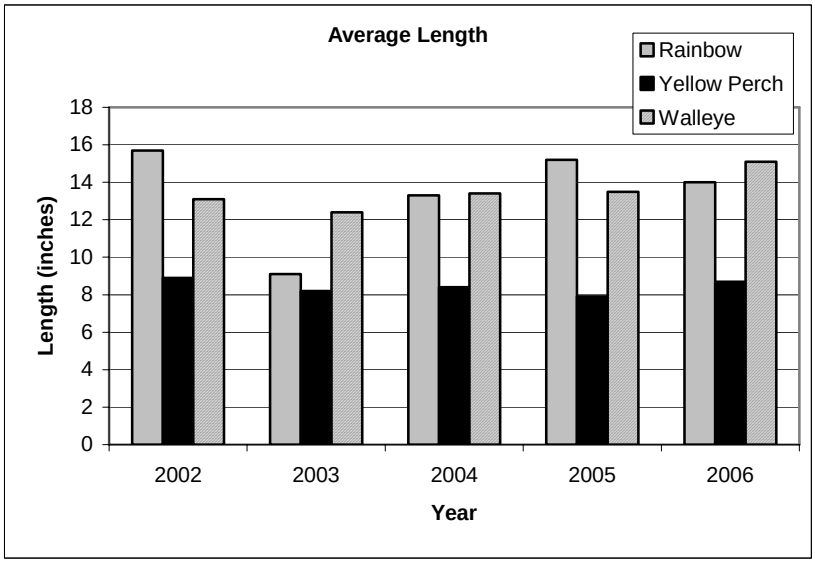
The average length of rainbow trout captured increased from the low of 9.1 inches in 2003 to 15.2 inches in 2005 and decreased slightly to 14 inches in 2006(Figure 24). This is just below the average length of 15.4 inches from 1997-2005. Captured rainbow trout ranged from 7.4-19.5 inches in total length.

Yellow Perch

The average length of yellow perch was 8.7inches in 2006 (Figure 24). This is higher than the average length of 8.3 inches for 1997-2005. Captured yellow perch ranged from 7.2-10.7 in. in total length.

Walleye

The average length of walleye in 2005 was 13.5 inches, which is slightly larger than the average length of 13.4 inches in 2004 (Figure 24). It is also larger than the average length of 13.0 inches for 1997-2004. Captured walleye ranged from 9.3-23.5 in. in total length.



• Figure 24: Average length of rainbow, yellow perch, and walleye captured from 1997 through 2006.

Length Frequency

Rainbow Trout

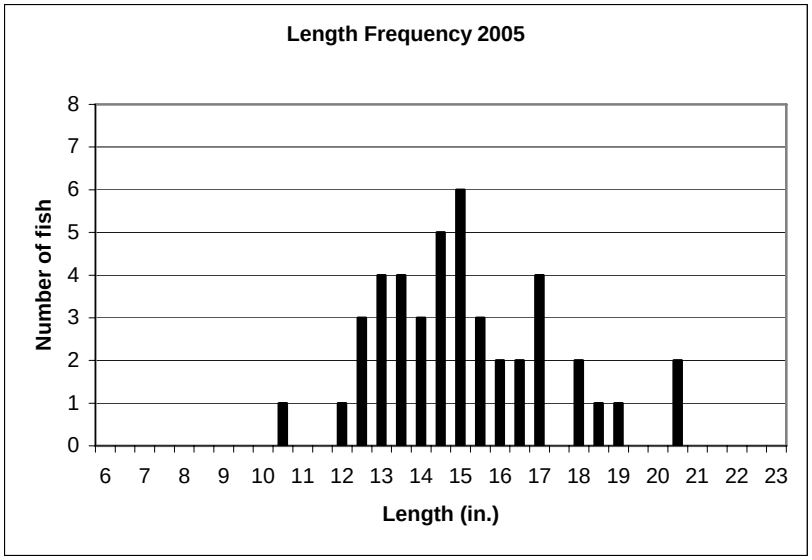
In 2006, the length-frequency distribution of rainbow trout in Dailey Lake was clearly weighted toward fish in the 7-11 inch and 15-20 inch range (Figure 25). It appears that there should be continued recruitment of rainbow to larger size classes in 2007.

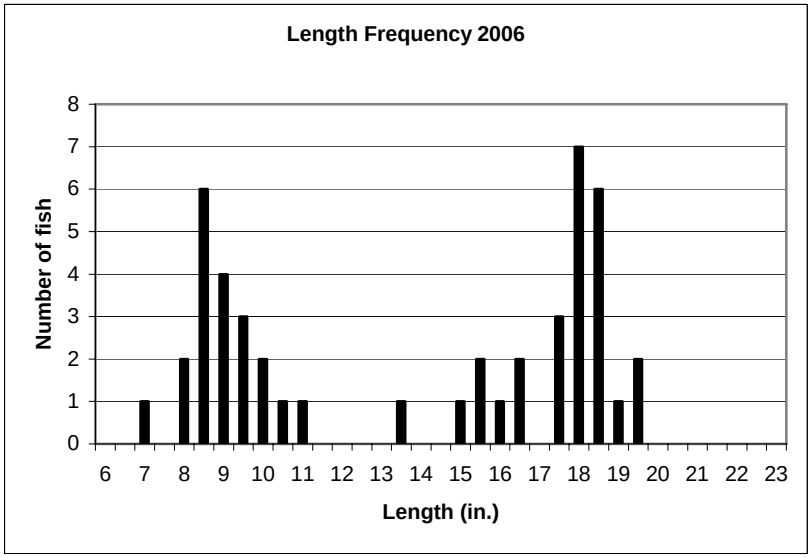
Yellow Perch

The length-frequency distribution for yellow perch in 2006 was weighted toward 8.5-inch and larger fish while showing a reduction in abundance of fish in all length groups compared to 2005 (Figure 26). This is very evident with the lack of fish in the 6 to 8-inch range. It appears that recruitment of juveniles to larger lengths will be very limited.

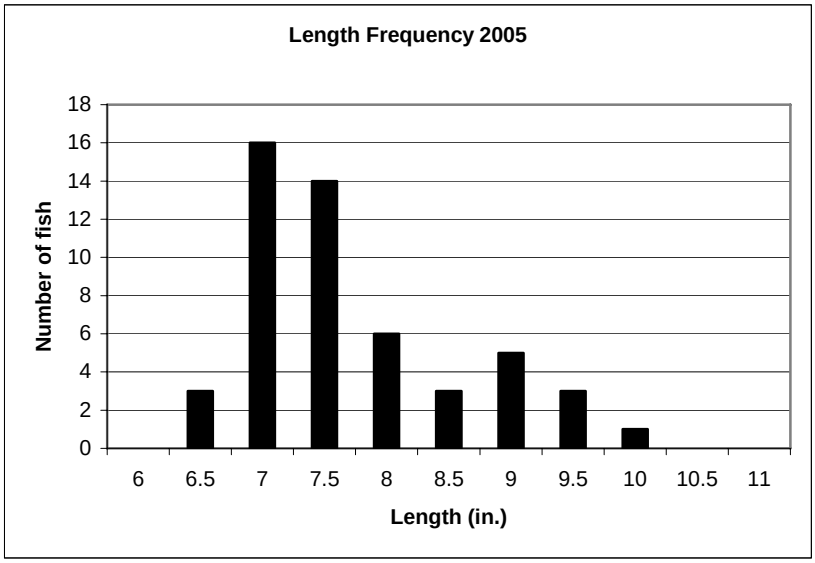
Walleye

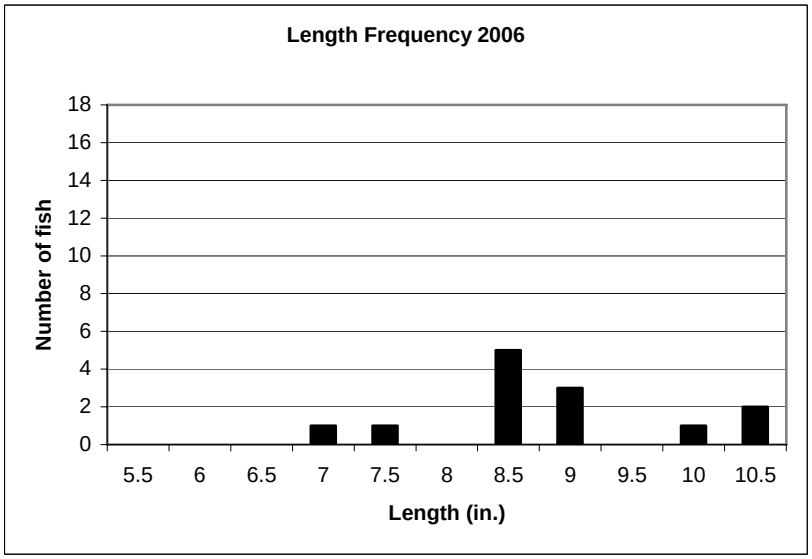
The length-frequency distribution of walleye in 2006 shows better distribution and higher abundance than 2005 (Figure 27). This suggests that the poor distribution seen in 2004 was likely caused by drought and low water levels or sampling efficiency.



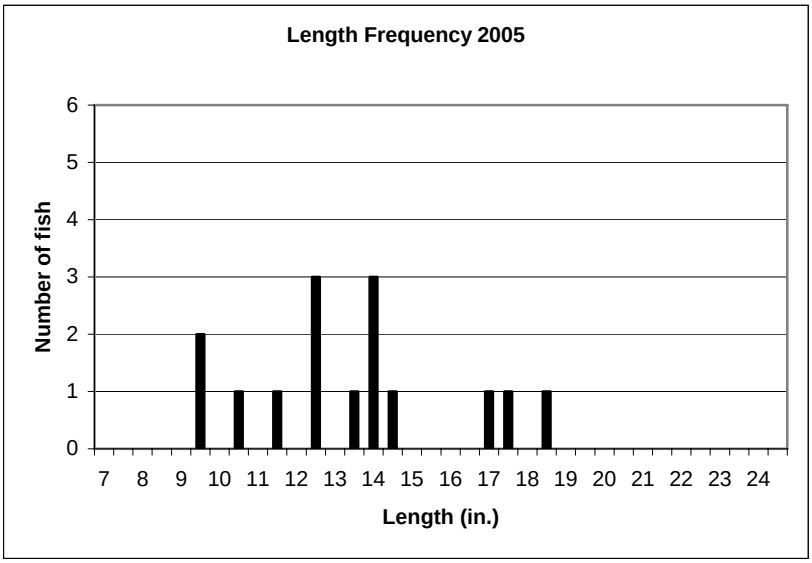


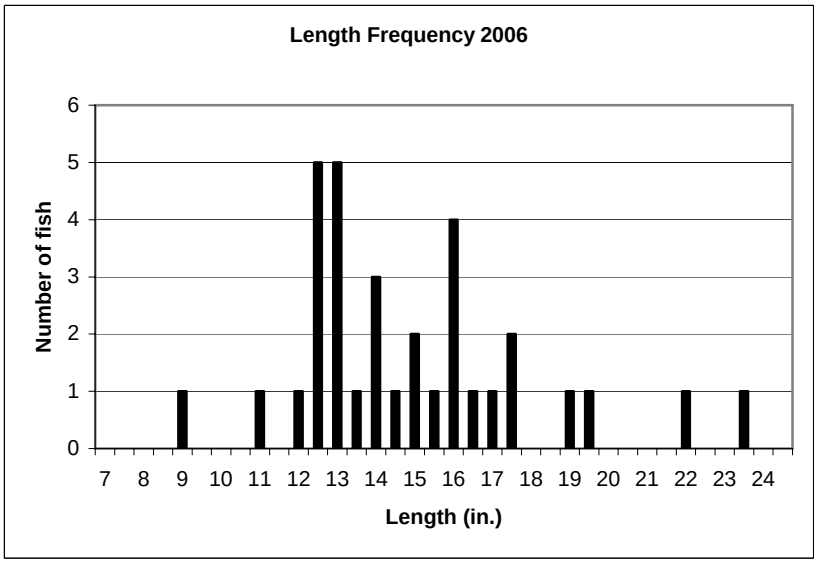
• Figure 25: Length-frequency distribution for Dailey Lake rainbow trout in 2005 and 2006.





• Figure 26: Length-frequency distribution for Dailey Lake yellow perch in 2005 and 2006.





• Figure 27: Length-frequency distribution of Dailey Lake walleye in 2005 and 2006.

Fish Stocking

Dailey Lake is stocked annually with rainbow trout and walleye in order to maintain a fishery for these species and meet goals of the Dailey Lake Management Plan (MFWP 1997).

Dailey Lake was planted with 26,889 rainbow trout in 2006. All fish from both Giant Springs and Blue Water Trout Hatcheries were released directly from the truck into the lake.

In 2006, 10,000 walleye were planted in Dailey Lake. The fish were from the Miles City Fish Hatchery and were raised from eggs collected at Fort Peck Lake. The walleye were released directly from the truck into the lake.

Walleye

On June 15, 5,000 walleye from the Miles City Fish Hatchery were stocked into Dailey Lake. They averaged 1.3 inches in length. On September 8, the Miles City Fish Hatcher stocked 4,856 walleye with an average length of 3.7 inches into Dailey Lake (Table 4). All walleye stocked in 2005 were from eggs collected at Fort Peck Lake in Spring 2005.

- Table 4:Walleye stocking information from 2001-2006.

Year	Date	Strain	Length (in.)	Number
2001	June 20	Fort Peck	1.3	5,000
	Aug. 21	Fort Peck	3.2	5,000
			Total	10,000
2002	July 1	Fort Peck	1.7	5,000
	Aug. 15	Fort Peck	2.6	3,542
			Total	8,542
2003	June 14	Fort Peck	1.1	5,000
	Aug. 20	Fort Peck	3.0	5,069
			Total	10,069
2004	June 24	Fort Peck	1.5	5,000
	Aug. 26	Fort Peck	2.4	5,000
			Total	10,000
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	4.8	5,000
	Aug. 26	Fort Peck	2.4	5,000
			Total	10,000

Rainbow

On April 12, Dailey Lake was stocked with 16,861 young-of-the-year rainbow trout from Giant Springs Trout Hatchery. The plant consisted of 11,000 Arlee strain rainbow trout that averaged 3.2 inches in length and 5,861 wild strain rainbow trout that averaged 7.4 inches in length. Eagle Lake strain young-of-the-year rainbow from Bluewater Springs Trout Hatchery were planted on May 9. There were 10,028 fish that had an average length of 3.0 inches in length (Table 5).

- Table 5: Rainbow stocking information from 2001-2006.

Year	Date	Strain	Length (in.)	Number
2001	Apr. 12	DeSmet	5.2	5,040
	Apr. 12	Arlee	2.8	9,976
	May 18	Eagle Lake	3.8	10,074
			Total	25,090
2002	Apr. 18	W	5.1	5,049
	Apr. 18	Arlee	3.1	10,392
	May 22	Eagle Lake	3.8	10,305
			Total	25,746
2003	May 7	W	6.3	5,227
	May 7	Arlee	3.8	10,000
	May 16	Eagle Lake	3.5	10,179
			Total	25,406
2004	Apr. 14	W	5.6	5,000
	Apr. 14	Arlee	3.5	10,000
	*	Eagle Lake	*	*
			Total	15,000
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	W	7.4	5,861
			Total	26,889

Discussion

The continued decline of Yellowstone cutthroat in the Springdale Section is a concern that will be looked at closely over the next few years. It is interesting that abundance of rainbow and brown trout in this section is remaining fairly stable while cutthroat are declining. This could be a result of drought inhibiting access of cutthroat from the river to spawning tributaries. Continued monitoring of the cutthroat population in the river, stream flows, and spawning tributaries should provide a more definite explanation of what is causing this decline.

The Shields River trout populations have increased this year but over the long term remain stable. The recent increases appear be a result of increased abundances of yearling fish. This is very encouraging in light of continued drought and dewatering of sections of the river.

Abundances for all species in Dailey Lake are down compared to previous years. This may be the result of continued drought and low water levels, sampling efficiency, or a combination of the two. Continued monitoring will help determine if the drop in abundance is indicative of a downward trend or just a natural fluctuation.

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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MFWP 1997. Montana Warmwater Fisheries Management Plan: 11997-2006. Montana Fish, Wildlife & Parks. Fisheries Division. Helena, Montana

Opitz, S. 2005. Fisheries Investigations in the Yellowstone and Shields River Basins, Park County, Montana. Annual report for 2004. Progress report for Federal Aid Project F-113-R-4. Montana Fish, Wildlife & Parks, Bozeman, Montana.

Opitz, S. 2006. Fisheries Investigations in the Yellowstone and Shields River Basins, Park County, Montana. Annual report for 2005. Progress report for Federal Aid Project F-113-R-5. Montana Fish, Wildlife & Parks, Bozeman, Montana.