

**Lake Davis Grizzly Valley Dam Fish
Containment Structure
2008-2010 Summary Report**



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Introduction

This report covers the third, fourth, and fifth year (2008-2010) of monitoring on the Grizzly Valley Dam fish containment structure, termed “strainers.” The strainers were constructed at the outfall of the dam to contain northern pike (NP) (*Esox lucius*), a non-native, invasive species from escaping Lake Davis, Plumas County, California and subsequently prevent them from entering into the Feather River from Big Grizzly Creek. Construction of eight strainers below the Grizzly Valley Dam at Lake Davis was completed by the California Department of Water Resources (DWR) in 2006. The strainers began operation on September 28, 2006. The California Department of Fish and Wildlife (CDFW) (formerly known as California Department of Fish and Game) began cleaning and monitoring the strainers for northern pike on December 1, 2006. The system was designed to prevent northern pike from escaping through the outfall until the lake could be treated with a formulation of Rotenone.

An attempt to eradicate northern pike was first made in 1997 by CDFW, but was found to have been unsuccessful in 1999, when northern pike were rediscovered in the lake. In 2007, Lake Davis was chemically treated for the second time. The strainers were decommissioned on September 26, 2007, for the duration of the chemical treatment and were returned to operation on January 24, 2008, following the chemical treatment. The containment system was to remain in operation until conclusive evidence could show that northern pike were successfully eradicated from Lake Davis. Following three years (2008-2010) of post-treatment monitoring, no northern pike had been observed or captured, thus supporting the hypothesis that the 2007 eradication project was effective at eliminating northern pike from Lake Davis and its tributaries. Therefore, the containment system was taken out of service on October 27, 2010. This report outlines the catch results of the strainer system in the years 2008, 2009, and 2010. The results of the 2006 through 2007 strainer monitoring are included in this report and summarized in-depth in a previous report (Rossi and Denney 2012).

Methods

Water releases from Lake Davis are controlled through an intake structure on Grizzly Valley Dam and are capable of drawing water from three elevations in the lake using a series of inlet valves. Inlet valves are located at 5,700 feet, 5,740 feet, and 5,760 feet above mean sea level. All water exiting the lake must pass through either of these inlet valves. At water surface elevations, additional water will go over the spillway (5,775 feet) (Figure 1). DWR manages the lake level to prevent the use of the spillway.

Water from the inlet valves enters the containment structure through a 36-inch diameter pipe. From there it passes through one or more of the eight strainers (Figure 2). Each strainer was designed to filter up to 50 cubic feet per second (cfs) of water. Water flows into each strainer from above and exits via the mesh side (one millimeter) of the basket (Figure 3). Strainer number one is closest to the dam outlet while strainer number eight is the furthest. All eight strainers have the potential to be operational at the same time. However, based on the average flow releases from Lake Davis, the system generally operates with fewer than eight strainers running simultaneously. Filtered water then flows into a second large pipe and through the outlet to Big Grizzly Creek (Figure 4).



Figure 1. Lake Davis showing Grizzly Valley Dam, the spillway, and outlet structure (pre-fish containment structure).



Figure 2. Containment structure below Grizzly Dam at Lake Davis, California (DWR).



Figure 3. One of the eight strainer baskets.

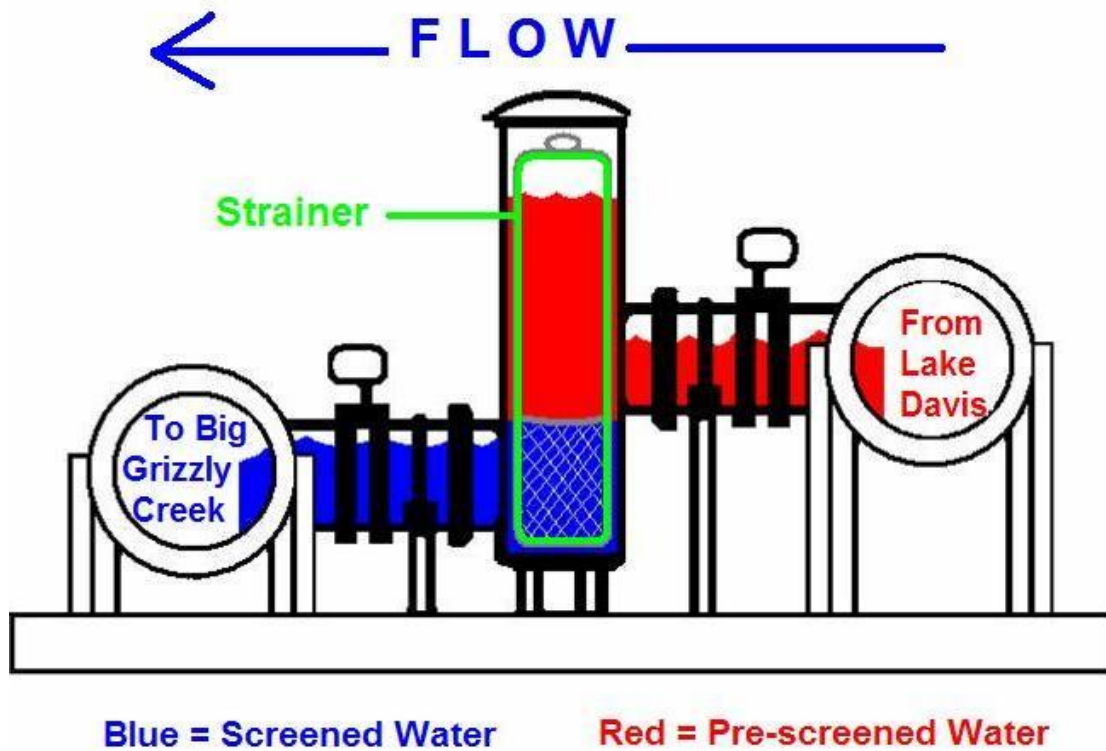


Figure 4. Schematic of strainer operation (DWR).

Strainers were checked and cleaned by CDFW employees approximately once per month during the 2008 through 2010 monitoring period. Fish collection was accomplished by removing the strainers, one at a time, from the containment structure using a mechanical hoist which ran along the roof of the structure. The accumulated biomass in each strainer was scraped into a bag and labeled for future analysis at the lab.

Analysis consisted of weighing and measuring all fish or fish parts that could be visually identified to species. Fish identified to species were weighed (to the nearest gram (g)) and their total length (TL) measured to the nearest millimeter (mm). For further details on the structure operation, methodology of sampling, and photographs, see the 2006-2007 strainer report (Rossi and Denney 2012).

Results: Pre-Treatment 2006-2007

From December 1, 2006, through September 26, 2007, the strainers were checked and cleaned a total of 48 times. Runtime between strainer checks varied between 22.75 and 476.50 hours. Flow rates during this monitoring period ranged from 8.8 to 161.0 cubic feet per second. The intake elevations used during 2006-2007 were located at 5,700 feet, 5,740 feet, and 5,760 feet above mean sea level (Rossi and Denney 2012). A total of 3,946 fish were captured, of which 1,325 were measured. Four species of fish were captured: brown bullhead (BB) (*Ameiurus nebulosus*; 30-198 mm; mean TL = 91 mm), pumpkinseed (PSD) (*Lepomis gibbosus*; 31-68 mm; mean TL = 41 mm), golden shiner (GSH) (*Notemigonus crysoleucas*; 30-132 mm; mean TL = 60 mm), and a northern pike (368 mm) (Table 1). Two additional northern pike were collected from the strainers by DWR staff prior to CDFW involvement in strainer monitoring. Crayfish were not enumerated due to their disintegrated condition. Total mass recorded as “miscellaneous weight” included unidentifiable portions of aquatic species such as fish and crayfish. Individual length and weight data for fish measured is archived in the CDFW North Central Region Fish Files, and is represented by a length frequency histogram in Figure 5.

Table 1. 2006-2007 strainer catch results (December 1, 2006 through September 26, 2007).

Species	Quantity Captured	Species Composition by Quantity	Total Mass (g)	Species Composition by Mass
Brown bullhead	3760	96.41%	17,448.4	9.98%
Pumpkinseed	64	1.64%	66.6	0.04%
Golden shiner	75	1.92%	135.2	0.08%
Northern pike	1	0.03%	186.9	0.11%
Miscellaneous	N/A	N/A	157,050.0	89.80%

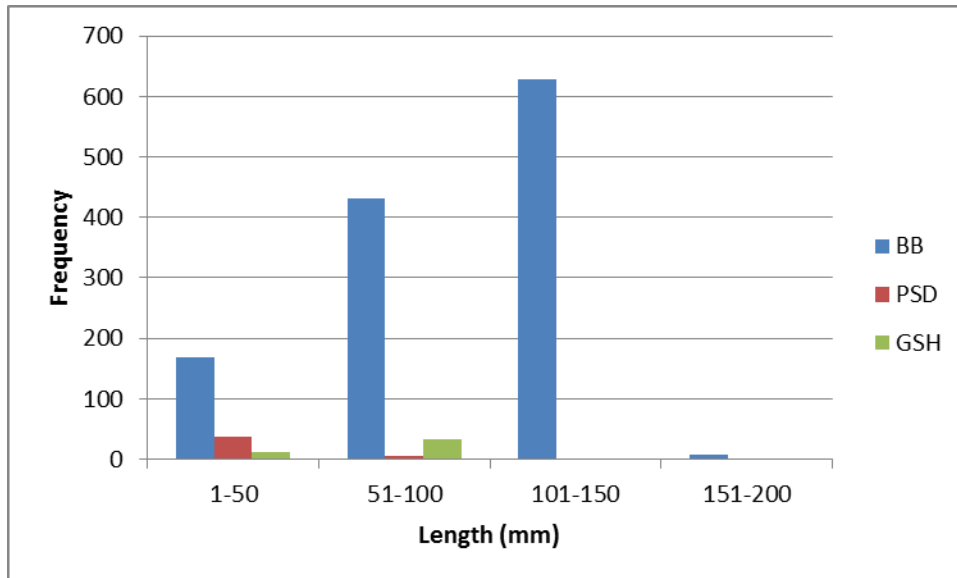


Figure 5. 2006-2007 length-frequency histogram of fish captured in the strainers (excluding northern pike and crayfish).

Results: Post-Treatment 2008

The strainers at Lake Davis were checked and cleaned a total of sixteen times from January 24, 2008, through December 31, 2008. Runtime between strainer checks varied between 168 and 696 hours. Flow rates during this monitoring period ranged from 10.0 to 11.2 cubic feet per second. The intake elevation used during 2008 was located at 5,700 feet above mean sea level (Appendix A). A total of 109 fish were captured, of which 63 were measured. Three species of fish were captured: brown bullhead (47-82 mm; mean TL = 65 mm), pumpkinseed (35-57 mm; mean TL = 49 mm), and one rainbow trout (RT) (*Oncorhynchus mykiss*, 234 mm) (Table 2). Crayfish were not enumerated due to their disintegrated condition. Total mass recorded as crayfish occasionally included unidentifiable portions of other aquatic species such as fish. Individual length and weight data for fish measured is provided in Appendix B, and in a length frequency histogram in Figure 6.

Table 2. 2008 strainer catch results (January 24, 2008 through December 31, 2008).

Species	Quantity Captured	Species Composition by Quantity	Total Mass (g)	Species Composition by Mass
Brown bullhead	103	94.5%	416.2	28.6%
Pumpkinseed	5	4.6%	12.5	0.9%
Rainbow trout	1	0.9%	96.1	6.6%
Crayfish	N/A	N/A	928.0	63.9%

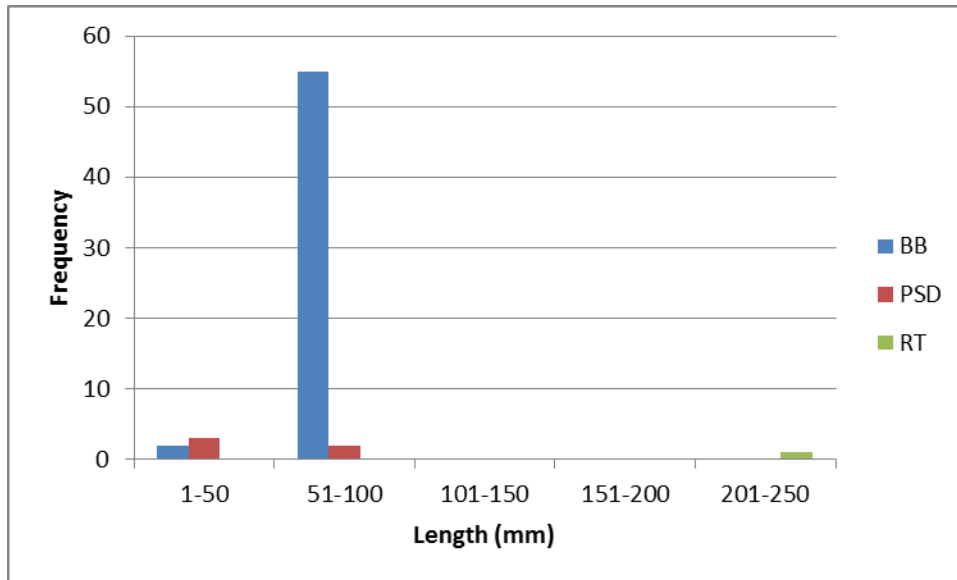


Figure 6. 2008 length-frequency histogram of fish captured in the strainers (excluding crayfish).

2009

The strainers at Lake Davis were checked and cleaned a total of ten times from January 1, 2009, through December 31, 2009. Runtime between strainer checks varied between 552 and 1,345 hours. Flow rates during this monitoring period ranged from 10.0 to 10.9 cubic feet per second. The intake elevations used during 2009 were located at 5,700 feet, 5,740 feet, and 5,760 feet above mean sea level (Appendix A). A total of 269 fish were captured, of which 112 were measured. Four species of fish were captured: brown bullhead (35-151 mm; mean TL = 73 mm), pumpkinseed (35-145 mm; mean TL = 87 mm), rainbow trout (126-185 mm; mean TL = 156 mm), and a largemouth bass (LMB) (*Micropterus salmoides*; 140 mm) (Table 3). Crayfish were not enumerated due to their disintegrated condition. Total mass recorded as crayfish occasionally included unidentifiable portions of other aquatic species such as fish. Individual length and weight data for fish measured is provided in Appendix B, and in a length frequency histogram in Figure 7.

Table 3. 2009 strainer catch results (January 1, 2009 through December 31, 2009).

Species	Quantity Captured	Species Composition by Quantity	Total Mass (g)	Species Composition by Mass
Brown bullhead	110	40.9%	408.2	1.6%
Pumpkinseed	156	58.0%	2,064.0	8.3%
Rainbow trout	2	0.7%	72.2	0.3%
Largemouth bass	1	0.4%	35.0	0.1%
Crayfish	N/A	N/A	22,388.1	90.0%

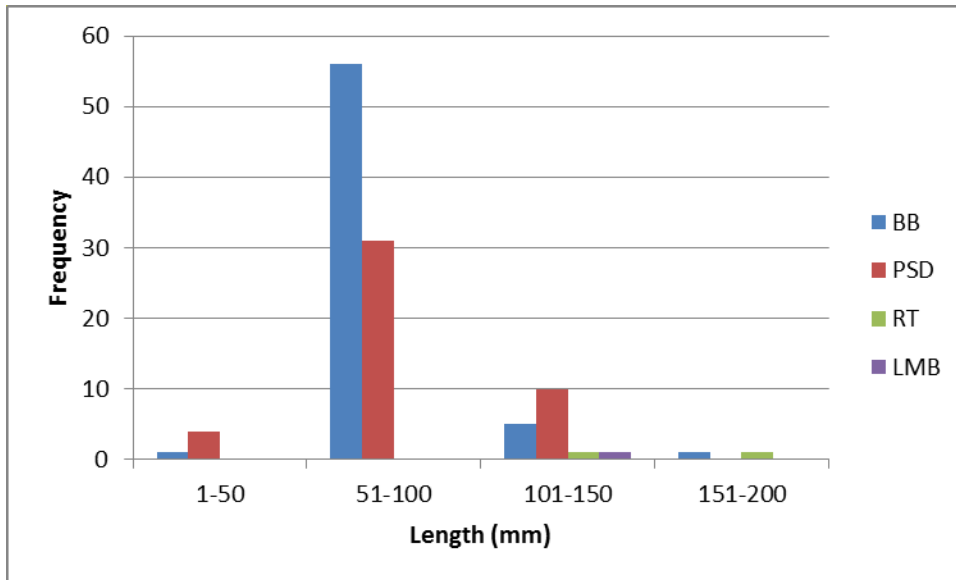


Figure 7. 2009 length-frequency histogram of fish captured in the strainers (excluding crayfish).

2010

The strainers at Lake Davis were checked and cleaned a total of seven times from January 1, 2010, through October 27, 2010. Runtime between strainer checks varied between 672 and 1,919 hours. Flow rates during this monitoring period ranged from 10.0 to 11.0 cubic feet per second. The intake elevations used during 2010 were located at 5,700 feet and 5,740 feet above mean sea level (Appendix A). A total of 373 fish were captured, of which all were measured. Two species of fish were captured: brown bullhead (35-140 mm; mean TL = 49 mm), and pumpkinseed (20-145 mm; mean TL = 45 mm) (Table 4). Crayfish were not enumerated due to their disintegrated condition. Total mass recorded as crayfish occasionally included unidentifiable portions of other aquatic species such as fish. Individual length and weight data for fish measured is provided in Appendix B, and in a length frequency histogram in Figure 8.

Table 4. 2010 strainer catch results (January 1, 2010 through October 27, 2010).

Species	Quantity Captured	Species Composition by Quantity	Total Mass (g)	Species Composition by Mass
Brown bullhead	160	42.9%	325.00	0.9%
Pumpkinseed	213	57.1%	743.00	2.0%
Crayfish	N/A	N/A	36,582.63	97.2%

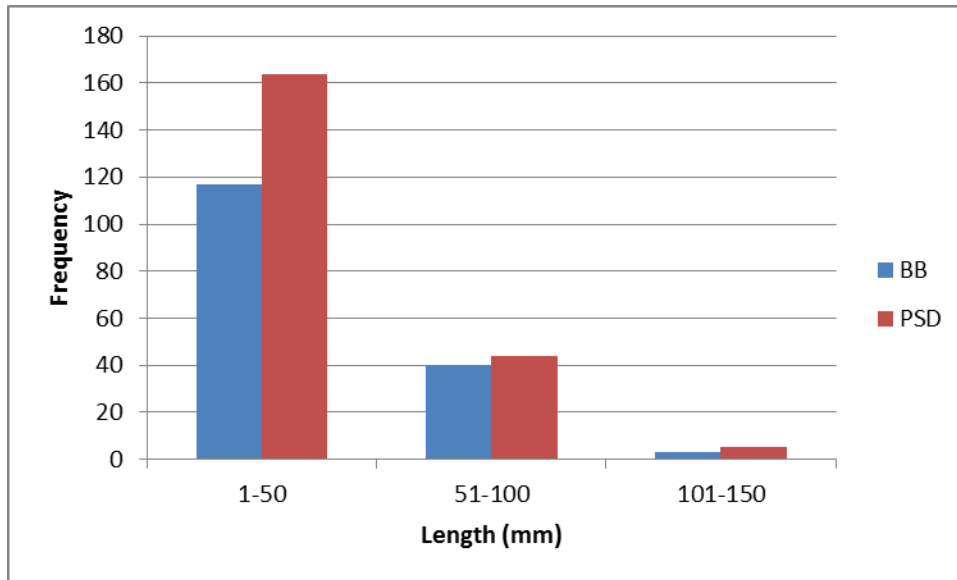


Figure 8. 2010 length-frequency histogram of fish captured in the strainers (excluding crayfish).

Discussion

One of the most obvious results from the data collected over the three year period was the absence of northern pike. There was also a noticeable increase in pumpkinseed numbers. The data indicated that there was an increase between 2008 and 2009, and an even larger increase towards the end of 2009 (Figure 9, Appendix B). This could be due to the use of higher elevation inlet valves, a decrease in predatory fish species, a decrease in competition for resources, or an overall pumpkinseed population increase within the lake. Although a small amount of golden shiner were observed during Lake Davis electrofishing (Figure 10) (LaCoss and Rossi 2012a) (LaCoss and Rossi 2012b), none were captured in the strainers throughout the 2008 through 2010 monitoring period. In addition, one largemouth bass was found in the strainers in 2009 (Table 3). No largemouth bass had been observed in the strainers during the 2006 through 2007 monitoring period (Table 1). The 2008 through 2010 strainer catch results were reflective of the Lake Davis electrofishing Catch Per Unit Effort (CPUE) results for the same time frame (Figures 9 and 10) (LaCoss and Rossi 2012a) (LaCoss and Rossi 2012b) (Rossi 2013). Strainer catch results appeared to be indicative of lake populations.

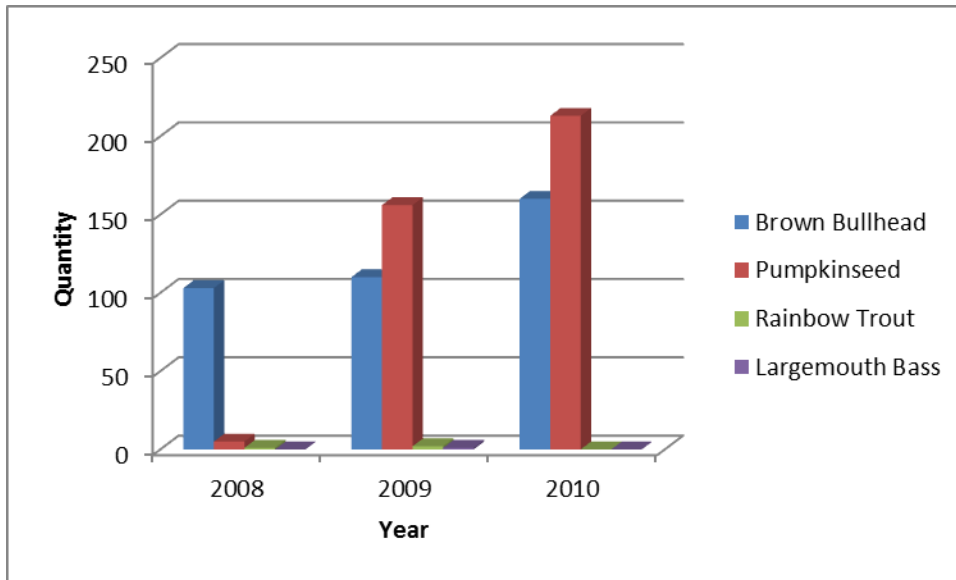


Figure 9. Strainer catch results of quantifiable fish from 2008 through 2010.

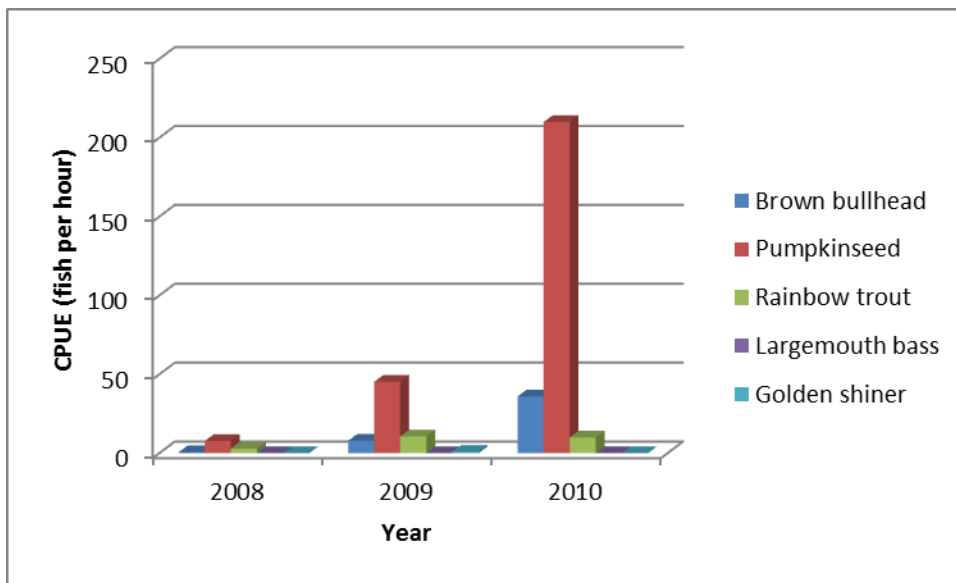


Figure 10. Lake Davis boat electrofishing CPUE (fish per hour) catch results from 2008 through 2010.

In 2007, flow rates were reduced to 10.0 cfs (+/- 2.4 cfs) from May 1, 2007 to September 26, 2007. Figure 11 indicates a decline in fish captured toward the end of May and throughout the summer. These pre-treatment results are comparable to the post-treatment results regarding seasonal variation displayed in Figure 12. Figure 12 indicates that there is a seasonal variation in fish abundance, with low numbers being caught during the warmer months (June through September) and much higher numbers found in the cooler months of fall, winter, and spring (October to May). Flow rates (10.0 to 11.2 cfs) remained relatively constant throughout the monitoring period (February 27,

2008 to October 27, 2010), thus excluding flow rate variation as a factor affecting strainer catch results.

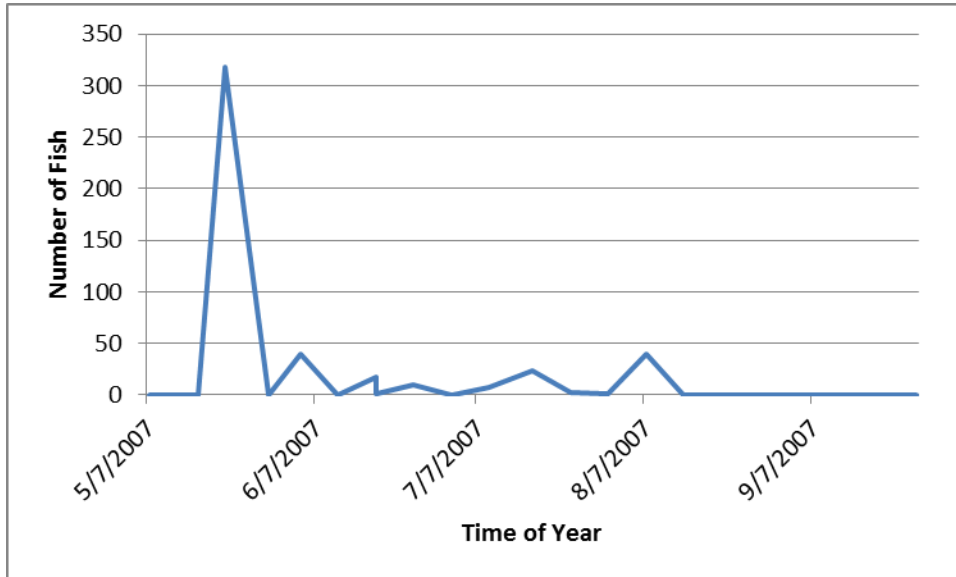


Figure 11. Seasonal variation of strainer catch results (May 7, 2007 to September 26, 2007)

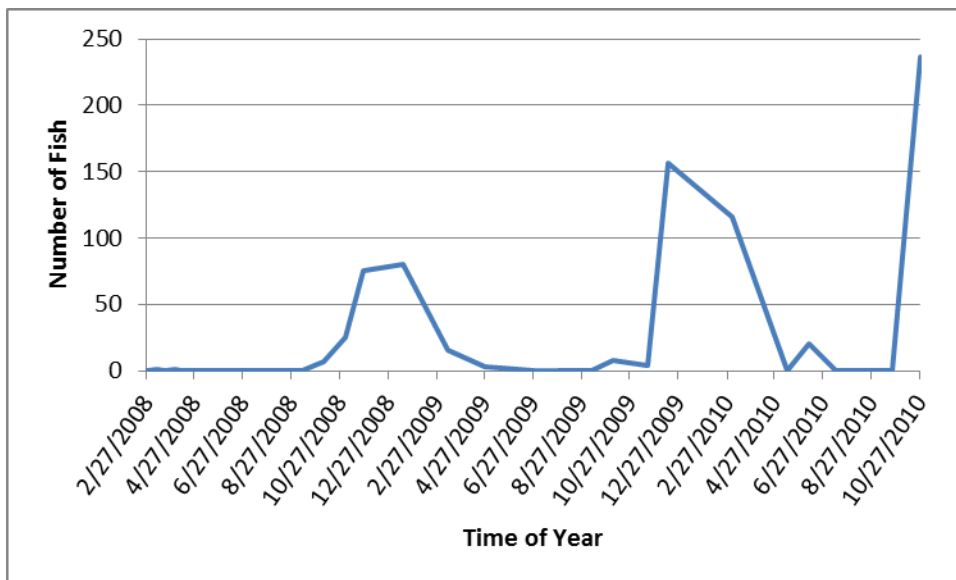


Figure 12. Seasonal variation of strainer catch results (February 27, 2008 to October 27, 2010).

The elevation of the operational inlet valve appeared to have an effect on the catch results as well. Lake surface levels ranged from 5,760 feet to 5,767 feet above mean sea level during the 2008 to 2010 monitoring period (CDEC). Different fish species and life stages inhabit different depths in the lake based upon the life history of the fish

species (Rischbieter 2000). Different inlet valves in operation resulted in different species composition in the strainers (Table 5). It is also possible that the inlet valves affected the sampling when operations changed from one valve to another. When an inlet valve had not been used for a period of time, there appeared to be surge of whatever species had taken up residence in the unused valve when it was returned to operation. This surge would have been a one-time occurrence until the valve was cycled again, and potentially skewed the total numbers depending on the size of the sample. The catch results after an inlet valve swap typically indicated that crayfish were the primary occupants of an unused inlet valve (Appendix A).

Table 5. Species composition by quantity, by inlet elevation (excluding crayfish).

2008	5,700' Inlet	5,740' Inlet	5,760' Inlet
Brown Bullhead	94.50%	N/A	N/A
Pumpkinseed	4.59%	N/A	N/A
Rainbow Trout	0.92%	N/A	N/A
Largemouth Bass	0.00%	N/A	N/A
2009	5,700' Inlet	5,740' Inlet	5,760' Inlet
Brown Bullhead	93.07%	9.62%	8.33%
Pumpkinseed	4.95%	90.38%	83.33%
Rainbow Trout	1.98%	0.00%	N/A
Largemouth Bass	0.00%	0.00%	8.33%
2010	5,700' Inlet	5,740' Inlet	5,760' Inlet
Brown Bullhead	54.43%	22.79%	N/A
Pumpkinseed	45.57%	77.21%	N/A
Rainbow Trout	0.00%	0.00%	N/A
Largemouth Bass	0.00%	0.00%	N/A

Conclusion

A full understanding of the meaning of these results is difficult to ascertain due to the change in variables. Continued monitoring for several more years would be necessary for a larger, more reliable data set. However, continued strainer monitoring is not an option since the system was decommissioned on October 27, 2010. While no pike were observed or captured during post-treatment monitoring, this effort does not prove the absence of northern pike, but builds upon the lake monitoring results from 2007 through 2010 and supports the hypothesis that the 2007 eradication project was effective at eliminating northern pike from Lake Davis and associated tributaries. Based on the findings from 2006 through 2010, the Lake Davis containment system successfully prevented the downstream movement of northern pike via entrainment.

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APPENDICES

Appendix A- Strainer Sampling Data Table 2008-2010.

Date	Strainer Number	Run Time (Hours) Calculated	CFS	Intake Elevation	Species	Crayfish Weight (g)	Fish Weight (g)	Total Weight (g)	Total number of fish
1/24/2008	1	Flow Increase, No Check	0.5	5700	N/A			N/A	
2/11/2008	1	Flow Increase, No Check	5	5700	N/A			N/A	
2/11/2008	1	Flow Increase, No Check	10	5700	N/A			N/A	
2/27/2008	1	379.3	10	5700	Crayfish	928	0	928	0
3/11/2008	1	311.4	10	5700	BB		16.3	16.3	1
3/20/2008	1	215.4	10	5700	N/A		0	0	0
4/3/2008	1	335.5	10	5700	RT		96.1	96.1	1
4/10/2008	1	167.7	10	5700	N/A		0	0	0
4/23/2008	1	313.6	10	5700	N/A		0	0	0
5/12/2008	1	453.5	10	5700	N/A		0	0	0
6/8/2008	1	696.2	10.5	5700	N/A		0	0	0
6/26/2008	1	383.3	10.9	5700	N/A		0	0	0
7/11/2008	1	361.0	11.2	5700	N/A		0	0	0
7/25/2008	3	334.8	11.2	5700	N/A		0	0	0
8/11/2008	3	409.0	11.2	5700	N/A		0	0	0
9/9/2008	3	694.5	10.9	5700	N/A		0	0	0
10/7/2008	3	670.3	10	5700	BB, PSD		22.7	22.7	7
11/3/2008	3	647.5	10	5700	BB, PSD		84.3	84.3	25
11/25/2008	3	528.7	10	5700	BB		305.4	305.4	75
1/15/2009	3	1224.0	10	5700	BB, PSD, RT		411.5	411.5	80
3/12/2009	3	1344.5	10	5700	BB		64.8	64.8	16
4/27/2009	3	1101.5	10	5700	BB, PSD		10.2	10.2	3
5/20/2009	3	551.8	10	5700	BB, RT		9.2	9.2	2
6/29/2009	3	961.3	10.9	5700	N/A		0	0	0
7/29/2009	3	718.8	10.9	5700	N/A		0	0	0
9/9/2009	3	1005.8	10.7	5700+5760	Crayfish	11792.4	0	11792.4	0
10/6/2009	3	648.8	10.7	5760	BB, PSD, LMB, Crayfish	8164.7	198	8362.7	8
11/18/2009	3	1030.9	10	5760	PSD, Crayfish	2268	47	2315	4
12/14/2009	3	625.8	10	5740	BB, PSD, Crayfish	162	2034	2196	156
3/4/2010	3	1918.5	10	5740	BB, Crayfish	2268	586	2854	116
5/13/2010	3	1678.5	10	5740	Crayfish	23813.6	0	23813.6	0
6/10/2010	3	671.5	10	5740	BB, Crayfish	9979.03	223	10202.03	20
7/13/2010	3	797.5	11	5700	Crayfish	1108	0	1108	0
8/16/2010	2	810.0	11	5700	Empty		0	0	0
9/23/2010	2	912.5	11	5700	Empty		0	0	0
10/27/2010	2	816.5	11	5700	BB, PSD		259	259	237

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
3/11/2008	BB	114	16.3	11/25/2008	BB	67	4.8
4/3/2008	RT	234	96.1	11/25/2008	BB	67	3.6
10/7/2008	BB	53	3.4	11/25/2008	BB	68	3.9
10/7/2008	BB	62	3.5	11/25/2008	BB	69	4.2
10/7/2008	BB	67	5.2	11/25/2008	BB	71	4.1
10/7/2008	BB	72	3.9	11/25/2008	BB	71	4.5
10/7/2008	PSD	35	0.7	11/25/2008	BB	71	4.5
10/7/2008	PSD	50	2.7	11/25/2008	BB	72	4.8
10/7/2008	PSD	57	3.3	11/25/2008	BB	72	4.3
11/3/2008	BB	47	1.7	11/25/2008	BB	75	5.4
11/3/2008	BB	50	1.7	11/25/2008	BB	75	6
11/3/2008	BB	53	2.3	11/25/2008	BB	77	6.1
11/3/2008	BB	54	2.6	11/25/2008	BB	77	5.3
11/3/2008	BB	55	2.6	11/25/2008	BB	79	6.5
11/3/2008	BB	55	2.3	11/25/2008	BB	79	6.9
11/3/2008	BB	60	2.7	11/25/2008	BB	79	5.5
11/3/2008	BB	61	3.7	11/25/2008	BB	82	7.3
11/3/2008	BB	62	3.1	11/25/2008	BB- 45 fish		178.7
11/3/2008	BB	63	3.8	1/15/2009	BB	54	2.5
11/3/2008	BB	64	3.8	1/15/2009	BB	58	2.7
11/3/2008	BB	64	3.6	1/15/2009	BB	62	3.3
11/3/2008	BB	64	3.7	1/15/2009	BB	62	3.6
11/3/2008	BB	65	3.5	1/15/2009	BB	63	3.2
11/3/2008	BB	65	3.1	1/15/2009	BB	64	3.6
11/3/2008	BB	65	3.8	1/15/2009	BB	64	4.1
11/3/2008	BB	66	4	1/15/2009	BB	65	3.5
11/3/2008	BB	69	4.8	1/15/2009	BB	65	4.9
11/3/2008	BB	69	4.4	1/15/2009	BB	67	4.4
11/3/2008	BB	70	4.6	1/15/2009	BB	67	4.2
11/3/2008	BB	70	4.5	1/15/2009	BB	68	4
11/3/2008	BB	70	5.2	1/15/2009	BB	70	4.6
11/3/2008	BB	73	3	1/15/2009	BB	71	5.1
11/3/2008	PSD	48	2	1/15/2009	BB	72	4.6
11/3/2008	PSD	56	3.8	1/15/2009	BB	73	5.3
11/25/2008	BB	52	2.7	1/15/2009	BB	75	5.4
11/25/2008	BB	53	2.8	1/15/2009	BB	75	4.3
11/25/2008	BB	55	2.1	1/15/2009	BB	75	5.7
11/25/2008	BB	55	2.6	1/15/2009	BB	75	5.8
11/25/2008	BB	58	2.7	1/15/2009	BB	76	5.8
11/25/2008	BB	59	2.7	1/15/2009	BB	76	5.3
11/25/2008	BB	60	2.6	1/15/2009	BB	77	5.8
11/25/2008	BB	60	2.7	1/15/2009	BB	78	4.6
11/25/2008	BB	62	3.5	1/15/2009	BB	79	6
11/25/2008	BB	64	3.4	1/15/2009	BB	79	6.3
11/25/2008	BB	64	3.2	1/15/2009	BB	80	6.2
11/25/2008	BB	65	4.4	1/15/2009	BB	80	6.9
11/25/2008	BB	65	3.6	1/15/2009	BB	81	7.1

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
1/15/2009	BB	83	7.8	12/14/2009	BB	108	17
1/15/2009	BB- 46 fish		195.3	12/14/2009	BB	110	16
1/15/2009	PSD	35	0.7	12/14/2009	BB	110	21
1/15/2009	PSD	42	1.5	12/14/2009	BB	129	25
1/15/2009	PSD	48	2.2	12/14/2009	BB	151	47
1/15/2009	RT	185	65.2	12/14/2009	PSD	55	4
3/12/2009	BB	60	3	12/14/2009	PSD	74	7
3/12/2009	BB	60	3.2	12/14/2009	PSD	79	9
3/12/2009	BB	62	3.1	12/14/2009	PSD	81	8
3/12/2009	BB	63	3.3	12/14/2009	PSD	81	11
3/12/2009	BB	65	4.1	12/14/2009	PSD	81	10
3/12/2009	BB	66	4	12/14/2009	PSD	82	11
3/12/2009	BB	66	4	12/14/2009	PSD	82	10
3/12/2009	BB	67	3.9	12/14/2009	PSD	84	11
3/12/2009	BB	67	4.5	12/14/2009	PSD	85	11
3/12/2009	BB	67	4	12/14/2009	PSD	85	12
3/12/2009	BB	70	3.1	12/14/2009	PSD	85	11
3/12/2009	BB	70	4.6	12/14/2009	PSD	86	11
3/12/2009	BB	70	5.2	12/14/2009	PSD	87	13
3/12/2009	BB	71	4.9	12/14/2009	PSD	89	18
3/12/2009	BB	72	5	12/14/2009	PSD	90	14
3/12/2009	BB	73	4.9	12/14/2009	PSD	92	18
4/27/2009	BB	69	4.6	12/14/2009	PSD	92	15
4/27/2009	PSD	52	2.2	12/14/2009	PSD	95	23
4/27/2009	PSD	58	3.4	12/14/2009	PSD	97	20
5/20/2009	BB	69	7	12/14/2009	PSD	97	15
5/20/2009	RT	126	2.2	12/14/2009	PSD	100	19
10/6/2009	BB	134	29	12/14/2009	PSD	105	24
10/6/2009	LMB	140	35	12/14/2009	PSD	105	25
10/6/2009	PSD	85	15	12/14/2009	PSD	106	26
10/6/2009	PSD	86	12	12/14/2009	PSD	106	24
10/6/2009	PSD	90	12	12/14/2009	PSD	110	30
10/6/2009	PSD	100	22	12/14/2009	PSD	125	31
10/6/2009	PSD	110	34	12/14/2009	PSD	130	48
10/6/2009	PSD	125	39	12/14/2009	PSD	145	70
11/18/2009	PSD	39	7		PSD- 20		
11/18/2009	PSD	65	6	12/14/2009	fish		236
11/18/2009	PSD	95	18		PSD- 30		
11/18/2009	PSD	96	16	12/14/2009	fish		309
12/14/2009	BB	35	2		PSD- 30		
12/14/2009	BB	50	2	12/14/2009	fish		409
12/14/2009	BB	54	2		PSD- 31		
12/14/2009	BB	55	3	12/14/2009	fish		360
12/14/2009	BB	60	3	3/4/2010	BB	45	1
12/14/2009	BB	60	3	3/4/2010	BB	45	1
12/14/2009	BB	60	3	3/4/2010	BB	50	2
12/14/2009	BB	60	3	3/4/2010	BB	50	2
12/14/2009	BB	60	3	3/4/2010	BB	50	2
12/14/2009	BB	65	4	3/4/2010	BB	50	2
12/14/2009	BB	90	10				

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
3/4/2010	BB	54	2	3/4/2010	PSD	40	1
3/4/2010	BB	54	3	3/4/2010	PSD	41	2
3/4/2010	BB	55	2	3/4/2010	PSD	42	1
3/4/2010	BB	55	2	3/4/2010	PSD	42	1
3/4/2010	BB	55	3	3/4/2010	PSD	42	1
3/4/2010	BB	55	2	3/4/2010	PSD	42	1
3/4/2010	BB	55	2	3/4/2010	PSD	42	1
3/4/2010	BB	55	1	3/4/2010	PSD	43	2
3/4/2010	BB	55	2	3/4/2010	PSD	45	1
3/4/2010	BB	57	2	3/4/2010	PSD	45	2
3/4/2010	BB	57	3	3/4/2010	PSD	45	2
3/4/2010	BB	58	3	3/4/2010	PSD	45	2
3/4/2010	BB	60	3	3/4/2010	PSD	45	2
3/4/2010	BB	60	3	3/4/2010	PSD	45	1
3/4/2010	BB	140	37	3/4/2010	PSD	45	2
3/4/2010	PSD	25	1	3/4/2010	PSD	45	2
3/4/2010	PSD	30	1	3/4/2010	PSD	45	2
3/4/2010	PSD	32	1	3/4/2010	PSD	45	2
3/4/2010	PSD	33	1	3/4/2010	PSD	45	1
3/4/2010	PSD	35	1	3/4/2010	PSD	49	2
3/4/2010	PSD	35	1	3/4/2010	PSD	49	1
3/4/2010	PSD	35	1	3/4/2010	PSD	49	2
3/4/2010	PSD	35	1	3/4/2010	PSD	49	2
3/4/2010	PSD	35	1	3/4/2010	PSD	50	2
3/4/2010	PSD	35	1	3/4/2010	PSD	50	2
3/4/2010	PSD	35	1	3/4/2010	PSD	50	3
3/4/2010	PSD	35	1	3/4/2010	PSD	50	1
3/4/2010	PSD	35	1	3/4/2010	PSD	50	3
3/4/2010	PSD	35	1	3/4/2010	PSD	50	2
3/4/2010	PSD	35	1	3/4/2010	PSD	54	3
3/4/2010	PSD	35	1	3/4/2010	PSD	60	5
3/4/2010	PSD	37	1	3/4/2010	PSD	65	5
3/4/2010	PSD	37	1	3/4/2010	PSD	65	8
3/4/2010	PSD	40	2	3/4/2010	PSD	65	7
3/4/2010	PSD	40	1	3/4/2010	PSD	70	5
3/4/2010	PSD	40	2	3/4/2010	PSD	70	10
3/4/2010	PSD	40	1	3/4/2010	PSD	70	7
3/4/2010	PSD	40	1	3/4/2010	PSD	72	6
3/4/2010	PSD	40	2	3/4/2010	PSD	72	7
3/4/2010	PSD	40	2	3/4/2010	PSD	75	8
3/4/2010	PSD	40	2	3/4/2010	PSD	75	8
3/4/2010	PSD	40	1	3/4/2010	PSD	77	8
3/4/2010	PSD	40	1	3/4/2010	PSD	78	9
3/4/2010	PSD	40	1	3/4/2010	PSD	80	10
3/4/2010	PSD	40	1	3/4/2010	PSD	82	9
3/4/2010	PSD	40	1	3/4/2010	PSD	84	11
3/4/2010	PSD	40	1	3/4/2010	PSD	85	11
3/4/2010	PSD	40	1	3/4/2010	PSD	85	12
3/4/2010	PSD	40	2	3/4/2010	PSD	85	12

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
3/4/2010	PSD	89	12	10/27/2010	BB	40	1
3/4/2010	PSD	90	26	10/27/2010	BB	40	2
3/4/2010	PSD	90	15	10/27/2010	BB	40	0
3/4/2010	PSD	90	13	10/27/2010	BB	40	1
3/4/2010	PSD	93	15	10/27/2010	BB	40	0
3/4/2010	PSD	95	30	10/27/2010	BB	40	2
3/4/2010	PSD	95	21	10/27/2010	BB	40	1
3/4/2010	PSD	100	28	10/27/2010	BB	40	0
3/4/2010	PSD	100	18	10/27/2010	BB	41	0
3/4/2010	PSD	105	30	10/27/2010	BB	41	2
3/4/2010	PSD	105	25	10/27/2010	BB	41	2
3/4/2010	PSD	106	23	10/27/2010	BB	41	0
6/10/2010	BB	49	1	10/27/2010	BB	41	0
6/10/2010	BB	50	1	10/27/2010	BB	41	0
6/10/2010	BB	55	1	10/27/2010	BB	42	1
6/10/2010	BB	57	2	10/27/2010	BB	42	1
6/10/2010	BB	60	2	10/27/2010	BB	42	1
6/10/2010	BB	60	2	10/27/2010	BB	42	0
6/10/2010	BB	60	2	10/27/2010	BB	42	1
6/10/2010	BB	65	4	10/27/2010	BB	42	0
6/10/2010	BB	120	20	10/27/2010	BB	42	1
6/10/2010	BB	140	37	10/27/2010	BB	42	2
6/10/2010	PSD	45	1	10/27/2010	BB	42	0
6/10/2010	PSD	47	2	10/27/2010	BB	42	1
6/10/2010	PSD	73	7	10/27/2010	BB	44	2
6/10/2010	PSD	76	7	10/27/2010	BB	44	3
6/10/2010	PSD	80	8	10/27/2010	BB	44	2
6/10/2010	PSD	85	9	10/27/2010	BB	44	0
6/10/2010	PSD	100	24	10/27/2010	BB	44	3
6/10/2010	PSD	100	19	10/27/2010	BB	44	0
6/10/2010	PSD	109	23	10/27/2010	BB	44	1
6/10/2010	PSD	145	51	10/27/2010	BB	44	2
10/27/2010	BB	35	1	10/27/2010	BB	45	2
10/27/2010	BB	35	0	10/27/2010	BB	45	1
10/27/2010	BB	35	0	10/27/2010	BB	45	1
10/27/2010	BB	35	0	10/27/2010	BB	45	2
10/27/2010	BB	35	0	10/27/2010	BB	45	0
10/27/2010	BB	35	0	10/27/2010	BB	45	1
10/27/2010	BB	36	1	10/27/2010	BB	45	2
10/27/2010	BB	37	2	10/27/2010	BB	45	0
10/27/2010	BB	37	0	10/27/2010	BB	45	0
10/27/2010	BB	37	2	10/27/2010	BB	45	0
10/27/2010	BB	38	0	10/27/2010	BB	45	2
10/27/2010	BB	38	0	10/27/2010	BB	45	2
10/27/2010	BB	39	2	10/27/2010	BB	45	2
10/27/2010	BB	39	1	10/27/2010	BB	45	0
10/27/2010	BB	40	0	10/27/2010	BB	45	0
10/27/2010	BB	40	1	10/27/2010	BB	46	2
10/27/2010	BB	40	2	10/27/2010	BB	46	2

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
10/27/2010	BB	46	2	10/27/2010	BB	52	2
10/27/2010	BB	46	0	10/27/2010	BB	52	2
10/27/2010	BB	46	2	10/27/2010	BB	52	3
10/27/2010	BB	46	2	10/27/2010	BB	52	2
10/27/2010	BB	46	2	10/27/2010	BB	54	2
10/27/2010	BB	46	1	10/27/2010	BB	54	2
10/27/2010	BB	46	1	10/27/2010	BB	54	2
10/27/2010	BB	46	1	10/27/2010	BB	55	2
10/27/2010	BB	46	2	10/27/2010	BB	55	2
10/27/2010	BB	47	2	10/27/2010	BB	55	3
10/27/2010	BB	47	2	10/27/2010	BB	55	3
10/27/2010	BB	47	2	10/27/2010	BB	55	2
10/27/2010	BB	47	2	10/27/2010	BB	57	3
10/27/2010	BB	47	0	10/27/2010	BB	59	3
10/27/2010	BB	47	2	10/27/2010	PSD	20	0
10/27/2010	BB	47	1	10/27/2010	PSD	20	3
10/27/2010	BB	47	1	10/27/2010	PSD	21	0
10/27/2010	BB	47	1	10/27/2010	PSD	21	0
10/27/2010	BB	47	2	10/27/2010	PSD	21	0
10/27/2010	BB	47	0	10/27/2010	PSD	22	0
10/27/2010	BB	48	2	10/27/2010	PSD	23	0
10/27/2010	BB	48	2	10/27/2010	PSD	24	0
10/27/2010	BB	48	0	10/27/2010	PSD	24	0
10/27/2010	BB	48	2	10/27/2010	PSD	24	0
10/27/2010	BB	48	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	1	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	1	10/27/2010	PSD	25	0
10/27/2010	BB	49	1	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	0	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	2	10/27/2010	PSD	25	0
10/27/2010	BB	49	1	10/27/2010	PSD	26	0
10/27/2010	BB	49	2	10/27/2010	PSD	26	0
10/27/2010	BB	49	2	10/27/2010	PSD	26	0
10/27/2010	BB	49	2	10/27/2010	PSD	26	0
10/27/2010	BB	50	1	10/27/2010	PSD	26	0
10/27/2010	BB	50	2	10/27/2010	PSD	26	0
10/27/2010	BB	50	2	10/27/2010	PSD	26	0
10/27/2010	BB	50	3	10/27/2010	PSD	27	0
10/27/2010	BB	51	2	10/27/2010	PSD	27	0
10/27/2010	BB	51	2	10/27/2010	PSD	27	0
10/27/2010	BB	51	2	10/27/2010	PSD	27	0
10/27/2010	BB	51	2	10/27/2010	PSD	27	0
10/27/2010	BB	51	2	10/27/2010	PSD	27	0
10/27/2010	BB	52	1	10/27/2010	PSD	27	0
10/27/2010	BB	52	2	10/27/2010	PSD	27	0

Appendix B- Length and Weight Data 2008-2010

Date	Species	Length (mm)	Mass (Grams)	Date	Species	Length (mm)	Mass (Grams)
10/27/2010	PSD	27	0	10/27/2010	PSD	35	1
10/27/2010	PSD	27	0	10/27/2010	PSD	36	0
10/27/2010	PSD	27	0	10/27/2010	PSD	36	0
10/27/2010	PSD	27	0	10/27/2010	PSD	36	0
10/27/2010	PSD	27	0	10/27/2010	PSD	36	0
10/27/2010	PSD	27	0	10/27/2010	PSD	37	1
10/27/2010	PSD	27	0	10/27/2010	PSD	37	0
10/27/2010	PSD	27	0	10/27/2010	PSD	37	1
10/27/2010	PSD	28	0	10/27/2010	PSD	37	1
10/27/2010	PSD	28	0	10/27/2010	PSD	38	1
10/27/2010	PSD	28	0	10/27/2010	PSD	40	1
10/27/2010	PSD	28	0	10/27/2010	PSD	40	1
10/27/2010	PSD	28	0	10/27/2010	PSD	41	2
10/27/2010	PSD	28	0	10/27/2010	PSD	50	3
10/27/2010	PSD	28	0	10/27/2010	PSD	50	2
10/27/2010	PSD	29	0	10/27/2010	PSD	60	8
10/27/2010	PSD	29	0	10/27/2010	PSD	61	5
10/27/2010	PSD	29	0	10/27/2010	PSD	64	5
10/27/2010	PSD	30	0	10/27/2010	PSD	64	6
10/27/2010	PSD	30	0	10/27/2010	PSD	70	6
10/27/2010	PSD	30	0	10/27/2010	PSD	75	10
10/27/2010	PSD	30	0	10/27/2010	PSD	75	7
10/27/2010	PSD	30	0	10/27/2010	PSD	80	9
10/27/2010	PSD	30	0	10/27/2010	PSD	82	12
10/27/2010	PSD	30	0				
10/27/2010	PSD	30	0				
10/27/2010	PSD	30	0				
10/27/2010	PSD	30	0				
10/27/2010	PSD	30	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	31	0				
10/27/2010	PSD	32	0				
10/27/2010	PSD	32	0				
10/27/2010	PSD	33	0				
10/27/2010	PSD	33	0				
10/27/2010	PSD	34	0				
10/27/2010	PSD	34	0				
10/27/2010	PSD	34	0				
10/27/2010	PSD	35	0				
10/27/2010	PSD	35	0				
10/27/2010	PSD	35	1				
10/27/2010	PSD	35	0				
10/27/2010	PSD	35	0				