



February 7, 2012

Mr. Jeff Berg, South Metro Area Hydrologist
Metro Region of Waters
Department of Natural Resources
1200 Warner Road
St. Paul, Minnesota 55106

2011 Prior Lake Outlet System Annual Operations Report

Dear Mr. Berg:

Enclosed is the Annual Operations Report for the Prior Lake Outlet Channel for the year 2011. If you have any questions or need additional information please contact me at (952) 447-4166 or mkinney@plslwd.org.

Sincerely,



Michael Kinney
District Administrator

PLSLWD Board Members
Carl Almer, EOR
Bruce Loney, City of Shakopee
Joe Swentek, City of Shakopee
Terry Schwalbe, LMRWD
Paul Nelson, Scott County

Scott County Commissioners
Katy Gehler, City of Prior Lake
Ross Bintner, City of Prior Lake
Stan Ellison, SMSC
Scott Walz, SMSC
Troy Kuphal, Scott SWCD

2011 Prior Lake Outlet System Annual Operations Report

Introduction

The Prior Lake Outlet Structure and Outlet Channel were constructed in 1983 under DNR permit 79-6016 to address high lake level issues on Prior Lake, which does not have a natural outlet. The Prior Lake Outlet Channel (PLOC) is utilized by the Prior Lake-Spring Lake Watershed District (District) in managing lake levels on Prior Lake, as well as a trunk storm water system for the Cities of Prior Lake and Shakopee, and the Shakopee Mdewakanton Sioux Community. The 7 mile long PLOC has been divided into 8 management Segments. Segment 1 is on the southern end beginning at the Prior Lake Outlet Structure, while Segment 8 is on the northern end and flows into the Minnesota River in Shakopee.

To address current needs and plan for future development in the watershed, in 2007 the District finalized a Joint Powers Agreement/Memorandum of Agreement (JPA/MOA) with the Cities of Prior Lake and Shakopee, and the Shakopee Mdewakanton Sioux Community for the operation, maintenance and use of the Prior Lake Outlet Channel. This group of Cooperators oversee the operation of the PLOC, while the District administers the day to day operations. In the early 2000's, it was determined by these JPA/MOA Cooperators that while the channel and outlet had worked well since their inception, if modified in several places, they could operate more efficiently, reduce long term maintenance and enhance the environment. With this in mind, the cooperators formed the JPA/MOA and undertook a 5-7 year project to restore and enhance the PLOC. Acknowledging that the PLOC is primarily a stormwater conveyance system and not a natural stream, the JPA/MOA cooperators focus is to manage the easements of the channel and the channel itself to maintain hydrologic capacity, reduce maintenance needs, provide long-term stability and improve water quality. Secondary benefits include increased aesthetics, providing improved habitat and providing consistency with city and county plans for parks and greenways.

Operation of the Prior Lake Outlet Structure is governed by the DNR approved Prior Lake Outlet Control Structure Management Policy and Operating Procedures dated October 2004, approved February 2005. This plan specifies a review procedure that is to be repeated every 3 years. A review and revision of this document is anticipated to occur when a calibrated rating curve has been established for the new Prior Lake Outlet Structure. Additionally, an Operation, Inspection and Maintenance Manual was drafted and adopted in September 2011 for the Prior Lake Outlet Structure. The purpose of this secondary manual is to establish guidelines and practices to provide existing and future District Staff with the knowledge of how to properly operate, inspect and maintain the structural and operational components of the outlet to maximize the life and

effectiveness of the structure. The manual includes a table of recommended inspections items along with the recommend frequency of inspection. These recommendations will be reviewed periodically by District Staff to determine if the frequency is appropriate based on findings in the field and the manual will be updated accordingly.

According to the National Oceanic and Atmospheric Administration records, the 30-year county wide average annual precipitation for Scott County is 30.95 inches. Following the wet year of 2010, where the District received an average of 37.23 inches of precipitation, the District and many portions of the state ended the year in drought conditions, despite high precipitation totals in the early portion of the year. Attachment G summarizes the precipitation recorded within the District. The high rainfall amounts in 2010 and early 2011 contributed to the continuous outflow from Spring Lake into Prior Lake, which is the largest source of water into Prior Lake, from the beginning of the year through late summer of 2011. Flow at the Spring Lake outlet channel near CR12 was measured at 101 cfs on March 30 and slowly tapered down until it was dry toward the end of September.

Outlet Structure

The Prior Lake Outlet structure was originally installed in and has been operated since 1983. The design of the structure was such that it required manual operation to open and close the flow. This design posed safety concerns for operation during high water levels. Additionally, there were inefficiencies in the structure's design in that the 36 inch pipe connected to the structure did not reach its maximum flow of 65 cfs until lake levels well surpassed the outlet elevation. Over the years the structure had also developed wear and required minor maintenance.

Given these conditions, a replacement outlet structure was pursued by the District and installed in 2010. The new Prior Lake Outlet Structure was fully operational prior to the lake rising to the outlet elevation of 902.50 feet on November 29, 2010 and performed well throughout 2011 as the lake elevation remained above the outlet elevation until September 2, 2011.

The new outlet structure has increased the efficiency of discharging water by allowing the outlet pipe to reach capacity sooner. It has also proven to provide safer conditions for staff during inspections and maintenance, and is self-operating, which will reduce overall operations and maintenance costs. A schematic of the new structure is provided in Attachment A and a graph showing the modeled stage-discharge relationship (rating curve) can be seen in Attachment C. A field verified rating curve for the new structure is being developed as flow data collected is sufficient to do so.

Excluding 2009, the Prior Lake Outlet Structure had flow, at least partially, every year since 1999. The year 2011 held the greatest volume of water flowing through the

system since the structure's establishment in 1983. This was partially due to the more efficient design of the new Outlet Structure, and partially due to the duration of continuous discharge being significantly greater than in previous years. While Attachments E and F show Prior Lake elevations throughout 2011, more information on the yearly and cumulative discharges from the Prior Lake Outlet can be seen in Attachment D. The table shown in Attachment D is provided for comparison between years on the overall usage of the Prior Lake Outlet Structure. The numbers shown are calculated based on the most accurate information available. They are not exact and are intended for yearly comparisons only.

In addition to site inspections throughout the year for general operation, the height of the weir crest was measured on April 29, 2011. The design elevation is at 902.50 ft. Actual height was recorded at 902.65 ft on the south side of the weir and 902.64 ft on the north weir. The District is working with Wenck, the design engineer, and Quiring Excavating, the contractor, to correct the height of the weir.

Outlet Channel

As stated above, the Prior Lake Outlet Structure was in operation and discharging water from late 2010 through late-summer 2011. The "Notice of Operation/Likely Discharge of Water" was issued on November 15, 2010 as required by the Prior Lake Outlet Control Structure Management Policy and Operating Procedures. An additional notice was not issued in 2011 as flow was continuous.

Before and during operations, the District is required to perform regular inspections of the Outlet Structure and the PLOC in accordance with the Outlet Operations Manual. On the basis of these inspections, the District was able to determine that the Outlet Structure and PLOC were structurally sound and able to handle the lake discharges and surface flows downstream of the Outlet Structure. As noted below, several crossing culverts were observed as in disrepair in 2011 due to age and other factors. However, the condition of these culverts did not reduce the hydraulic capacity of the conveyance system unacceptably or jeopardize the basic integrity of the channel. As indicated, the District has been working with property owners to address those culvert issues.

Given the vast amount of water flowing through the system, several culverts throughout the system were fully inundated and flowing at full capacity throughout portions of the year. Water overtopped and flowed out of the channel and into the adjacent floodplain areas in both Segments 5b and 7a. Water flow outside the channel banks in Segment 7a created a gully washout into Quarry Lake which was repaired by the District in December and a berm was installed to prevent future erosion in that area. In addition, accumulated sediment was removed from the channel as in this area as a maintenance item and to provide additional capacity in the channel.

Additionally, several culverts washed out throughout the PLOC and required replacement or repair. Erosion was noted at the culvert at the Squires residence in Segment 2 in early March and the culvert was replaced by the property owner after obtaining a District permit in early May. A culvert at the end of Jackson Trail in Segment 4 showed evidence of collapse in early April. Erosion continued throughout the year and the failed culvert was removed in late November and the District is working with the property owner and the City of Prior Lake to address the replacement of this culvert. Also in Segment 4, a culvert at a field crossing just downstream of Jackson Trail was observed to be disjointed and failing in mid-April, and has not yet been repaired, removed or replaced by the property owner. Lastly, the primary and secondary culverts on the US Fish and Wildlife Service driveway in Segment 8 were overtopped and were partially washed out by mid-May and have yet to be addressed by the property owner. Removal of small organic debris from several culverts throughout the year to ensure free flows was the primary extent of the additional maintenance that occurred.

Monitoring within the PLOC in 2011 consisted of both water quantity and vegetation monitoring. Water quantity monitoring was limited to obtaining stage and flow measurements at the immediate daylight of the Outlet Structure. The primary goal was to provide an accurate field verified rating curve for the new Outlet Structure. Vegetation surveys were also completed along the easements of the PLOC in the spring and fall. These assessments, which will continue again in the spring and fall of 2012 and 2013 and end in the spring of 2014, collected data on species composition and distribution of noxious plants, noted erosion sites along the PLOC, and identified land cover and plant community types. An annual Comprehensive Maintenance Plan for Vegetation is also a product of these vegetation surveys.

Aside from the aforementioned permit issued for the replacement of the culvert in Segment 2 at the Squires residence, no additional permits were issued by the District for PLOC crossings during 2011. However, work continued on several outstanding items from a previous permit issued for the Riverside Bluffs development in Segment 5a. The District has worked with the property developer and the City of Shakopee to address the issues and continues to monitor the area.

Outlet Channel Restoration and Enhancement Project

Over the last few years the PLSLWD and the other JPA/MOA cooperators have undertaken a project to restore and enhance the PLOC. The purpose of the project has been to maintain hydrologic capacity, reduce maintenance needs, provide long-term stability, improve water quality, increase aesthetics, provide improved habitat and provide consistency with city and county plans for parks and greenways. Several portions of this project have been completed. Work completed on Segment 1 in 2006 consisted of bank stabilizations, increased native plantings and a creation of a spillway between Upper and Lower Jeffers Ponds. The year 2011 marked the end of the 5 year

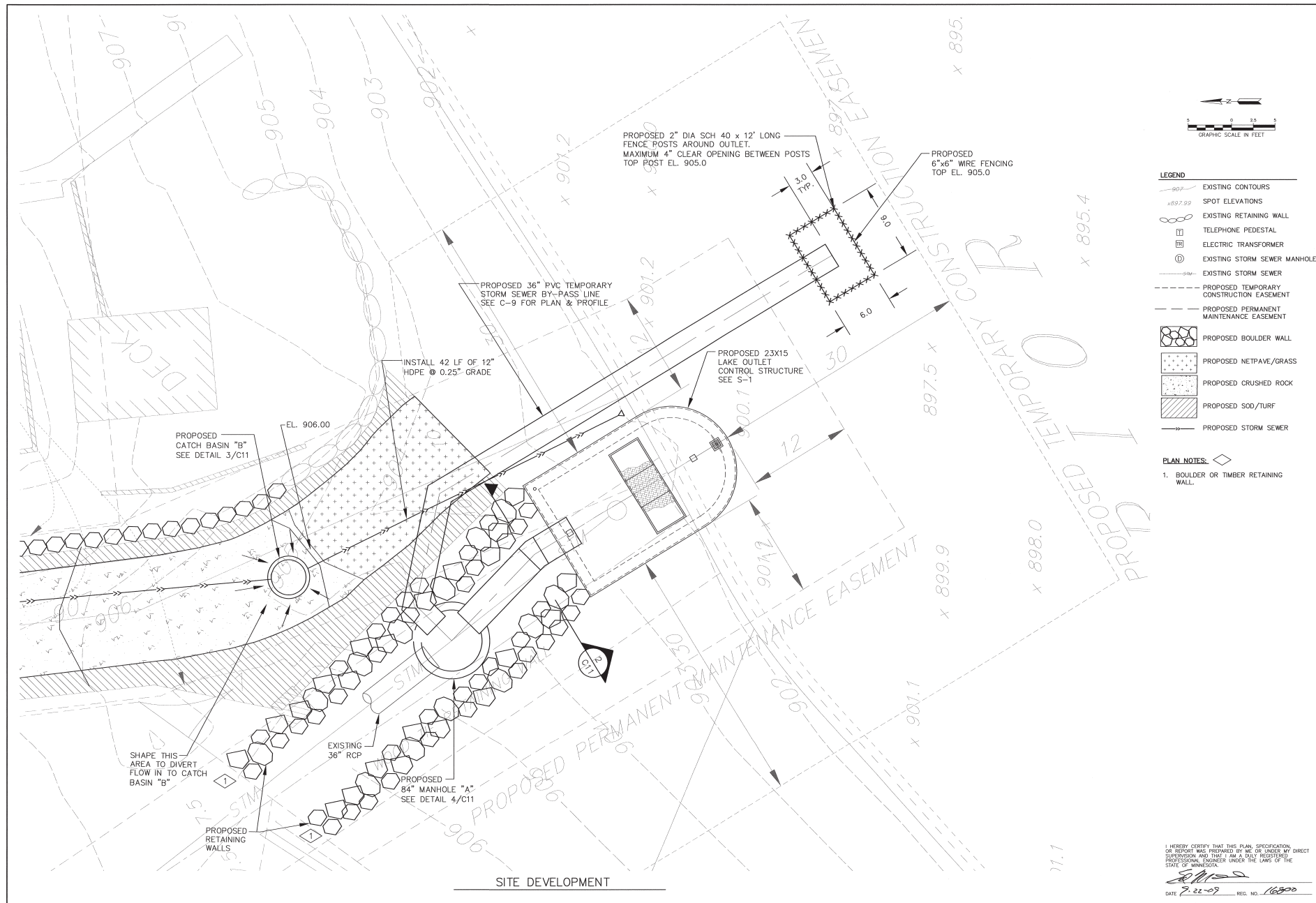
maintenance contract for the work in Segment 1. A basin was excavated and sinuosity was added to the channel in Segment 5c prior to entering Dean Lake during the early portion of 2007. Work in 2009 included the replacement of an undersized culvert on the northern end of Segment 8. The year 2010 held the finalization of work in several Segments including: banks being reshaped, in addition to toe stabilization and weir reinforcements put in place on Segment 7a; toe stabilization, bank protections and flow realignment in Segment 3; and work to build up the channel bed and reconnect it to the floodplain in Segment 2. Additional site checks were made throughout 2011 to ensure stability against erosion and vegetation survival within the areas of previous work in Segments 2, 3, and 7a.

No major reconstruction work as a part of the restoration and enhancement project was completed in 2011. Additional areas with planned future reconstruction include Segments 4a, 4b and 7b. Segment 4a will consist of reshaping the channel. Segment 4b will include bank stabilizations, grade controls, cattle exclusion fencing and vegetation plantings within the bank and riparian area. Segment 7b is planned to have toe stabilizations and bank protection installed. These additional reconstruction items will be addressed with the JPA/MOA cooperators as they progress.

Attachments:

- A. Prior Lake Outlet Structure Diagram**
- B. 2011 Outlet Operations Summary**
- C. Stage-Discharge Relationship (New Structure)**
- D. Volumes Discharged from Prior Lake**
- E. Prior Lake Elevations and Precipitation**
- F. Prior Lake Elevations Graph**
- G. Summary of Precipitation within PLSLWD**

Attachment A: Prior Lake Outlet Structure Diagram



FILE NAME: W:\24279\OUTLET BOX SURVEY POST 80607\CONSTRUCTION PLANS\2008_08_04\008 SITE DEVELOPMENT.DWG

DATE	_____
REVISIONS	_____
SHEET TITLE	CONSTRUCTION PLANS - PRIOR LAKE OUTLET STRUCTURE
SITE DEVELOPMENT	PREPARED FOR:
DATE	AUGUST 2009
DWN	JOB
DSGN	EXAM
APPD	DRP

Wenck
 1800 Plover Creek Center (763) 479-4200
 Maple Plain, MN 55059 Fax: (763) 479-4242
 Environmental Engineers

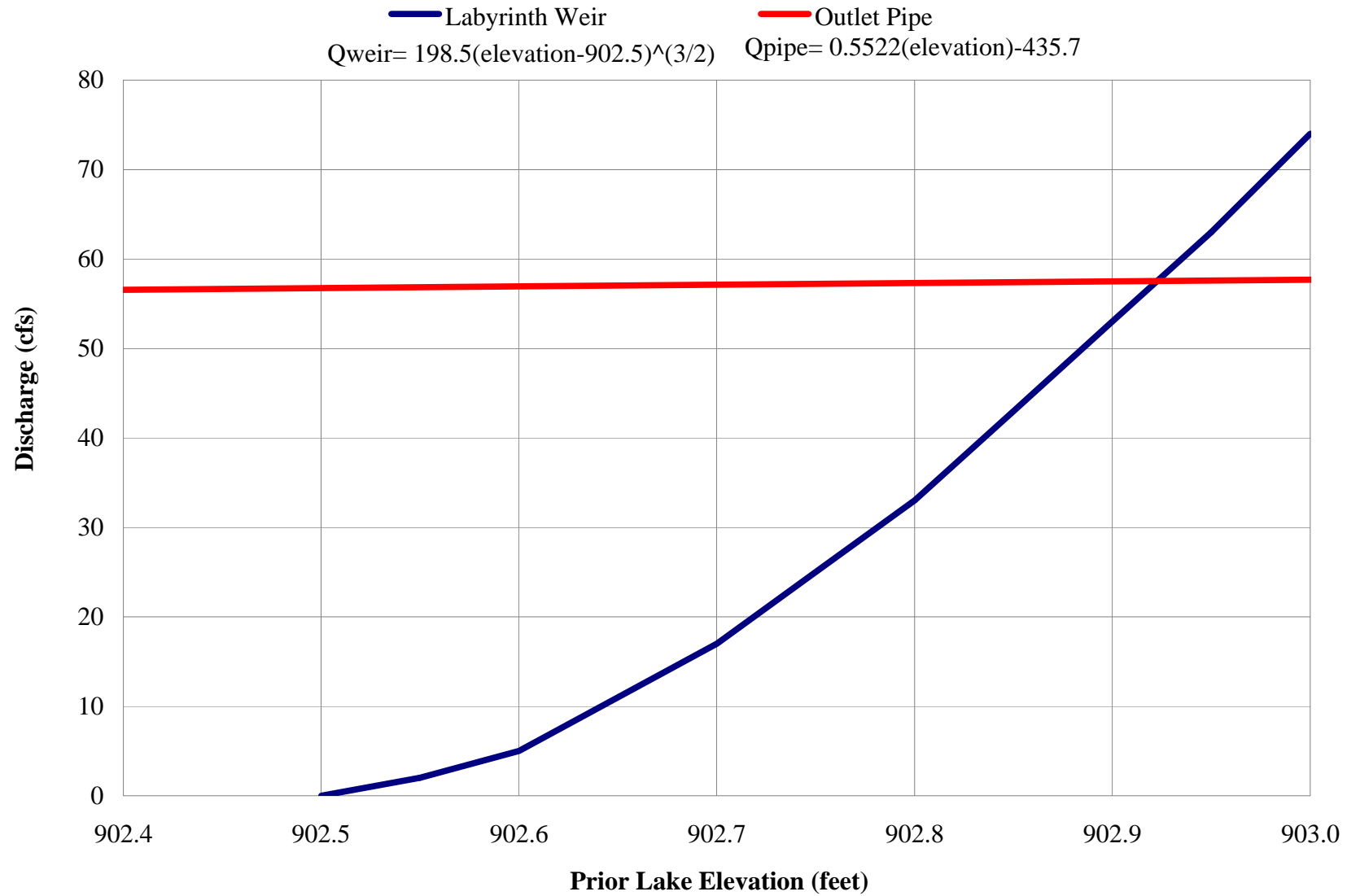
SHEET NO.	CB
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Attachment B:
2011 Outlet Operations

Date	Elevation	Outlet Activity	Channel Activity
12/29/2010	902.74	Freely flowing	Partial inspection- portions frozen or snow covered.
1/3/2011	902.70	Freely flowing	Partial inspection- portions frozen or snow covered.
1/4/2011	902.78	Freely flowing	Partial inspection- portions frozen or snow covered.
1/13/2011	902.76	Freely flowing	Partial inspection- portions frozen or snow covered.
1/20/2011	902.74	Freely flowing	Partial inspection- portions frozen or snow covered.
1/27/2011	902.72	Freely flowing	Partial inspection- portions frozen or snow covered.
2/10/2011	902.68	Freely flowing	Partial inspection- portions frozen or snow covered.
2/17/2011	902.68	Freely flowing	Partial inspection- portions frozen or snow covered.
2/24/2011	902.86	Freely flowing	Partial inspection- portions frozen or snow covered.
3/1/2011	902.76	Freely flowing	Lower slide gate was opened on Outlet Structure per allowable March and April use. Partial inspection
3/4/2011	902.54	Freely flowing	Removed organic debris from various culverts.
3/7/2011	902.78	Freely flowing	Noted possible erosion under Squires culvert.
3/10/2011	902.66	Freely flowing	Removed organic debris from various culverts.
3/14/2011	902.54	Freely flowing	Noted failing Squires culvert .
3/21/2011	902.59	Freely flowing	Noted failing Squires culvert, and near overtopping and plugging at FWS culverts. Removed organic debris from various culverts
3/22/2011	902.81	Freely flowing	Overtopping at Strauss and FWS driveway culverts.
3/23/2011	903.02	Freely flowing	Noted bank collapse at Squires culvert.
3/25/2011	903.25	Freely flowing	Overtopping at Jackson Trl, bank erosion at Kes driveway and failing Squires culvert
3/28/2011	903.65	Freely flowing	Overtopping at Strauss, Jackson Trl and FWS culverts, still failing culvert at Squires. Noted water out of banks at Seg 7
3/29/2011	903.72	Freely flowing	Noted washing out at Jackson Trl and FWS.
3/30/2011	903.78	Freely flowing	Removed organic debris from various culverts.
4/1/2011	903.86	Freely flowing	Noted degrees of collapse of Squires and Jackson Trl driveways. Flooding noted in fields adjacent to Seg 5b
4/4/2011	903.95	Freely flowing	Removed organic debris from various culverts.
4/6/2011	903.94	Freely flowing	Removed organic debris from various culverts.
4/8/2011	903.80	Freely flowing	Removed organic debris from various culverts.
4/12/2011	903.83	Freely flowing	Removed organic debris from various culverts.
4/14/2011	903.74	Freely flowing	Removed organic debris from various culverts.
4/15/2011	903.70	Freely flowing	Removed organic debris from various culverts.
4/19/2011	903.49	Freely flowing	Noted continued overtopping of FWS driveway, disjointed culvert at field crossing near Jackson Trl. Damaged Squires culvert removed
4/21/2011	903.49	Freely flowing	Removed organic debris from various culverts.
4/25/2011	903.32	Freely flowing	Removed organic debris from various culverts. Continued overtopping of banks in Seg 5b
4/26/2011	903.38	Freely flowing	Safety rail installed on Outlet Structure, removed organic debris from various culverts
4/29/2011	903.38	Freely flowing	Lower slide gate was closed on Outlet Structure per allowable March and April use. Repairs began on Squires driveway culvert
5/2/2011	903.36	Freely flowing	Continued repairs on Squires driveway culvert.
5/5/2011	903.28	Freely flowing	Noted continued blockage/poor flow at FWS driveway culvert.
5/6/2011	903.26	Freely flowing	Noted severe erosion at FWS driveway culvert.
5/10/2011	903.20	Freely flowing	Noted sink hole forming on Steve Kes driveway above culvert.
5/16/2011	903.10	Freely flowing	Removed organic debris from various culverts.
6/8/2011	902.90	Freely flowing	Removed organic debris from various culverts.
6/13/2011	902.77	Freely flowing	Removed organic debris from various culverts.
6/22/2011	903.06	Freely flowing	Noted some erosion near the new Squires culvert.
7/8/2011	902.90	Freely flowing	Removed organic debris from various culverts.
8/5/2011	903.04	Freely flowing	Removed organic debris from various culverts. Noted overflowing channel at Quarry Lake
8/11/2011	902.83	Freely flowing	Noted continued failing of culvert on field crossing near Jackson Trl
8/18/2011	902.74	Freely flowing	Removed organic debris from various culverts.
8/25/2011	902.64	Freely flowing	Removed organic debris from various culverts, noted continued failing of field crossing near Jackson Trl
8/30/2011	902.60	Freely flowing	Removed debris from Lower Jeffers culverts (3).
9/8/2011	902.35	No Flow	Low flows in channel, lake no longer outletting. All flow (~1cfs) entering Jackson Trl flows out break in center of culvert.
9/30/2011		No Flow	Partial inspection Seg 5-8, all looks as previously noted, no flow in Seg 4, ~2cfs in Seg 5a from ponds
** Various spot checks as needed through remainder of the year. No flow from Outlet Structure and minimal to no flows in channe			
11/29/2011		No flow	Damaged Jackson Trail culvert removed.
12/12-12/20/2011		No Flow	Seg 7, Quarry Lake repair work completed.

Attachment C:
Stage-Discharge Relationship

Prior Lake Outlet Stage-Discharge Relationship



Attachment D:
Volumes Discharged from Prior Lake

Volumes Discharged from the Prior Lake Outlet and Associated Elevations

Year	Volume Discharged (ac*ft)	Depth Eliminated from Lake (ft)	Min Elevation for the Year	Date of Min Elevation	Max Elevation for the Year	Date of Max Elevation	Max Elevation <i>without</i> the Outlet	Average Rainfall
2011	20314	9.93	900.87	12/28/2011	903.95	4/5/2011	913.88	26.07
2010	1110	0.59	899.38	1/14/2010	902.78	12/23/2010	903.37	37.23
2009	0	0.00	898.98	9/30/2009	900.44	4/29/2009	900.44	27.41
2008	4993	2.61	900.28	12/29/2008	902.90	5/8/2008	905.51	23.88
2007	1395	0.74	900.55	8/10/2007	902.78	4/23/2007	903.52	28.59
2006	4331	2.27	900.50	12/14/2006	903.27	4/7/2006	905.54	27.77
2005	2299	1.21	900.71	1/18/2005	903.10	10/18/2005	904.31	38.02
2004	13	0.01	900.50	4/15/2004	902.79	7/12/2004	902.80	32.96
2003	5921	3.08	900.62	12/30/2003	903.17	5/23/2003	906.25	23.00
2002	9520	4.88	900.70	3/4/2002	903.60	9/10/2002	908.48	41.96
2001	8692	4.47	901.04	12/28/2001	904.28	5/7/2001	908.75	28.52
2000	80	0.04	901.52	2/20/2000	903.00	7/11/2000	903.04	26.09
1999	6240	3.24	902.00	11/25/1999	904.78	5/27/1999	908.02	33.29
1998			<i>902.05</i>	<i>1/1/1998</i>	<i>903.90</i>	<i>4/13/1998</i>		35.00*
1997	4150	2.18	901.20	2/28/1997	902.90	4/21/1997	905.08	32.36*
1996		0.00	<i>900.77</i>	<i>11/4/1996</i>	<i>902.98</i>	<i>4/10/1996</i>		26.52*
1995			<i>902.26</i>	<i>9/26/1995</i>	<i>903.25</i>	<i>3/30/1995</i>		30.62*
1994	1760+	0.93	901.90	9/7/1994	903.05	10/24/1994	903.98	35.28*
1993	10,000+	5.12	902.00	3/9/1993	904.49	7/14/1993	909.61	36.40*
1992	8,331	4.29	899.95	2/19/1992	903.16	10/12/1992	907.45	35.86
1991			<i>898.11</i>	<i>4/1/1991</i>	<i>900.92</i>	<i>6/13/1991</i>		
1990			<i>895.46</i>	<i>4/24/1990</i>	<i>899.38</i>	<i>8/10/1990</i>		
1989			<i>895.49</i>	<i>11/27/1989</i>	<i>897.15</i>	<i>4/3/1989</i>		
1988			<i>896.90</i>	<i>11/11/1988</i>	<i>899.63</i>	<i>1/1/1988</i>		
1987			<i>899.63</i>	<i>12/31/1987</i>	<i>901.54</i>	<i>3/6/1987</i>		
1986			<i>901.22</i>	<i>2/14/1986</i>	<i>903.96</i>	<i>5/15/1986</i>		
1985			<i>902.23</i>	<i>9/12/1985</i>	<i>903.93</i>	<i>4/25/1985</i>		
1984			<i>901.75</i>	<i>10/9/1984</i>	<i>903.60</i>	<i>6/24/1984</i>		
1983	Outlet Installed		<i>901.76</i>	<i>1/17/1983</i>	<i>905.68</i>	<i>7/20/1983</i>		
1982			<i>900.06</i>	<i>3/24/1982</i>	<i>902.56</i>	<i>5/21/1982</i>		
1981			<i>898.91</i>	<i>7/31/1981</i>	<i>899.88</i>	<i>9/17/1981</i>		
1980			<i>899.92</i>	<i>12/29/1980</i>	<i>902.60</i>	<i>4/18/1980</i>		
Averages	4552 (when operated)	2.85 (when operated)	900.30		902.67		905.88	30.76

Unless otherwise noted, data is taken from annual Prior Lake Outlet operations reports

* Rainfall data is from MN Climatology office for 115N, 22W, 15 Prior Lake; all other rainfall as recorded at PLSLWD Office

Italics data from PLSLWD Historic Volunteer Collected Lake Level Data

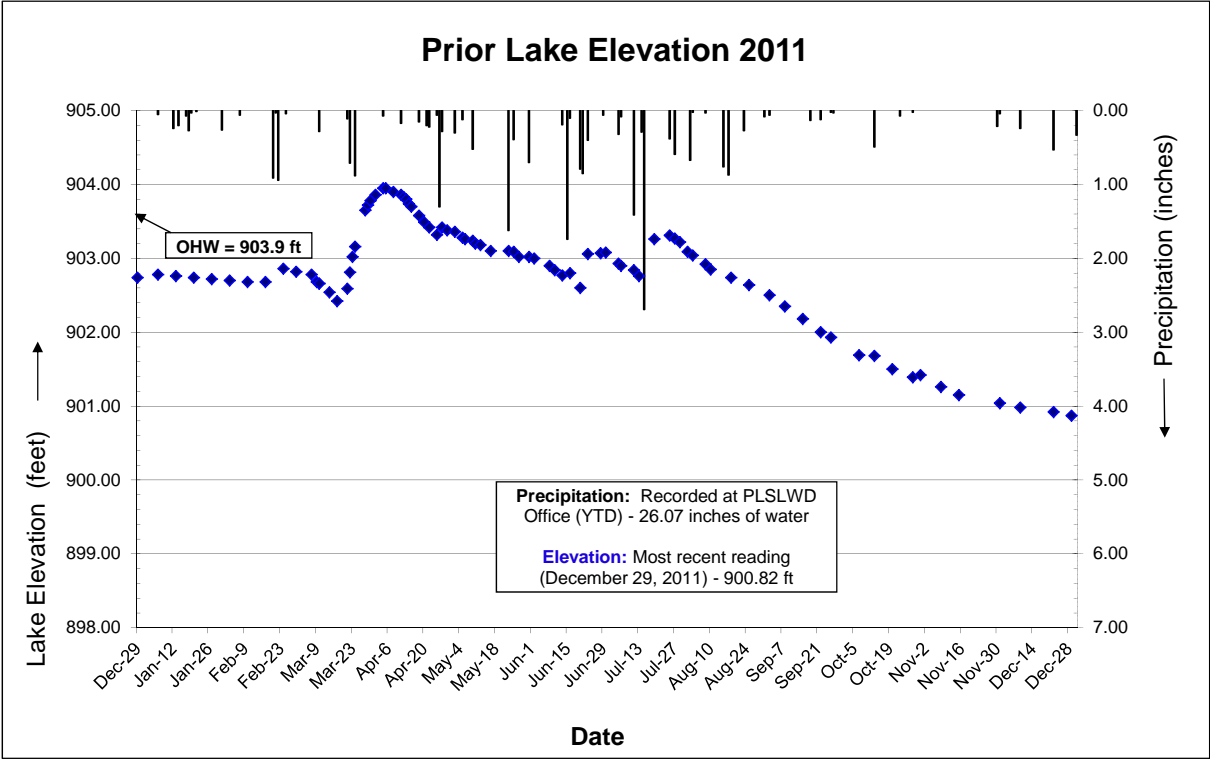
Attachment E:
Prior Lake Elevations and Precipitation

Date	Prior Lake Elevation (feet)	Precipitation b/w readings (in)	Monthly Precipitation Total
1/6/11 10:00	902.78	0.05	
1/12/11 7:00	*	0.24	
1/13/11 10:20	902.76		
1/14/11 0:00	*	0.20	
1/17/11 0:00	*	0.07	
1/18/11 7:00	*	0.27	
1/19/11 0:00	*	0.03	
1/20/11 10:30	902.74		
1/21/11 7:00	*	0.01	
1/27/11 10:30	902.72		
1/31/11 7:00	*	0.26	1.13
2/3/11 10:30	902.70		
2/7/11 7:00	*	0.06	
2/10/11 10:30	902.68		
2/17/11 4:00	902.68		
2/20/11 0:00	*	0.91	
2/21/11 0:00	*	0.03	
2/22/11 7:00	*	0.94	
2/24/11 0:00	902.86		
2/25/11 0:00	*	0.04	1.98
3/1/11 0:00	902.82		
3/7/11 0:00	902.78		
3/9/11 0:00	902.68		
3/10/11 0:00	902.66	0.28	
3/10/11 0:00	902.66		
3/14/11 0:00	902.54		
3/17/11 8:45	902.42		
3/21/11 11:28	902.59	0.11	
3/22/11 18:00	902.81	0.71	
3/23/11 13:10	903.02		
3/24/11 9:55	903.16	0.88	
3/28/11 10:15	903.65		
3/29/11 9:50	903.72		
3/30/11 9:34	903.78		1.98
4/1/11 9:42	903.86		
4/4/11 12:00	903.95	0.07	
4/5/11 11:15	903.95		
4/8/11 14:37	903.90		
4/11/11 10:10	903.86	0.17	
4/12/11 7:50	903.83		
4/13/11 7:50	903.80		
4/14/11 7:50	903.74		
4/15/11 7:50	903.70		
4/18/11 7:50	903.58	0.15	
4/20/11 7:50	903.49		
4/21/11 9:00	*	0.20	
4/22/11 7:55	903.42	0.22	
4/25/11 7:50	903.32	0.06	
4/26/11 12:05	*	1.30	
4/27/11 7:45	903.42	0.28	
4/29/11 7:50	903.38		2.45
5/2/11 7:45	*	0.30	
5/2/11 15:45	903.36		
5/5/11 13:30	903.28	0.12	
5/6/11 7:45	903.26		
5/9/11 7:50	903.24	0.52	
5/10/11 13:30	903.20		
5/12/11 7:45	903.18		
5/16/11 7:45	903.10		
5/23/11 7:45	903.10	1.62	
5/25/11 7:45	903.09	0.39	
5/27/11 7:45	903.02		
5/31/11 7:45	903.02	0.70	3.65

Date	Prior Lake Elevation (feet)	Precipitation b/w readings (in)	Monthly Precipitation Total
6/2/11 8:00	903.00		
6/8/11 9:10	902.90		
6/10/11 7:45	902.84		
6/13/11 12:20	902.77	0.19	
6/15/11 13:18	*	1.74	
6/16/11 8:30	902.80	0.10	
6/20/11 0:00	902.60	0.79	
6/21/11 0:00	*	0.85	
6/23/11 0:00	903.06	0.40	
6/28/11 15:45	903.07		
6/29/11 0:00	*	0.06	
6/30/11 9:10	903.08		4.13
7/5/11 12:30	902.93	0.32	
7/6/11 7:45	902.90	0.08	
7/11/11 7:45	902.84	1.41	
7/13/11 7:45	902.76		
7/14/11 9:00	*	0.29	
7/15/11 13:45	*	2.69	
7/19/11 7:30	903.26		
7/25/11 7:40	903.31	0.38	
7/27/11 8:00	903.27	0.59	
7/29/11 8:00	903.22		5.76
8/1/11 8:00	903.09		
8/2/11 7:40	*	0.67	
8/3/11 7:45	903.04	0.02	
8/8/11 7:35	*	0.03	
8/8/11 11:30	902.92		
8/10/11 8:15	902.85		
8/15/11 7:45	*	0.76	
8/17/11 7:35	*	0.87	
8/18/11 7:30	902.74		
8/23/11 7:30	*	0.27	
8/25/11 7:35	902.64		
8/31/11 0:00	*	0.08	2.70
9/2/11 7:35	902.50	0.06	
9/8/11 7:35	902.35		
9/15/11 7:35	902.18		
9/18/11 0:00	*	0.13	
9/22/11 7:30	902.00	0.12	
9/26/11 10:30	901.93	0.02	
9/27/11 0:00	*	0.03	0.36
10/7/11 7:25	901.69		
10/13/11 7:30	901.68	0.49	
10/20/11 7:25	901.50		
10/23/11 0:00	*	0.07	
10/28/11 7:30	901.39	0.02	
10/31/11 0:00	901.42		0.58
11/8/11 7:25	901.26		
11/15/11 7:30	901.15		
11/30/11 0:00	*	0.21	0.21
12/1/11 7:30	901.04	0.04	
12/9/11 15:00	900.98	0.24	
12/22/11 12:00	900.92	0.53	
12/29/11 11:00	900.87		
12/31/11 0:00	*	0.33	1.14

Elevation		Precipitation	
Average	902.83	Yearly Total	26.07
Minimum	900.87	Max 1 Day	2.69
Maximum	903.95		

Attachment F:
Prior Lake Elevations Graph



Attachment G:
Summary of precipitation within PLSLWD

Month	PLSLWD 2011 Office Readings
Jan	1.13
Feb	1.98
Mar	1.98
Apr	2.45
May	3.65
Jun	4.13
Jul	5.76
Aug	2.70
Sep	0.36
Oct	0.58
Nov	0.21
Dec	1.14
Year Total	26.07

* Readings taken
at PLSLWD
Office manual
rain gauge

PLSLWD 2011 mo ave	PLSLWD 2011 YTD ave
0.76	0.76
1.35	2.11
1.66	3.77
3.05	6.82
3.70	10.52
3.94	14.46
6.27	20.73
1.96	22.69
0.53	23.23
0.76	23.98
0.24	24.22
1.02	25.24
25.24	

*PLSLWD average is
calculated based on
four sites in the District
with complete monthly
records

NOAA Scott Co 30yr mo ave	NOAA Scott Co 30yr YTD ave
0.73	0.73
0.62	1.35
1.73	3.08
2.53	5.61
3.69	9.30
4.64	13.94
3.49	17.43
5.05	22.48
3.41	25.89
2.47	28.36
1.64	30.00
0.95	30.95
30.95	

* NOAA 30 year average is
per the NWS site in Jordan
for the years 1981-2010

Monthly % Deviation	Monthly Numeric Deviation	YTD % Deviation	YTD Numeric Deviation
4.1%	0.03	4.1%	0.03
117.7%	0.73	56.3%	0.76
-3.9%	-0.07	22.5%	0.69
20.6%	0.52	21.6%	1.21
0.3%	0.01	13.2%	1.22
-15.1%	-0.70	3.7%	0.52
79.7%	2.78	18.9%	3.30
-61.1%	-3.09	1.0%	0.21
-84.4%	-2.88	-10.3%	-2.66
-69.4%	-1.72	-15.4%	-4.38
-85.6%	-1.40	-19.3%	-5.78
7.7%	0.07	-18.4%	-5.71
		-18.4%	-5.71

*Deviation is calculated by the difference
between the current year PLSLWD average
and the 30 year Scott County average