

**CITY OF ST. JOSEPH WATER FILTRATION PLANT**

**OPERATIONAL REPORT**

**OCTOBER 2014**



**Mission Statement**

WSJOB- The City and Authority working together to provide safe drinking water of the highest quality to all of our customers at the lowest possible price.

## WATER PLANT REPORT-OCTOBER 2014

Water demand in October was down by 15,919,330 gallons or 13% from last year. This year 103,378,929 gallons were delivered which compares to 119,298,259 gallons delivered in October of 2013. Interestingly, while down from 2014 this usage is comparable to that seen in 2012 if one factors out Fairplain. This consumption pattern extends a trend first observed in August of this year. Also apparent in October is a downward trend in average day consumption that began in 1995. In October of that year the plant pumped an average of 5.1 million gallons per day. By 2014 this average had dropped to just 3.3 million gallons per day. The 2014 pumpage ranks 29<sup>th</sup> in the 30 year tabulation dating back to 1985.

### **GENERAL ACTIVITIES**

#### *Strategic Capital Improvement Plan*

The SCIP project is complete. City staff met with CH2M Hill on October 9<sup>th</sup> to review water demand forecasts and on October 14<sup>th</sup> to rank projects and complete the SCADA review. The meetings had been planned in Milwaukee at staff request to facilitate tours of the Oak Creek and Milwaukee Water Plants. However, due to scheduling conflicts and the ongoing UDF program the meetings were moved to St. Joseph. The plan will be presented to the WSJOB and St. Joseph City Commission as their schedules permit sometime in late November/early December. At this point the preliminary findings are that chemical feed will be ranked high and recommended to the board in the coming fiscal year. It is also apparent that the old section of the water plant is in poor condition, provides marginal treatment utility and presents a significant vulnerability in so far as the piping located under the floor is inaccessible. The rerating of filters 5-12 and the shifting of high service suction and discharge to a new pump station will be recommended in the report. In addition, the changeout of the clarifiers to plate settler technology once the service life of the existing steel is reached in about eight to ten years is planned. The St. Joseph SCIP is timely since we learned in October that the Michigan Department of Environmental Quality will be requiring all water supplies to submit capital improvement plans by January 1, 2016.

#### *High Service #3*

On August 1<sup>st</sup>, High Service #3 failed. Specifically the babbit bearing in the motor seized. The motor was last rebuilt in 2002. Peerless Midwest was called in to pull the motor. Competitive bids were solicited for the replacement of the motor and base from two suppliers. A recommendation was presented to the WSJOB on September 17<sup>th</sup> and the St. Joseph City Commission on September 22<sup>nd</sup>. The recommendation which was approved by both boards was to accept the proposal from Peerless Midwest to furnish and install a U.S. Motor brand motor with a matching motor mount. The other competitive bid included a motor manufactured in Brazil by Wegg. Wegg is the largest electrical motor supplier in all of Latin America. Staff preferred the U.S. Motor since several of the motors at the water plant and in the Authority boosters were made by U.S. and have provided good service over the last several years. High Service #3 is rated at 4 MGD. The total high service capacity of the St. Joseph Water Plant is 24 MGD. The new motor was installed in October by Peerless but was not set due to incorrect base dimensions. Peerless returned to reset the mounting. The VFD manufacturer was also called in to reprogram the parameters which had changed with the replacement of the motor. Staff will test the new motor under load during the week of November 17<sup>th</sup>.

### *Reclaim Pump #2*

Reclaim Pump #2 was installed on August 28<sup>th</sup> and is performing satisfactorily. The check valve on this pump was also replaced after having failed shortly after reinstallation. A second check valve was ordered and installed on Reclaim Pump #1 at the same time. Staff replaced the valves after it was determined that the old valves were no longer made and no rebuild kits were available.

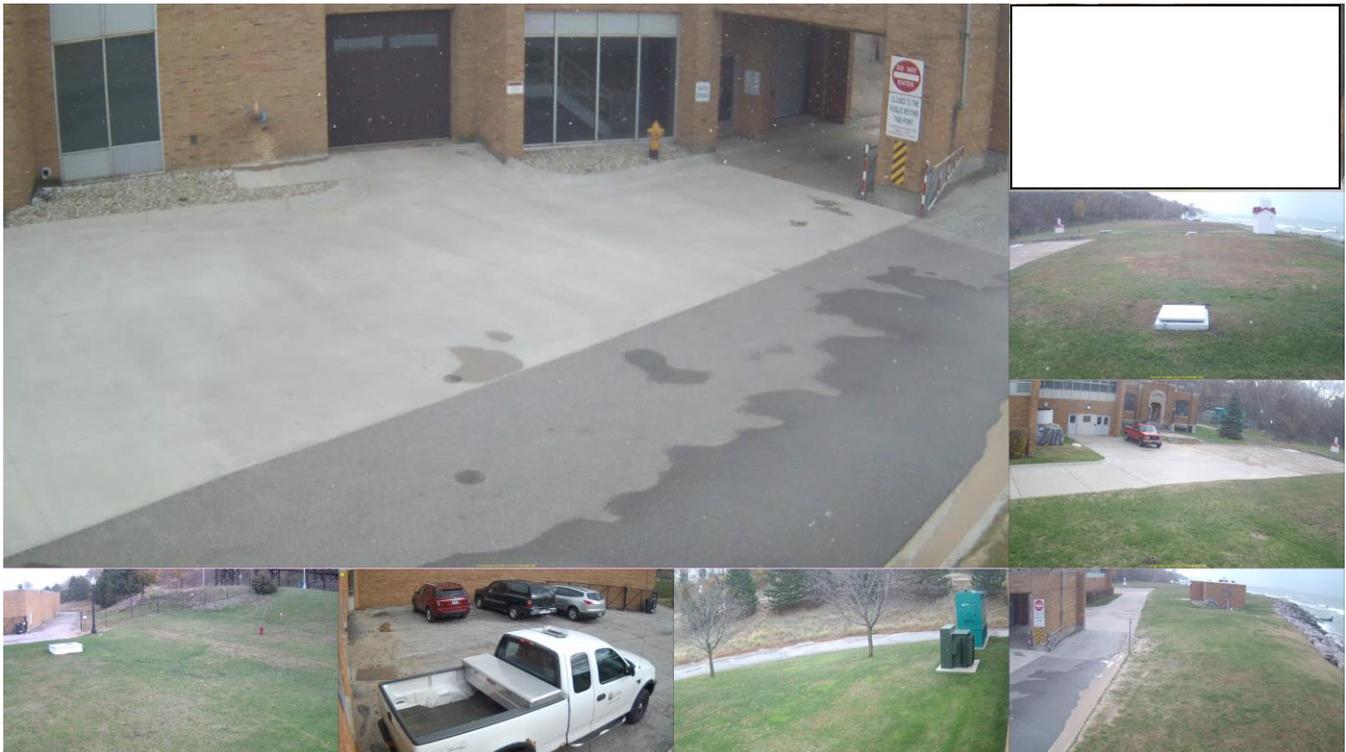
### *Reclaim Pump Check Valves*

One of the reclaim check valves failed in October. D.A. Dodd checked into the availability of a replacement valve and found that the manufacturer had gone out of business. Comparable valves were found that would fit. However, the cost of an AWWA approved valve was \$1,000 more than an unapproved valve. Given the function of this valve and the fact that it does not come in contact with potable water it was decided to go with the lower cost valve. The total cost for the replacement of the valve with labor and an additional valve to be stocked as a spare would be \$4,210. The valves are on order.

### *Reclaim Basin Cleaning*

Last month we reported to you that the reclaim basin would be cleaned this year. However, due to the lengthy work in the reservoir and the deteriorating weather this project will likely be deferred to the Spring.

### *Water Plant Security*



Installation of the security system is nearly complete. Two weather rated high resolution cameras are on order and should be in by mid-November. Plant staff and Mead & White began running conduit and cable in August and worked with Simplex Grinnell and Double K Enterprises to install the card readers, cameras and monitoring equipment. The system is now on line and operating.

### *Cross Connection Control Inspections*

Hydro Designs completed 32 inspections in the City during the weeks of August 4<sup>th</sup> and 11<sup>th</sup>. I accompanied the inspector on several inspections in the field including the new Harbor Village, Azul Restaurant, City Hall and the Joint Wastewater Plant. They will return during the week of November 17<sup>th</sup> to complete the annual round of inspections. The address listing was updated in October as well.



### *South Reservoir Cleaning and Inspection*

The 1.8 MG South Reservoir at the water plant was dewatered, cleaned and inspected in October. This basin provides on-site finished water storage and was last inspected sometime in the late 1980's. Due to the inoperability of the valves servicing the 30" filtered water influent line (Filters 9-12) and the 30" suction line divers from Seebrex Marine installed a plug in the suction line and bolted a plate to the flange on the filter line. The tank was then pumped dry and cleaned. Very little material was present. The divers reported about an inch of sand and alum on the floor of the basin. Dixon Engineering was hired to conduct a structural inspection. They found the reservoir to be in excellent condition. Recommendations were made to repair cracks emanating from the 18" filter influent line (Filters 5-8) and apply a protective coating to the concrete. They noted however that the cracks appeared to be quite old and superficial and that the coating would only be necessary 'several years in the future' if the light spalling observed on the pillars deteriorates to the point where rebar is exposed. The cracks in any case cannot be repaired until the leaking is stopped from the 18" filter valve. This valve and the two others mentioned above servicing this reservoir along with the three serving the north reservoir cannot be closed and cannot be repaired or rebuilt. Reservoir valve replacement is scheduled in the SCIP.

Upon inspection of the basin, divers removed the plug and plate and chlorinated the reservoir in accordance with AWWA 652-12.

#### *West Michigan Water Plant Supervisors October Monthly Meeting-St. Joseph Water Plant*

In October the West Michigan Water Plant Supervisors group met for lunch at Clementine's followed by a tour of the St. Joseph Water Plant. The turnout was great and our colleagues were impressed by the facility and the City of St. Joseph.

#### *West Michigan Water Works Association Meeting-Benton Harbor Water Plant*

Staff attended the Fall WMAWWA meeting hosted by the City of Benton Harbor. The event was held at the Benton Harbor Water Plant. A presentation on the new Muir plate settlers was given by Utility Services Director Beach followed by a plant tour. Plate Settler technology is transforming surface water treatment in Michigan. To date, several plants have replaced the old upflow clarifiers with this equipment. Plate Settlers were considered in the SCIP and determined to be the best solution for St. Joseph since the existing upflow clarifiers can be retrofitted with this technology without having to build new basins.

#### *Michigan Section Fall Regional Meeting-Kalamazoo*

Alan Smaka gave a presentation on the 2012 St. Joseph Charter Township Water System Improvements Project at the AWWA Michigan Section Fall Meeting in Kalamazoo.

#### *Chlorine Safety/Haz Mat Training*

Hazardous Material training was held at the water plant. Alexander Chemical provided the training which was followed by hands on instruction and a tour of the chlorine, alum and fluoride storage areas of the water plant. Berrien County Haz Mat and City of St. Joseph Public Safety attended.

#### *Intake Raw Water Sampling Line*

The raw water sampling line was taken out of service in late October after plant staff reported problems with the sample pump. Further investigation of the problem indicated that the pump was fine and that either a blockage in the line/screen had developed or the recently installed check valves at the intake crib had failed. The line will remain out of service until divers can look at it during the routine spring maintenance in April.

#### *D/DBPR Stage 2 October Authority Monitoring*

Laboratory analysis of the October sample taken on the 15<sup>th</sup> revealed a HAA5 result of 105 ppb. This is a concern since the running annual average must not exceed 60 ppb. A second sample was taken on October 31<sup>st</sup> in which a result of 38 ppb was found. Given the low levels of HAA5 found throughout the year we expect to remain in compliance. Nonetheless, plant staff is actively exploring measures to improve HAA5 reduction without adversely affecting other water quality parameters. Beginning in December, the chlorine feed ratio will be adjusted whereby the overall dose will remain unchanged but the amount fed in the wet well and after the clarifiers will be recalibrated. The plant's on line TOC analyzer and bench analysis of UV254 have proved to be valuable tools in monitoring organic carbon in the raw water which when combined with chlorine form disinfection byproducts such as HAA5's or Haloacetic Acids. Disinfection byproducts can also be reduced by active distribution system flushing. The City has undertaken unidirectional flushing this fall in the City service area and will resume in the spring.

# Monthly Maintenance Notes

October 2014

Normal PM Maint. done Monthly	Check all High Service and Low Service Pumps, BPS pumps, Service BPS Chlorinators, Change out air filters on VFD Drives and Air Handlers. Mow and Grounds Maintenance at Plant, Booster Stations and Towers
9/29 to 10/15/14	Staff (+) Mead & White - Installed New Conduit, Boxes, Door Locks, Switches, Cameras and New Wiring for all components for Security System. Simplex Grinnell terminated Door and Card Reader wiring only in control panel
10/03/14	Peerless Midwest - Installed New Packing on Backwash # 2 Pump ( 3 Packing Rings on each side of the pump
10/15/14	Installed New Monitor in control room for security system and installed new monitor in lab for microscope
10/16/14	Certified Crane - Annual Crane and Hoist Inspections
10/17/14	Mounted DVR for Security System in Control Electrical Room
10/20 to 10/21/14	Cleaned Clarifier # 1
10/21/14	Exercised BH/St Joe Interconnect Valve During UDF trial.
10/21/14	RS Technical - Service and Inspected the Chlorinators, Vacuum Regulators and Chlorine Gas Detectors.
10/27/14	Installed New Battery Back up in Filter 10 & 12 Control Panel
10/27/14	Isolated South Reservoir and started draining
10/28/14	DA Dodd - Installed New Check Valves on Reclaim Pumps #1 & #2
10/28/14	Peerless Midwest - Installed New Motor on High Service Pump # 3
10/29 to 10/30/14	Seabrex Marine - Cleaned South Reservoir
10/30/14	Cummins Bridgeway - Installed New Fuel Solenoid on North Low Service Generator
10/31/14	Dixon Eng. - Inspection of South Reservoir
10/31/14	Chlorinated South Reservoir and filled 5%
10/31/14	Mead & White - Hooked up power to New H.S. # 3 Pump Motor

**ST. JOSEPH WATER FILTRATION PLANT**  
**1701 LIONS PARK DRIVE**  
**SAINT JOSEPH, MI. 49085**

By: Greg Alimenti  
 St. Joseph Water Plant  
 700 Broad St.  
 Saint Joseph, MI. 49085-1276  
 (269) 983-1240

**OCTOBER 2014**

DISTRIBUTION:	
Total Gallons	103,378,929
Average Day	3,334,804
Maximum Day	4,495,857
Minimum Day	2,528,888

TREATMENT:	
Total Low Service	104,556,870
Wash Water Gals.	1,716,474
Wash Water %	1.67%
Plant Use Gals.	1,576,915
Plant Use %	1.53%

FILTRATION:		
Ave. Filter Run	78.4	hours
Ave. Filter Rate	1.87	g/sqft/min
Filter Eff. Index	176.2	
Ave. Loss of Head	3.4	feet
Plant Sewer Usage		
	\$4,595	2,079

LABORATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	19.8	19.4
Fluoride mg/L	0.15	1.13
Alkalinity mg/L	115	104
Hardness mg/L	145	141
pH	7.8	7.3
Calcium mg/L	40	39
Magnesium mg/L	10	10
Turbidity NTU	1.31	0.03
Temperature °F	60	
Total Coliform		0.0
Chlorine Residual		
		mg/L Free
Mixing Basin		1.65
Applied		1.81
Tap		1.65
Distribution		0.91

TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al <sup>+3</sup> )	1.58	1,387	\$4,036.34	5,989	134
Chlorine (Cl <sub>2</sub> )	3.58	3,112	\$809.12	6,936	69
Fluoride (F <sub>2</sub> )	0.78	688	\$2,064.54	4,274	193

			REMARKS:			
Total Cost all Chemicals		\$6,910.00				
Chemical Cost per Mil. Gallon Treated		\$66.09				
Chemical Cost per Mil. Gallon Delivered		\$66.84				
PLANT UTILITIES SUMMARY						
Electric:						
Total KWH		5,440	***includes measure of melted snow			
Total Power Cost		\$16,299.34	visit the City of Saint Joseph's Home page at <a href="http://www.sjcity.com">www.sjcity.com</a>			
Power Cost per Million Gallon Treated		\$137.64	e-mail comments to either: <a href="mailto:operator@sjcity.com">operator@sjcity.com</a> or <a href="mailto:galimenti@sjcity.com">galimenti@sjcity.com</a>			
Power Cost per Million Gallon Delivered		\$155.89	WEATHER CONDITIONS AT THE PLANT		Air Temp. °F	
Gallons Pumped per KWH		19003	SJWW Weather Computer		Avg.	54.6
			Rain Guage, Inches	3.6	Max.	72.4
			days it rained***	11	Min.	37.7
Natural Gas:			Wind Speed, Avg	10.6	Lake Temp. °F	
Metered CCF		187	Wind Speed, Max	60	Avg.	60.5
Natural Gas Cost		\$116.00	Prevailing Wind Dir.	South	Max.	64.8
Emergency Power Diesel Fuel Inv. Gals. South	Full	3200	Lake Level (USACE)	579.3	Min.	55.0
Emergency Power Diesel Fuel Inv. Gals. North	3/4 Tank	620				

**DISTRIBUTION REPORT**

**For the Month of October 2014**

Activity	Number	Description
Water Main Breaks	5	
MISS DIGS	350	
Delinquent Shut Off	19	LCT
Delinquent Shut Off (Broken Payment Plans)		
Hydrants (Repaired/Replaced)	13	Frozen caps, leaking, will not open, etc. (all in LCT)
	1	Replaced broken hydrant at 4950 Roosevelt Road
Valves	1	Main St. & Forres. Repl broken 4" found by Wachs
Taps (1")	6	2719 S. Cleveland Avenue (SJCT). Bad well.
		2139 Samuel Avenue (SJCTE). Bad well.
		2400 Baypoint Drive (SJCT). New construction
		535 Dunewood Drive (City). New construction.
		4055 Silver Oaks Drive (RCT). Bad well
		5200 Red Arrow Highway. (LCT). Bad well
Service Work (system valves)	9	Replaced/Repaired operating nuts. (City)
Water Service Repairs	0	
Repair of Curb box/Shut-Off Valves	0	
Water Quality Complaint(s)	0	
Unidirectional Flushing Program (City)		1,636,000 gallons (SJ)
Hydrant Flushing to maintain water quality		
Hydrant Flushing (Stage 2 Auth Oct)		128,385 gallons (LCT)
Staff Education/Training	0	
Overtime-Total	137.5	(Including Sanitary and Storm)
Turn Off	14	(Note: This number does not include delinquent Shut off)
Turn On	8	
Finals	126	
Meter Repair		
Meter Repair/Replacement	39	Verify Read
Per detail		New Installation
Meter leaking		New Installation-Benton Harbor
Stopped Meter		Replaced/various reasons
Faulty Register		Rockwell Replacement
Frozen Meter		Mxu Replaced
Move Meter Inside		Sprinkler meter removed/line capped
Hard to read		Removals
Replace/Adding Sprinkler Meter		Curb box location
Damage to Trt		Broken Remote
New Plumbing		Noisy Meter
New siding		Upgrade 5/8" to 3/4"
Meter sent out for testing		Meter Change/Benton Harbor

**CITY OF ST. JOSEPH WATER MAIN BREAK REPORT**

**For the Month/Year of: October 2014**

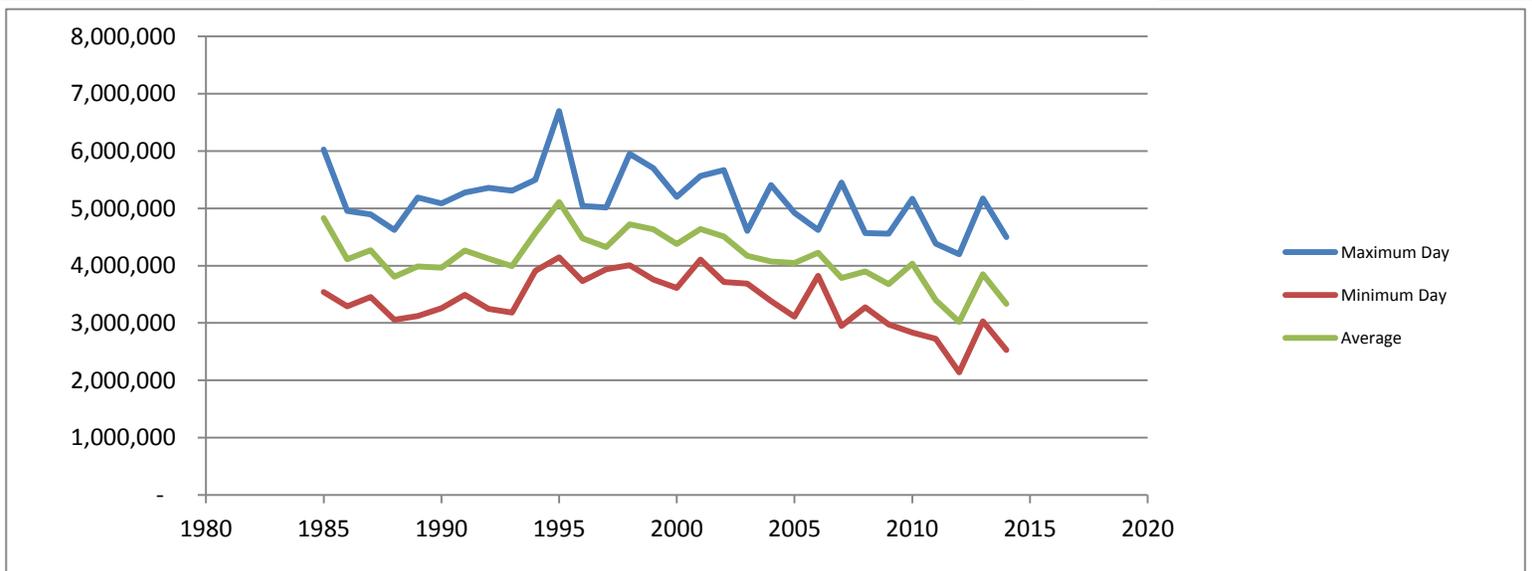
#	Date	Location	Main Size	Gallons Lost	Break Type	Valves Turned	City Twp	Labor	Remarks
1	10/23/2014	2950 Niles Avenue	8"	60,000	Hole	5	City		3" hole on side of pipe. No apparent corrosion.
2	10/23/2014	Jakway & Marral Drive	6"	12,000	Circumf. Crack	2	SJCT	30	In the intersection. Fairplain area. Sandy soil
3	10/28/2014	1111 Orchard Avenue	6"	60,000	hole and crack	3	City	15	1" hole and 3" crack. Clay
4	10/30/2014	Riverwood Terrace at Langley	3"	12,000	cracks	3	City	20.0	crack on 3" main concurrent with crack on 4" main
5	10/30/2014	Riverwood Terrace at Langley	4"	12,000	cracks	3	City		crack on 3" main concurrent with crack on 4" main
6									
		Total Gallons Lost		156,000					

# ST. JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED

OCTOBER 2014

Year	Average	Maximum Day	Minimum Day	Monthly Total
1985	4,829,587	6,026,100	3,541,500	149,717,200
1986	4,109,139	4,952,700	3,291,100	127,383,300
1987	4,267,894	4,892,900	3,450,900	132,304,700
1988	3,806,768	4,622,500	3,055,200	118,009,800
1989	3,986,361	5,189,800	3,123,200	123,577,200
1990	3,967,368	5,085,400	3,255,300	122,988,400
1991	4,262,319	5,274,700	3,494,000	132,131,900
1992	4,120,694	5,359,000	3,246,700	127,741,500
1993	3,990,787	5,311,000	3,183,200	123,714,400
1994	4,576,481	5,498,000	3,908,500	141,870,900
1995	5,110,329	6,697,750	4,145,750	158,420,200
1996	4,478,248	5,044,400	3,730,375	138,825,675
1997	4,326,223	5,014,100	3,937,500	134,112,900
1998	4,722,913	5,953,000	4,009,200	146,410,300
1999	4,635,503	5,700,000	3,756,700	143,700,600
2000	4,377,215	5,202,250	3,609,500	135,693,650
2001	4,641,072	5,563,000	4,106,500	143,873,240
2002	4,507,228	5,665,250	3,717,250	139,724,080
2003	4,172,994	4,605,040	3,688,250	129,362,820
2004	4,072,083	5,407,660	3,381,750	126,234,560
2005	4,048,260	4,924,500	3,111,000	125,496,050
2006	4,223,672	4,622,024	3,821,251	130,993,825
2007	3,782,964	5,451,500	2,945,000	117,271,870
2008	3,897,484	4,568,000	3,274,890	120,822,920
2009	3,675,142	4,557,250	2,976,750	113,939,560
2010	4,036,904	5,166,249	2,832,295	125,144,029
2011	3,400,119	4,384,390	2,727,365	105,403,683
2012	3,018,269	4,199,562	2,138,902	93,566,332
2013	3,848,340	5,171,412	3,030,222	119,298,259
2014	3,334,804	4,495,857	2,528,888	103,378,929

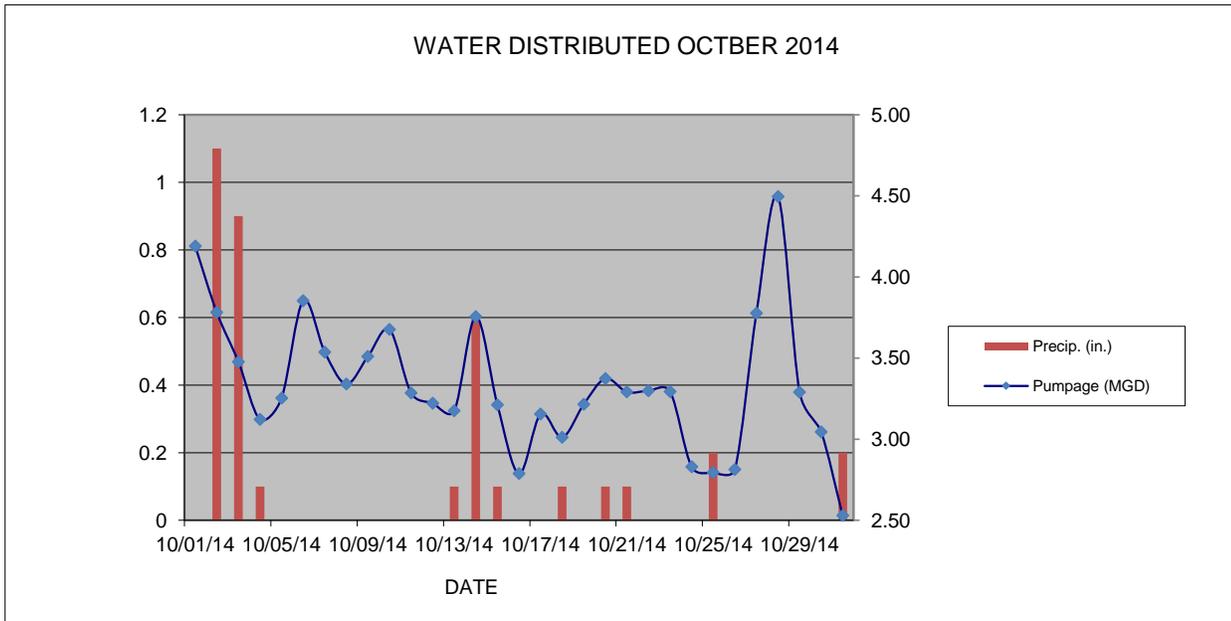
Rank	Year	Monthly Total
1	1995	158,420,200
2	1985	149,717,200
3	1998	146,410,300
4	2001	143,873,240
5	1999	143,700,600
6	1994	141,870,900
7	2002	139,724,080
8	1996	138,825,675
9	2000	135,693,650
10	1997	134,112,900
11	1987	132,304,700
12	1991	132,131,900
13	2006	130,993,825
14	2003	129,362,820
15	1992	127,741,500
16	1986	127,383,300
17	2004	126,234,560
18	2005	125,496,050
19	2010	125,144,029
20	1993	123,714,400
21	1989	123,577,200
22	1990	122,988,400
23	2008	120,822,920
24	2013	119,298,259
25	1988	118,009,800
26	2007	117,271,870
27	2009	113,939,560
28	2011	105,403,683
<b>29</b>	<b>2014</b>	<b>103,378,929</b>
30	2012	93,566,332



**ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED/RAINFALL  
OCTOBER 2014**

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	Rainfall (in)*	October 2013
10/01/14	4,189,440	4.19	0	4,714,211
10/02/14	3,781,059	3.78	1.1	5,171,412
10/03/14	3,476,965	3.48	0.9	4,863,211
10/04/14	3,120,513	3.12	0.1	4,119,233
10/05/14	3,253,029	3.25	0	4,229,741
10/06/14	3,853,510	3.85	0	4,114,773
10/07/14	3,536,309	3.54	0	4,320,372
10/08/14	3,339,848	3.34	0	4,073,350
10/09/14	3,509,652	3.51	0	4,211,929
10/10/14	3,675,750	3.68	0	4,009,663
10/11/14	3,284,792	3.28	0	4,265,806
10/12/14	3,221,809	3.22	0	4,269,187
10/13/14	3,174,834	3.17	0.1	4,125,552
10/14/14	3,755,388	3.76	0.6	4,228,006
10/15/14	3,211,403	3.21	0.1	3,968,293
10/16/14	2,786,843	2.79	0	3,856,581
10/17/14	3,154,230	3.15	0	3,493,314
10/18/14	3,010,306	3.01	0.1	3,715,505
10/19/14	3,214,644	3.21	0	3,397,240
10/20/14	3,373,373	3.37	0.1	3,701,528
10/21/14	3,290,460	3.29	0.1	3,204,061
10/22/14	3,297,841	3.30	0	3,836,894
10/23/14	3,293,598	3.29	0	3,120,088
10/24/14	2,828,848	2.83	0	3,302,643
10/25/14	2,794,786	2.79	0.2	3,101,220
10/26/14	2,812,832	2.81	0	3,341,243
10/27/14	3,776,846	3.78	0	3,030,222
10/28/14	4,495,857	4.50	0	3,668,616
10/29/14	3,290,348	3.29	0	3,124,647
10/30/14	3,044,929	3.04	0	3,516,200
10/31/14	2,528,888	2.53	0.2	3,203,788
<b>TOTAL</b>	<b>103,378,929</b>	<b>103.38</b>	<b>3.60</b>	<b>119,298,529</b>

<b>Average Day</b>	<b>3,334,804</b>
<b>Maximum Day</b>	<b>4,495,857</b>
<b>Minimum Day</b>	<b>2,528,888</b>



## CLEVELAND BOOSTER STATION

## HILLTOP BOOSTER STATION

## BOTH

DATE	MGD TREATED	FEED METER GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> RES PRE mg/l	Cl <sub>2</sub> RES POST mg/l	Cl <sub>2</sub> RES MON mg/l	MGD TREATED	FEED METER GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> RES PRE mg/l	Cl <sub>2</sub> RES POST mg/l	Cl <sub>2</sub> RES MON mg/l	MGD TREATED BOTH
1-Oct	1.680	78	11.06	0.79	1.49	1.69	1.75	1.461	28	3.97	0.33	1.42	1.59	1.76	3.141
2-Oct	0.917	45	6.38	0.83	1.46	1.47	1.51	1.297	53	7.51	0.69	1.30	1.67	1.72	2.214
3-Oct	0.528	25	3.54	0.80	1.26	1.70	1.76	1.478	71	10.07	0.82	1.28	1.84	1.97	2.007
4-Oct	0.647	30	4.25	0.79				1.251	23	3.26	0.31				1.897
5-Oct	0.647	30	4.25	0.79				1.251	23	3.26	0.31				1.897
6-Oct	0.647	30	4.25	0.79	1.84	2.15	1.59	1.251	23	3.26	0.31	1.72	1.51	1.60	1.897
7-Oct	1.580	78	11.06	0.84	2.11	1.67	1.69	0.829	16	2.27	0.33	2.00	1.58	1.68	2.409
8-Oct	1.489	74	10.49	0.85	1.36	1.83	1.84	0.000	0	0.00	0.00	1.17	1.34	1.35	1.489
9-Oct	1.747	91	12.90	0.89	1.96	1.68	1.70	0.571	9	1.28	0.27	1.31	1.74	1.78	2.317
10-Oct	0.000	0	0.00	0.00	1.61	1.51	1.56	2.254	39	5.53	0.29	2.04	1.71	1.60	2.254
11-Oct	1.257	67	9.50	0.91				0.892	14	1.98	0.27				2.149
12-Oct	1.257	67	9.50	0.91				0.892	14	1.98	0.27				2.149
13-Oct	1.257	67	9.50	0.91	1.24	1.76	1.69	0.892	14	1.98	0.27	1.21	1.64	1.77	2.149
14-Oct	1.118	58	8.22	0.88	1.59	1.26	1.21	0.544	25	3.54	0.78	2.81	1.98	2.49	1.663
15-Oct	0.804	40	5.67	0.85	1.71	1.63	1.44	0.967	26	3.69	0.46	1.40	1.75	1.80	1.771
16-Oct	0.000	0	0.00	0.00	1.31	1.27	1.27	2.072	43	6.10	0.35	1.26	1.57	1.68	2.072
17-Oct	1.295	72	10.21	0.94	1.72	1.60	1.57	0.475	14	1.98	0.50	2.11	1.57	1.51	1.770
18-Oct	0.548	29	4.11	0.90				1.172	16	2.27	0.23				1.719
19-Oct	0.548	29	4.11	0.90				1.172	16	2.27	0.23				1.719
20-Oct	0.548	29	4.11	0.90	1.35	1.38	1.44	1.172	16	2.27	0.23	1.85	1.47	1.61	1.719
21-Oct	1.722	92	13.04	0.91	1.87	1.87	1.91	0.000	0	0.00	0.00	1.55	1.40	1.35	1.722
22-Oct	0.821	42	5.95	0.87	1.58	1.54	1.64	0.658	23	3.26	0.59	2.07	1.76	1.87	1.479
23-Oct	1.671	93	13.19	0.95	1.68	1.76	1.84	0.000	0	0.00	0.00	1.74	1.61	1.68	1.671
24-Oct	0.000	0	0.00	0.00	1.62	1.60	1.65	2.204	36	5.10	0.28	2.17	1.68	1.61	2.204
25-Oct	1.176	63	8.93	0.91				0.611	6	0.85	0.17				1.787
26-Oct	1.176	63	8.93	0.91				0.611	6	0.85	0.17				1.787
27-Oct	1.176	63	8.93	0.91	1.59	2.06	2.19	0.619	5	0.71	0.14	1.66	1.74	1.91	1.795
28-Oct	1.278	49	6.95	0.65	1.78	2.11	2.17	0.594	1	0.14	0.03	1.76	1.74	1.83	1.872
29-Oct	0.716	37	5.25	0.88	2.19	1.91	2.30	0.867	0	0.00	0.00	1.86	1.86	1.93	1.584
30-Oct	1.522	79	11.20	0.88	1.84	1.87	1.96	0.000	0	0.00	0.00	1.63	1.64	1.68	1.522
31-Oct	0.694	42	5.95	1.03	1.68	1.99	1.95	1.392	0	0.00	0.00	1.71	1.71	1.74	2.086
TOTAL	30.463	1,562	221.46					29.447	560	79.40					59.909
AVE DAY	0.983		7.14	0.79	1.65	1.71	1.723	0.9499		2.56	0.28	1.70	1.66	1.74	1.933
MAX	1.747		13.19	1.03	2.19	2.15	2.3	2.2544		10.07	0.82	2.81	1.98	2.49	3.141
MIN	0.000		0	0.00	1.24	1.26	1.21	0.0000		0	0.00	1.17	1.34	1.35	1.479
MONTHLY TOTALS:	Cleveland	Total MG	30.463	SJCT-East				Hilltop	Total MG	29.447	Cleveland Pump Station:			30.463	
		Cl2 Add	30.463	Ave Day			0.186		Cl2 Add	27.188	Hilltop Pump Station:			27.188	
Total Authority Flow:	65.279	No Cl2	0.000	Total Month			5.767		No Cl2	2.259	TOTAL AUTHORITY (Trted.)			57.651	

STAGE 2 D/DBPR MONITORING-TTHM

July 2014

WSSN 3726

Date	01/15/14	01/15/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Bromodichloromethane	7.9	9.6
Bromoform	<0.5	<0.5
Chloroform	15	21
Dibromochloromethane	3.1	3
<i>Total Trihalomethanes</i>	26	33.6

Date	04/10/14	04/10/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Bromodichloromethane	8.5	9.7
Bromoform	<0.5	<0.5
Chloroform	32	32
Dibromochloromethane	1.4	2.4
<i>Total Trihalomethanes</i>	41.9	44.1

Date	07/09/14	07/09/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Bromodichloromethane	10	12
Bromoform	<0.5	<0.5
Chloroform	25	39
Dibromochloromethane	4.9	5.4
<i>Total Trihalomethanes</i>	39.9	56.4

Date	10/15/14	10/31/14	10/15/14
Site	Lincoln Twp Hall (DBP-1)	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Bromodichloromethane	16	11	9.6
Bromoform	<0.5	<0.5	<0.5
Chloroform	69	34	54
Dibromochloromethane	2.5	3.4	1.6
<i>Total Trihalomethanes (by sample)</i>	87.5	48.4	65.2
<i>Total Trihalomethanes (month)</i>		67.95	65.2

	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
<b>RAA (ppb)</b>	<b>43.9</b>	<b>49.8</b>

STAGE 2 D/DBPR MONITORING-HALOACETIC ACIDS

OCTOBER 2014

WSSN 3726

Date	01/15/14	01/15/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Dibromoacetic acid	1.1	1
Dichloroacetic acid	9.6	12
Monobromoacetic acid	<1	<1
Monochloroacetic acid	<2	<2
Trichloroacetic acid	12	17
<i>Total HAA5</i>	22.7	30.0

Date	04/10/14	04/10/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Dibromoacetic acid	<1	<1
Dichloroacetic acid	25	22
Monobromoacetic acid	<1	<1
Monochloroacetic acid	5	5.1
Trichloroacetic acid	42	31
<i>Total HAA5</i>	72	58.1

Date	07/09/14	07/09/14
Site	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Dibromoacetic acid	1.2	<1
Dichloroacetic acid	15	10
Monobromoacetic acid	<1	<1
Monochloroacetic acid	<2	<2
Trichloroacetic acid	9.6	12
<i>Total HAA5</i>	25.8	22.0

Date	10/15/14	10/31/14	10/15/14
Site	Lincoln Twp Hall (DBP-1)	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
Dibromoacetic acid	<1	<1	<1
Dichloroacetic acid	43	20	4.8
Monobromoacetic acid	<1	<1	<1
Monochloroacetic acid	4.6	<2	<2
Trichloroacetic acid	57	19	17
<i>Total HAA5 (by sample)</i>	104.6	39.0	21.8
<i>Total HAA5 (month)</i>		71.8	21.8

	Lincoln Twp Hall (DBP-1)	Dane (DBP-2)
<b>RAA (ppb)</b>	<b>48.1</b>	<b>33.0</b>

**MONTHLY CLIMATOLOGICAL SUMMARY**

**October**

**2014**

**NAME: sjwwweather**

**St. Joseph Water Plant - 1701 Lions Park Drive - St. Joseph, MI**

DAY	MEAN TEMP	NORM MEAN TEMP	HIGH TEMP	TIME	NORM HIGH TEMP	REC HIGH TEMP	YEAR	LOW TEMP	TIME	NORM LOW TEMP	REC LOW TEMP	YEAR	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	60.4	58	<b>66.4</b>	4:00p	69	87	1971	<b>56.0</b>	6:00a	47	26	1984	3.8	0	<b>0.0</b>	<b>1.5</b>	<b>14</b>	1:00p	SSE
2	65	58	<b>68.7</b>	3:00p	68	86	1971	<b>61.2</b>	6:00a	46	28	1981	0.1	0	<b>1.1</b>	<b>2.7</b>	<b>23</b>	11:00p	SSE
3	60	57	<b>65.9</b>	1:00a	68	84	1953	<b>51.9</b>	12:00m	46	28	1974	6.1	0	<b>0.9</b>	<b>20.7</b>	<b>48</b>	11:00p	WNW
4	48.7	57	<b>52.1</b>	1:00a	68	86	1951	<b>44.8</b>	11:00a	46	27	1989	16.6	0	<b>0.1</b>	<b>26.7</b>	<b>50</b>	6:00p	WNW
5	51.7	57	<b>54.6</b>	8:00p	67	85	1990	<b>47.9</b>	9:00a	45	25	1993	13.8	0	<b>0.0</b>	<b>18.3</b>	<b>39</b>	5:00p	WSW
6	55.1	56	<b>58.8</b>	4:00p	67	85	1963	<b>49.8</b>	7:00a	45	28	1988	10.7	0	<b>0.0</b>	<b>14.3</b>	<b>38</b>	1:00p	W
7	56.3	56	<b>60.4</b>	4:00p	66	85	1963	<b>50.0</b>	5:00a	44	26	1988	9.8	0	<b>0.0</b>	<b>9.9</b>	<b>35</b>	12:00m	SSE
8	58.5	56	<b>60.7</b>	5:00p	66	85	1949	<b>55.8</b>	9:00a	44	23	1989	6.8	0	<b>0.0</b>	<b>19.3</b>	<b>34</b>	1:00p	WNW
9	55.1	55	<b>59.4</b>	1:00a	66	82	1949	<b>50.8</b>	12:00m	44	19	1989	9.9	0	<b>0.0</b>	<b>8.2</b>	<b>24</b>	9:00a	N
10	51.4	55	<b>54.5</b>	1:00p	65	85	1949	<b>47.8</b>	7:00a	43	23	1956	13.9	0	<b>0.0</b>	<b>5.1</b>	<b>20</b>	6:00p	NNE
11	50.4	54	<b>55.2</b>	5:00p	65	85	1962	<b>45.5</b>	8:00a	43	26	1993	14.6	0	<b>0.0</b>	<b>4.0</b>	<b>16</b>	5:00p	E
12	52.8	54	<b>59.3</b>	4:00p	64	84	1962	<b>46.1</b>	7:00a	43	23	1990	12.3	0	<b>0.0</b>	<b>2.0</b>	<b>15</b>	4:00p	ESE
13	61.2	54	<b>68.4</b>	11:00p	64	85	1975	<b>54.7</b>	3:00a	42	20	1993	3.4	0	<b>0.1</b>	<b>2.6</b>	<b>19</b>	9:00p	S
14	63.6	53	<b>66.9</b>	1:00a	63	84	1962	<b>59.9</b>	12:00m	42	24	1993	1.6	0	<b>0.6</b>	<b>2.8</b>	<b>31</b>	10:00a	S
15	59.6	53	<b>61.9</b>	2:00p	63	85	1962	<b>57.7</b>	7:00a	42	31	1983	5.2	0	<b>0.1</b>	<b>1.3</b>	<b>12</b>	8:00p	SSE
16	57.5	53	<b>58.7</b>	1:00a	63	85	1963	<b>56.7</b>	4:00p	42	24	1991	7.3	0	<b>0.0</b>	<b>9.4</b>	<b>26</b>	6:00p	N
17	56.3	52	<b>58.6</b>	1:00p	62	84	1963	<b>53.3</b>	10:00p	41	24	1982	9.1	0	<b>0.0</b>	<b>16.5</b>	<b>43</b>	7:00p	W
18	50.3	52	<b>53.3</b>	1:00a	62	82	1950	<b>46.4</b>	12:00m	41	25	1990	15.1	0	<b>0.1</b>	<b>23.3</b>	<b>39</b>	4:00a	N
19	47.8	51	<b>53.1</b>	12:00m	61	82	1953	<b>41.2</b>	8:00a	41	23	1972	17.9	0	<b>0.0</b>	<b>7.6</b>	<b>28</b>	12:00m	SSE
20	52.7	51	<b>54.6</b>	3:00p	61	81	1953	<b>50.0</b>	7:00a	40	23	1988	12.7	0	<b>0.1</b>	<b>11.7</b>	<b>33</b>	12:00m	N
21	50.8	51	<b>52.7</b>	1:00a	60	83	1953	<b>46.7</b>	12:00m	40	21	1952	15.3	0	<b>0.1</b>	<b>12.0</b>	<b>36</b>	7:00a	NNE
22	46.3	50	<b>50.2</b>	4:00p	60	85	1953	<b>41.9</b>	8:00a	40	21	1989	18.9	0	<b>0.0</b>	<b>3.2</b>	<b>14</b>	3:00p	E
23	48.3	50	<b>54.8</b>	4:00p	60	83	1963	<b>41.5</b>	8:00a	39	20	1990	16.9	0	<b>0.0</b>	<b>4.0</b>	<b>18</b>	1:00p	SSE
24	54.4	50	<b>57.5</b>	4:00p	59	80	1963	<b>51.4</b>	8:00a	39	22	1982	10.5	0	<b>0.0</b>	<b>4.2</b>	<b>17</b>	12:00m	SSE
25	58.4	49	<b>60.7</b>	4:00p	59	80	1963	<b>56.2</b>	1:00a	39	22	1987	6.5	0	<b>0.0</b>	<b>11.7</b>	<b>31</b>	10:00p	WSW
26	55.3	49	<b>58.3</b>	1:00a	58	80	1963	<b>51.5</b>	11:00p	39	19	1990	10.1	0	<b>0.0</b>	<b>8.3</b>	<b>28</b>	1:00a	N
27	63	49	<b>72.4</b>	4:00p	58	80	1963	<b>52.4</b>	1:00a	38	21	1976	2.6	0	<b>0.0</b>	<b>7.2</b>	<b>32</b>	11:00p	SSW
28	59	48	<b>68.0</b>	1:00a	57	76	1989	<b>54.0</b>	12:00m	38	27	1951	4	0	<b>0.2</b>	<b>19.8</b>	<b>40</b>	10:00p	W
29	50.3	48	<b>54.0</b>	1:00a	57	78	1999	<b>48.7</b>	11:00a	38	18	1990	13.6	0	<b>0.0</b>	<b>16.7</b>	<b>35</b>	10:00a	NW
30	50.3	48	<b>51.8</b>	12:00m	56	81	1950	<b>49.4</b>	7:00a	38	15	1988	14.4	0	<b>0.0</b>	<b>11.1</b>	<b>26</b>	1:00p	WSW
31	43.5	47	<b>51.8</b>	1:00a	56	82	1950	<b>37.7</b>	12:00m	37	15	1988	20.3	0	<b>0.2</b>	<b>23.2</b>	<b>60</b>	9:00a	NNE
AVE	<b>54.6</b>	<b>52.6</b>											<b>10.4</b>	<b>0.0</b>	<b>0.1</b>	<b>10.6</b>	<b>29.8</b>		S
MAX	<b>65</b>	<b>58</b>	<b>72.4</b>		<b>69</b>	<b>87</b>		<b>61.2</b>		<b>47</b>	<b>31</b>		<b>20.3</b>	<b>0</b>	<b>1.1</b>	<b>26.7</b>	<b>60.0</b>		
MIN	<b>43.5</b>	<b>47</b>	<b>50.2</b>					<b>37.7</b>		<b>37</b>	<b>15</b>		<b>0.1</b>	<b>0</b>	<b>0.0</b>	<b>1.3</b>	<b>12</b>		
TOTAL															<b>3.6</b>				

Max Rain: 1.09 ON 10/02/14  
 Days of Rain: 12 (>.01 in) 7 (>.1 in) 1 (>1 in)

# WEEKLY GREAT LAKES WATER LEVEL UPDATE

November 07, 2014

## WEATHER CONDITIONS

Temperatures were below average over the past weekend with average to slightly above average temperatures during the early part of the week. Temperatures across the basin are forecast to be near normal over the weekend and dip well below normal by mid-week. Precipitation values were slightly below normal for the past week across the basin despite a strong storm on October 31<sup>st</sup> that deposited significant snowfall in portions of northern Wisconsin. Monthly precipitation totals for October for Lakes Superior and Michigan-Huron were above monthly averages while Lakes Ontario and Erie were below their monthly averages.

## LAKE LEVEL CONDITIONS

Lakes Superior and Michigan-Huron are both 11 and 22 inches, respectively, above their levels of a year ago. Lakes St. Clair and Erie are 12 and 7 inches, respectively, above what they were at this time last year while Lake Ontario is 5 inches below its level of a year ago. Lakes Superior and Michigan-Huron are predicted to decline 3 and 2 inches respectively over the next 30 days. Lakes St. Clair, Erie and Ontario are projected to fall 1 to 2 inches over the next month. See our [Daily Levels web page](#) for more water level information.

## FORECASTED MONTHLY OUTFLOWS/CHANNEL CONDITIONS

Lake Superior's outflow through the St. Mary's River is forecasted to be well above average for the month of November. Lake Michigan-Huron's outflow into the St. Clair River is predicted to be above average, and Lake St. Clair's outflow into the Detroit River is predicted to be above average in November. In addition, the outflow of Lake Erie into the Niagara River and Lake Ontario's outflow into the St. Lawrence River are projected to be above average in November.

## ALERTS

Official records are based on monthly average water levels and not daily water levels. Users of the Great Lakes, connecting channels and St. Lawrence River should keep informed of current conditions before undertaking any activities that could be affected by changing water levels. Mariners should utilize navigation charts and refer to current water level readings.

	SUPERIOR	MICH-HURON	ST. CLAIR	ERIE	ONTARIO
Forecasted Water Level for Nov 7, 2014 (feet)	602.62	579.3	574.57	571.52	244.42
Chart Datum (feet)	601.10	577.50	572.30	569.20	243.30
Difference from chart datum (inches)	+18	+22	+27	+28	+13
Difference from average water level for Oct 7, 2014 (inches*)	-1	+1	-1	-2	-5
Difference from average water level for Nov 7, 2013 (inches*)	+11	+22	+12	+7	-5
Difference from long-term monthly average of Nov (inches)	+9	+8	+9	+8	-1
Difference from highest monthly average of record for Nov (inches)	-8	-32	-27	-26	-27
Year of highest recorded monthly mean	1985	1986	1986	1986	1945
Difference from lowest monthly average of record for Nov (inches)	+26	+36	+37	+39	+30
Year of lowest recorded monthly mean	1925	1964	1934	1934	1934
Projected change in levels by Dec 7, 2014 (inches)	-3	-2	-1	-1	-2

ALL DATA SHOWN IN THIS SUMMARY ARE REFERENCED TO IGLD 1985  
\*VALUES FOR SPECIFIC DAY ARE BASED ON 3-DAY DAILY AVERAGE AROUND SPECIFIED DATE  
LONG TERM AVERAGE PERIOD OF RECORD, 1918-2013

FORECASTED INFORMATION PROVIDED BY  
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Detroit District, Corps of Engineers  
[Detroit District Home](#)  
1-888-694-8318 ext. 1

RECORDED DATA (1918 – present)  
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FOR MORE INFORMATION VISIT  
[Detroit District Great Lakes Homepage](#)  
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