

## Jennie Duncan

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**From:** Sarah Dvoracek <sarah.dvoracek@evart.org>  
**Sent:** Monday, April 29, 2019 2:47 PM  
**To:** Jennifer Duncan  
**Subject:** FW: March monitoring data  
**Attachments:** March 2019 monitoring data.pdf; Evert Springs pamphlet.pdf; Evert Monitoring Well Locations.pdf; Stream Flow locations.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

For council packets FYI

### Sarah J. Dvoracek

*City Manager/Treasurer/Assessor*

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**From:** Pozniak, Mike <Mike.Pozniak@arcadis.com>  
**Sent:** Monday, April 29, 2019 2:19 PM  
**To:** Sarah Dvoracek (sarah.dvoracek@evart.org) <sarah.dvoracek@evart.org>; Mark Wilson <mark.wilson@evart.org>; Patrick Muczynski <patrick.muczynski@evart.org>  
**Cc:** Robinson, Amanda <Amanda.Robinson@arcadis.com>  
**Subject:** March monitoring data

Sarah, Mark, and Patrick,

Attached are the updated plots for the Evert Springs Site data through March 2019. Precipitation for through February 2019 is 1.13 inches above the 30-year average.

Also attached is a pamphlet that provides overall information about the monitoring program. Please feel free to distribute.

If you have questions on any of the updated plots, please do not hesitate to contact me.

Regards,

Mike

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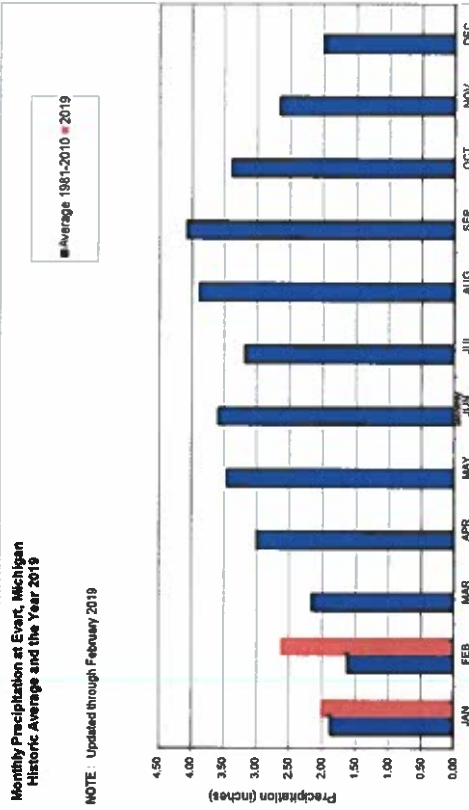
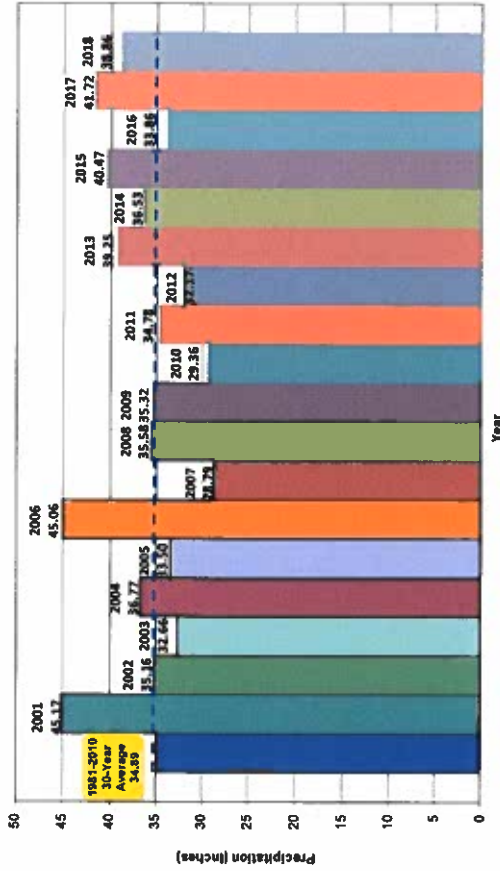
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Be green, leave it on the screen.

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**Total Yearly Precipitation at Ewart, Michigan**  
**Historic Average (1981-2010) compared to Recent Annual**



NOTE: Updated through February 2019

Month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average 1971-2000
JAN	1.28	1.16	0.74	2.15	3.18	3.32	1.09	2.99	0.84	0.67	2.80
FEB	3.64	1.74	0.80	1.22	2.35	1.38	1.15	2.48	2.37	0.67	1.54
MAR	0.50	3.14	2.33	3.49	1.89	3.43	3.94	1.85	2.83	1.38	2.20
APR	4.26	3.96	2.43	2.15	0.95	3.57	3.83	3.59	3.90	2.72	2.80
MAY	8.04	3.92	2.53	9.19	1.83	4.56	1.72	3.76	2.59	5.05	2.94
JUN	2.49	3.52	3.05	2.37	1.18	4.93	2.95	5.48	2.57	5.47	3.44
JUL	1.97	5.25	3.97	1.53	5.90	3.97	1.83	2.66	2.61	3.48	2.79
AUG	5.45	5.90	2.24	3.71	4.86	5.61	4.43	0.91	4.81	2.86	4.13
SEP	4.54	1.72	2.6	0.28	5.27	4.11	1.36	4.18	2.92	4.89	4.21
OCT	7.49	2.89	3.15	4.80	0.49	4.36	2.93	1.92	5.60	1.81	2.93
NOV	2.87	1.43	6.02	2.65	4.61	2.77	1.05	1.51	1.34	1.69	2.39
DEC	1.61	1.13	3.00	2.83	1.57	3.05	2.51	4.25	2.34	0.87	1.98
ANNUAL Total	45.16	35.16	32.00	36.77	33.60	45.06	28.79	35.58	35.32	29.35	33.35
Annual - 30-year Average	11.83	1.81	-0.70	3.42	0.15	11.71	-4.56	2.23	1.97	-3.99	

\* Precipitation is in inches

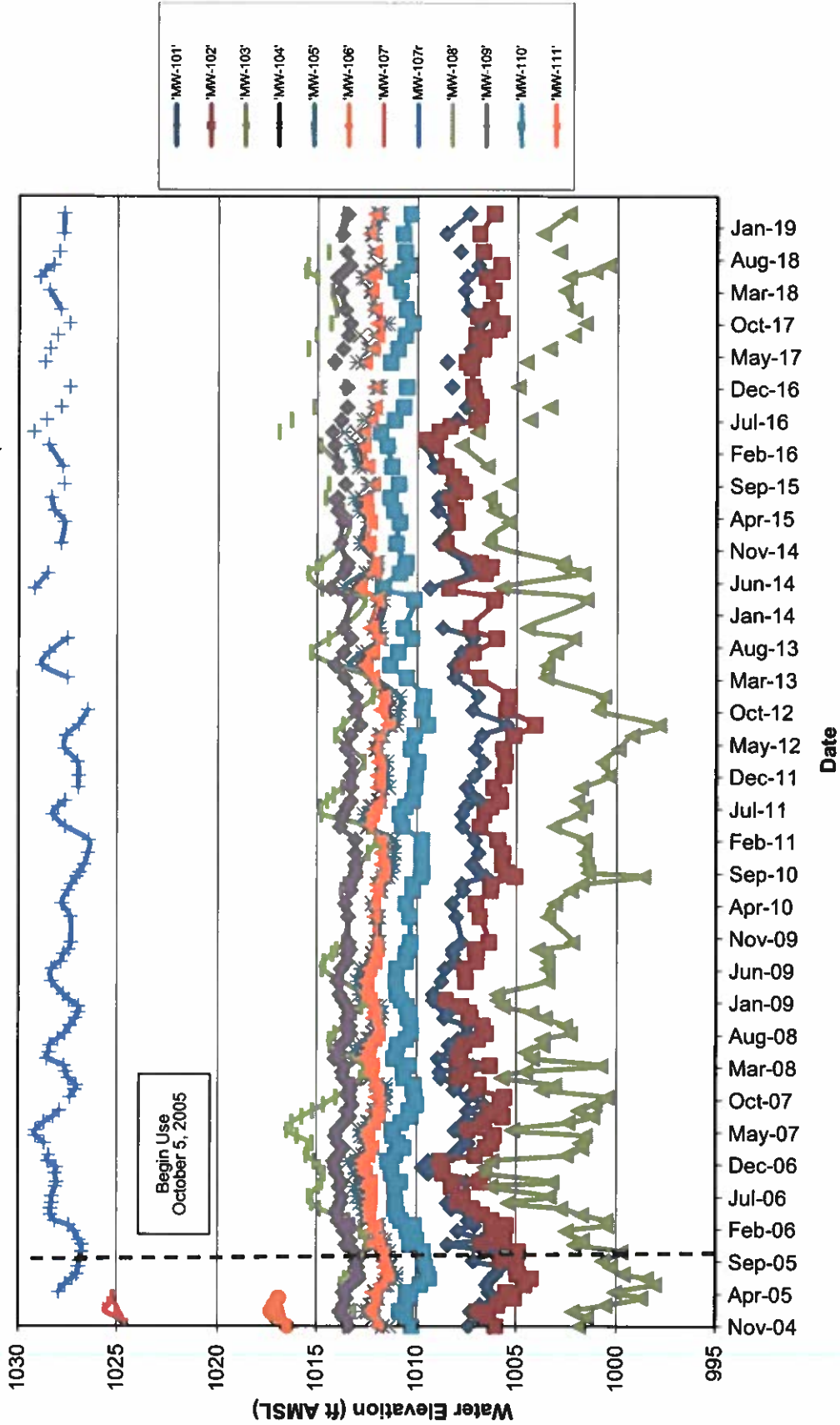
Red indicates if precipitation is less than the 30-year average  
 Blue indicates if precipitation is greater than the 30-year average. Note - All month of data were not obtained for April 2012

Month	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 1981-2010
JAN	1.64	2.07	4.52	3.18	2.25	1.68	3.56	2.30	2.02		1.88
FEB	0.93	1.32	2.21	1.73	0.83	1.79	2.70	4.28	2.62		1.63
MAR	2.37	3.55	0.87	1.54	3.00	5.37	2.67	1.26	3.18		2.16
APR	7.14	1.87	7.06	6.93	3.76	2.14	5.52	3.80			3.00
MAY	1.81	5.27	5.25	3.14	4.88	2.91	0.95	5.73			3.45
JUN	5.73	2.08	2.80	4.11	4.59	3.34	6.98	0.83			3.59
JUL	0.98	2.59	2.71	3.21	2.80	2.80	2.30	1.83			3.18
AUG	3.44	2.48	2.53	2.58	4.15	2.57	3.13	6.35			3.69
SEP	3.46	1.33	1.31	2.40	3.75	3.58	1.21	3.24			4.09
OCT	3.26	4.51	4.74	2.63	3.12	3.23	8.16	4.93			3.39
NOV	2.85	0.47	3.26	3.61	3.31	1.71	2.51	2.21			2.65
DEC	1.17	4.63	1.98	1.47	4.03	2.74	2.03	2.10			1.99
ANNUAL Total	34.78	32.17	39.25	36.53	40.47	33.86	41.72	36.86			34.89
Annual - 30-year Average	-0.11	-2.72	4.38	-7.64	5.58	-1.03	8.93	3.97			

September 2012 data is from McBan Michigan State Extension Enviro-Weather  
 -- The 30-Year Average Year to Date total is through the end of February since monitoring conducted before the 18th of the month.  
 Data is through March 14, 2019.  
 Data provided by the Ewart Wastewater Treatment Plant

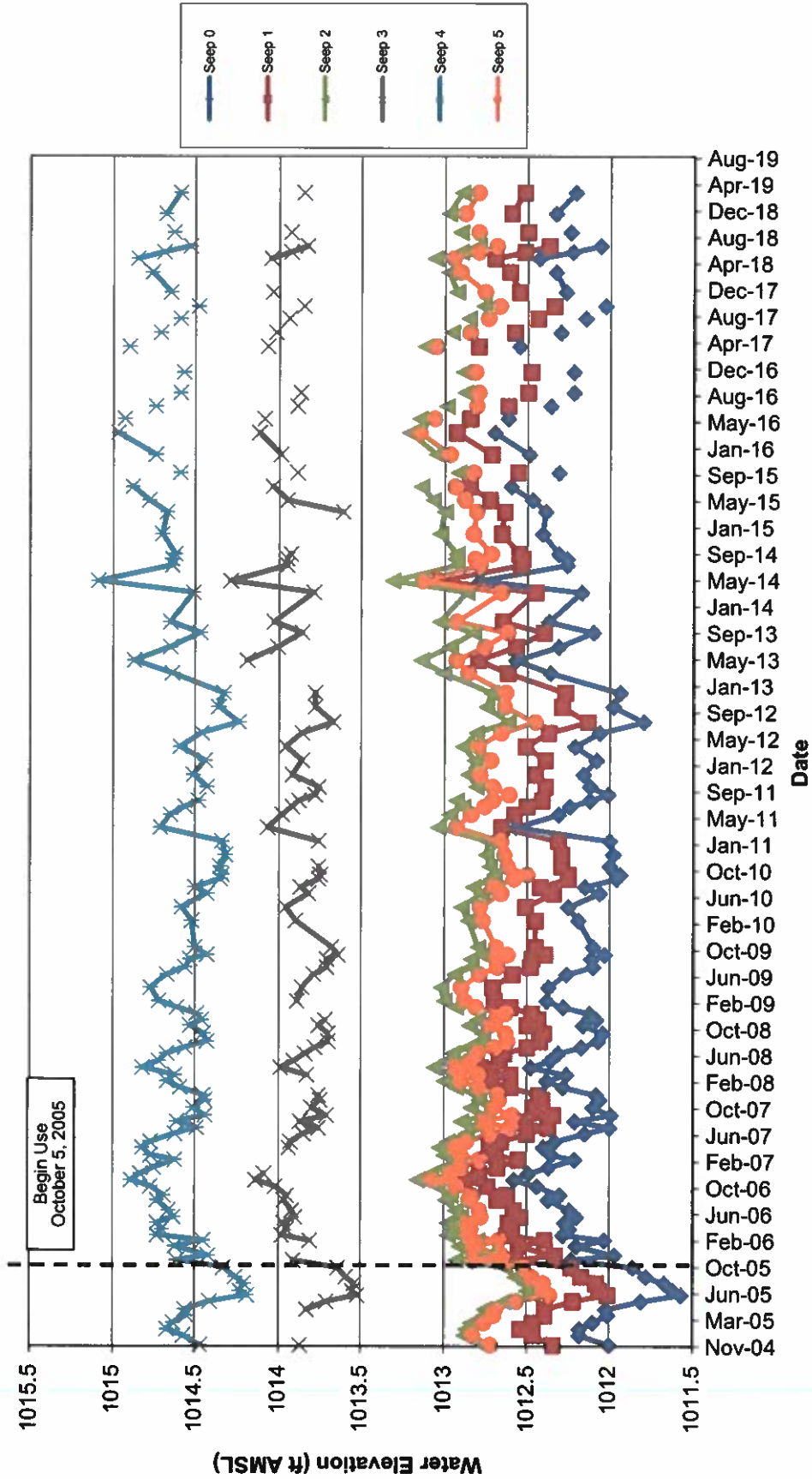
**MANUAL WATER LEVELS AT MONITORING WELLS  
NESTLE WATERS NORTH AMERICA  
EVART SPRINGS SITE**

Updated March 2019

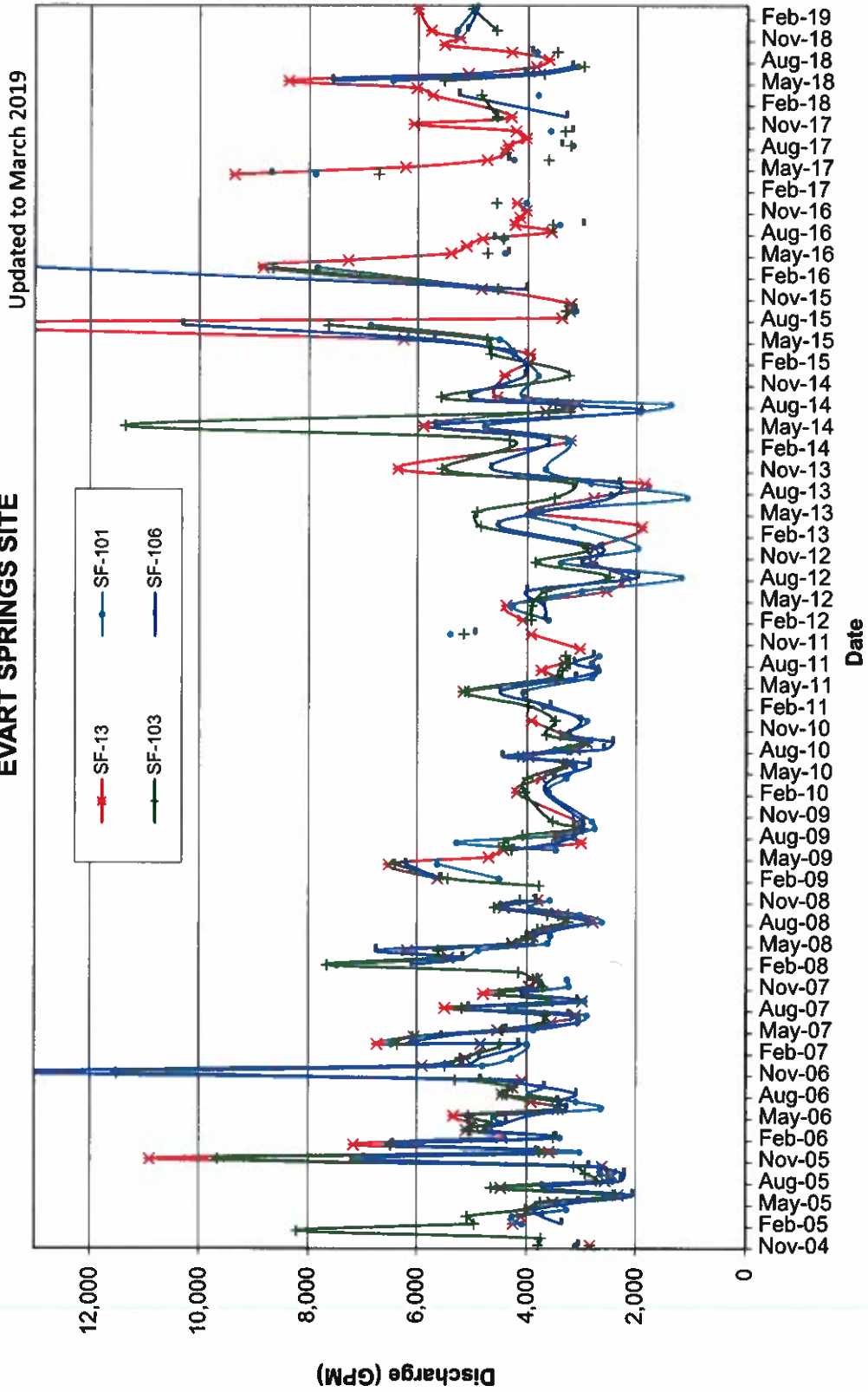


**MANUAL WATER LEVEL MEASUREMENTS AT SEEPS  
NESTLE WATERS NORTH AMERICA  
EVART SPRINGS SITE**

Updated to March 2019



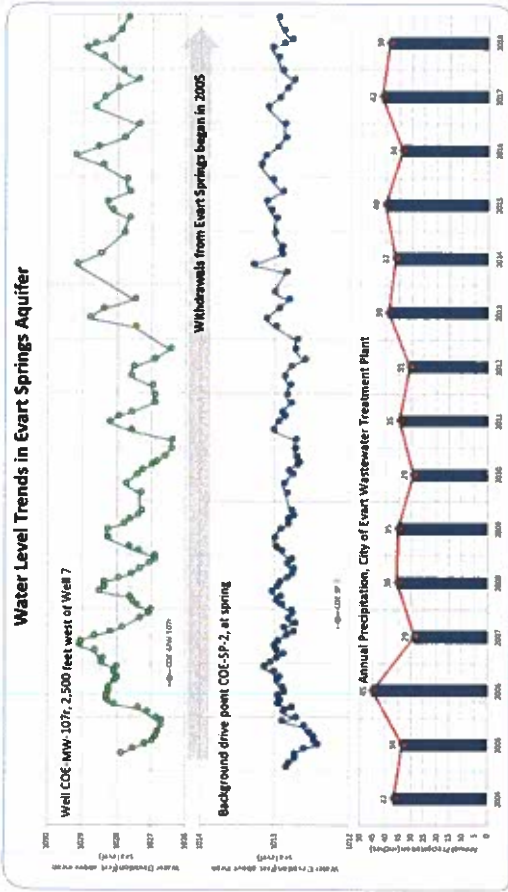
**TWIN CREEK STREAM FLOWS  
NESTLE WATERS NORTH AMERICA  
EVART SPRINGS SITE**



## FUTURE MONITORING ●●●

Ice Mountain is committed to sustainable management and stewardship of natural resources. Aquifer groundwater levels, stream and lake surface levels, stream flows, and the ecological health of wetland and fish communities will continue to be monitored for the duration of Ice Mountain's operations in Evart.

Figure 2: Groundwater Monitoring Data and Annual Precipitation (2004-2018)



Aquifer water levels naturally range 1 to 2 feet from year to year, and as much as 3 feet over the entire 14 year record. Since Ice Mountain began purchasing water from Evart in 2005, water levels have not measurably declined, and have remained within historic ranges.

## SUMMARY ●●●

Water withdrawals by Ice Mountain at the Evart Springs in the City of Evart are overseen by independent scientists and City personnel. Monitoring data are shared with stakeholders. Ice Mountain manages our sources sustainably through proactive monitoring and responsible use. Water withdrawals from the Evart Springs have not resulted in adverse effects to groundwater, surface water, wetlands, and other natural resources.

Questions about Evart Springs or the monitoring program may be directed to:

Arlene Anderson-Vincent, Natural Resource Manager  
 Arlene.Anderson-Vincent@waters.nestle.com • (231) 823-8451

# Monitoring Report Summary

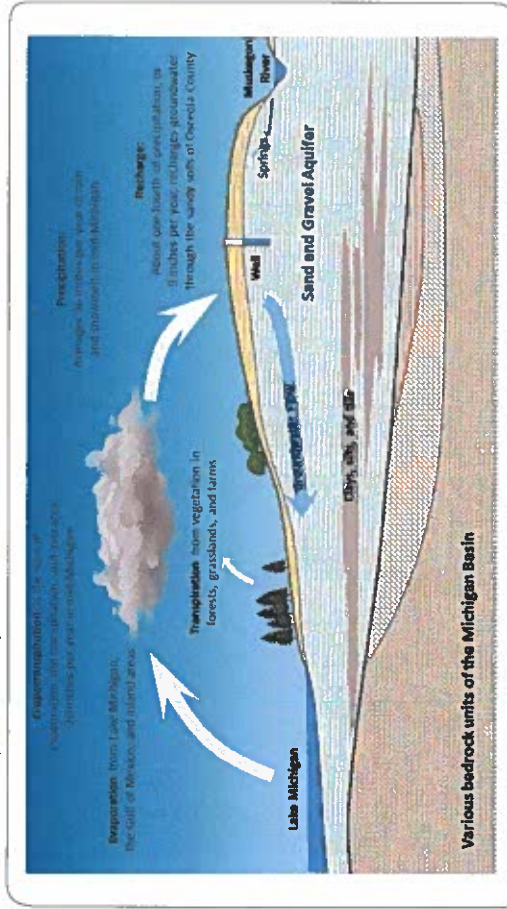
2018  
 EVART SPRINGS, EVART, MICHIGAN



## ORIGIN OF MICHIGAN'S SPRINGS

When the glaciers receded from Michigan, they left behind not only the Great Lakes, but massive quantities of gravel, sand, silt and clay that form the rolling hills of northern Michigan. In Oscoda County, where Ice Mountain's Evert Springs source is located, these glacial deposits range between 400 to nearly 1,200 feet thick (United States Geologic Survey, HA 730-7). Water filling the voids between grains of sand and gravel creates prolific groundwater aquifers that supply water for many Michigan cities, farms, businesses, and homes. Groundwater has been called the "sixth Great Lake" as the volume of groundwater stored in Michigan's glacial aquifers (1.1 trillion gallons) is roughly the same as the volume of water contained in Lake Michigan (USGS WRI Report 00-4008, 2000). Groundwater is continually renewed by precipitation.

Figure 1: Michigan's Water Cycle



In Oscoda County, the 36 inches of precipitation each year equates to about 360 billion gallons of water. County-wide, about 90 billion gallons infiltrate the sandy soils to recharge the regional groundwater supply (recharge data, Michigan Department of Environmental Quality). Groundwater flows slowly at the rate of a few feet each day, eventually emerging at springs, lakes, streams, and rivers.

## MICHIGAN WATER WITHDRAWALS

To protect both public health and the environment, the State of Michigan governs the withdrawal of water in the State. The State specifies which materials and equipment are used in the construction and operation of a water supply, and certifies site contractors and system operators. State approval for use of the source follows only after an on-site inspection and thorough review of testing data. Water quality must meet or exceed standards set by the US Food and Drug Administration (U.S. FDA), the State of Michigan, and the U.S. Environmental Protection Agency (U.S. EPA).

The permitting standards for bottled water are as rigorous as the standards for municipal water supplies. In 2018, the Evert Springs wells were permitted to withdraw water at a maximum rate of 500 gallons per minute for Well 13, and 300 gallons per minute for Well 7.

## EVART SPRINGS

The Evert Springs source consists of two wells owned by the City of Evert. Until 2005, the wells were used by the city for a portion of its municipal water supply. Ice Mountain purchases water from city, paying the same commercial water rate as other businesses in Evert.

The wells are located in the City's Twin Creek wellfield, Evert's source of municipal water since 1930. Springs just west of the wellfield flow from the sand and gravel aquifer into Twin Creek, a tributary of the Muskegon River. To meet the U.S. Food and Drug Administration's (U.S. FDA) labelling requirements for spring water, it has been demonstrated that both source wells draw water from the same aquifer from which the springs flow; and that the well water quality is the same as the water flowing from the springs.

## ENVIRONMENTAL MONITORING

In keeping with Michigan Water Use regulations, the City of Evert monitors the withdrawal rates from the wells continuously, and reports withdrawal volumes to the State each year. An environmental monitoring program that began in 2004 documents that the withdrawal has not adversely affected natural resources, local water users, or the environment. The monitoring data are provided to stakeholders.

Professionally trained, independent scientists contracted by Ice Mountain monitor water levels in streams, ponds, wetlands, and the aquifer. The flow of Twin Creek is measured at multiple locations both upstream and downstream of the Twin Creek wellfield. The Muskegon River has been monitored in Evert, less than one mile from Evert Springs, by the United States Geological Society (USGS) since 1930.

The aquatic habitat of Twin is also monitored by independent scientists. Twin Creek is designated by the Michigan Department of Natural Resources as a coldwater trout stream, characterized by stable flows, stable temperatures, and a stable channel, which are typical of spring-fed streams. Wetlands adjacent to Twin Creek have been mapped and are routinely monitored. The water withdrawal has not affected the functional ecology of the wetlands or the aquatic communities.

## RECENT MONITORING RESULTS

Independent scientists and Nestle Waters Resource Managers monitor groundwater levels for unexpected changes. Figure 2 depicts water elevations in a monitoring well at Evert's Twin Creek wellfield; and compares them with water levels at the springs.

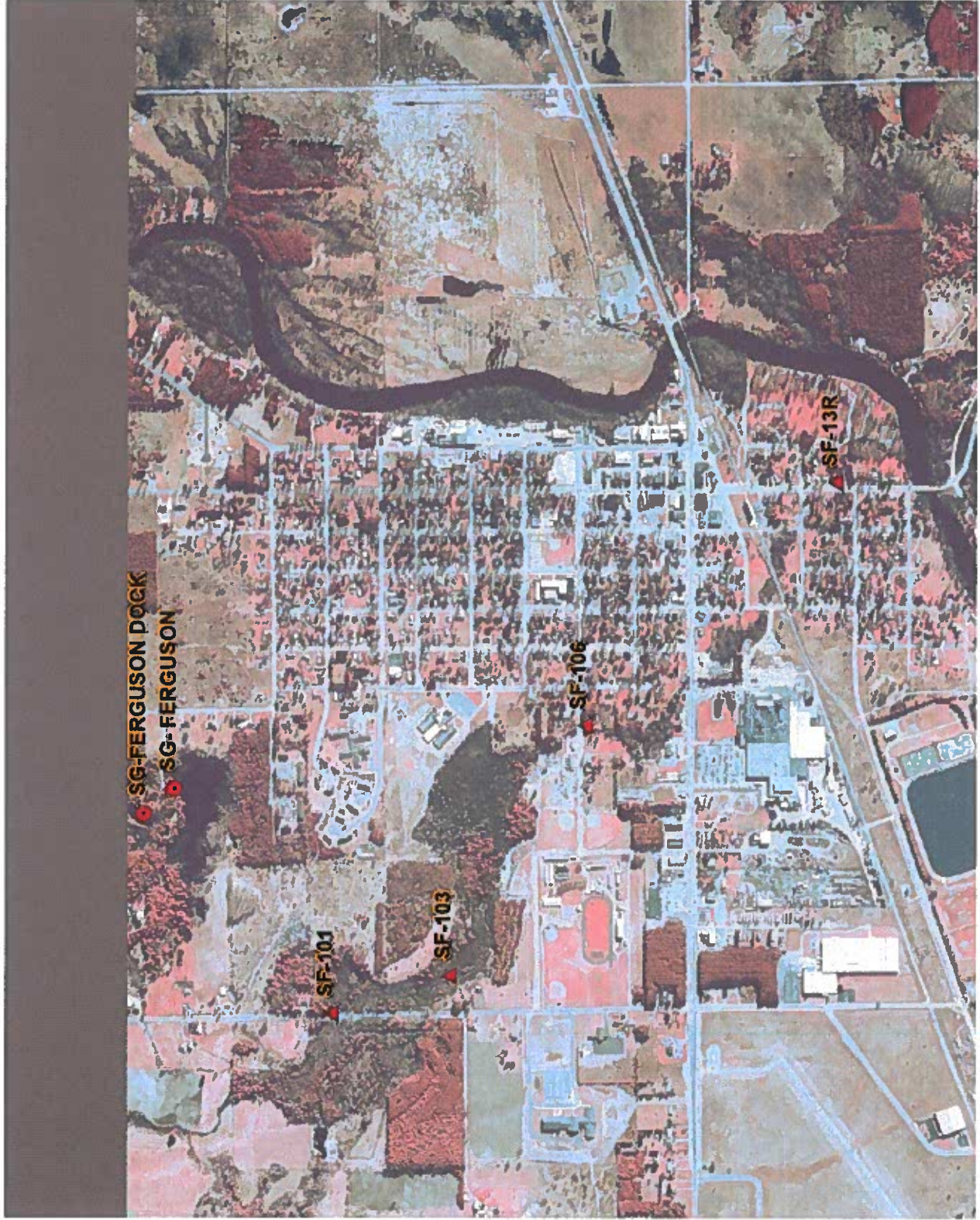
Aquifer water levels naturally fluctuate several feet over the course of a year. The highest groundwater levels typically occur in late spring, following spring rains and snowmelt. The lowest levels typically occur in the late fall and early winter, following the growing season. Since Ice Mountain began purchasing water from Evert in 2005, water levels have not measurably declined in the aquifer, but instead remain within historic ranges.





- Legend**
- Monitoring Wells
  - Stilling Wells
  - Stream Flow Gauging Stations
  - Piezometer/Staff Gauge Clusters
  - Drive Points
  - Seeps
  - Productions Wells





**Legend**

-  STREAM FLOW
-  STAFF GAUGE



**Figure 1**  
**CITY OF EVART, MI**  
**STREAM FLOWS AND**  
**FERGUSON PROPERTY**  
**MONITORING POINTS**