GARBER-WELLINGTON ASSOCIATION

- THE AQUIFER IN REVIEW 2018
- MIDWEST CITY GROUNDWATER MODEL

JANUARY 2018

John Harrington
Water Resources Division Director

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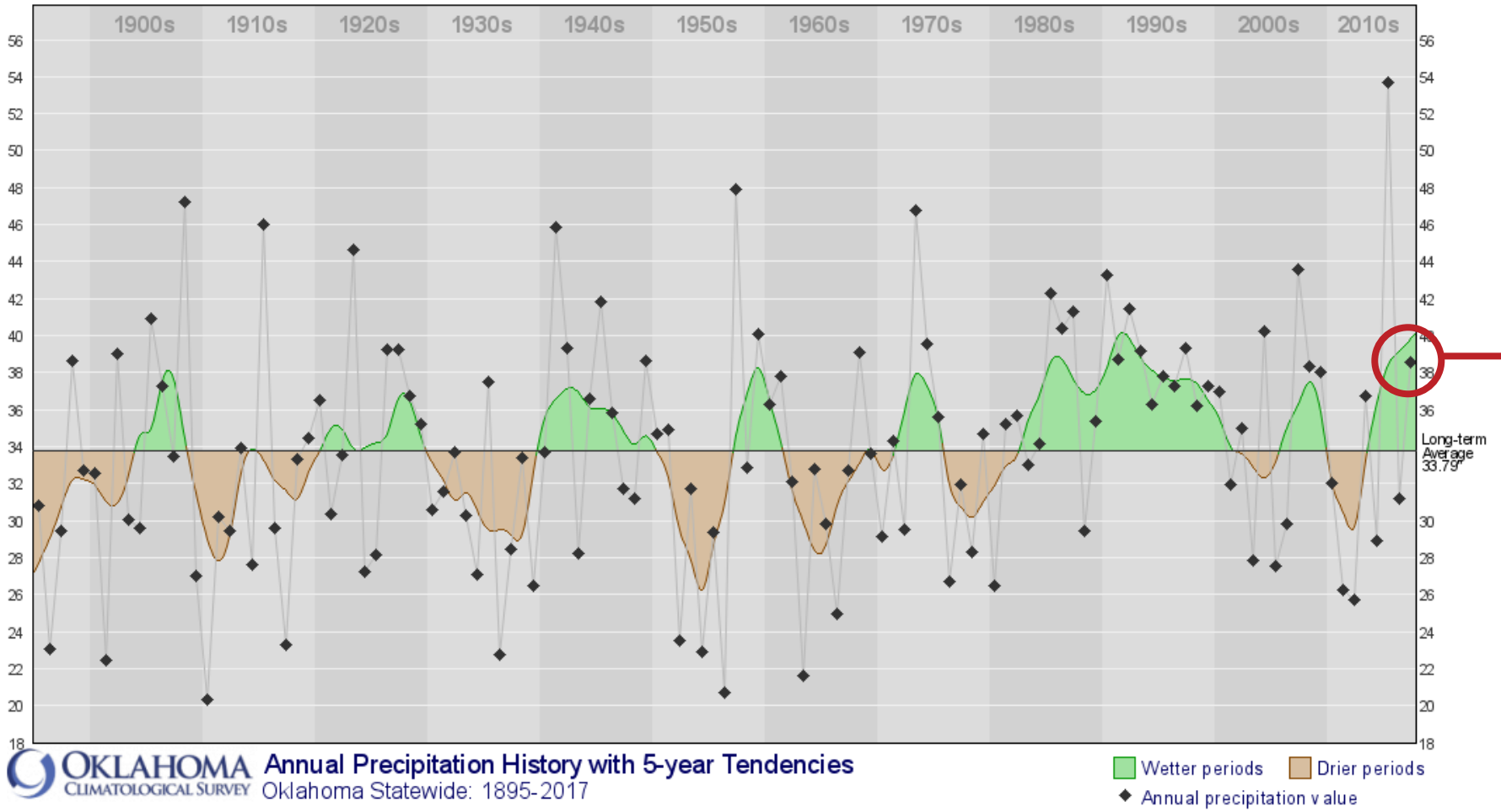
THE AQUIFER IN REVIEW 2018



A BIT ABOVE AVERAGE FOR RAINFALL FOR 2017

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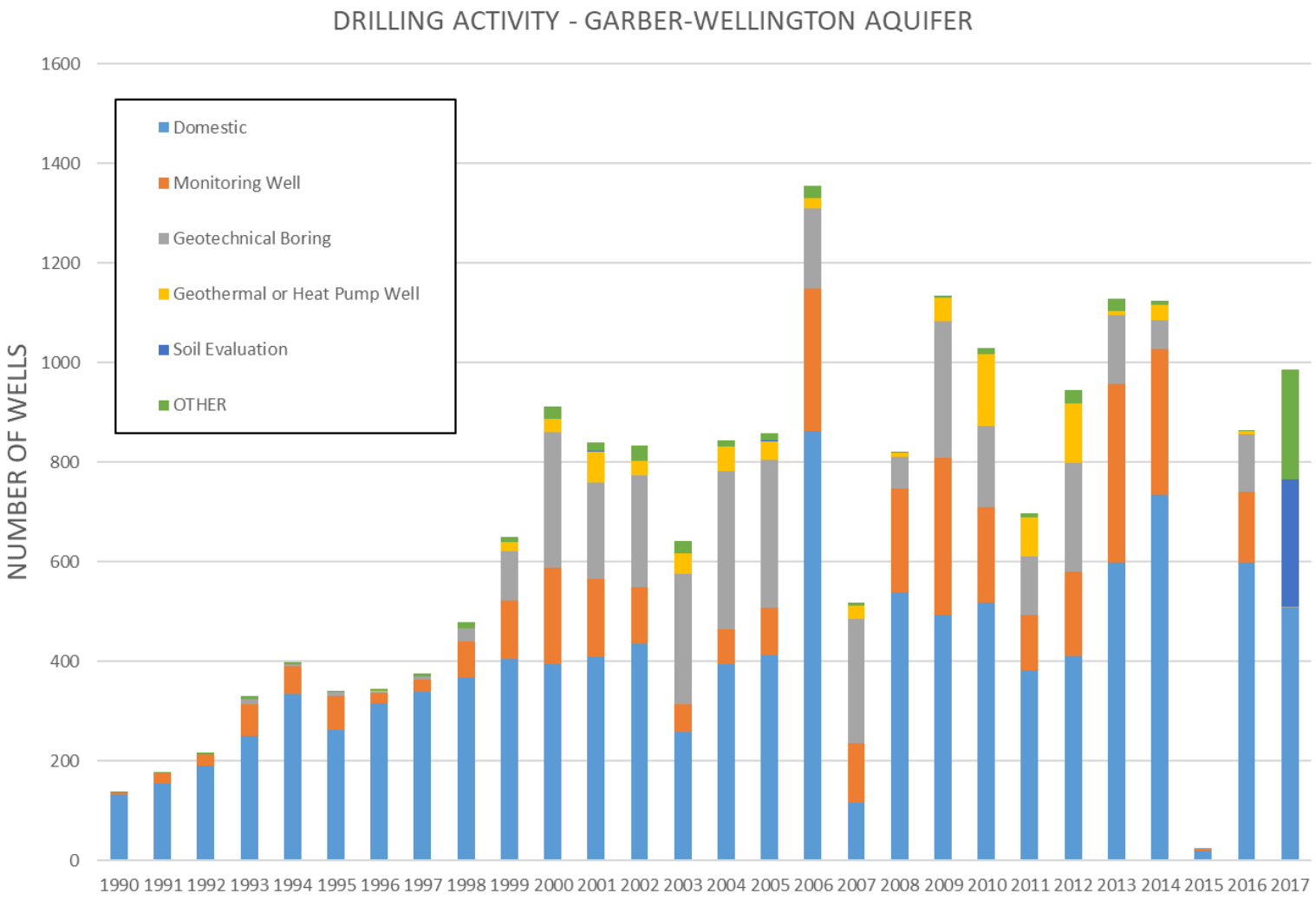

Well drilling bounced back to almost normal levels:

- **2016**, with a total of **863** wells drilled.
- **2017** continued this trend with a total of **986** wells.

Top categories were domestic wells and soil evaluation holes.

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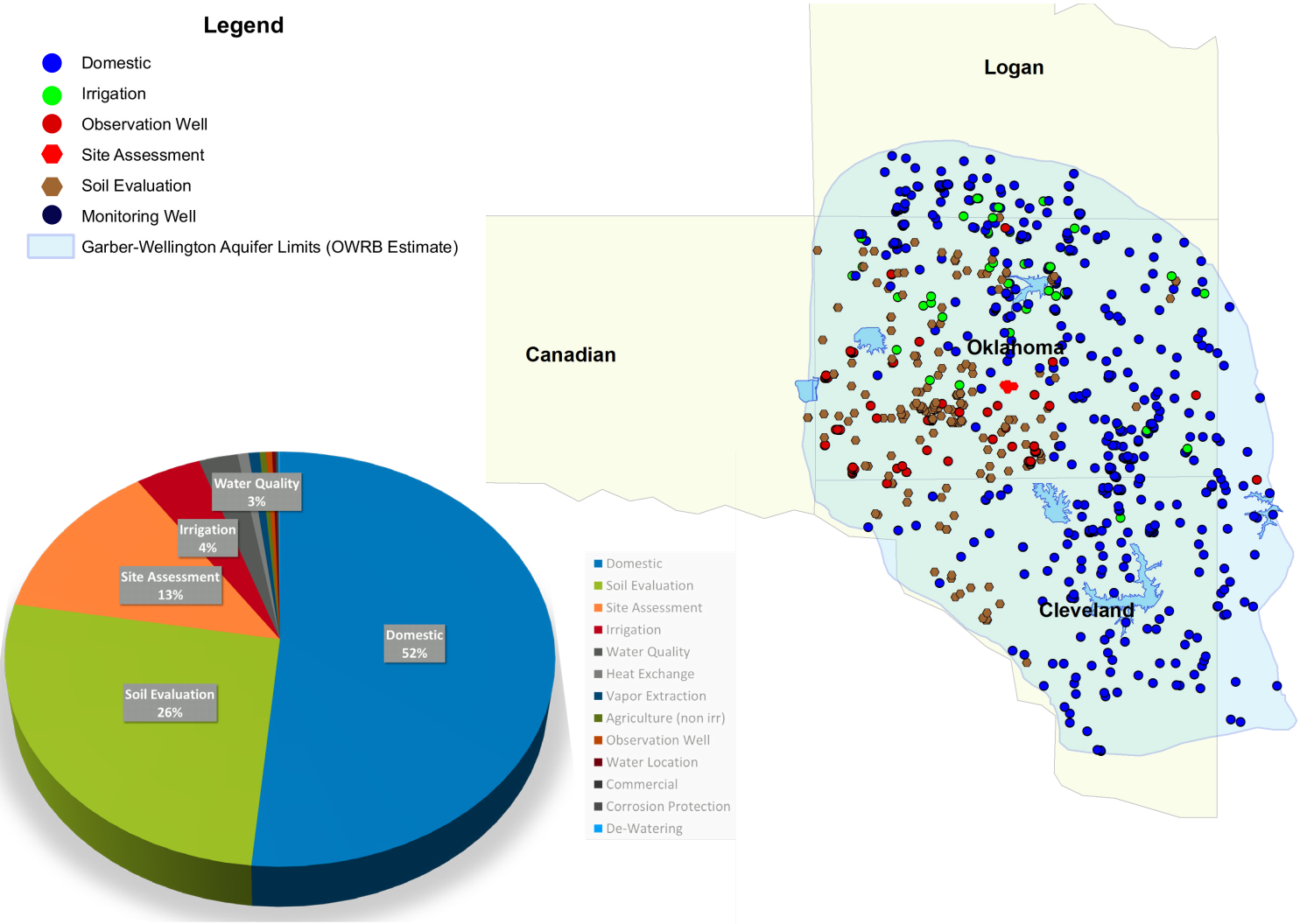

Wells drilled Garber-Wellington Aquifer 2018

- **986** wells drilled on the aquifer, up from **863** in **2016**.
- Domestic wells evenly distributed.
- Monitor/soil evaluation wells mostly in urban Oklahoma county.

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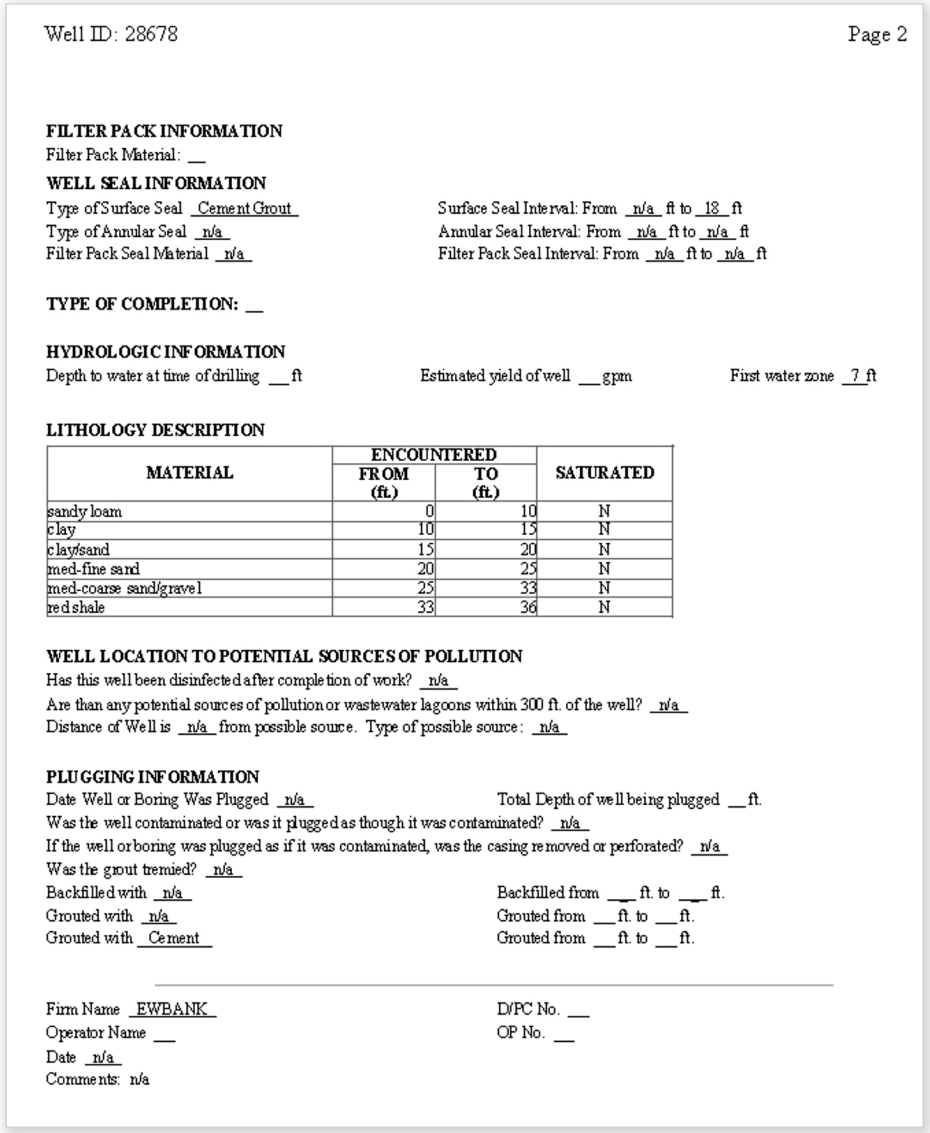

Well ID: 28678 Page 2

FILTER PACK INFORMATION
Filter Pack Material: __

WELL SEAL INFORMATION
Type of Surface Seal _Cement Grout_ Surface Seal Interval: From _n/a_ ft to _18_ ft
Type of Annular Seal _n/a_ Annular Seal Interval: From _n/a_ ft to _n/a_ ft
Filter Pack Seal Material _n/a_ Filter Pack Seal Interval: From _n/a_ ft to _n/a_ ft

TYPE OF COMPLETION: __

HYDROLOGIC INFORMATION
Depth to water at time of drilling __ ft Estimated yield of well __ gpm First water zone _7_ ft

LITHOLOGY DESCRIPTION

MATERIAL	ENCOUNTERED FROM (ft.)	ENCOUNTERED TO (ft.)	SATURATED
sandy loam	0	10	N
clay	10	15	N
clay/sand	15	20	N
med-fine sand	20	25	N
med-coarse sand/gravel	25	33	N
red shale	33	36	N

WELL LOCATION TO POTENTIAL SOURCES OF POLLUTION
Has this well been disinfected after completion of work? _n/a_
Are than any potential sources of pollution or wastewater lagoons within 300 ft. of the well? _n/a_
Distance of Well is _n/a_ from possible source. Type of possible source: _n/a_

PLUGGING INFORMATION
Date Well or Boring Was Plugged _n/a_ Total Depth of well being plugged __ ft.
Was the well contaminated or was it plugged as though it was contaminated? _n/a_
If the well or boring was plugged as if it was contaminated, was the casing removed or perforated? _n/a_
Was the grout tremied? _n/a_
Backfilled with _n/a_ Backfilled from __ ft. to __ ft.
Grouted with _n/a_ Grouted from __ ft. to __ ft.
Grouted with _Cement_ Grouted from __ ft. to __ ft.

Firm Name _EWBANK_ D/PC No. __
Operator Name __ OP No. __
Date _n/a_
Comments: n/a

- Static water levels were recorded in **552** of the **986** wells drilled in **2017**.
- Static water levels were recorded in **658** of the **863** wells drilled in **2016**.
- This is NOT an improvement

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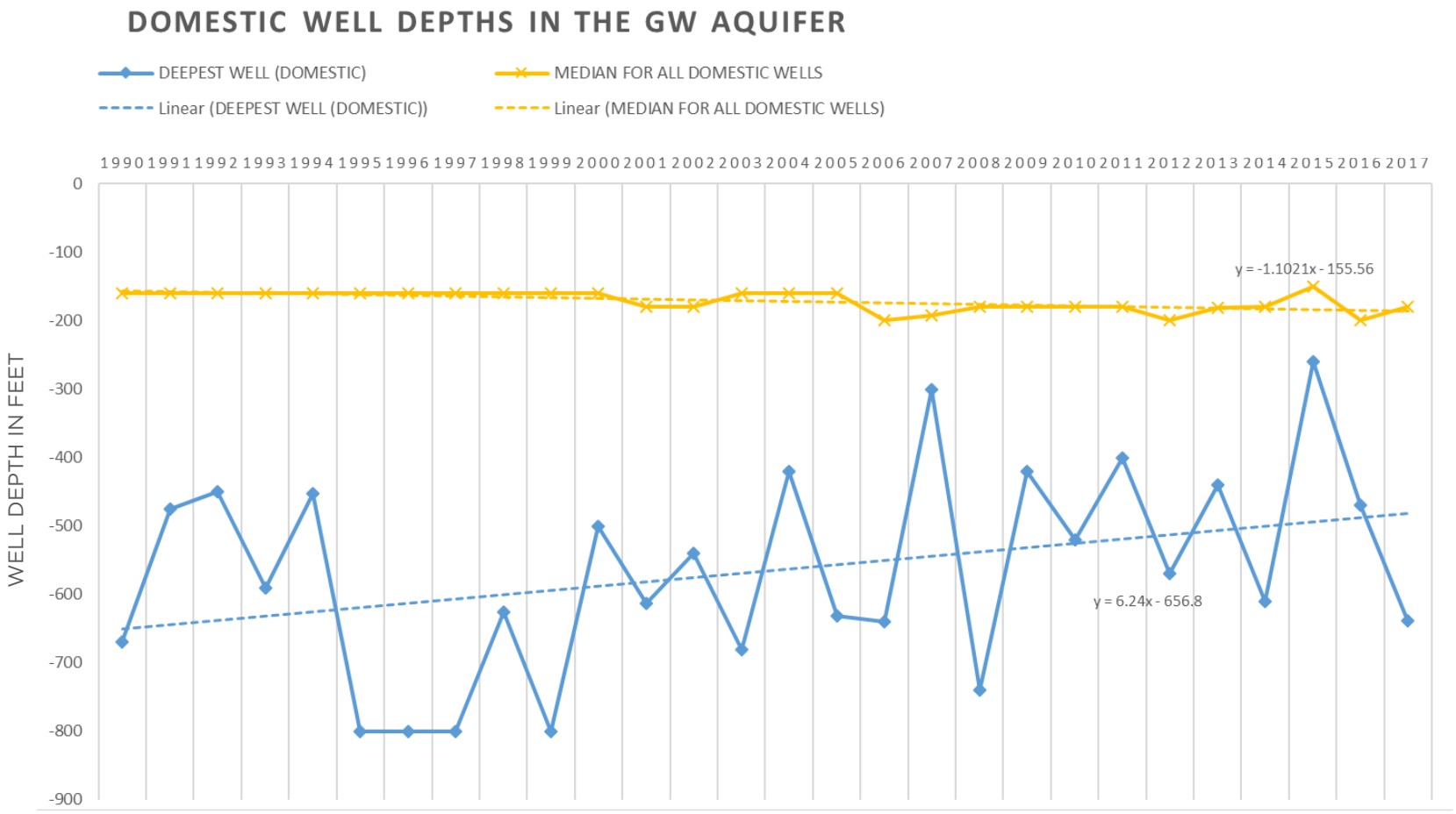

- Domestic well depths are trending deeper, but the deepest wells are getting shallower.
- This is due to more wells being drilled towards the edges of the aquifer in combination with drought conditions

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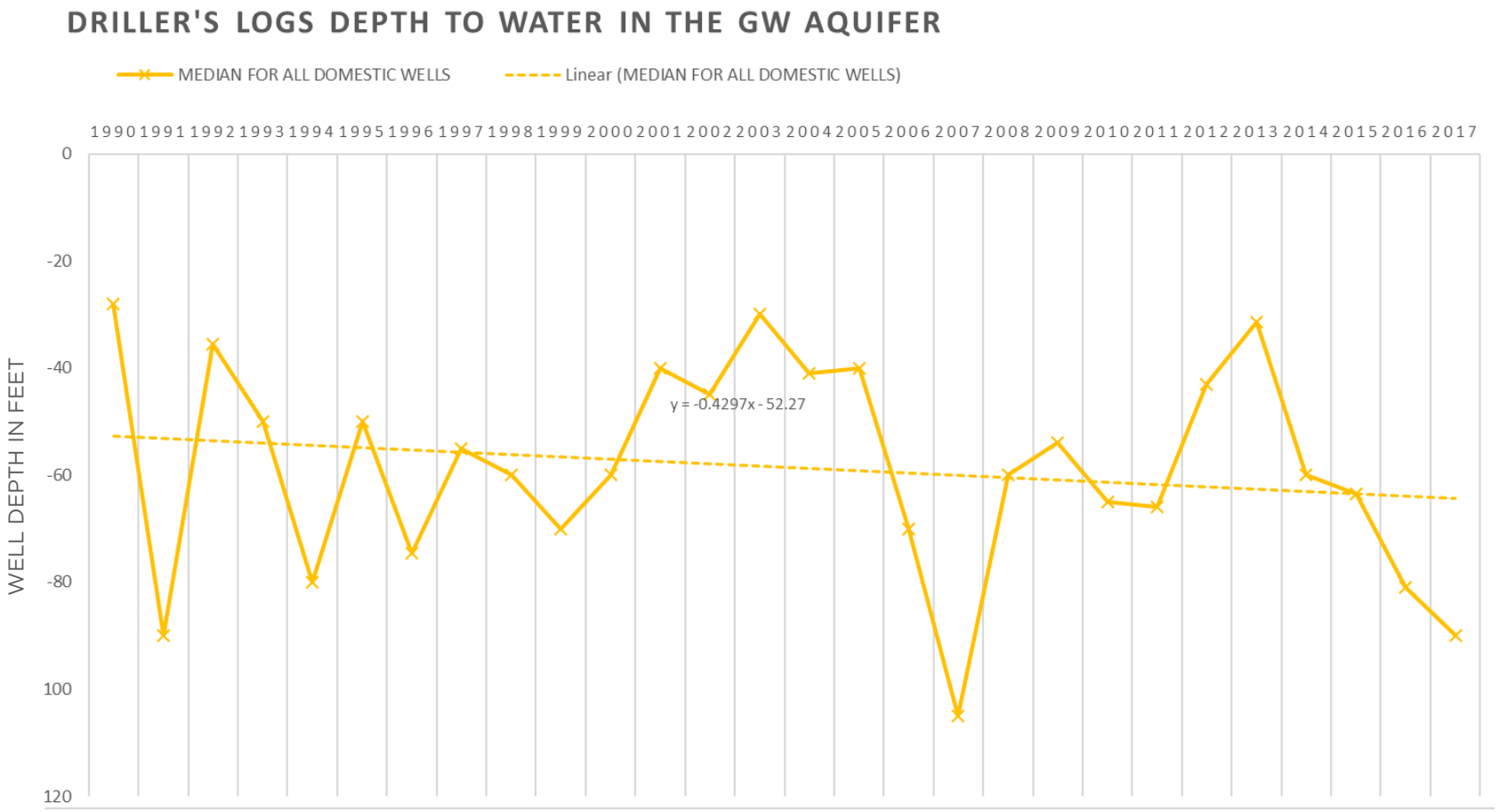

- Reported median depth to water for domestic wells has declined since the wet decades of the 1980's and 1990's.
- In 2016-17 reported water levels continued to decline.

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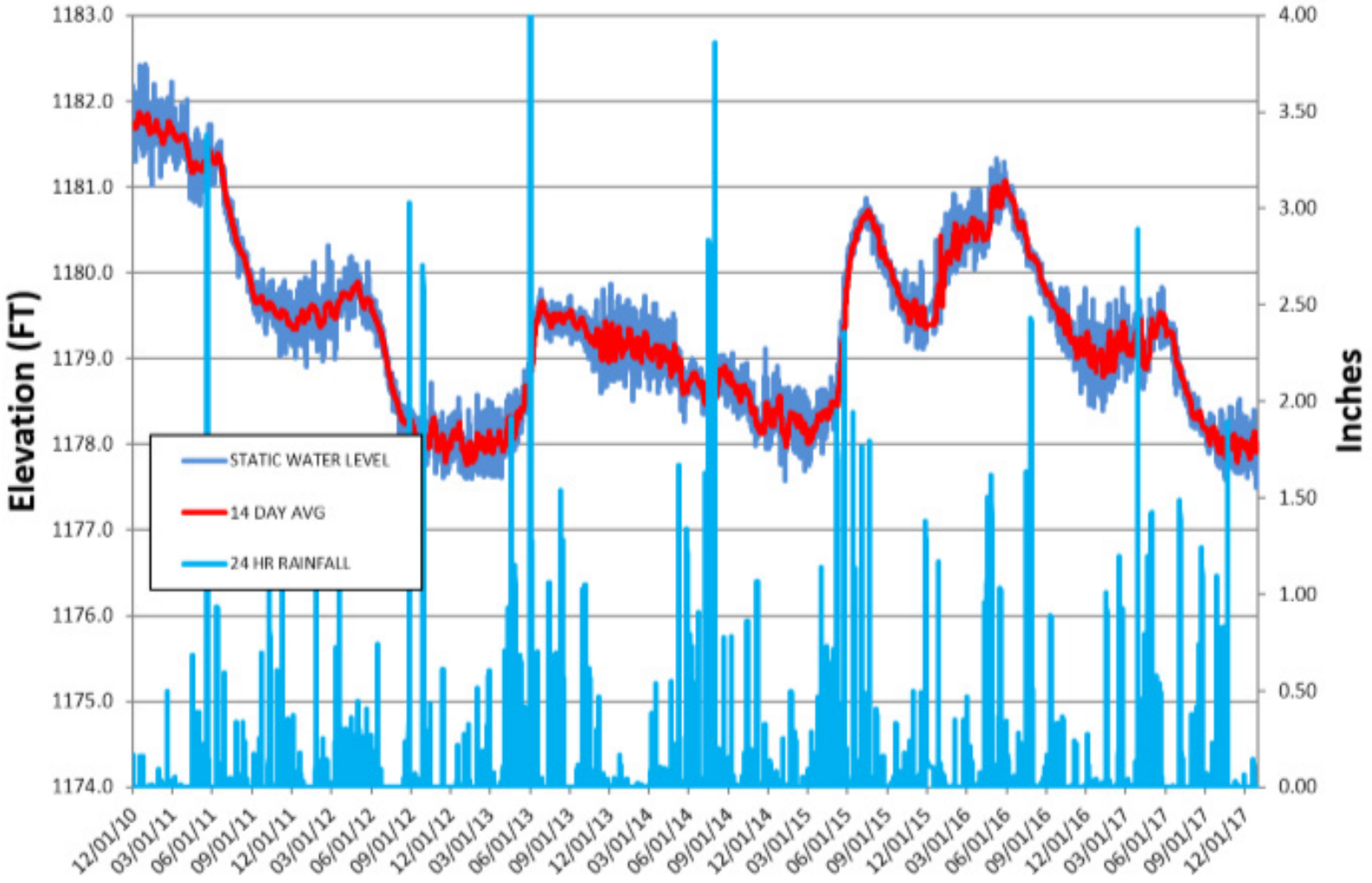

- Static water levels recorded from the Spencer Mesonet station has shown a steady decrease in static water levels in the aquifer since 2015.
- The aquifer never actually recovered fully from the extreme drought years of 2011-14.
- In late December 2017, static water levels reached a new low since 2010, surpassing the levels seen in the drought of 2010-14

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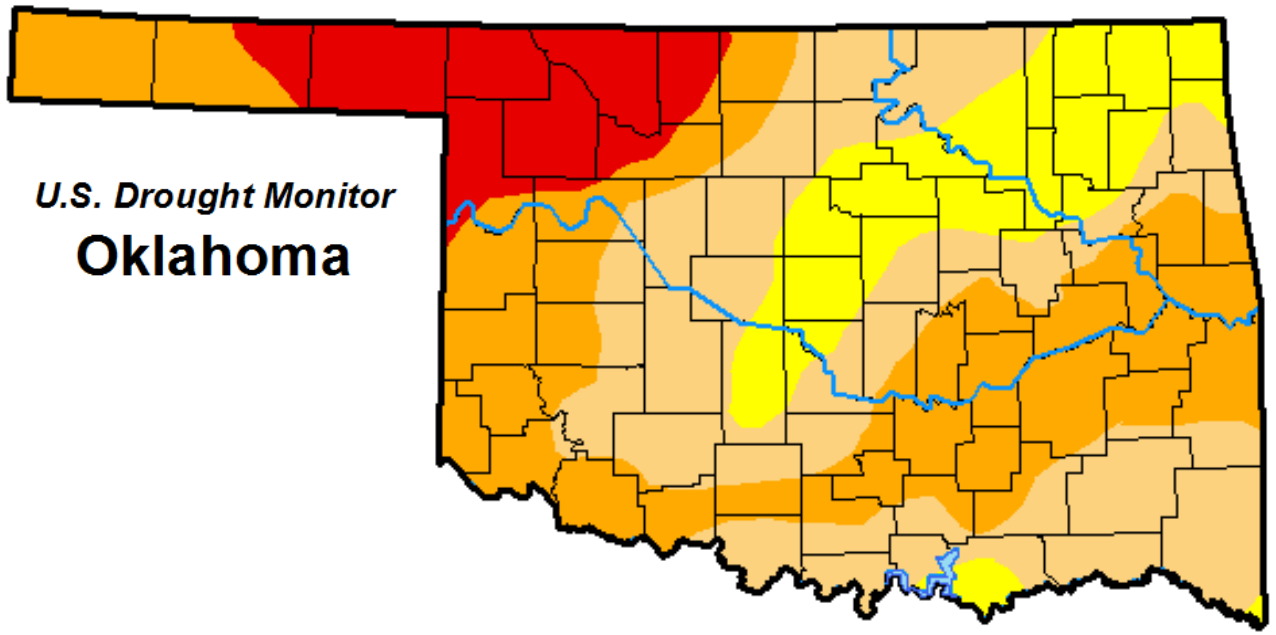

DROUGHT IS RETURNING TO OKLAHOMA!

January 16, 2018

(Released Thursday, Jan. 18, 2018)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	84.04	48.14	12.10	0.00
Last Week *01-09-2018*	0.00	100.00	82.65	42.11	7.03	0.00
3 Months Ago *10-17-2017*	70.28	29.72	11.57	0.00	0.00	0.00
Start of Calendar Year *01-02-2018*	0.00	100.00	77.15	38.76	0.00	0.00
Start of Water Year *09-26-2017*	64.46	35.54	0.77	0.00	0.00	0.00
One Year Ago *01-17-2017*	4.08	95.92	81.05	31.71	4.17	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Brian Fuchs
National Drought Mitigation Center

http://droughtmonitor.unl.edu/

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QUESTIONS?

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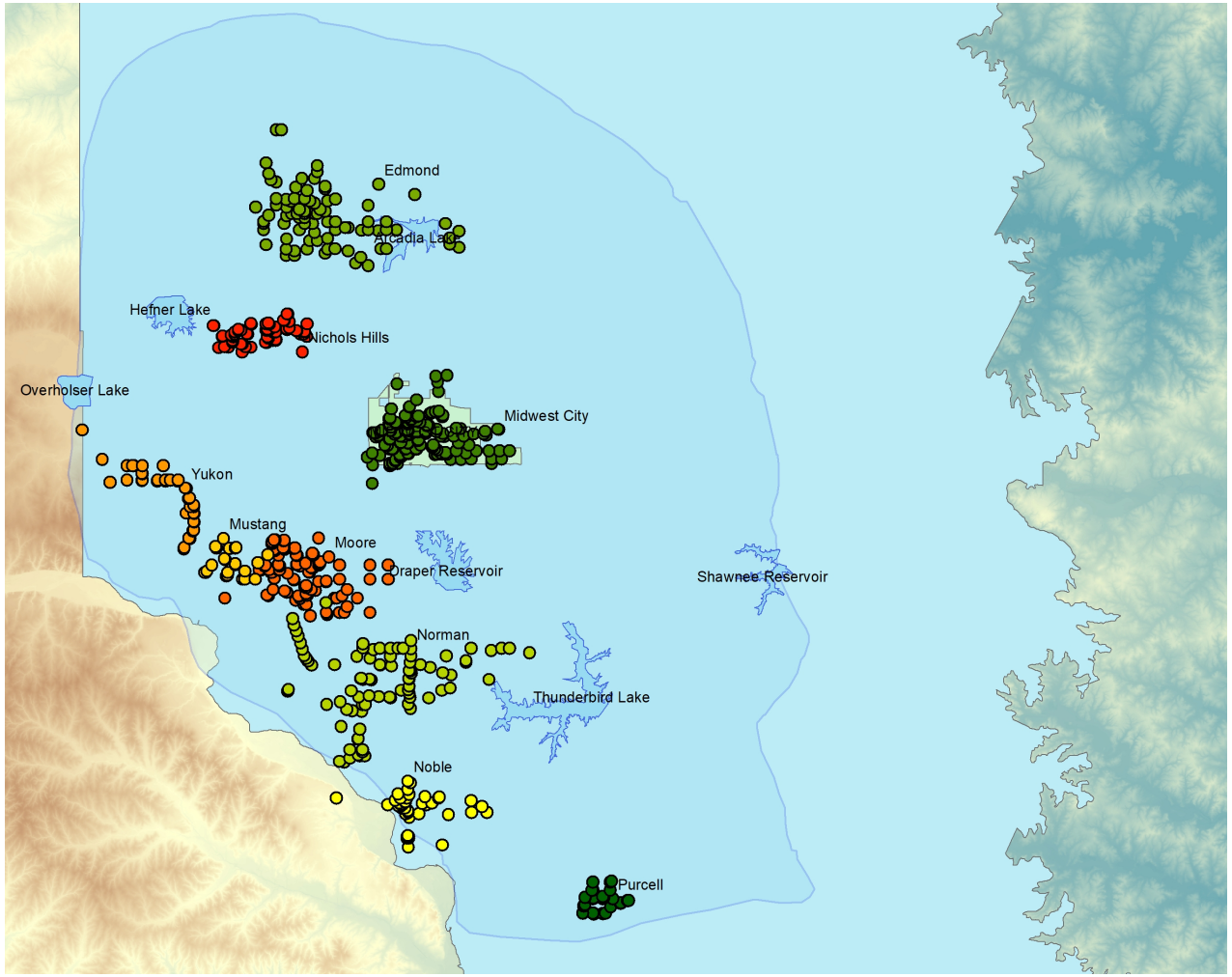
CITY OF MIDWEST CITY GROUNDWATER MODEL



- Analyzing individual well fields for drought sustainability is a multi-year effort by the ACOG and GWA as part of the commitment "to determine the boundaries of the fresh water, recharge characteristics of the aquifer, production potential and safe withdrawal zones and rates, to identify pollution sources, and recommend preventive measures." (GWA, 1979).
- These studies are funded through the EPA 604(b) funds.

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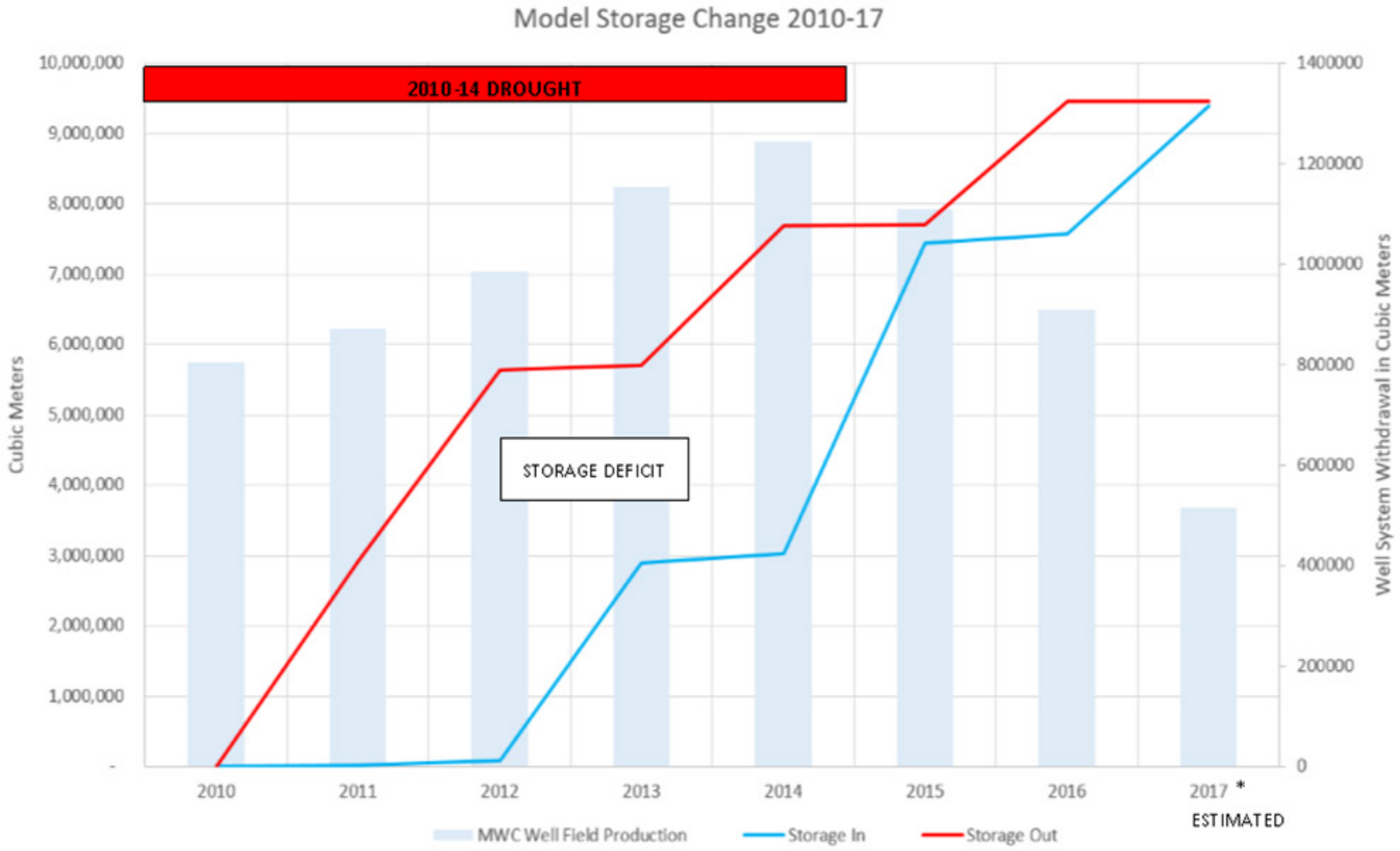

- During the drought of 2010-14 the aquifer in this area experienced a storage deficit. The rains of 2015 almost made up the deficit.
- Lower demand on the system has erased the deficit in 2017

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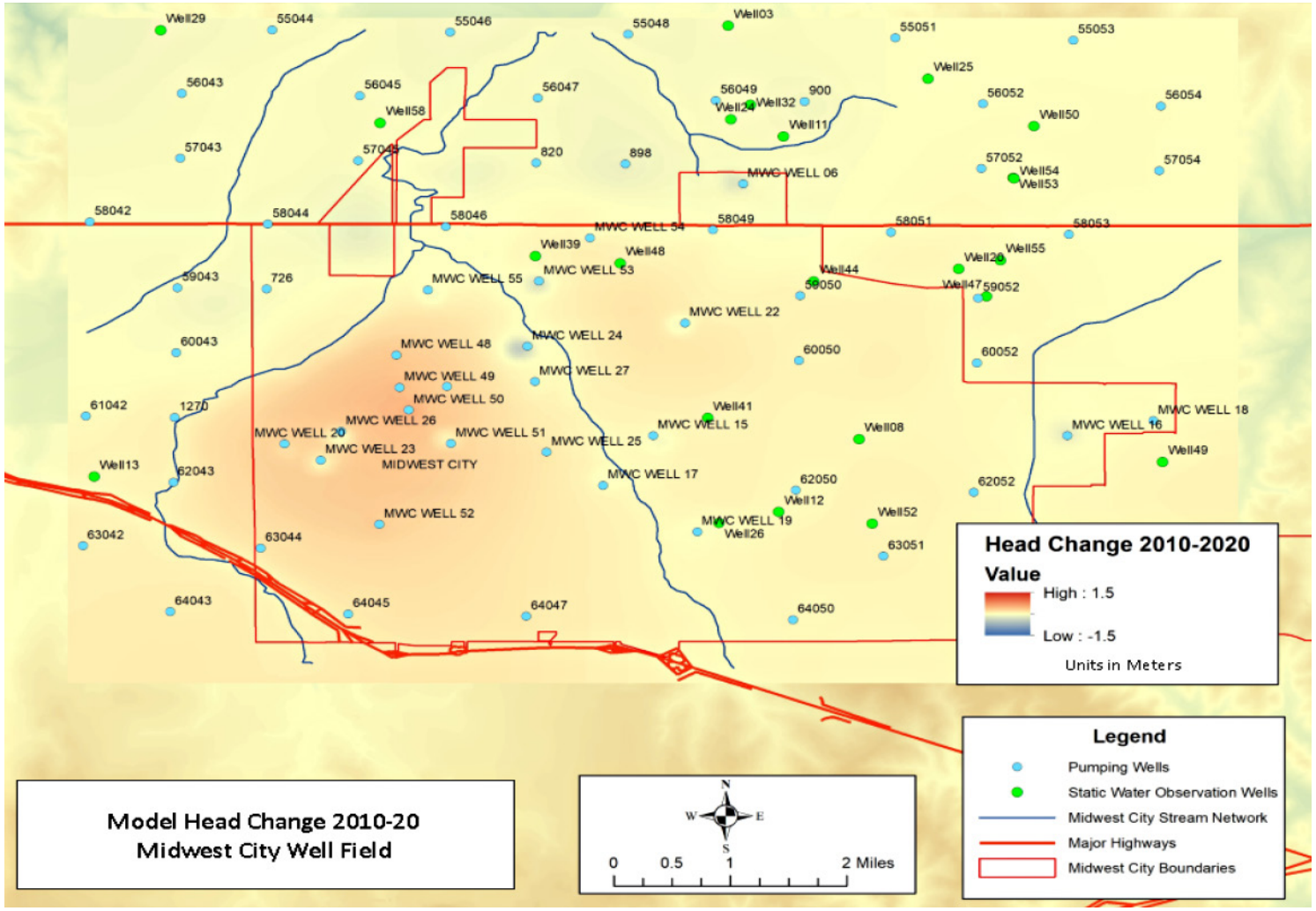

- Projecting over a ten-year drought scenario of 2010-20, static water levels are minimal.

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- A computer simulation for the Midwest City well field was performed with the objective of determining the sustainability of the well field in drought conditions.
- Based on this calculation, the well field is sustainable for a ten-year drought under the present management scenario. Additional factors such as increased population and new well sites should be incorporated and additional modeling work should be completed when the data is made available.
- Static water level data was not available for the well field. The model was calibrated against static water level data from drillers' logs in the vicinity. A static water level survey sould be performed and the model recalibrated to these data.

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QUESTIONS?

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