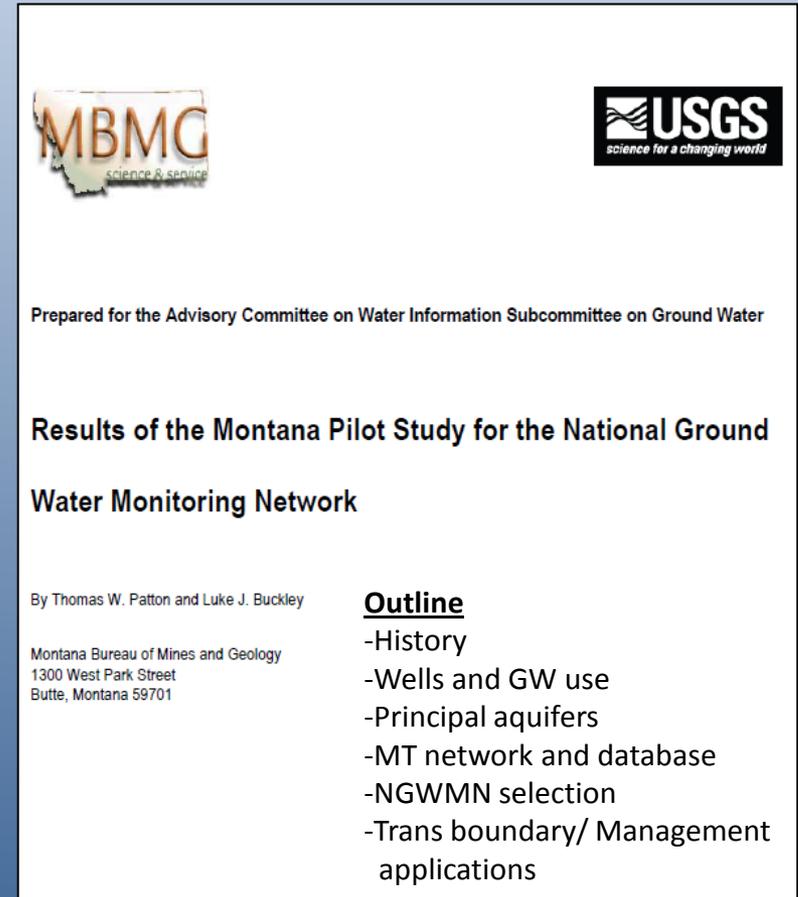
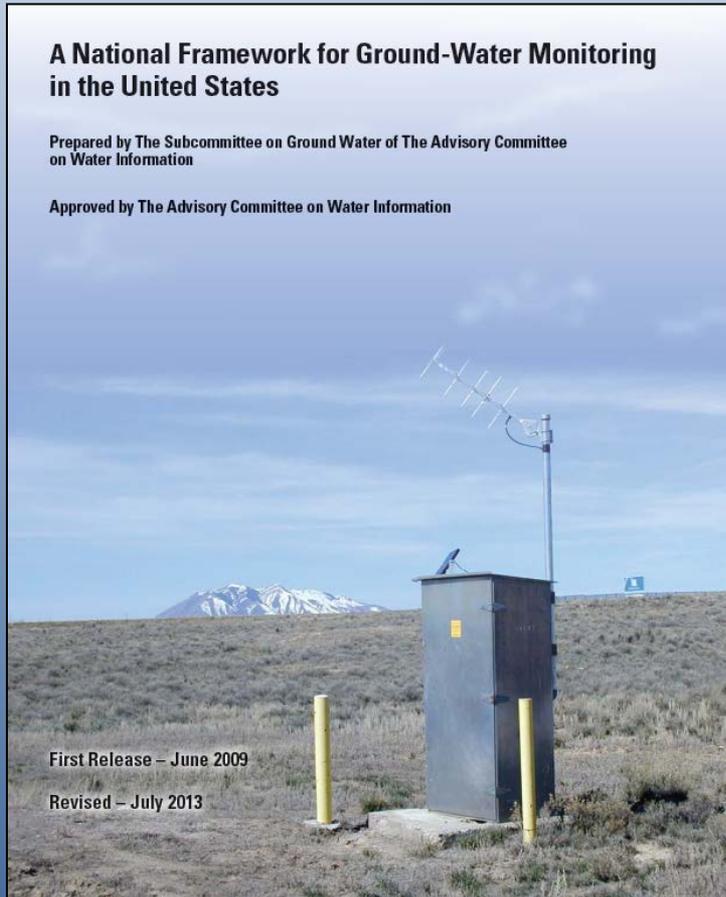


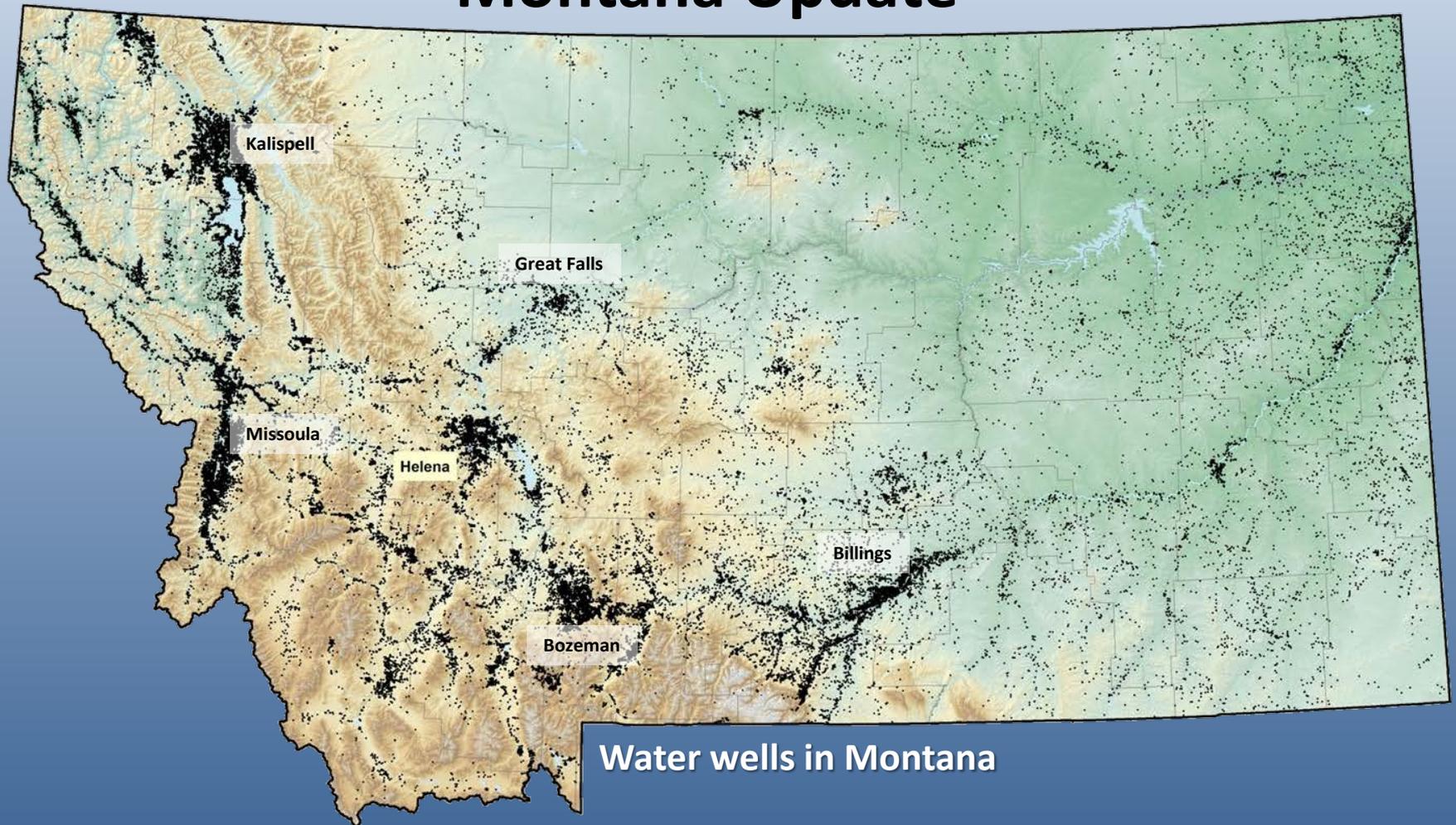
National Ground-Water Monitoring Network

Montana Update



John LaFave
Montana Bureau of Mines and Geology
Presented to SOGW 12/6/16

National Ground-Water Monitoring Network Montana Update



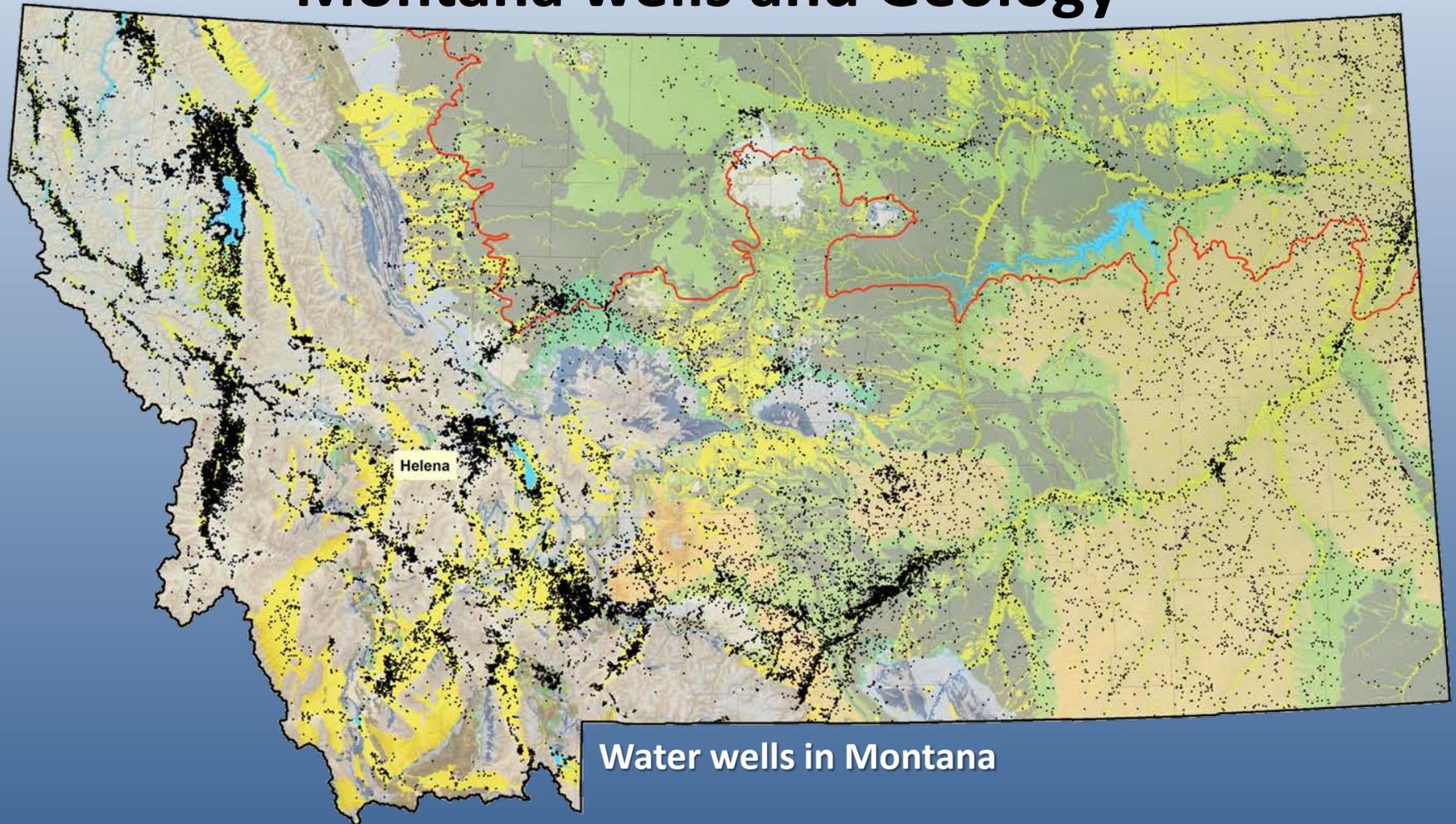
John LaFave

Montana Bureau of Mines and Geology

Presented to SOGW 12/6/16

National **Ground-Water** Monitoring Network

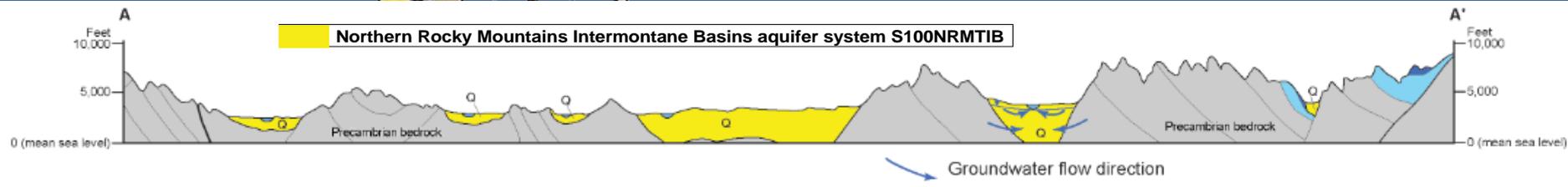
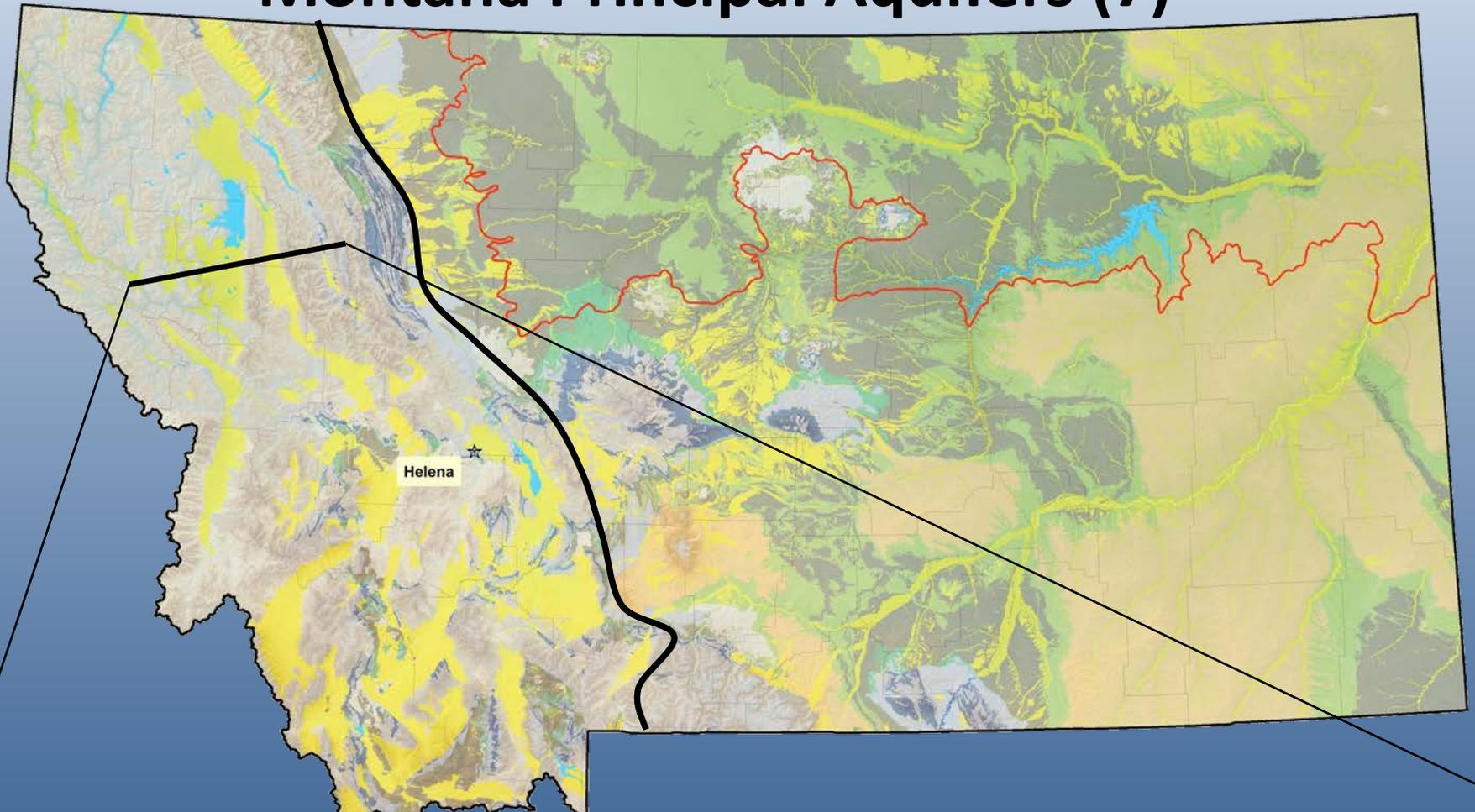
Montana wells and Geology



Water wells in Montana

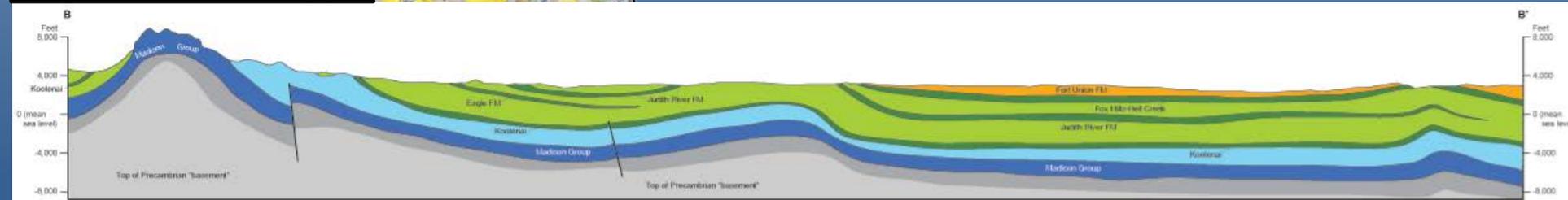
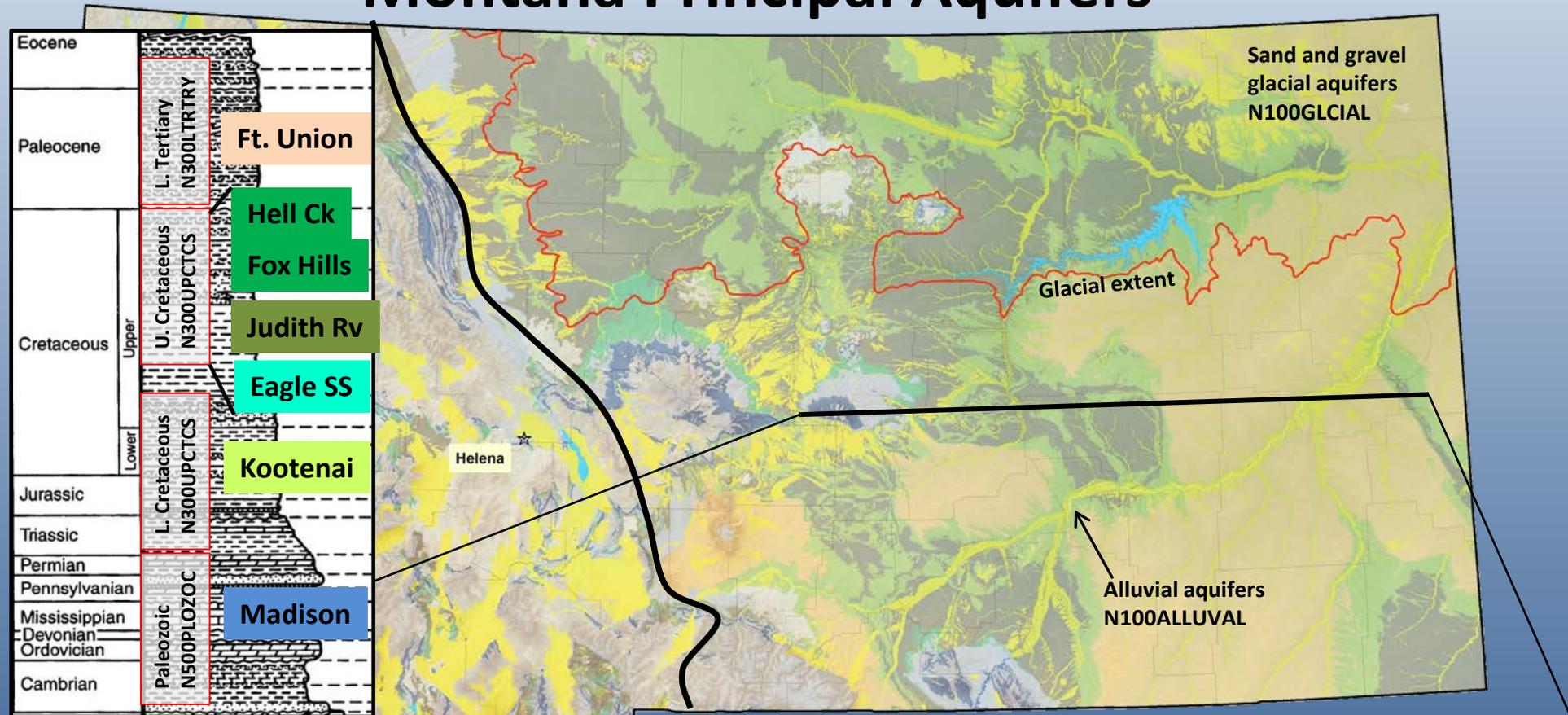
National Ground-Water Monitoring Network

Montana Principal Aquifers (7)



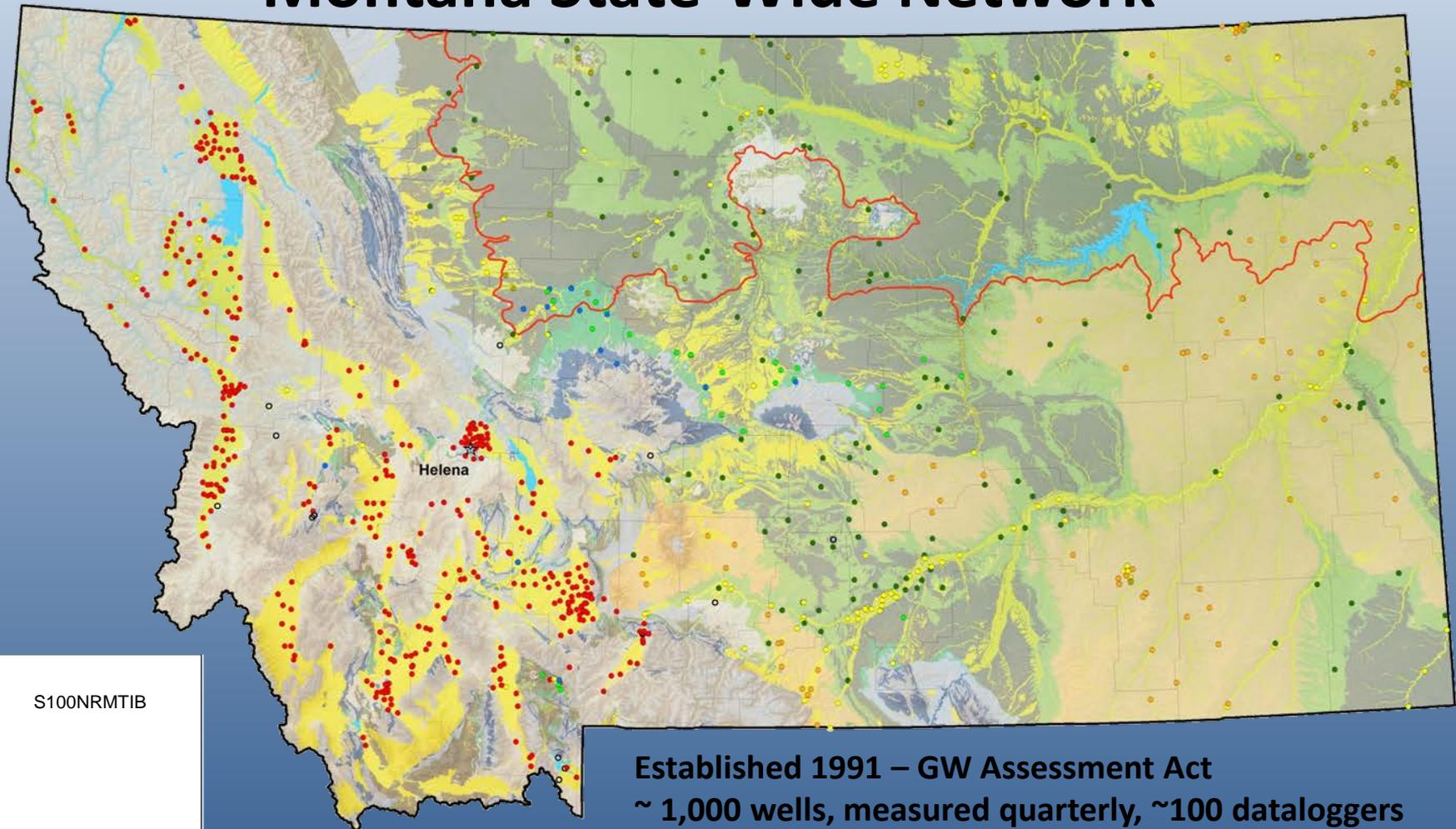
National Ground-Water Monitoring Network

Montana Principal Aquifers



National **Ground-Water** Monitoring Network

Montana State-Wide Network

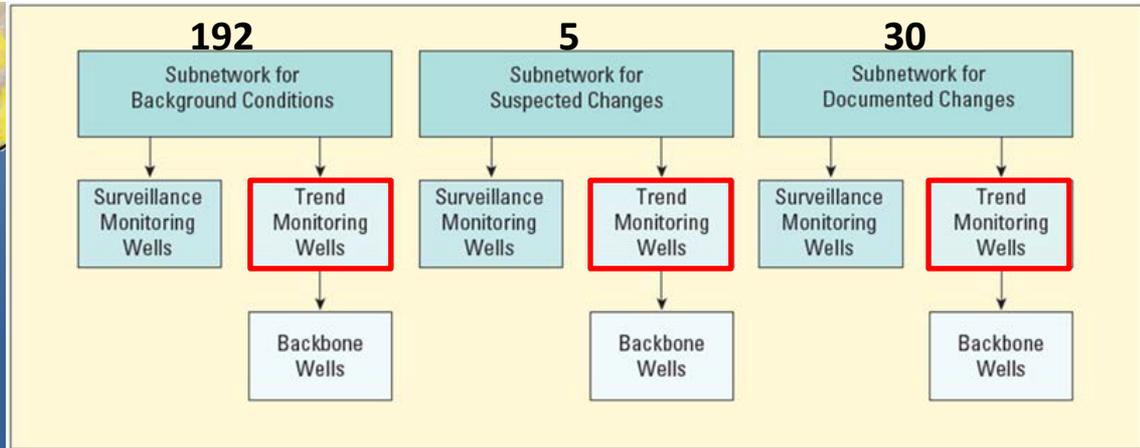
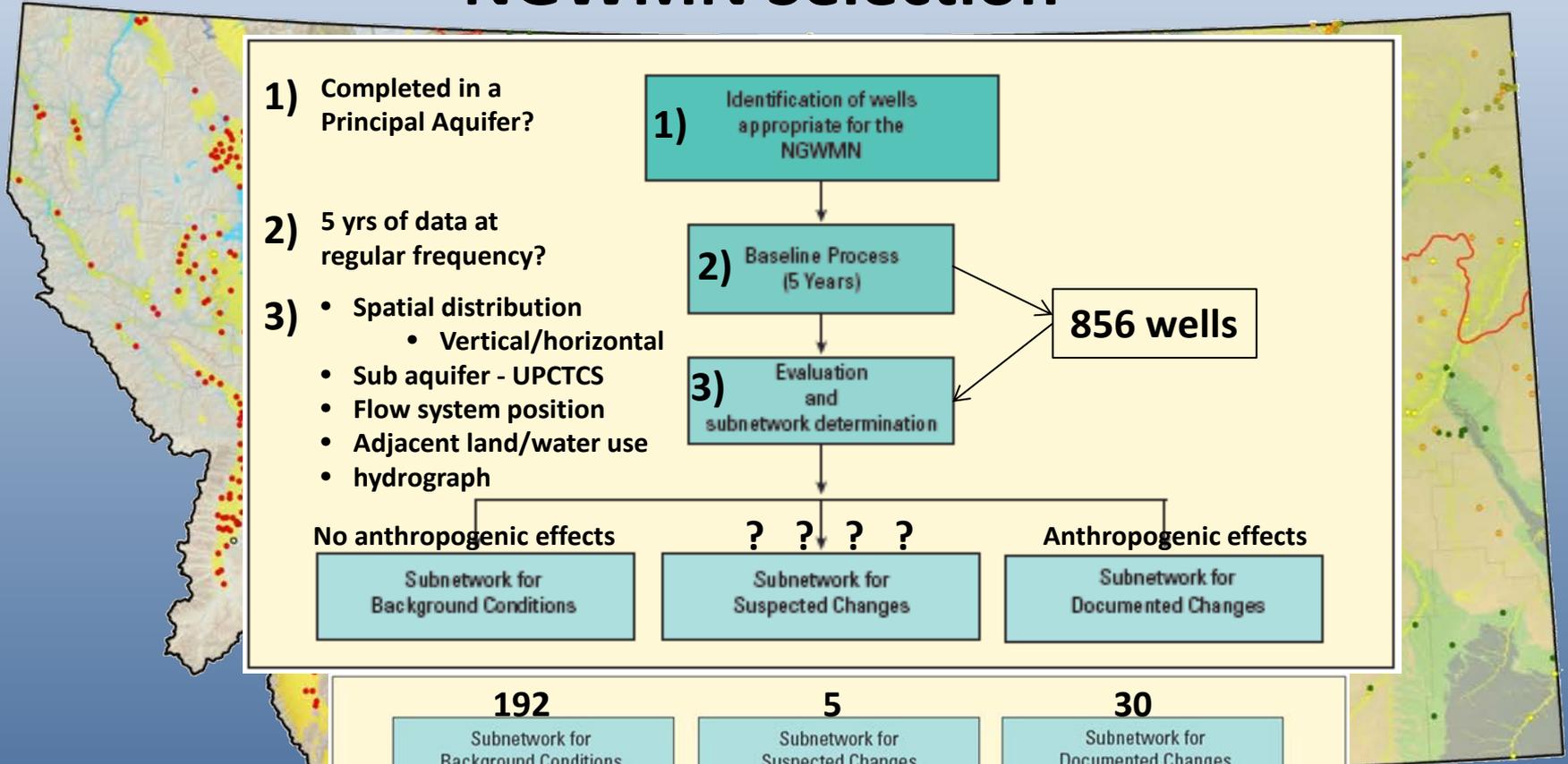


S100NRMTIB

Established 1991 – GW Assessment Act
~ 1,000 wells, measured quarterly, ~100 dataloggers
Funding – Steering Committee - COOP
Online database - mapper

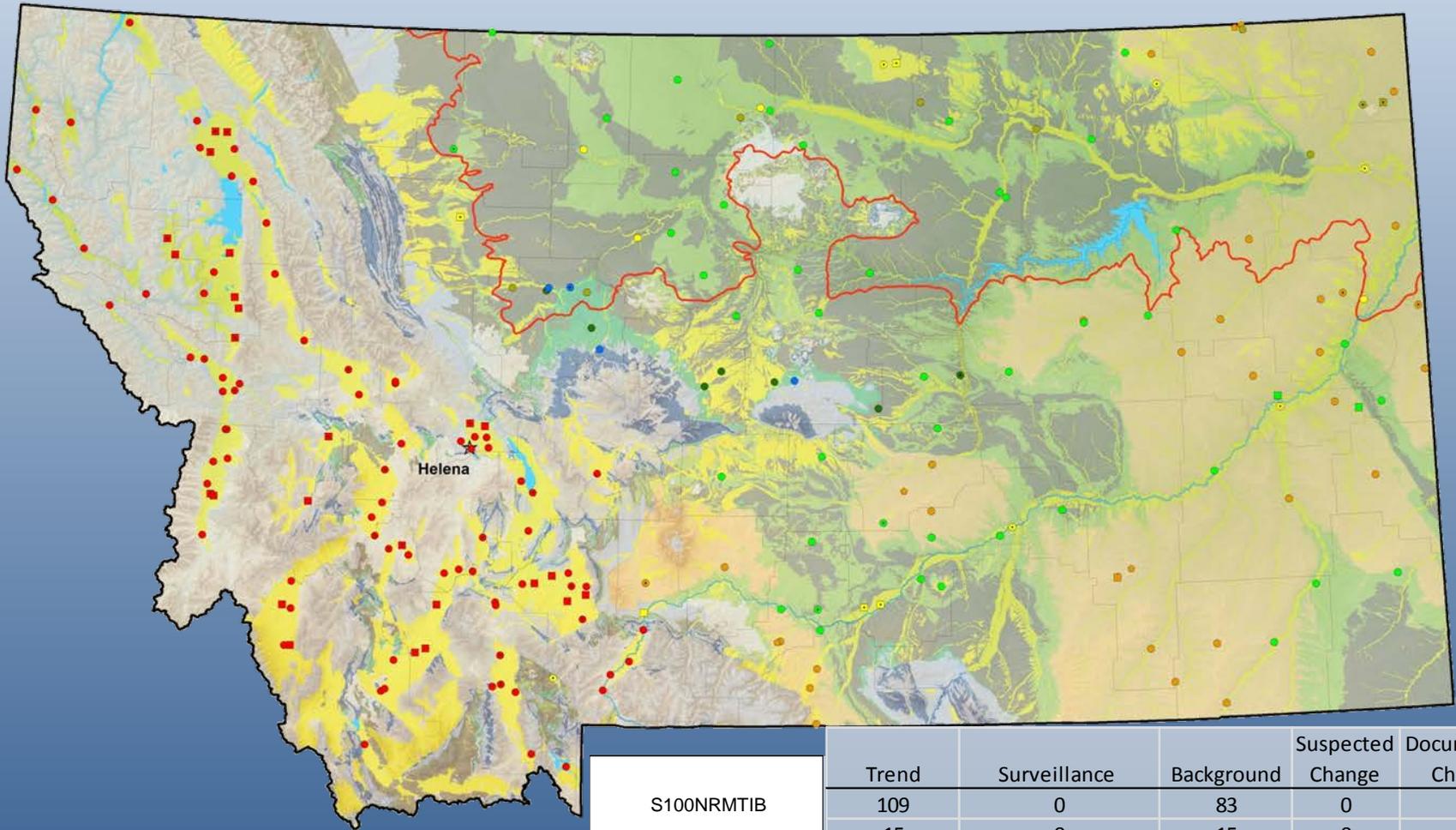
National Ground-Water Monitoring Network

NGWMN Selection



National Ground-Water Monitoring Network

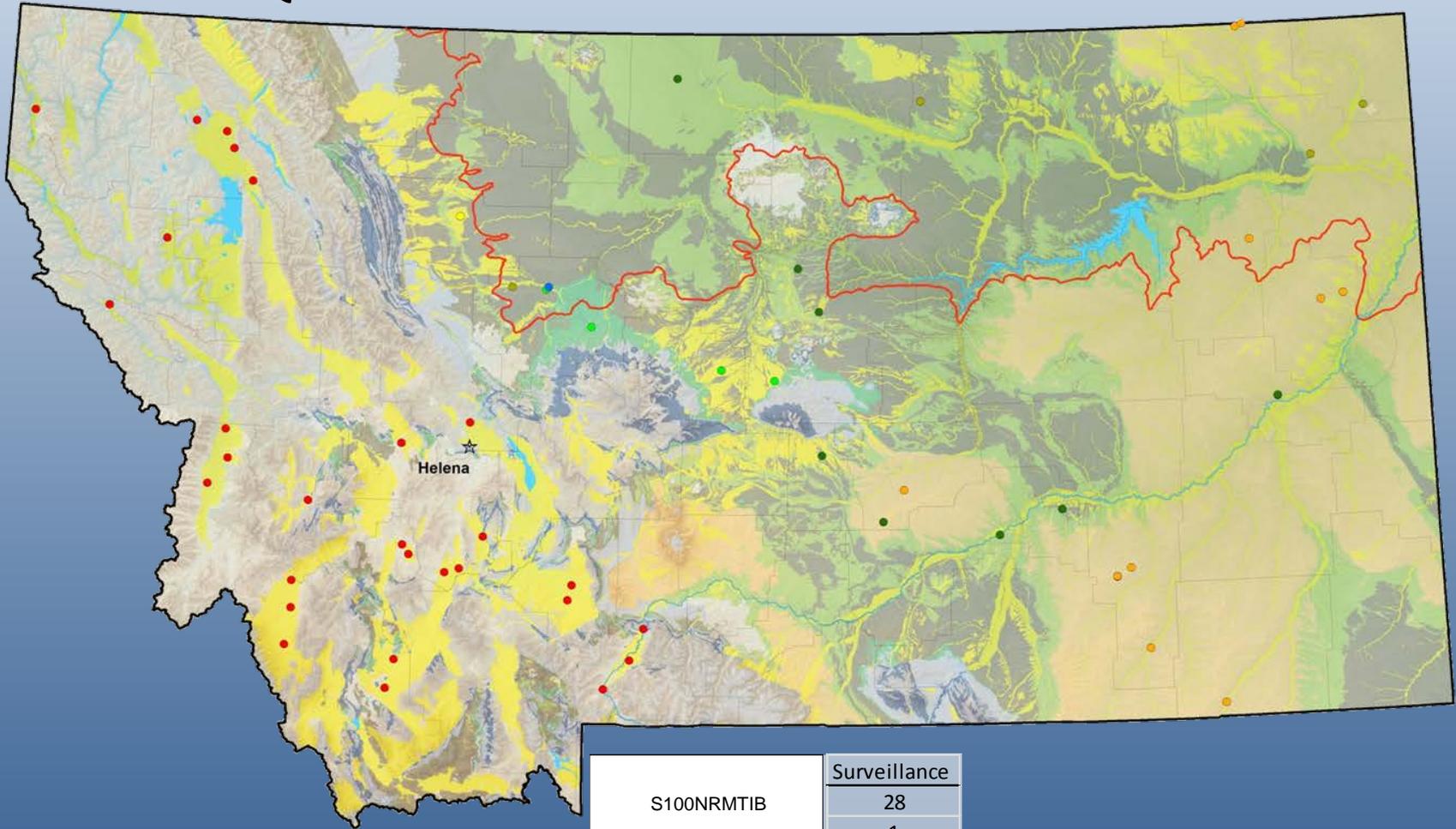
WL: NGWMN Selection – 227 wells



S100NRMTIB	Trend	Surveillance	Background	Suspected Change	Documented Change
	109	0	83	0	26
15	0	15	0	0	
9	0	8	0	1	
37	0	31	5	1	
46	0	44	0	2	
7	0	7	0	0	
4	0	4	0	0	

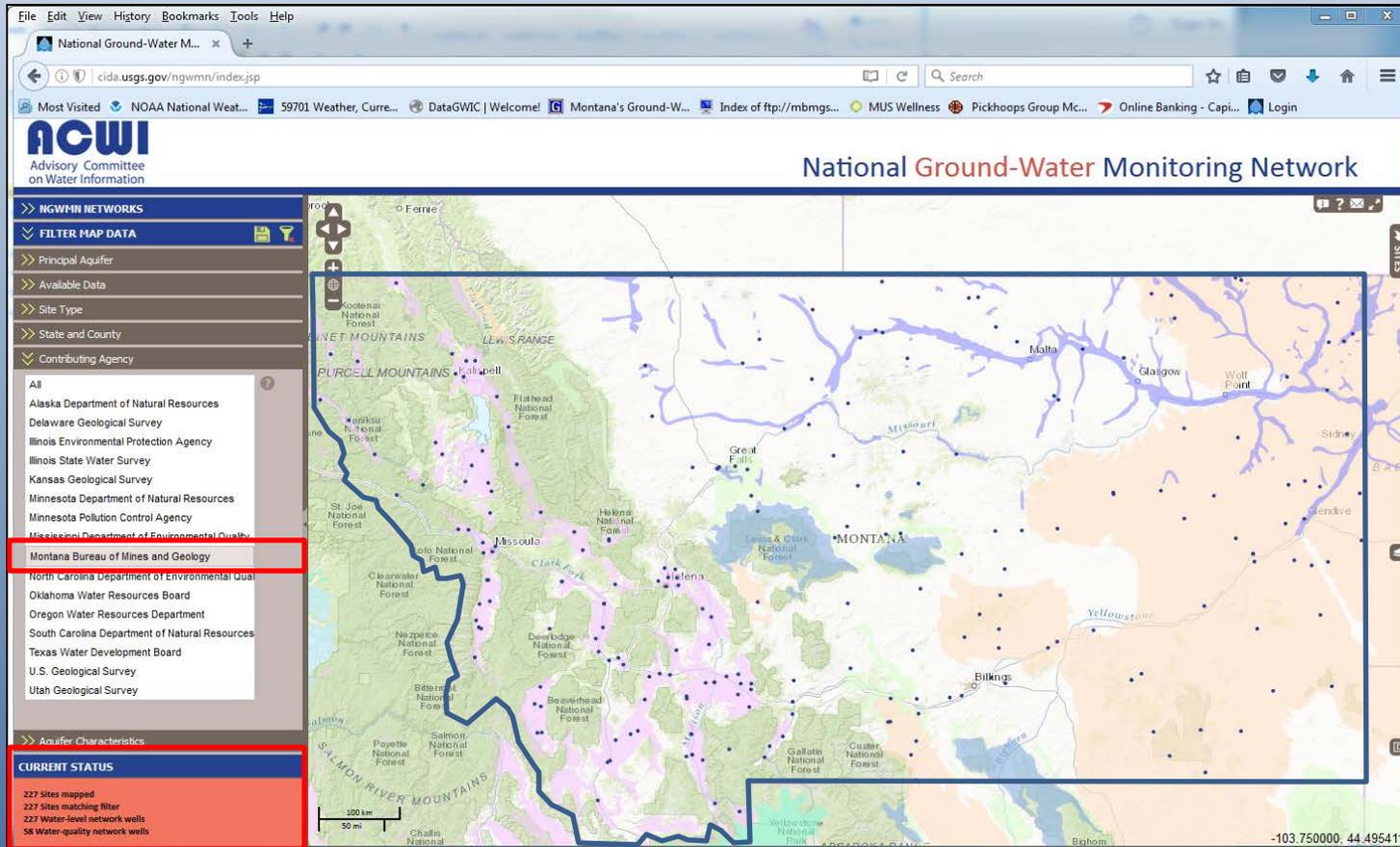
National Ground-Water Monitoring Network

WQ: NGWMN Selection – 58 wells

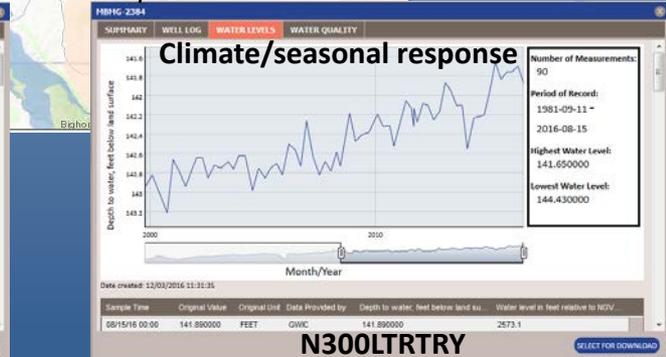
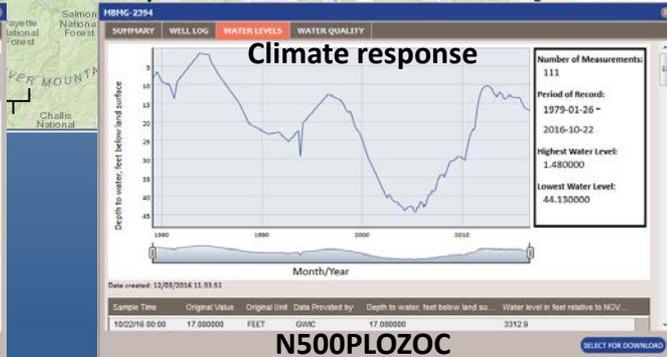


National Ground-Water Monitoring Network

NGWMN Portal View



National Ground-Water Monitoring Network NGWMN 'Background'



National Ground-Water Monitoring Network NGWMN 'Documented Changes'

File Edit View History Bookmarks Tools Help

National Ground-Water M... x +

cida.usgs.gov/ngwmn/index.jsp

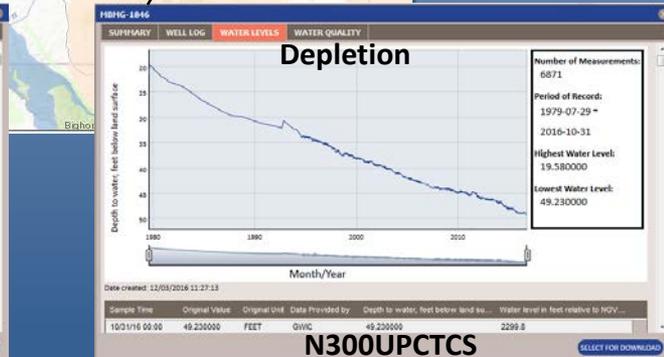
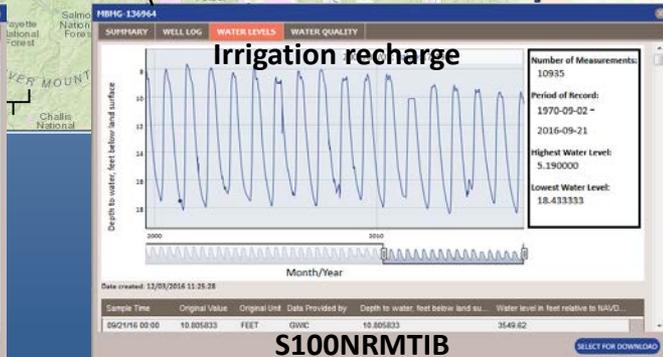
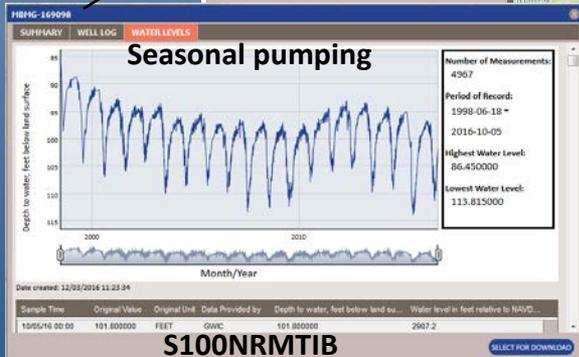
Most Visited NOAA National Weat... 59701 Weather, Curre... DataGWC | Welcome! Montana's Ground-W... Index of ftp://mbmgs... MUS Wellness Pickhoops Group Mc... Online Banking - Capi... Login

ACWI
Advisory Committee on Water Information

National Ground-Water Monitoring Network

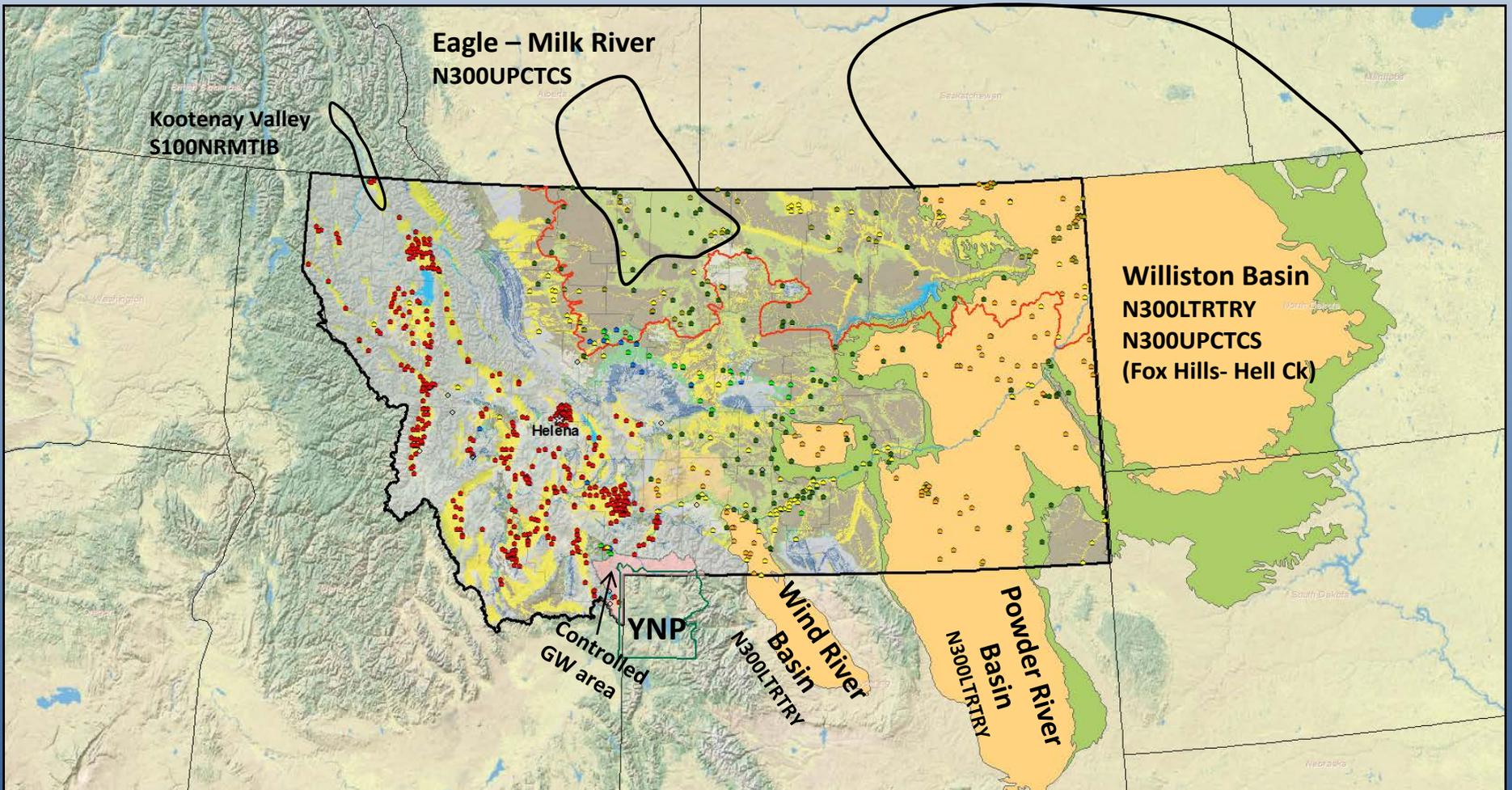
NGWMN NETWORKS
 FILTER MAP DATA
 Principal Aquifer
 Available Data
 Site Type
 State and County
 Contributing Agency

- All
- Alaska Department of Natural Resources
- Delaware Geological Survey
- Illinois Environmental Protection Agency
- Illinois State Water Survey
- Kansas Geological Survey
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- Mississippi Department of Environmental Quality
- Montana Bureau of Mines and Geology
- North Carolina Department of Environmental Quality
- Oklahoma Water Resources Board
- Oregon Water Resources Department
- South Carolina Department of Natural Resources
- Texas Water Development Board
- U.S. Geological Survey
- Utah Geological Survey



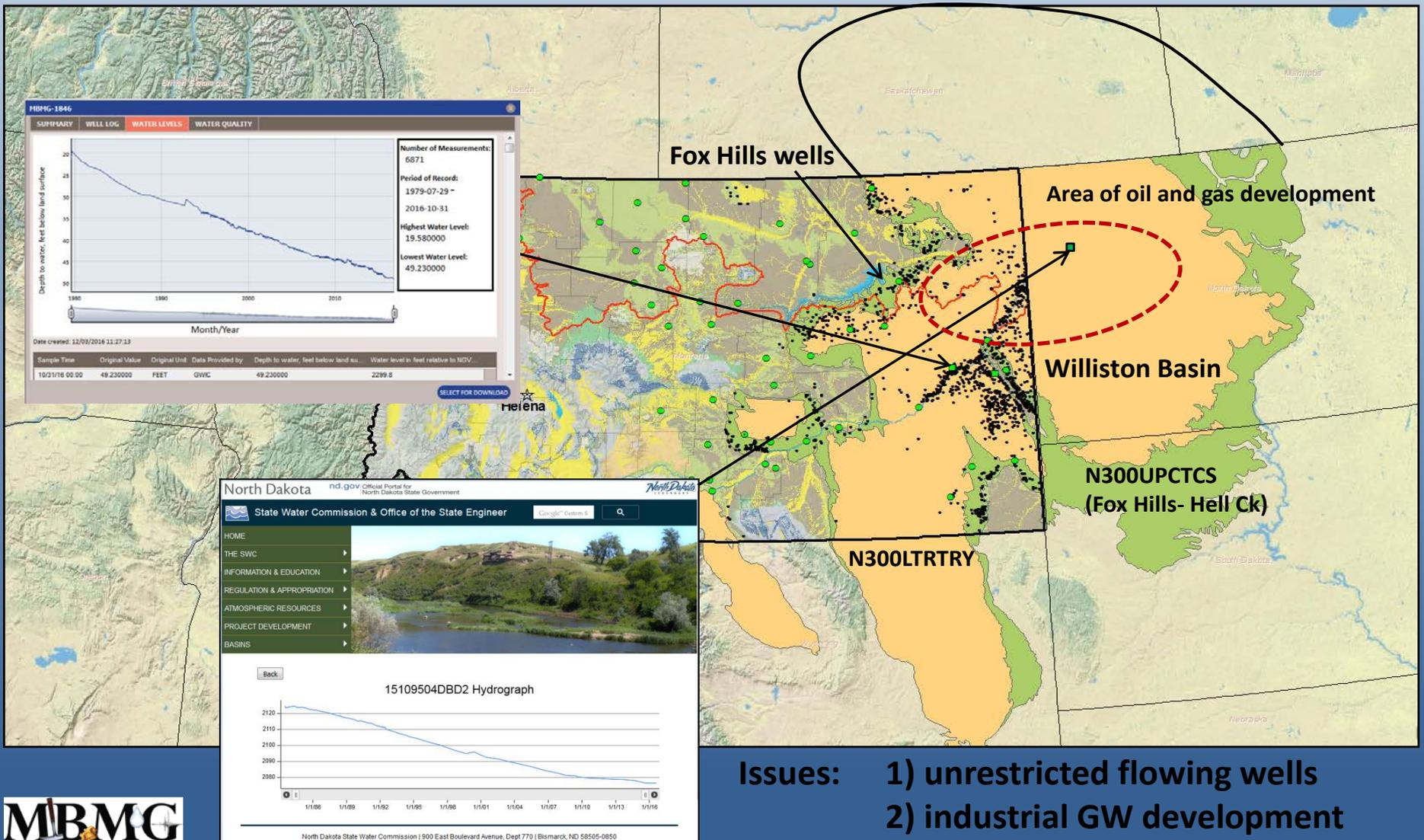
National Ground-Water Monitoring Network Network Application - Transboundary issues

three states – four Canadian provinces



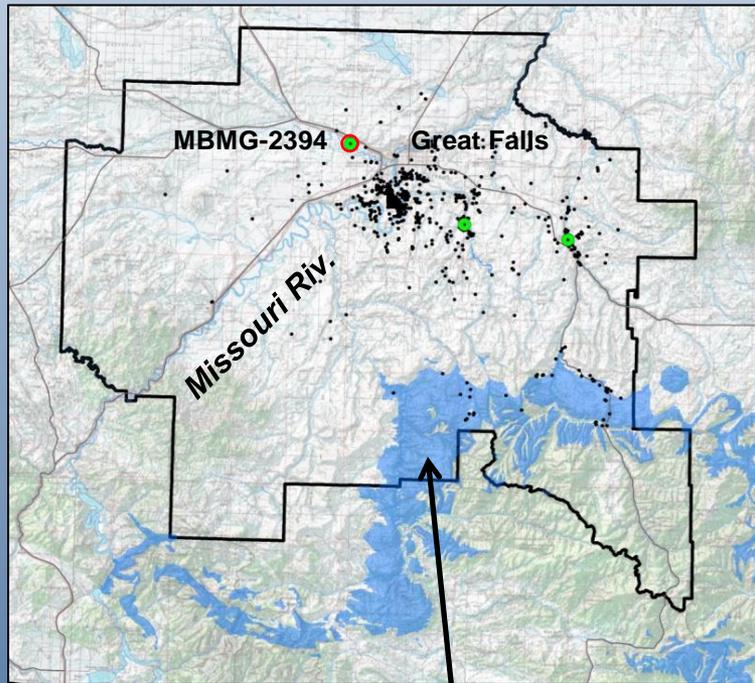
Issues: GW development – coal and CBM development

National Ground-Water Monitoring Network Network Application - Transboundary issues

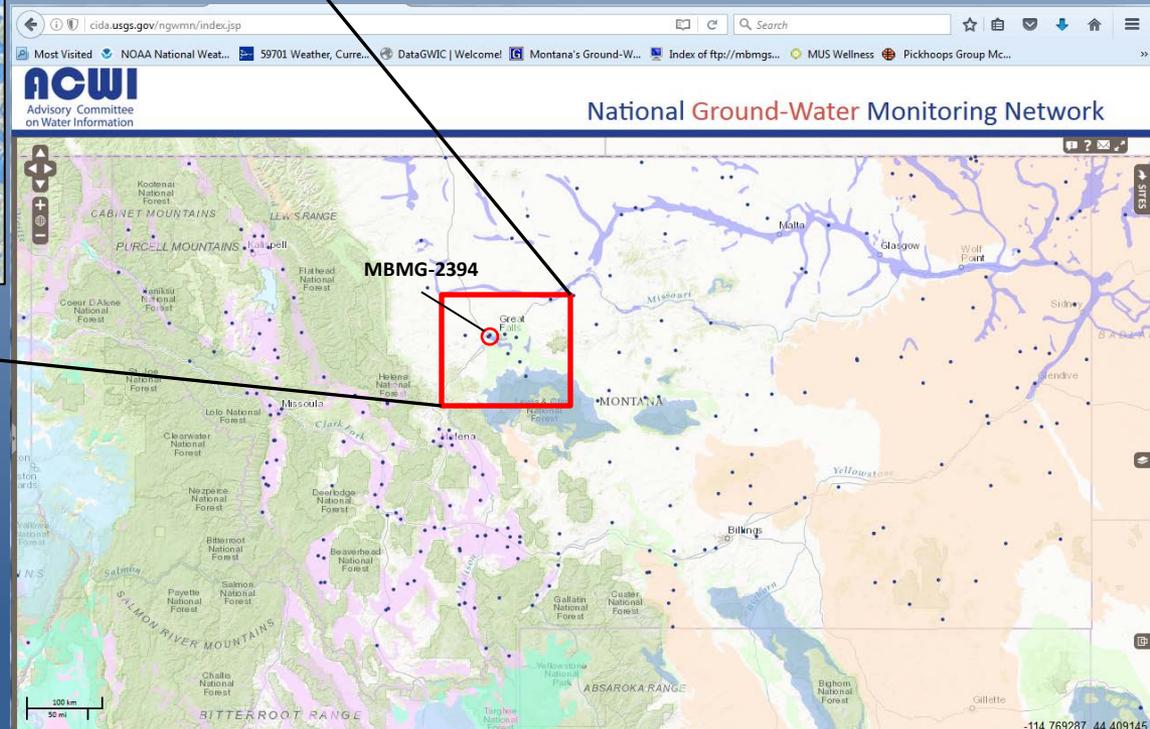


National Ground-Water Monitoring Network

Network Application - Management question

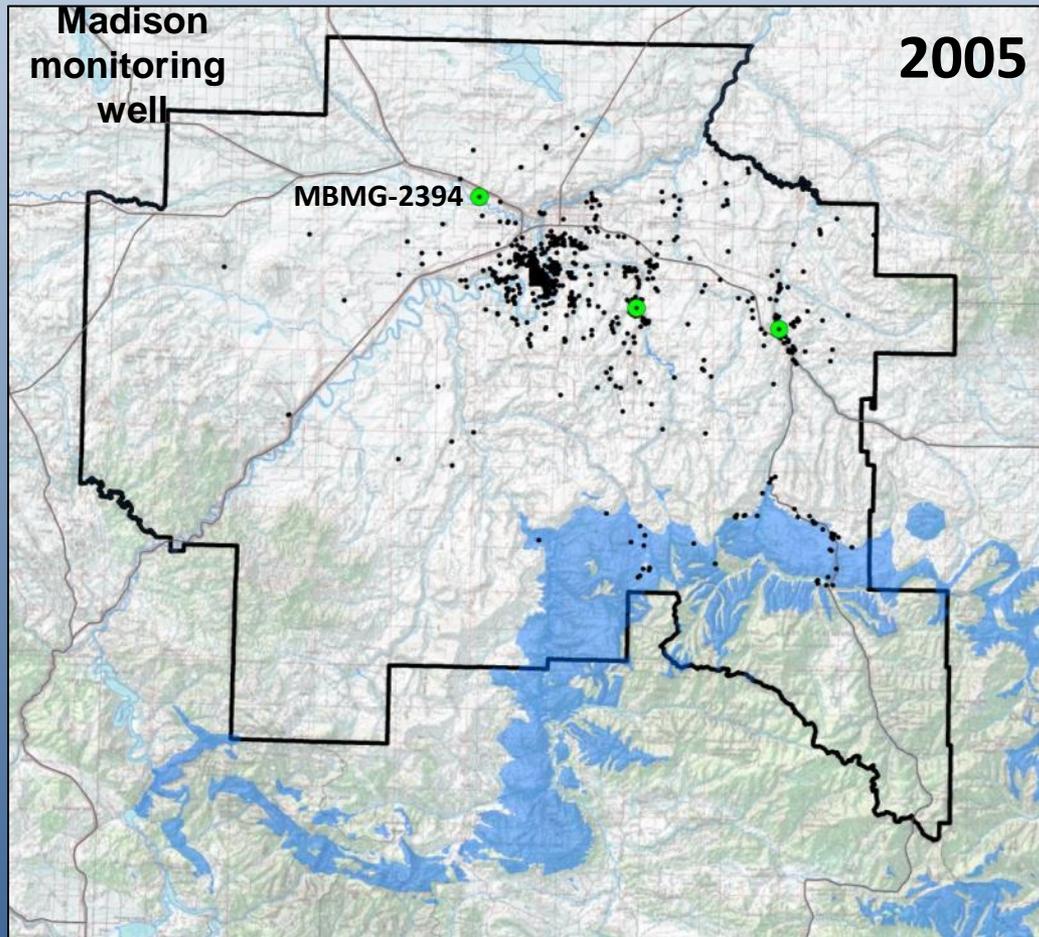


Is groundwater development depleting the Madison aquifer near Great Falls ?

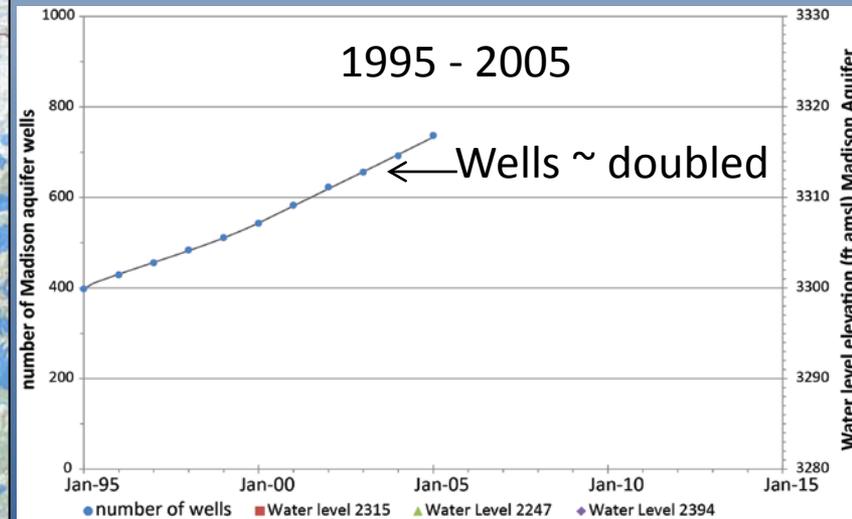


National Ground-Water Monitoring Network

Network Application - Management question

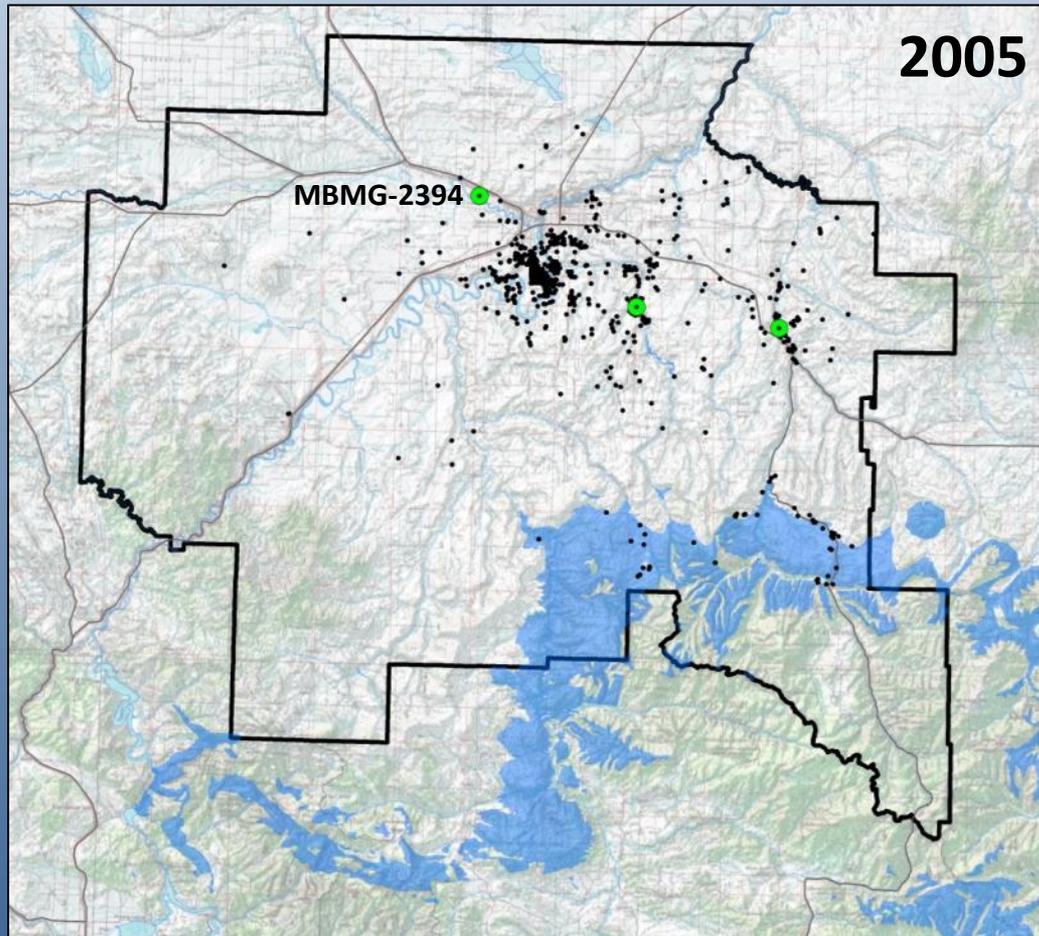


Development impacts ?

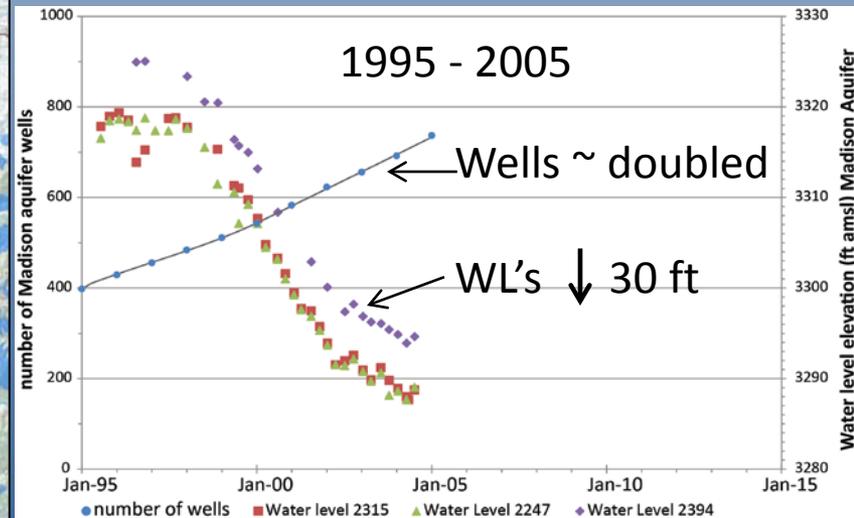


National Ground-Water Monitoring Network

Network Application - Management question

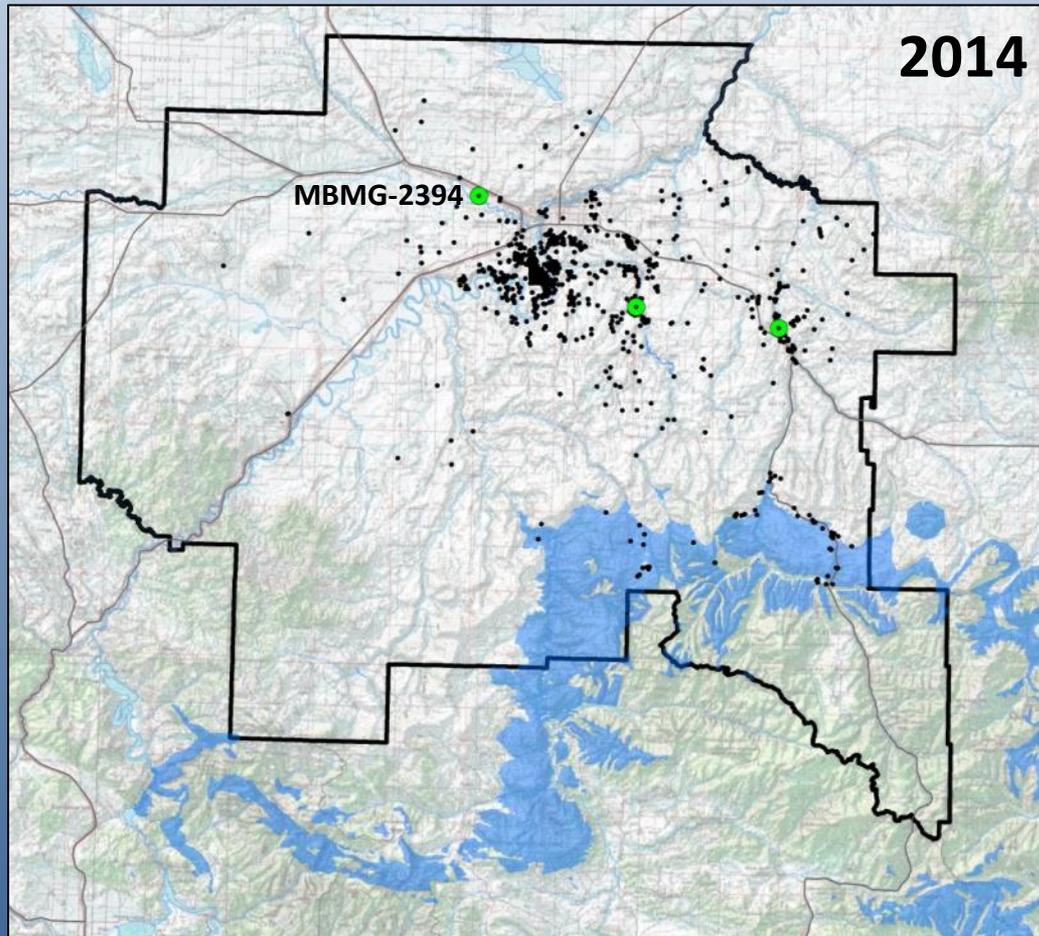


Development IMPACTS !

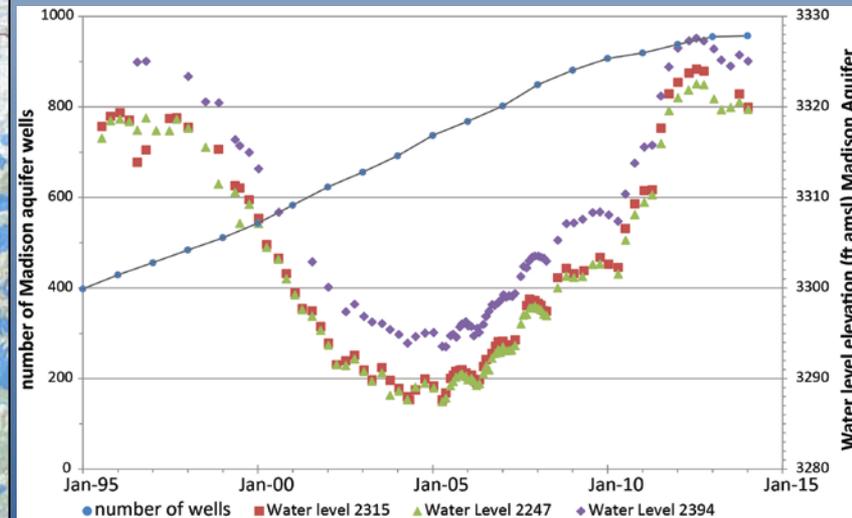


National Ground-Water Monitoring Network

Network Application - Management question



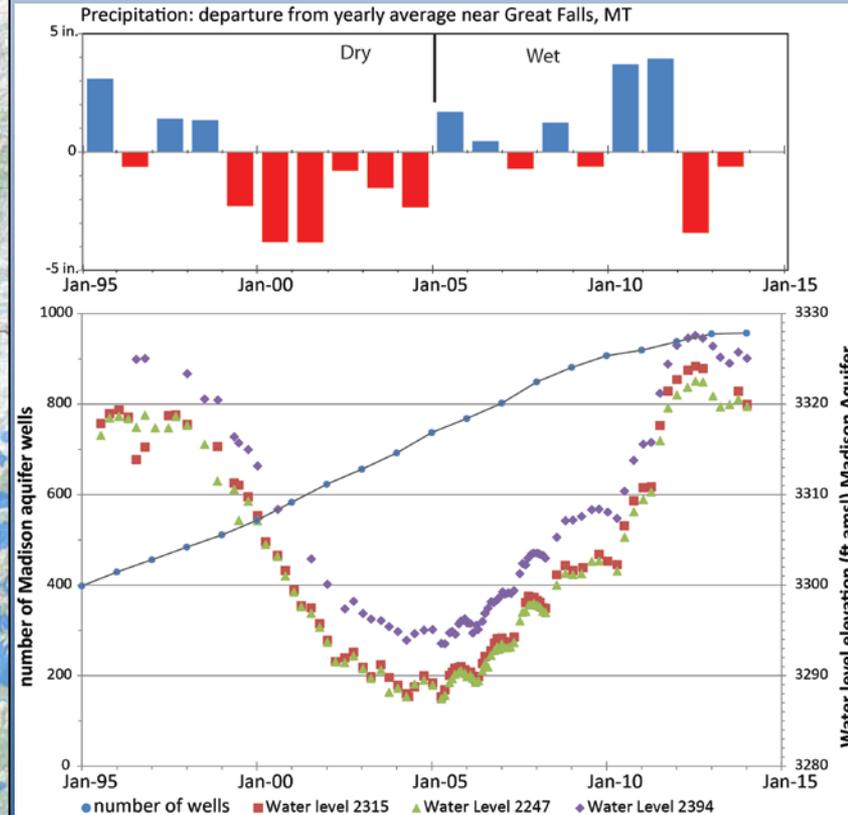
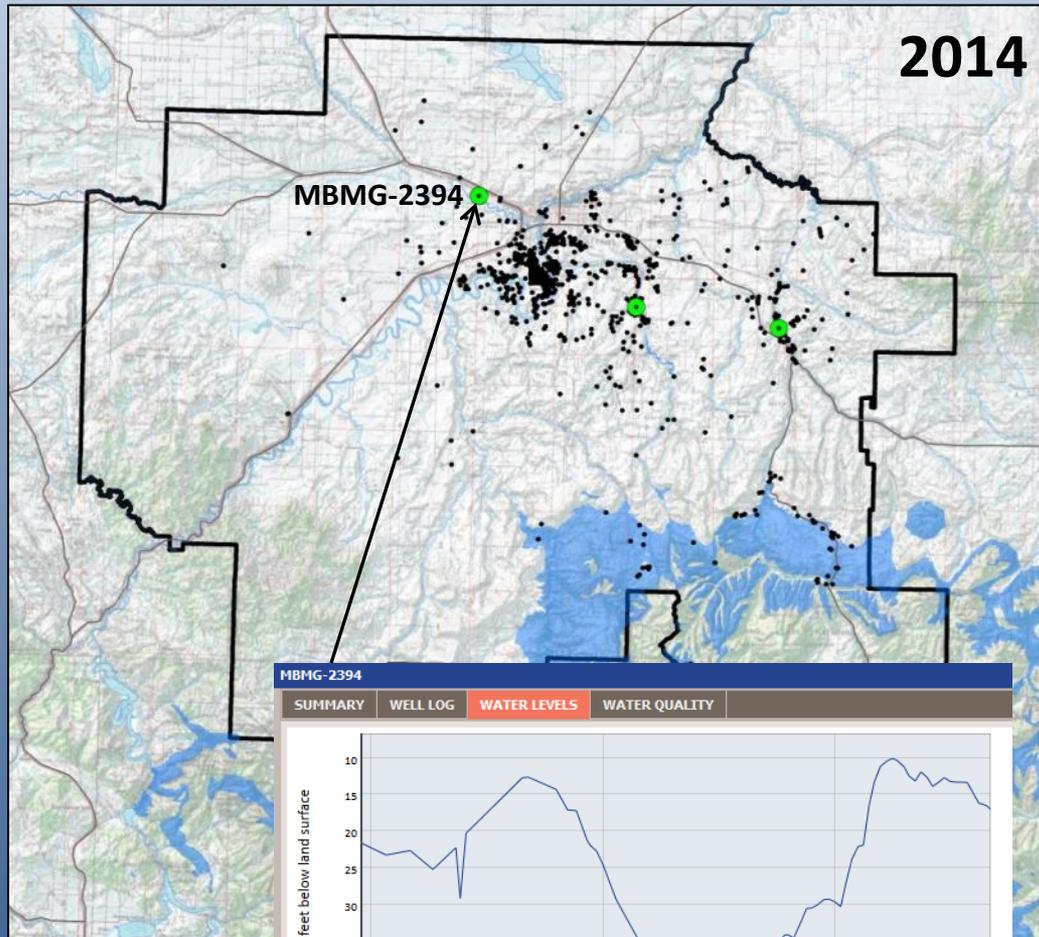
Development not controlling
water levels
Since 2005 water levels recovered
30+ feet



National Ground-Water Monitoring Network

Network Application - Management question

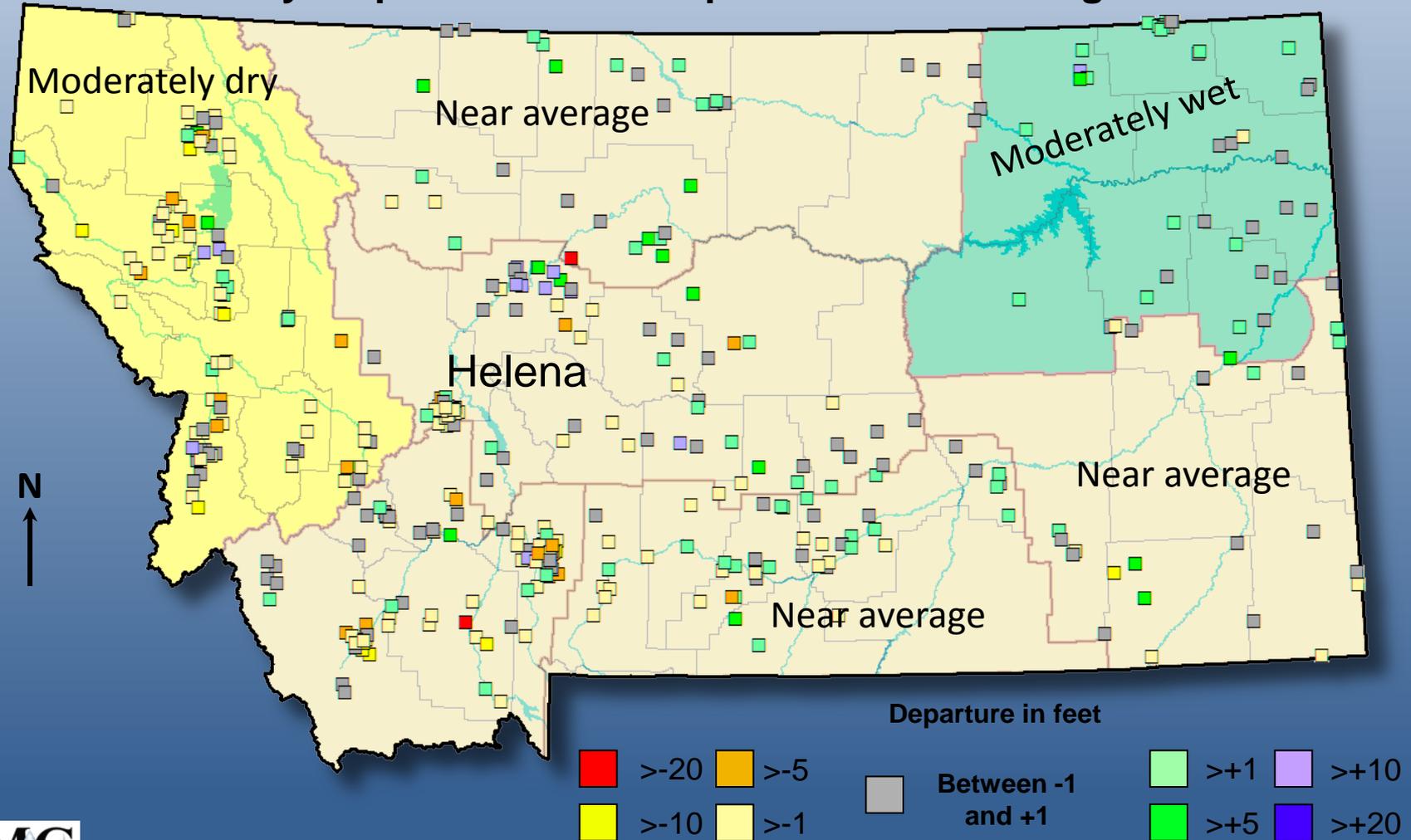
Climate (precipitation) controls water levels



National Ground-Water Monitoring Network

Network Application - Management question

Climate & Groundwater levels
July–September 2016: departures from average



National **Ground-Water** Monitoring Network Montana Update - Current NGWMN Projects:

- Provide Well Registry updates and ongoing web services
- obtain survey grade GPS locations and land-surface altitudes
- install protective steel surface casing around PVC-cased wells

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Ground Water Assessment Program

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