



Well 158587: 03N 30E 21 CCAA-
Yellowstone County

NGWMN- Montana

Providing mutual
benefit

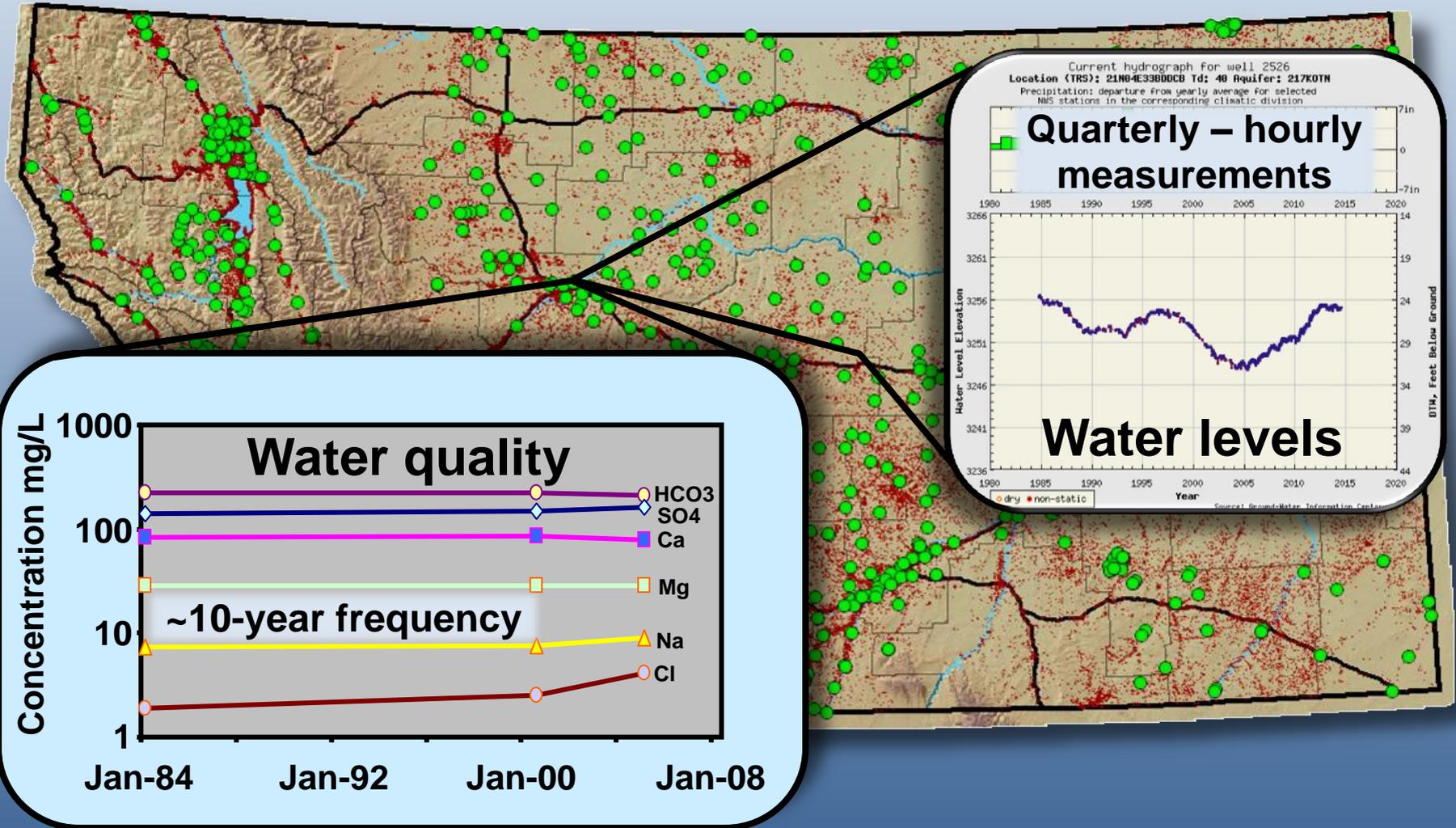
Thomas Patton

Montana Bureau of Mines
and Geology

September 16, 2014

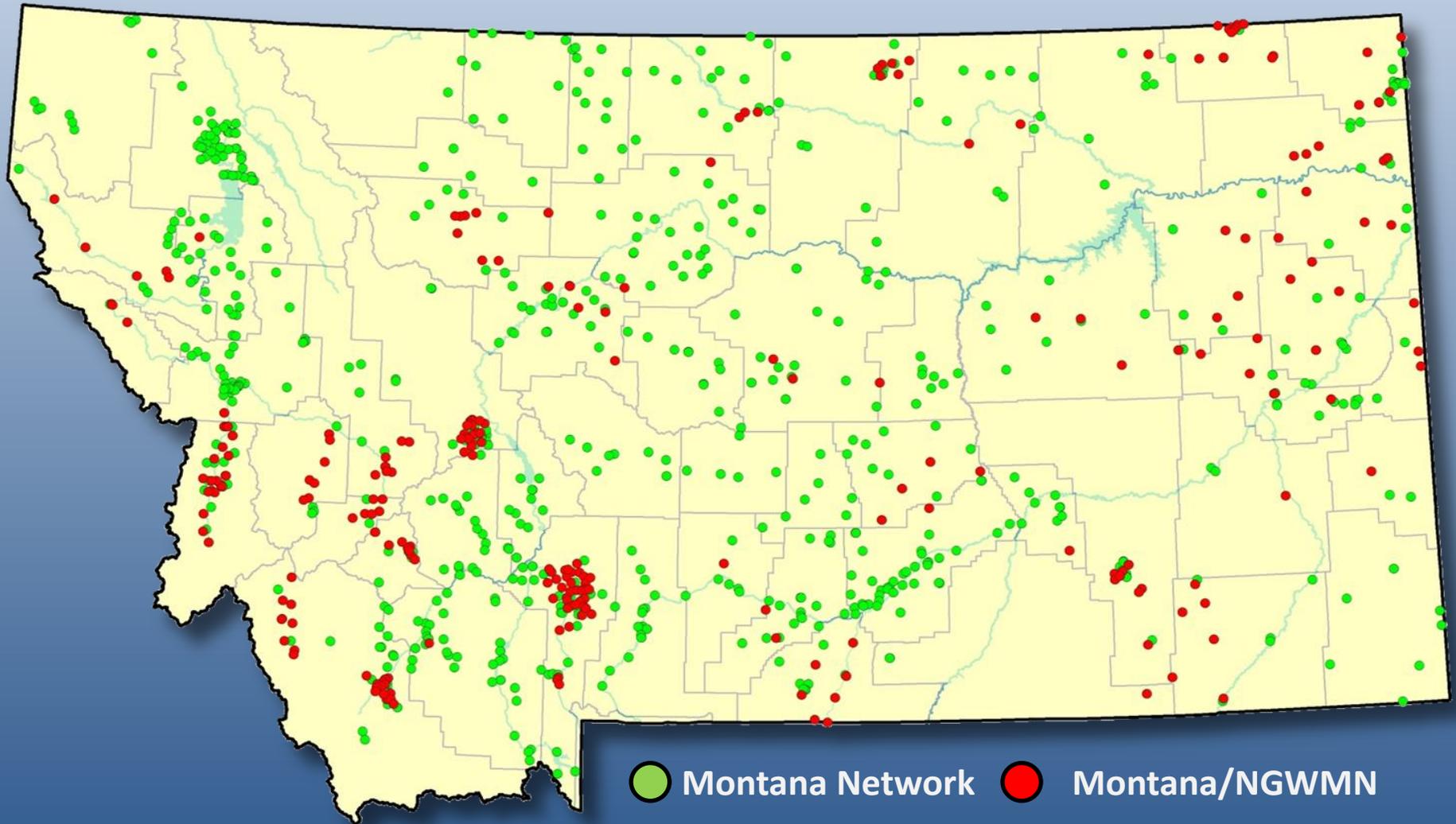


Monitoring network design

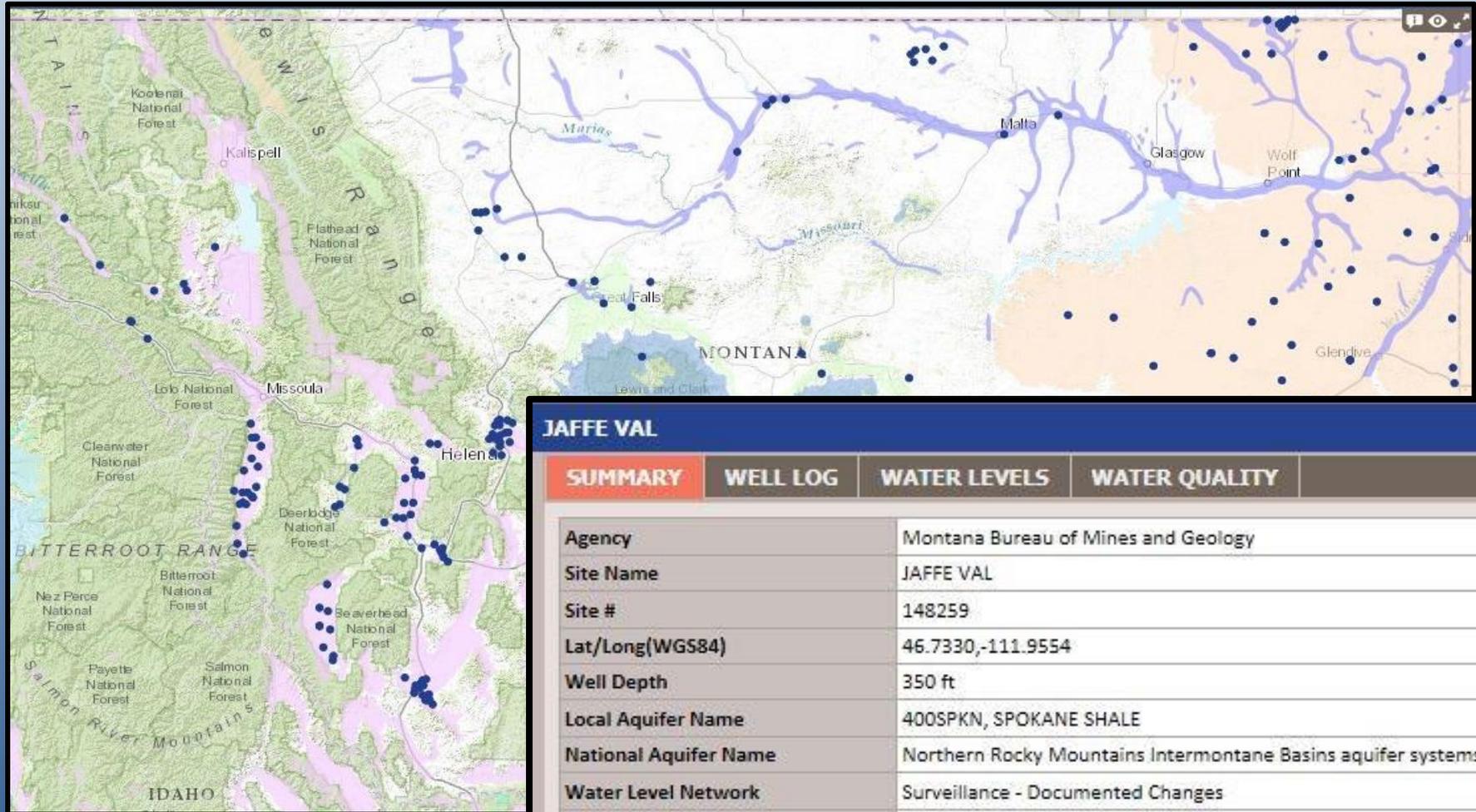


994 monitoring wells. About 30 percent (300+/-) dedicated or unused wells: 107 instrumented wells.

Current Montana network wells designated as NGWMN sites: 271 of 994



NGWMN-Montana sites available through the NGWMN portal



JAFFE VAL			
SUMMARY	WELL LOG	WATER LEVELS	WATER QUALITY
Agency	Montana Bureau of Mines and Geology		
Site Name	JAFFE VAL		
Site #	148259		
Lat/Long(WGS84)	46.7330,-111.9554		
Well Depth	350 ft		
Local Aquifer Name	400SPKN, SPOKANE SHALE		
National Aquifer Name	Northern Rocky Mountains Intermontane Basins aquifer systems		
Water Level Network	Surveillance - Documented Changes		
Water Quality Network	Surveillance - Background		
Additional info	login required		

Fiscal Year 2014 expenses/ cooperators

Montana Statewide Monitoring

(July 1, 2013 through June 30, 2014)

Personnel	\$ 156,500
Operations	\$ 78,940
Program	\$ 235,440
Total Sites Monitored	931
Hand measurements	3,922
Instrumental measurements	781,618
Water quality analyses	105
Cost per hand measurement	\$ 55*

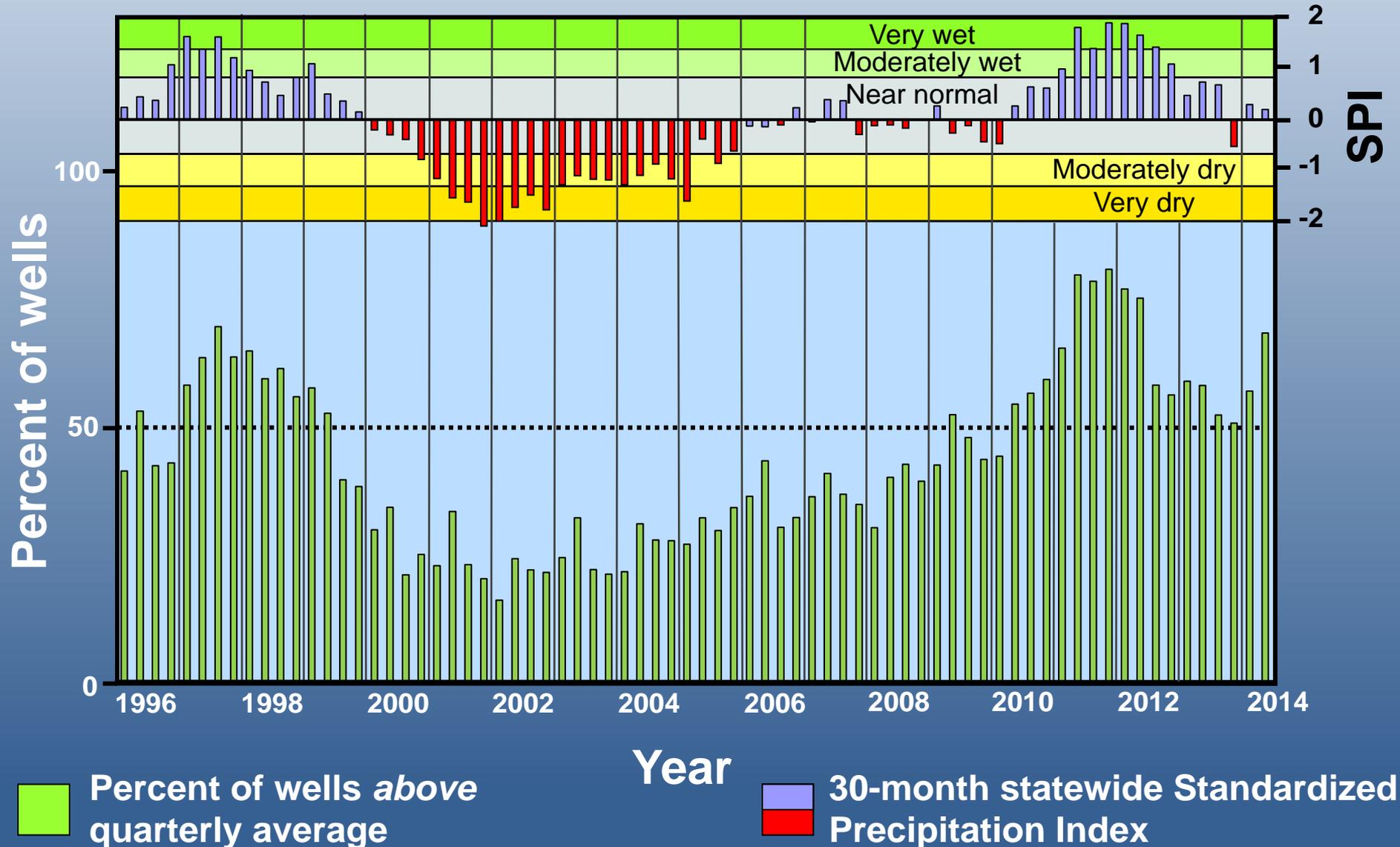
*Laboratory charges not included in this cost.

Cooperators

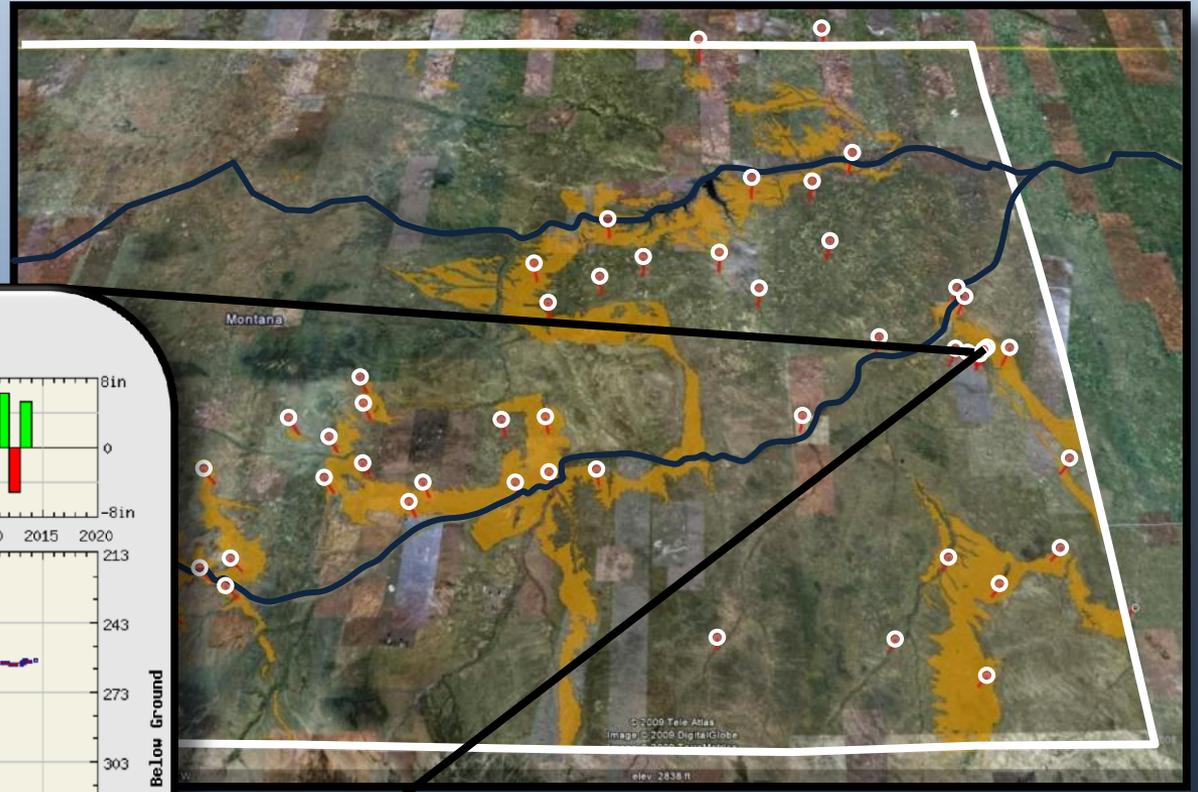
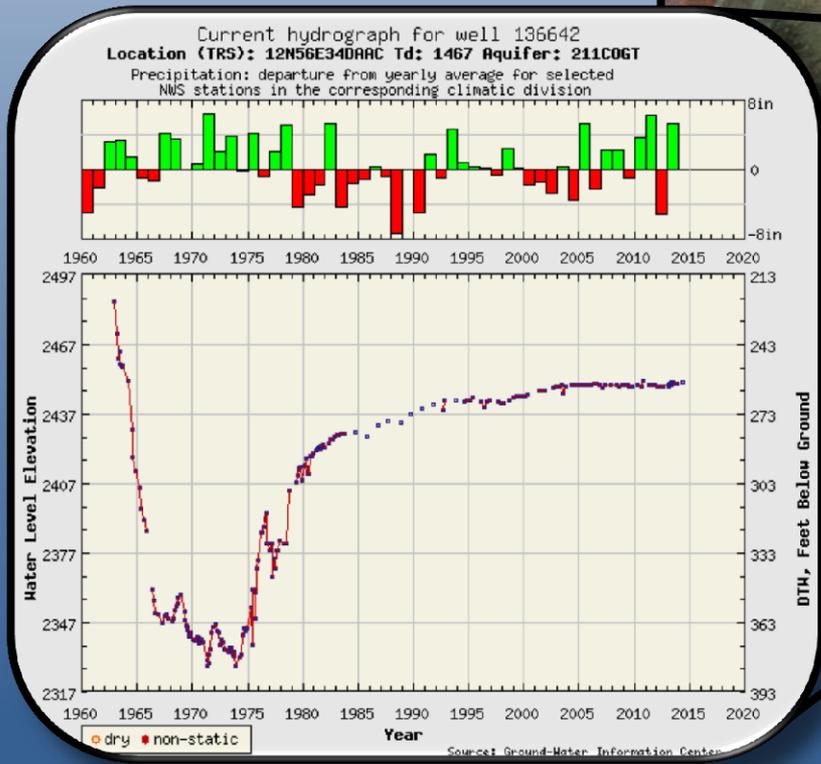
- Montana Ground Water Assessment Steering Committee (Departments of Natural Resources, Environmental Quality, Agriculture, and State Library)
- Gallatin County Water Quality Protection District
- Lewis and Clark County Water Quality Protection District
- Missoula County Water Quality Protection District
- Confederated Salish and Kootenai Tribes

Capital/improvements: for instruments and limited well construction
- \$5,000 to \$20,000 annually.

Benefit – tracking water levels with long-term precipitation



Benefit – long-term monitoring provides context for FHHC numeric models



Benefit - MBMG mapper

<http://data.mbmg.mtech.edu/mapper/mapper.asp>

MBMG
Montana Bureau of Mines and Geology

Montana Bureau of Mines and Geology
Natural Resources Building
1300 West Park Street
Butte, MT 59701

Rectangular Snip

Lon: -114.335548 Lat: 49.624667 Scale: 1:4,622,324

▼ Welcome
Welcome to the online web mapping application of the Montana Bureau of Mines and Geology.

▼ Layers
Geology: 1:500,000 geologic map (STATEMAP).
Transparency
GWIC Wells: Available well and borehole records from the Ground Water Information Center database. Visible at scales greater than 1:288,895.
Statewide Network: Wells noted as green triangles are part of the MBMG statewide groundwater monitoring network.

▼ Switch Basemap
Click on any of the basemaps below to change the map area. Maps are provided by ESRI and MBMG has no responsibility for their content.

Imagery Imagery with Labels
Streets Topographic
Terrain with Labels Light Gray Canvas

14 Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri Chi...
POWERED BY esri

The screenshot displays a web-based mapping application. The main map area shows a geographic region of Montana, with numerous green triangles scattered across the landscape, representing groundwater monitoring wells. The map includes various features such as roads, rivers, and topographic contours. A sidebar on the left provides navigation and layer management options, including a 'Welcome' message, a 'Layers' section with a transparency slider, and a 'Switch Basemap' section with several map style thumbnails. The top of the interface shows the MBMG logo and contact information. The bottom right corner features a scale bar and a 'POWERED BY esri' logo.

Montana pilot project benefits

- Current review of standard operating procedures.
- In-depth review of current statewide network - are we measuring the right wells, too many wells, etc?
- Where are **our** data gaps?
- Through a NGWMN, is there potential federal support to fill data gaps where monitoring would serve both purposes?
- Can we build a case to share monitoring costs if there is NGWMN interest in Montana data?



A couple of hurdles

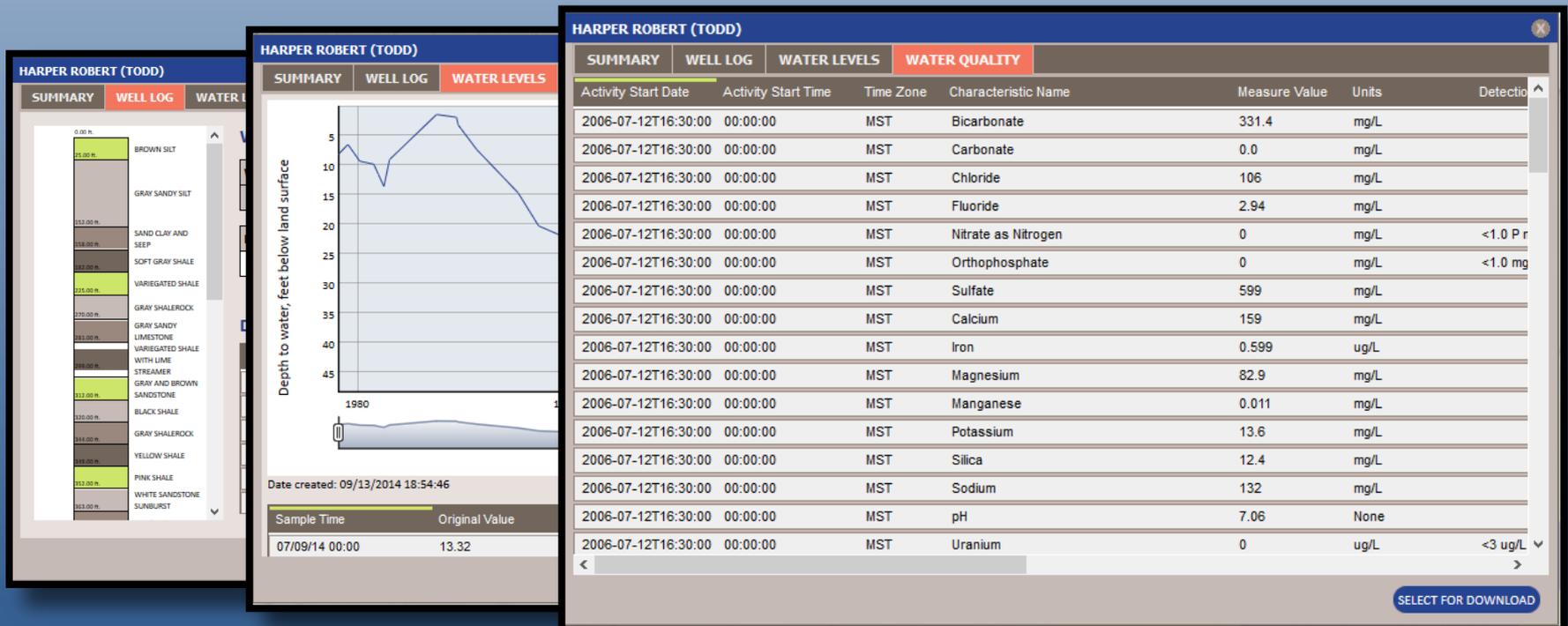
- We didn't get it done – the pilot report extrapolated expenses from selected vs. unselected wells.



- Without “contractual” interest or support, we cannot justify the time to add to the number of NGWMN-Montana wells. We need to fund a partial FTE to manage the network (DBMS); insure that network metadata are completed and maintained; and link NGWMN wells.

Progress since pilot

- We have maintained the sites, casing, completion, lithology, and water-level services developed for the pilot.
- We have added the water-quality service since the pilot ended.



Framework document thoughts

NGWMN subnetworks contain these sites:

- **Background** – locations that provide data from aquifers or parts of aquifers with no or minimal anthropomorphic effects.
- **Suspected changes** – locations that provide data from aquifers or parts of aquifers with suspected or anticipated anthropomorphic effects.
- **Documented changes** – locations that provide data from aquifers or parts of aquifers that demonstrate known anthropomorphic effects.

Have we over-thought all of this?

- 1) I am not sure how we are to “suspect” or “anticipate” the future? A five-year record of falling (or rising) water-levels even in a developed area does not “anthropomorphic” impact make. It could be long-term climate.
- 2) How will we handle situations where the first 25 years of record clearly show no anthropomorphic signal, but on year 26 nearby groundwater-supported irrigation development adds that signal? Can the site be in both subnetworks dependent on period of measurement?

Framework document thoughts

NGWMN monitoring categories:

- **Surveillance** – at frequencies suitable to assess long-term natural trends or the effect of slowly changing anthropomorphic activity. (Synoptic measurements).
- **Trend** – at frequencies suitable to assess long-term trends and seasonal variation. Data collection generally more frequent but at fewer sites than for Surveillance purposes.
- **Special studies** – at frequencies necessary to assess depletion or impairment risk at locations within the Documented Changes subnetwork. Focused monitoring to understand a specific threat.

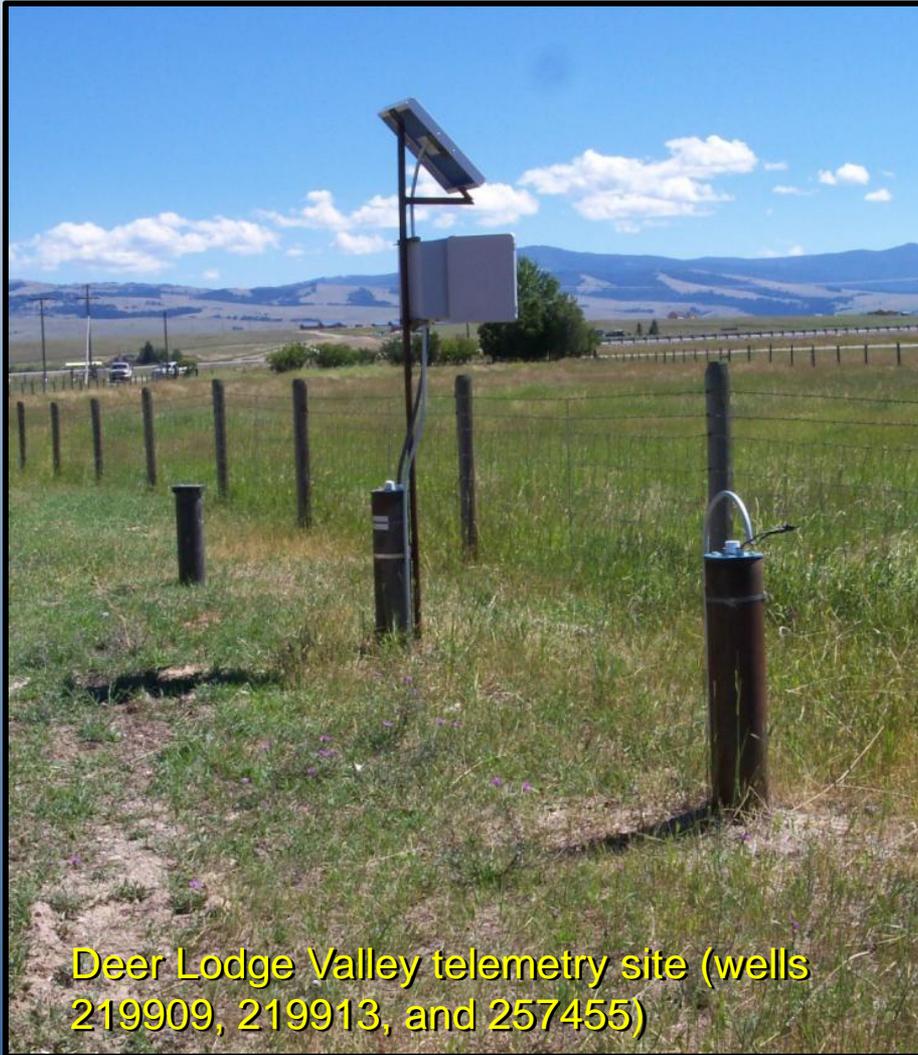
A couple of thoughts:

- 1) The language in the document does not always clearly indicate that the categories are “frequency of measurement” terms.
- 2) It might be good to bring thoughts about “backbone” wells currently buried in section 7.1 on page 49 into the discussion in sections 1.4.4.2 and 1.4.4.4 on page 11.

Framework document thoughts

Discussion:

- Section 4.4.3 – the language does not acknowledge that Montana did not fully evaluate all of its wells in the principal aquifers. The proposed number of wells from table 11, page 39 of the Montana Pilot Study report should be used for NGWMN planning purposes.
- Section 7.5 on page 50 – we strongly agree that the NGWMN is not designed to be an interpretative product. As we more fully develop the portal we need to remember to not create “interpretations” for the users.
- Are the subnetwork definitions “interpretations”?



Deer Lodge Valley telemetry site (wells 219909, 219913, and 257455)

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