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# *Groundwater Level Trends on the Idaho Site*

*Nicole Hernandez (DOE-ID)*

*July 11, 2012*



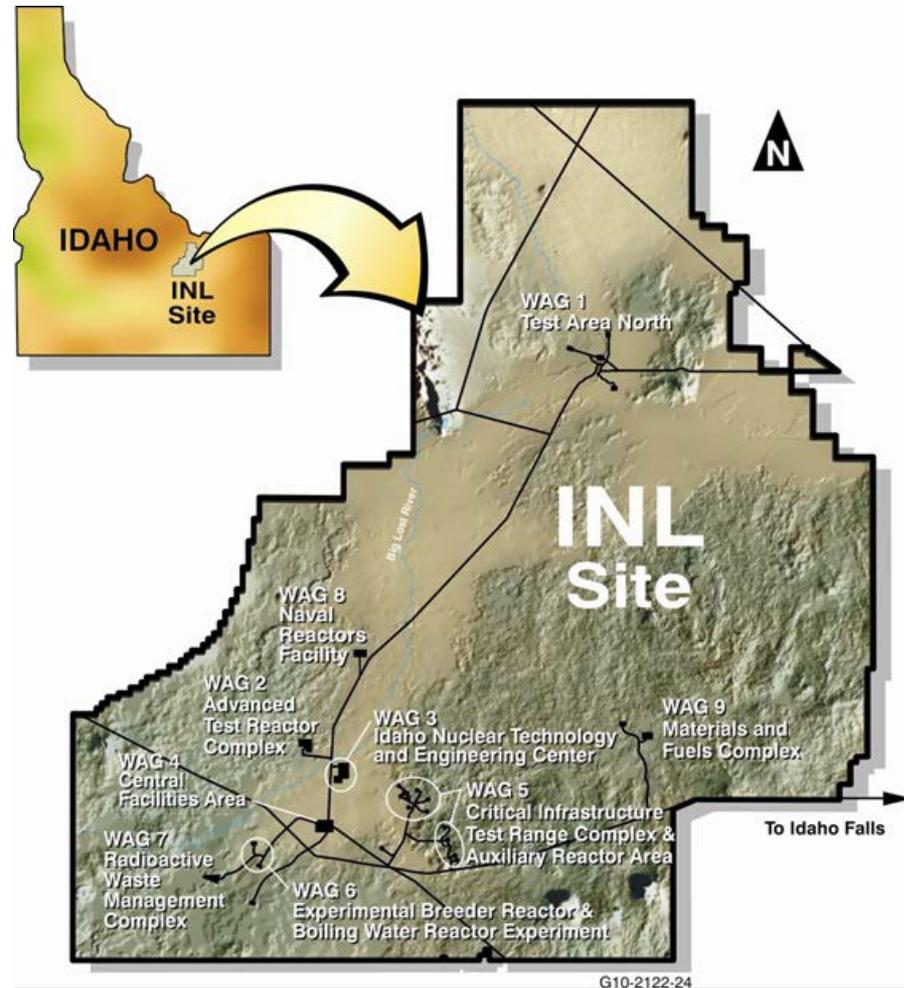
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# CERCLA Groundwater Monitoring Wells

Snake River Plain Aquifer (SRPA) Wells Sampled:

- WAG 1: 32 wells
- WAG 2: 7 wells
- WAG 3: 19 wells
- WAG 4: 13 wells
- WAG 7: 15 wells
- WAG 10: 12 wells
- Total: 98 wells

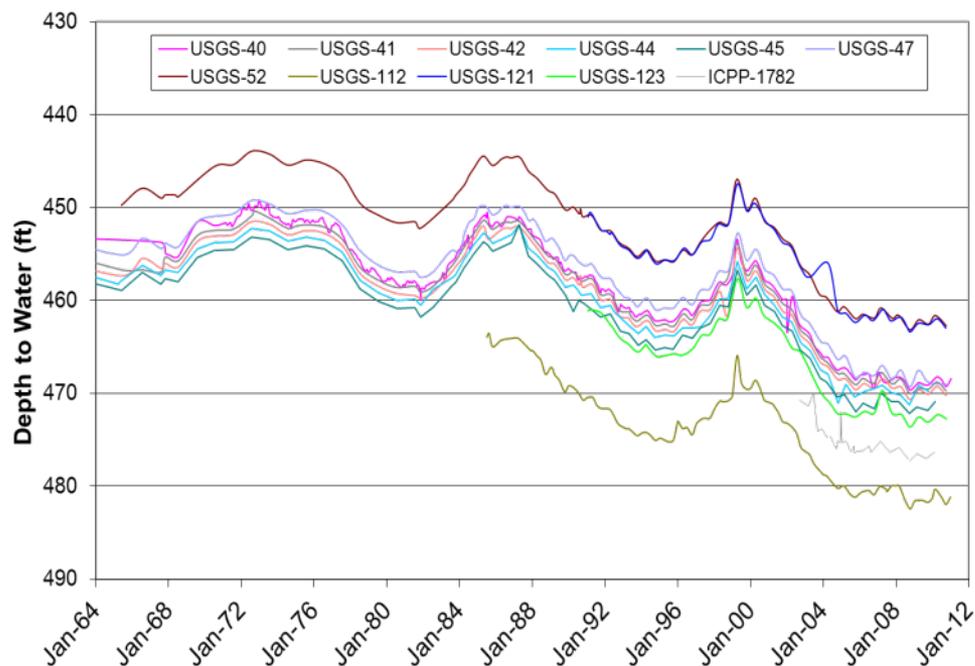


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# SRPA Groundwater Level Trends

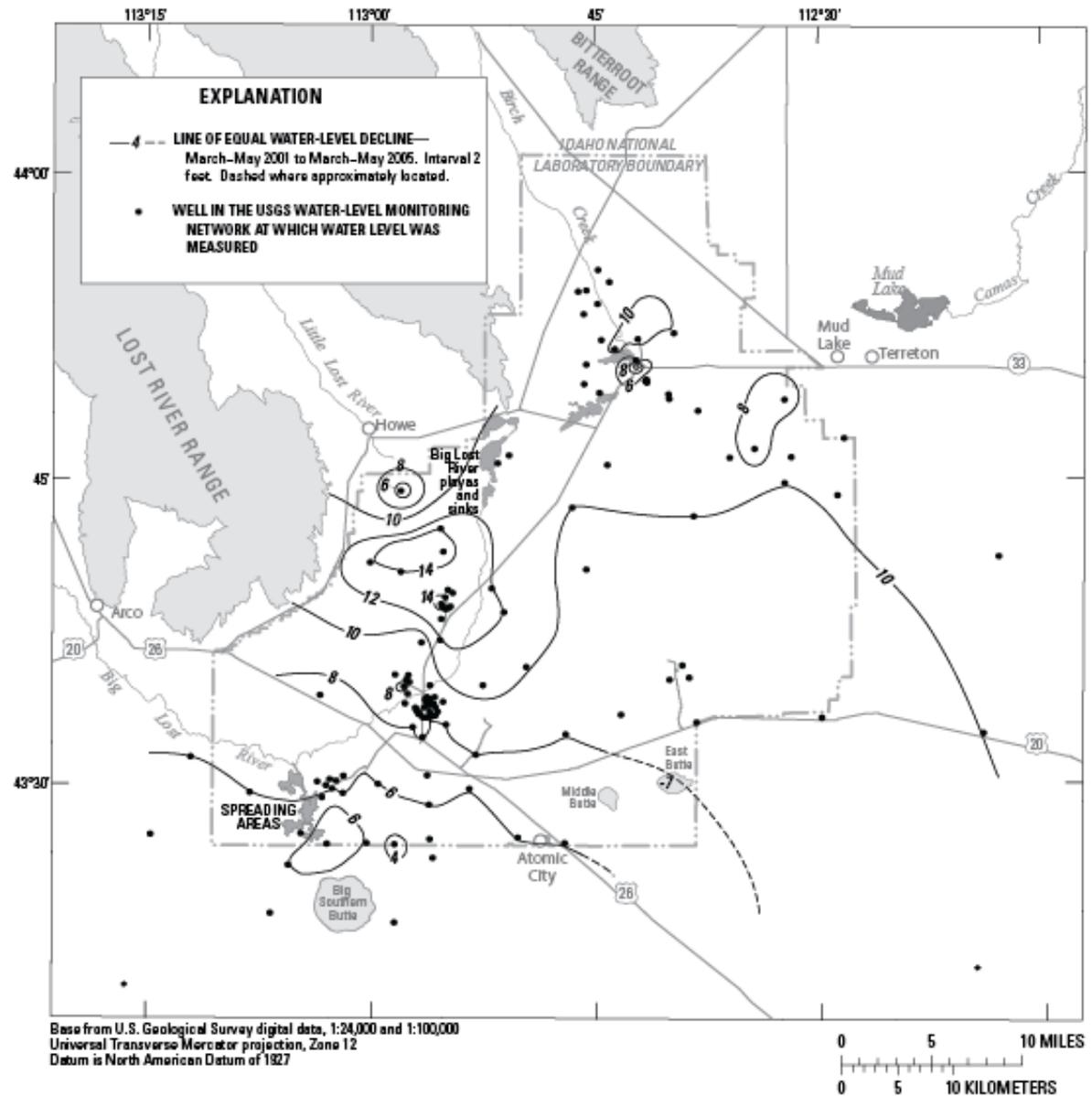
- SRPAquifer shows decade-long cycles of rising and falling water levels (wet and dry cycles).
- Long-term declining trend, with partial recovery during wetter years.



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# Water level declines vary around the Idaho Site

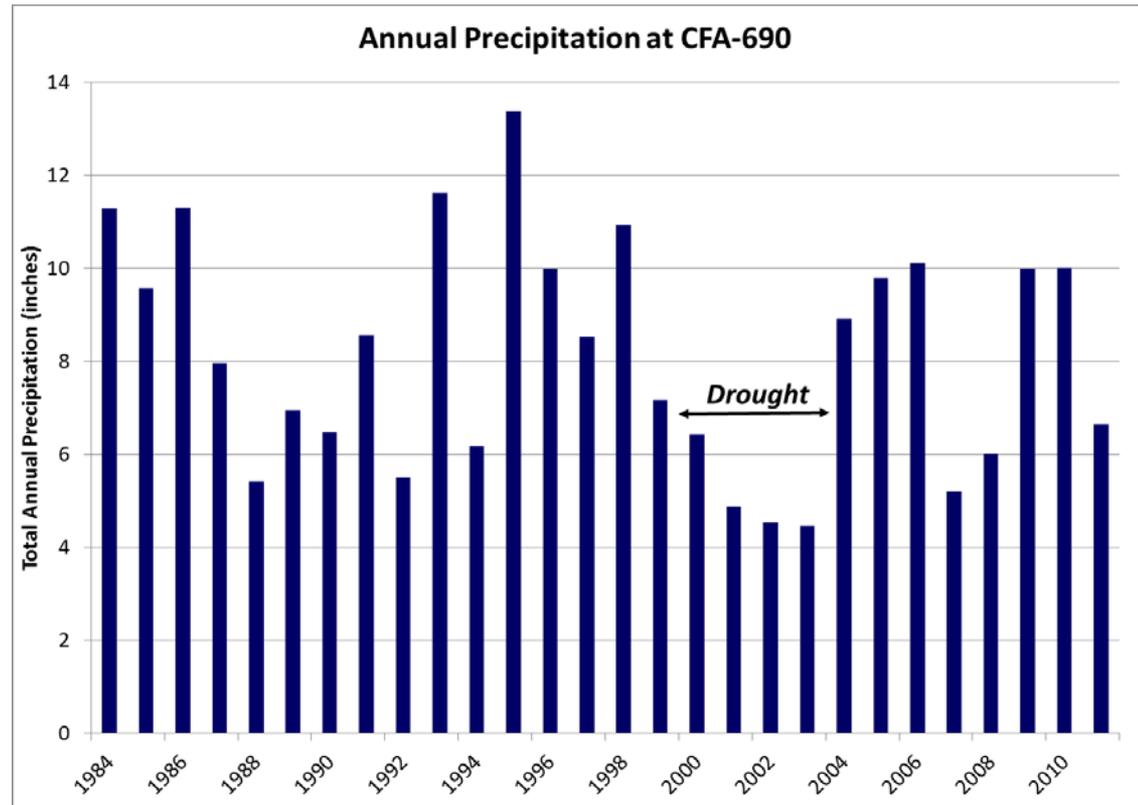


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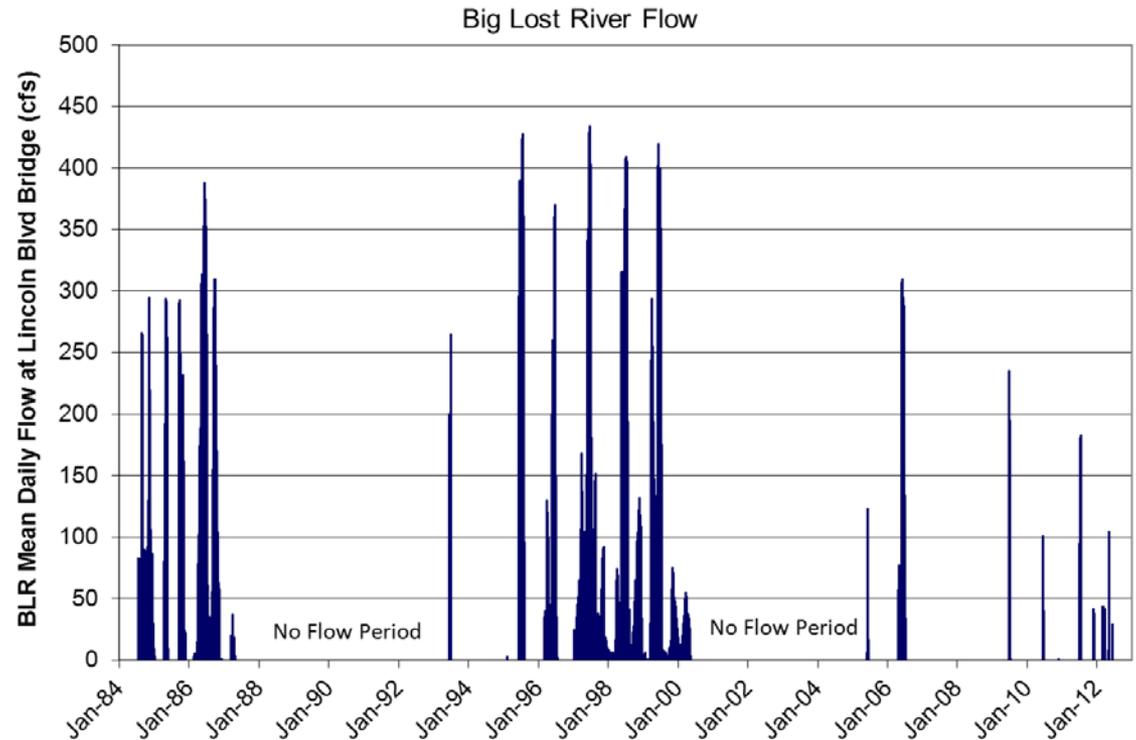
# Causes of Groundwater Level Changes

- Regional droughts result in reduced recharge from Yellowstone Plateau, Birch Creek, etc.
- Changing irrigation practices (flood to sprinkler) has resulted in reduced groundwater recharge throughout the Snake River Plain.



# Causes of Groundwater Level Changes

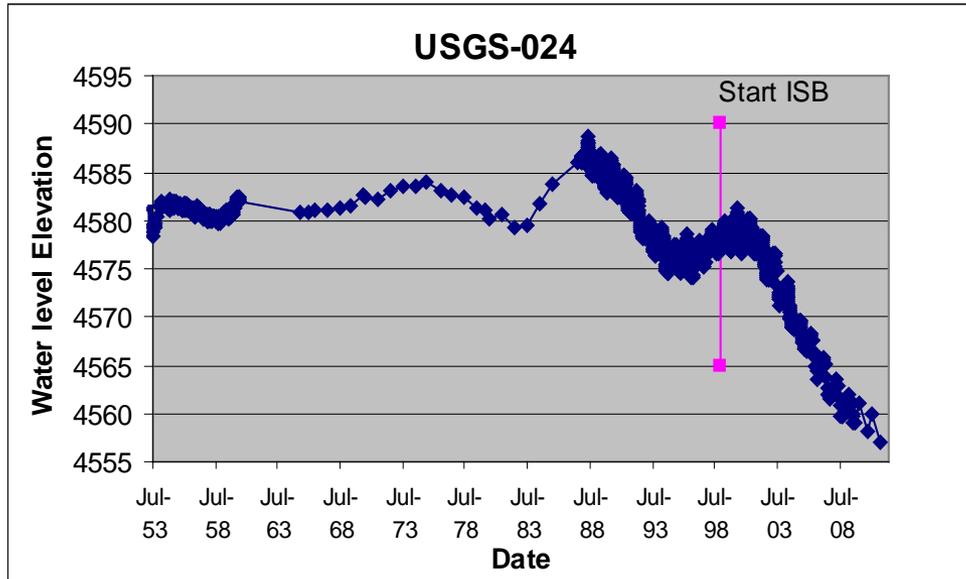
- Controlled discharges from Mackey Reservoir result in variable periods of flow and no flow in the Big Lost River (BLR).
- Diversion of Birch Creek surface water flow to Reno Ditch for irrigation purposes (1991) reduced groundwater recharge;
- Decreasing BLR flows onto the Site since 2005 as a result of diversion of flow to recharge basins (upstream of Site)



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# WAG 1- Test Area North



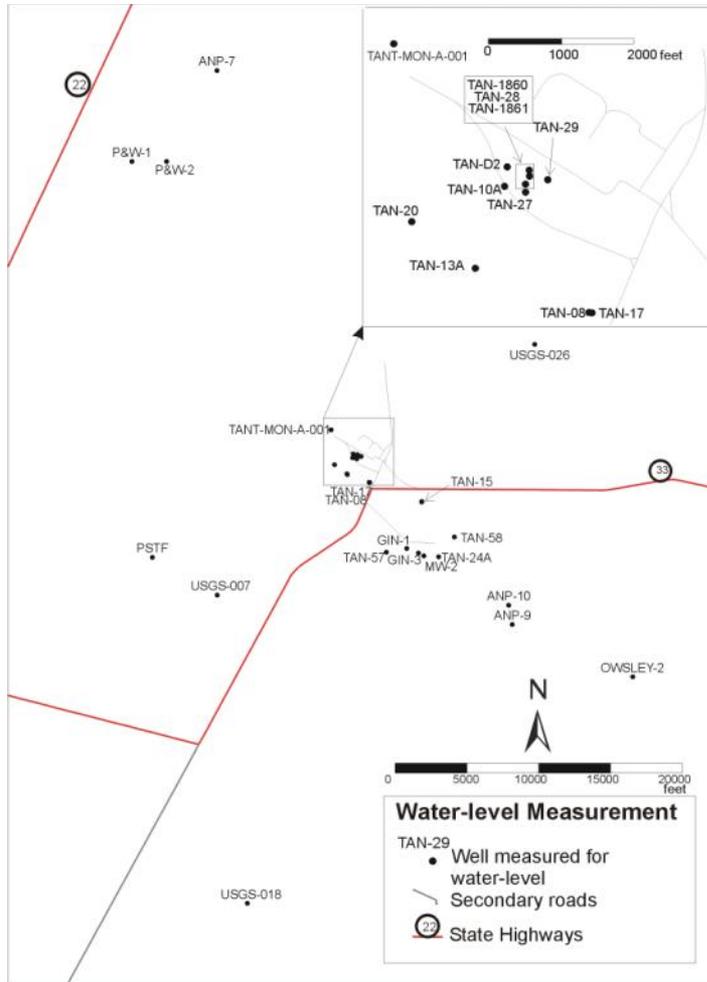
Water levels at TAN have declined >20 feet since In-Situ Bioremediation (ISB) was initiated to treat the TCE source (Jan 1999).



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# WAG 1 Wells (Test Area North)



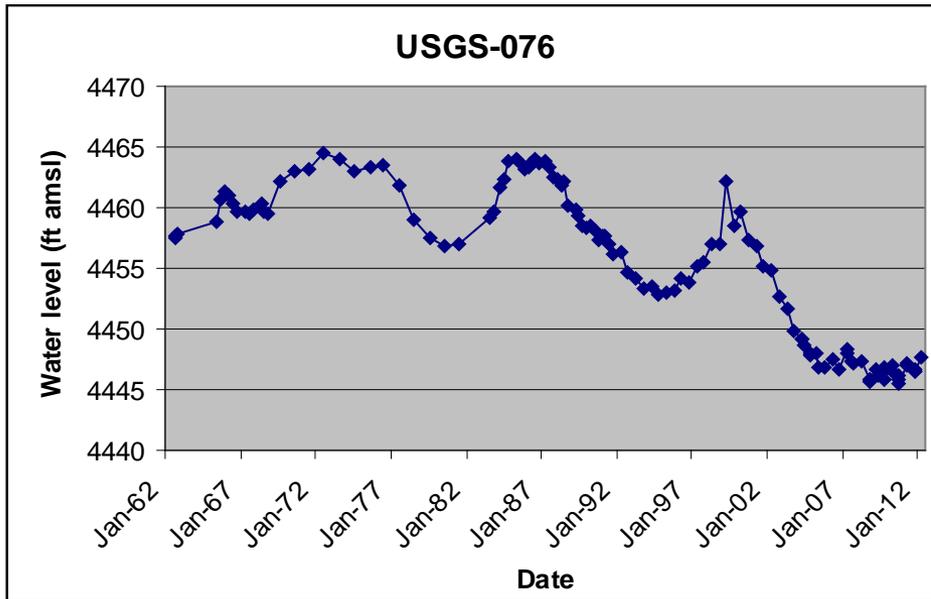
- Map shows wells used for water level map.
- Additional wells are used to support ISB activities.
- None of the required water-level monitoring wells are in immediate danger of going dry.
- The upper sampling interval in one ISB sampling well may go dry, but the well can still be sampled at the lower depth.



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# WAG 2 (ATR Complex)



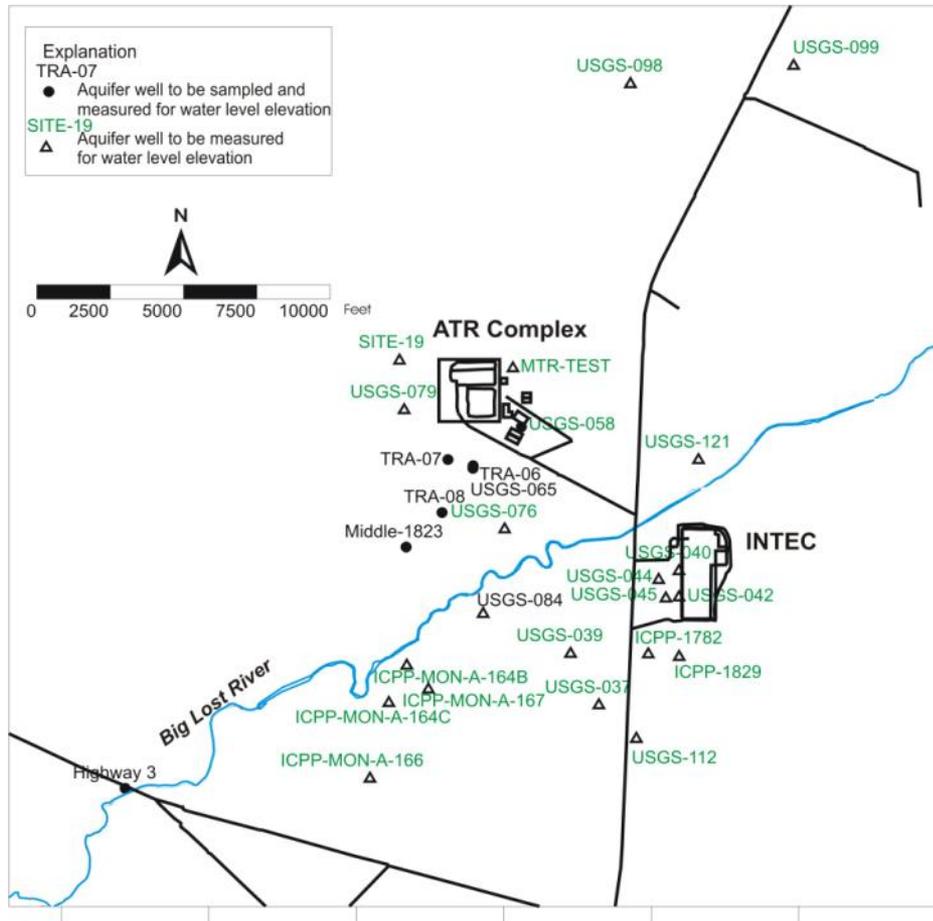
- Water levels have dropped >11 feet since 2000.
- Most of the decline happened during 2000-2005.
- Water levels have been relatively stable since 2005.



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# WAG 2 Wells (ATR Complex)



- Well TRA-08 was deepened in 2010.
- If water levels continue to decline, USGS-065 may need to be deepened.

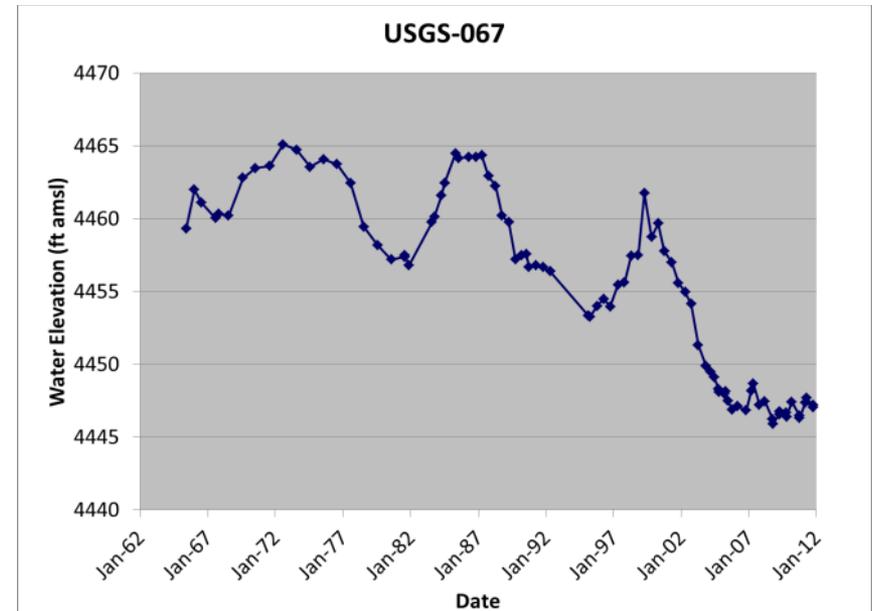
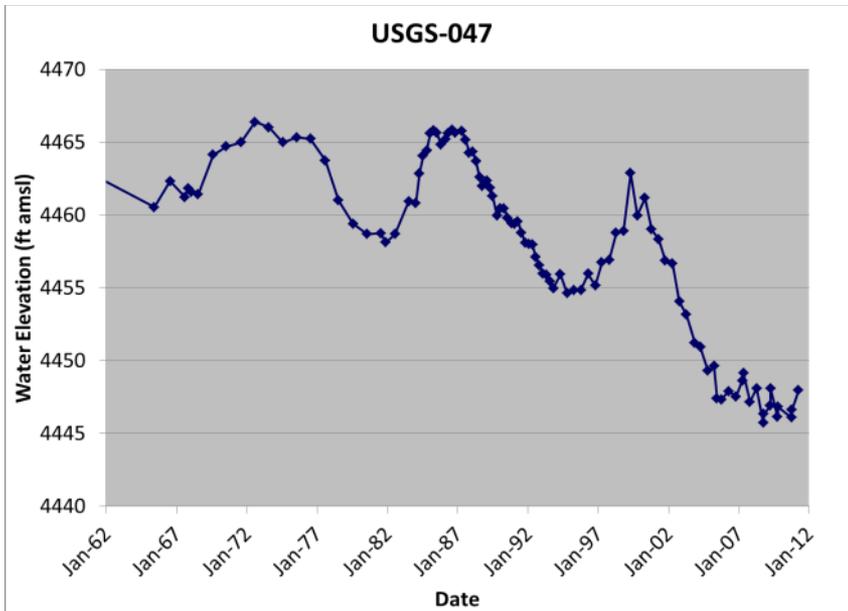


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# WAG 3 (INTEC)

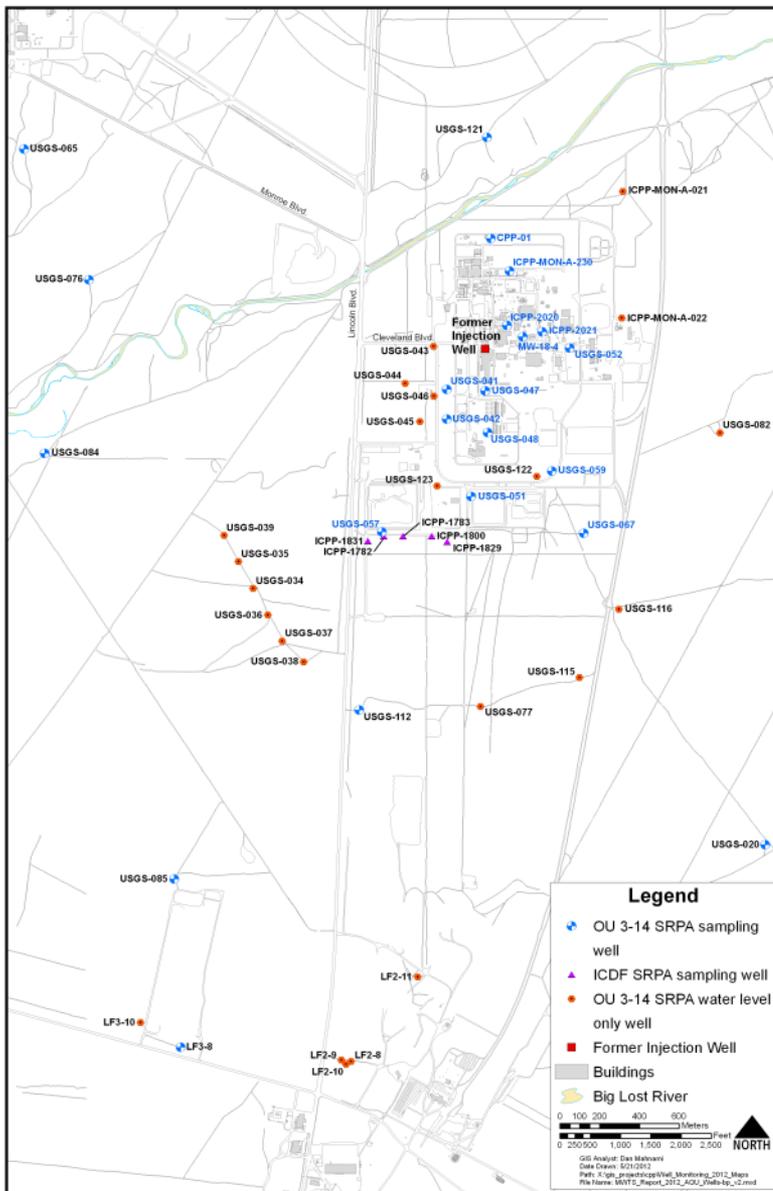
- Water levels have dropped >15 feet since 2000.
- Most of the decline occurred from 2000 to 2005.
- Water levels have been relatively stable since 2005.



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# WAG 3 Wells (INTEC)



- Well USGS-123 was deepened in 2004.
- If water levels decline 5+ feet, the following wells may need to be replaced or deepened: LF3-08, MW-18-4, USGS-121 (deepened).



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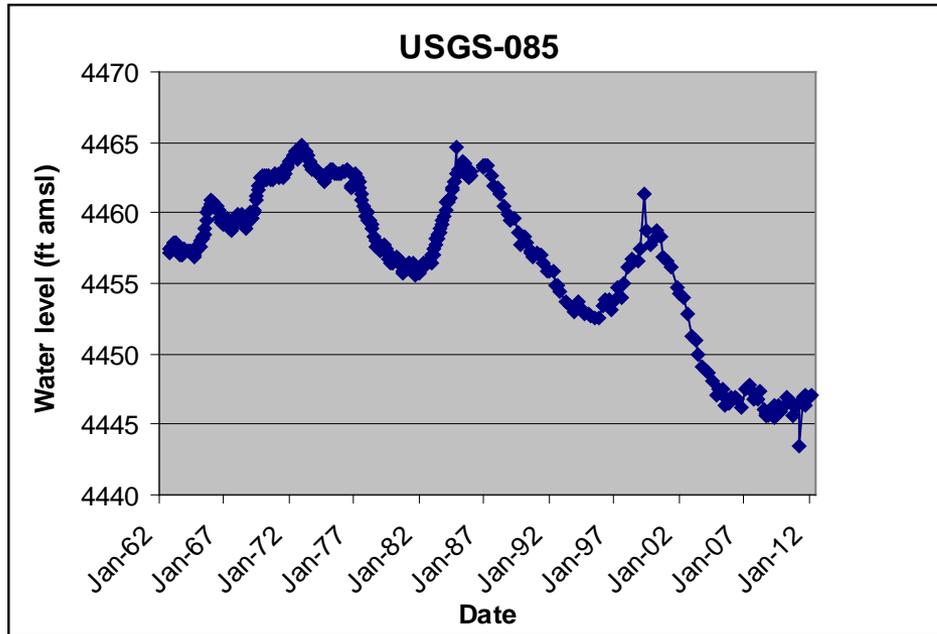
# *WAG 3 Assessment of Well Integrity*

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- As result of corrosion, Well USGS-40 collapsed in 2011. This well was installed in 1956, and will soon be decommissioned in accordance with State of Idaho procedures.
- For each WAG 3 well, records were reviewed to identify:
  - ✓ Year well installed
  - ✓ Completion type
  - ✓ Pump riser pipe material
  - ✓ Water-level tube material
  - ✓ Pump install date
- This evaluation indicated that although many wells are similar in age (installed in 1950s), USGS-40 is the only sampling location with a perforated carbon steel well screen (most subject to corrosion).



# WAG 4 (Central Facilities Area)



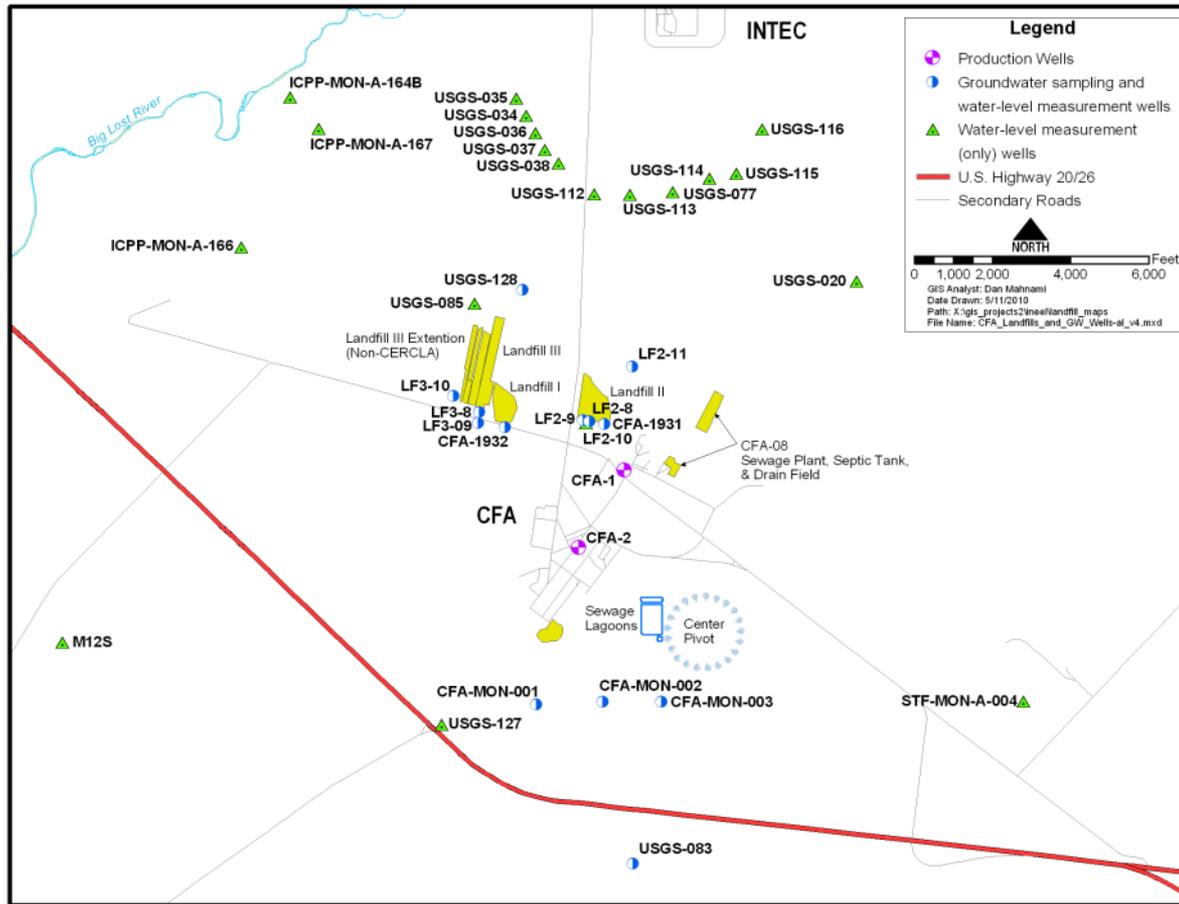
- Water levels have dropped approximately 11 feet since 2000, but most of the decline took place from 2000 to 2005.
- Water levels have been relatively stable since 2005.



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# WAG 4 Wells (Central Facilities Area)



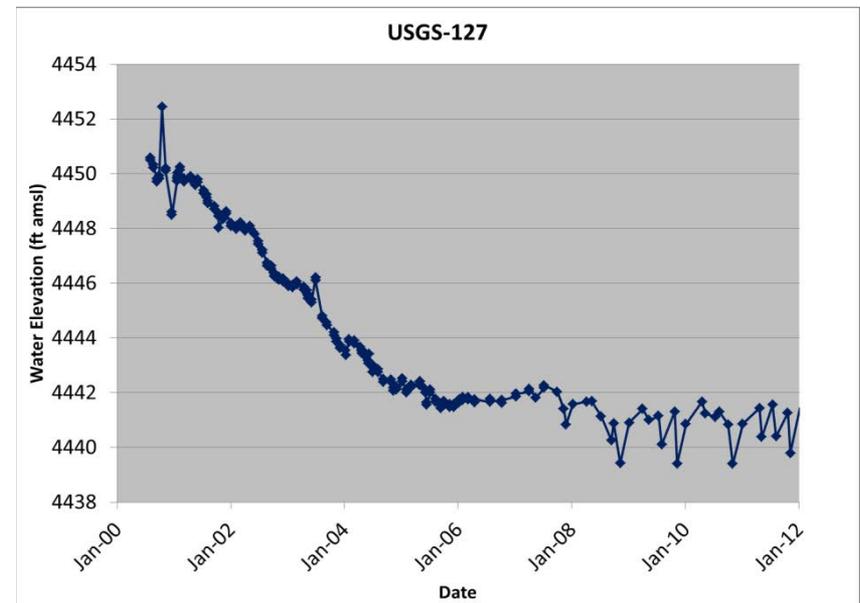
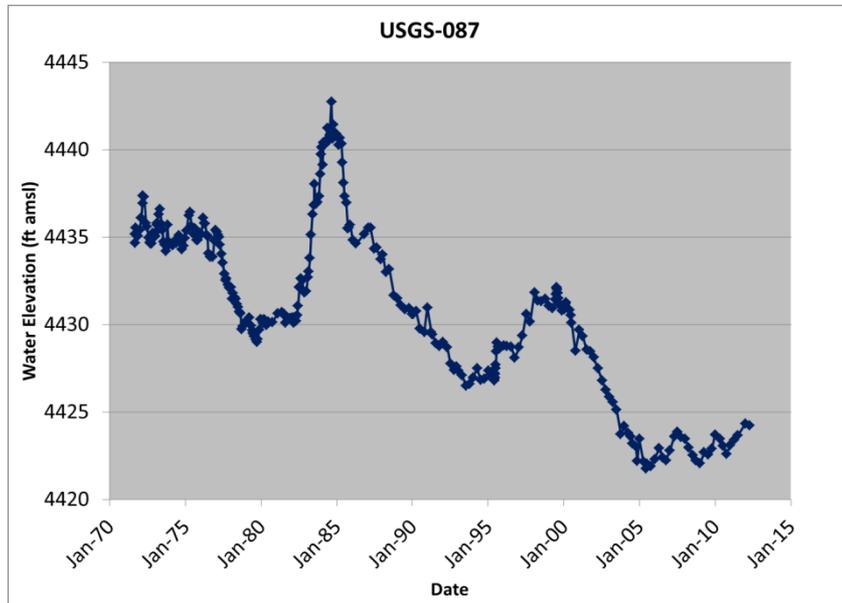
- Pumps have been removed from wells LF2-08, LF2-09, LF3-08, LF3-09 and LF3-10.
- These 5 wells are currently sampled by bailer, and are in danger of going dry if water levels were to drop another 5-10 feet.
- LF3-09 and LF3-10 could be deepened, others would require replacement.



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# WAG 7 (RWMC)



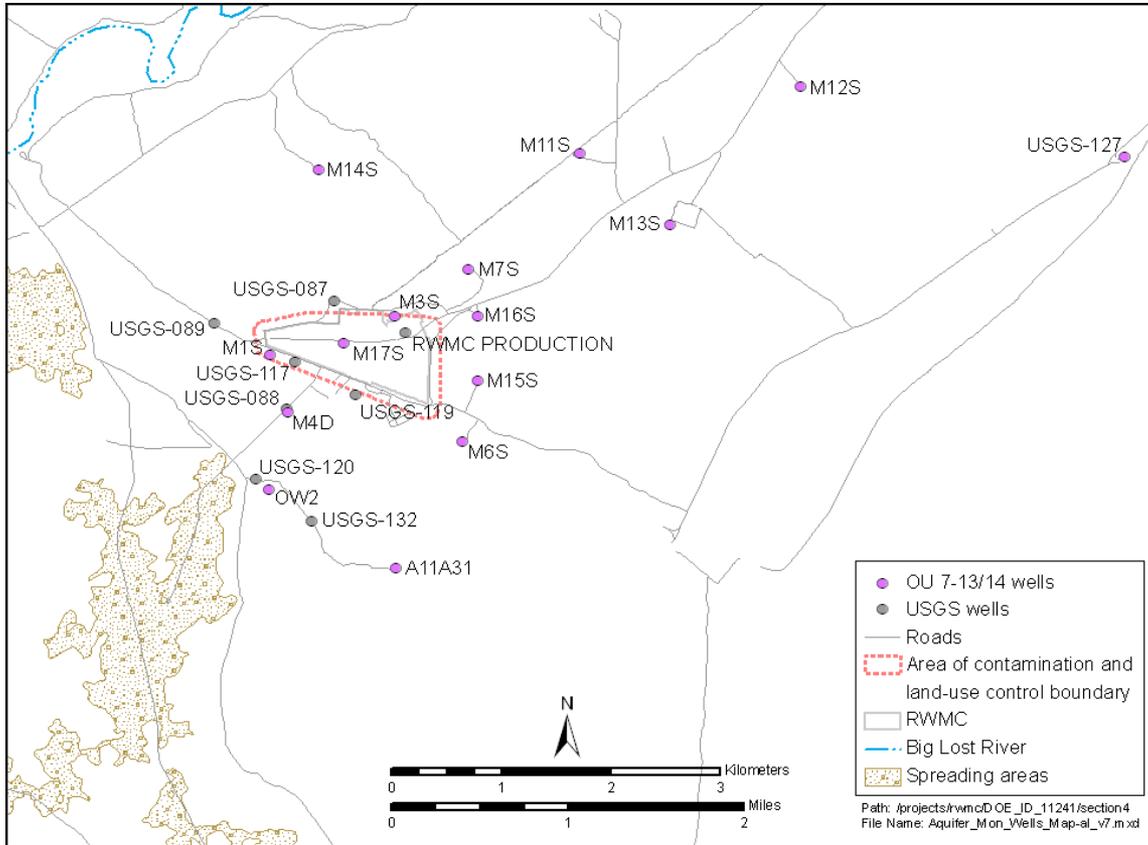
- Water levels have dropped approximately 9 feet since 2000, but most of the decline took place from 2000 to 2005.
- Water levels have been relatively stable since 2005.



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# WAG 7 Wells (RWMC)



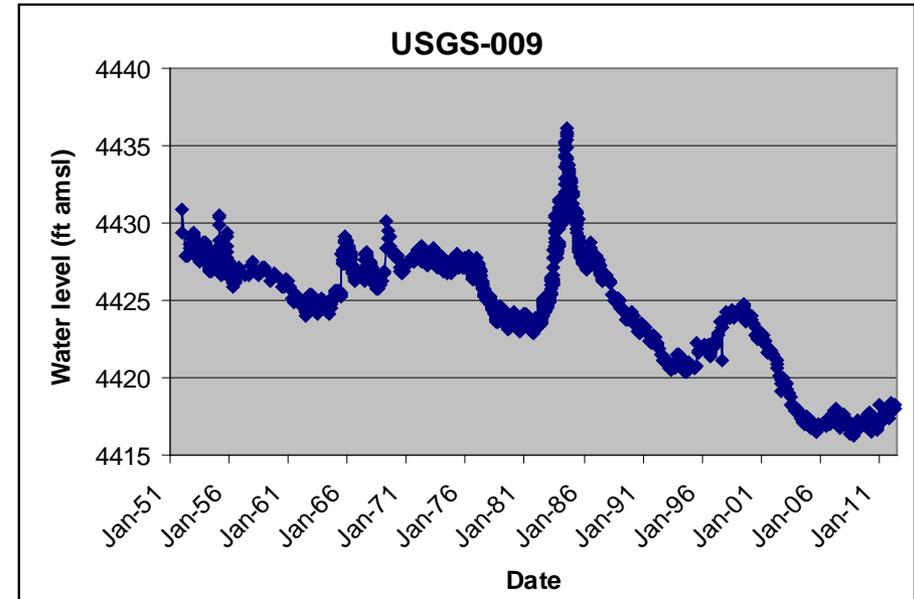
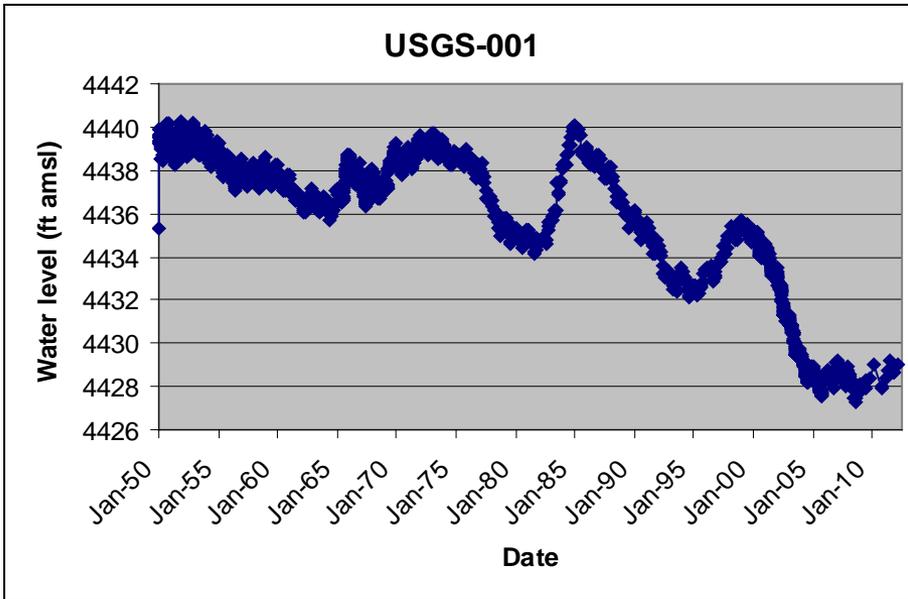
None of the required aquifer monitoring wells are in danger of going dry.



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# WAG 10 (INL Sitewide Monitoring)



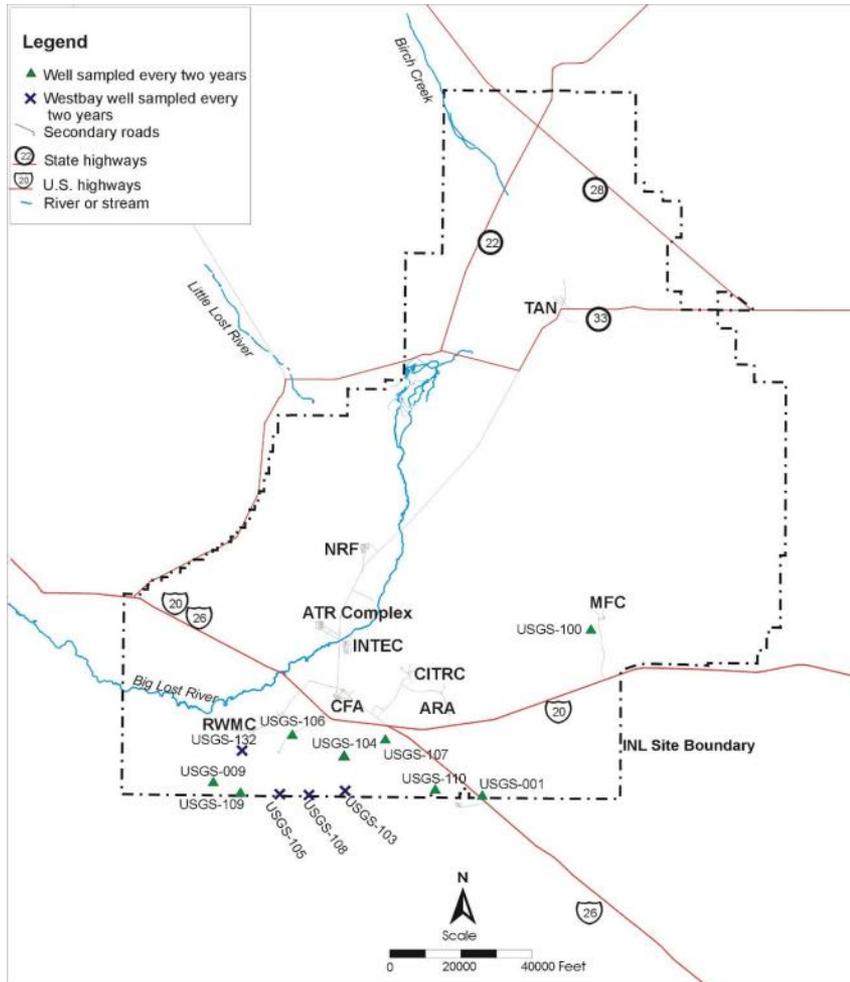
- WAG 10 monitors wells at and near the southern Site boundary.
- From 2000 to 2012, water levels dropped about 6-8 feet at USGS-001 and USGS-009.



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# WAG 10 Wells (Sitewide Monitoring)



- Water levels are currently measured only at wells that are sampled.
- Pumps may need to be lowered in USGS-100 and USGS-106 if water levels decline further.



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# Well Services

**Objective:** *To ensure the workability of monitoring wells at the INL, to ensure quality construction protocol, installation of appropriate well components, and performance of routine well inspections.*

## Construction/Decommissioning

- Prepare/review well construction and decommissioning documents
- Oversight of work activities
- Ensure compliance with State regulations



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# Well Services (continued)



## Maintenance/Repair

- Standardization of well completion materials
- Corrosion evaluation

## Institutional Controls

- Routine wellhead inspections
- Implementation of appropriate wellhead controls



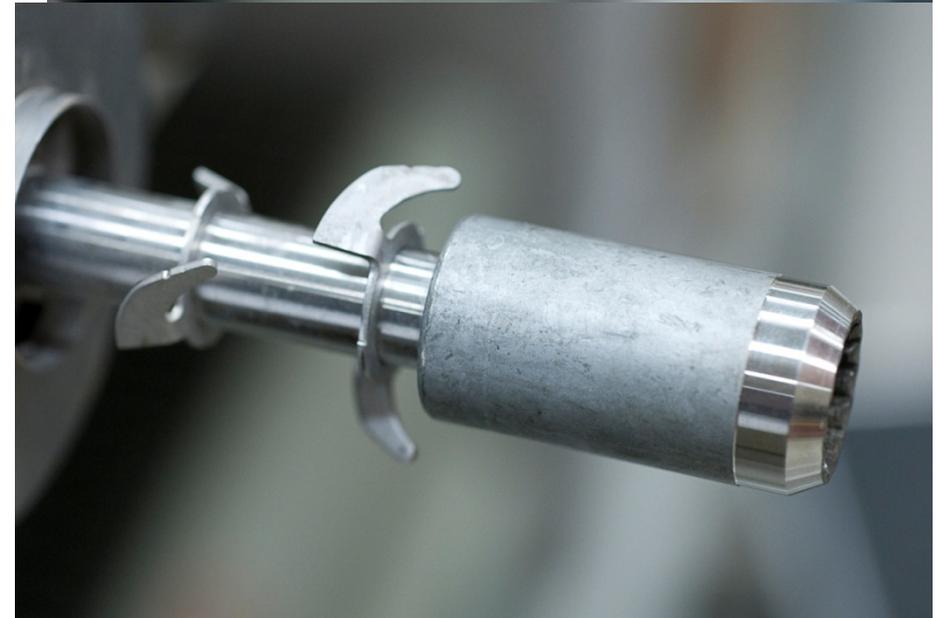
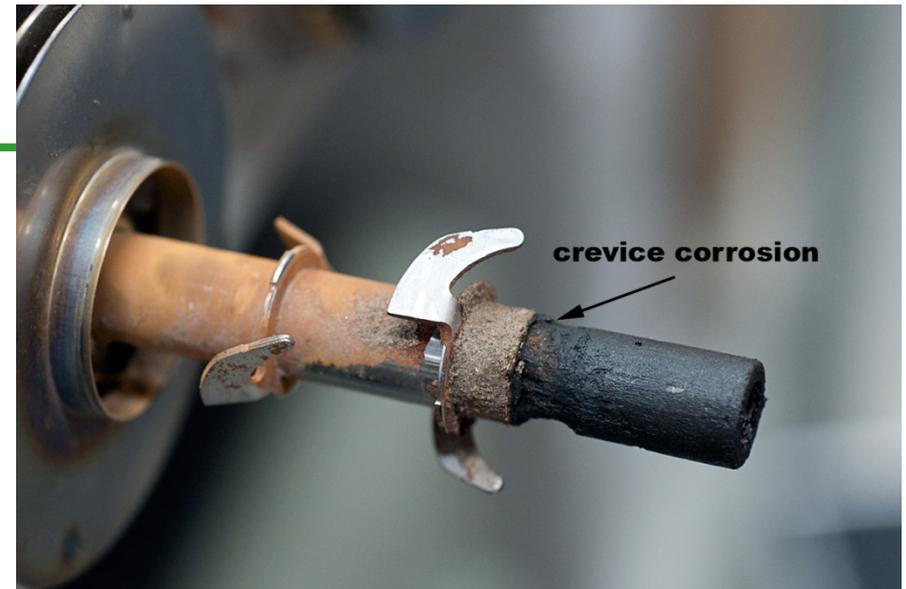
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# Well Services (continued)

## Corrosion Evaluation

- Issues
  - Failure to pump water to the surface
  - Broken drive shafts
- Corrosion Evaluation
  - Dissimilar metal pump components
  - Pitting/thinning and buildup on pumps
- Corrective actions
  - Purchased pumps with same type of stainless steel components



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# Well Services Tracking System

## CERCLA Automated Tracking System

Home

DMEC/MRAAN Home

Administration

Create a New CERCLA Request

Create a New Well Services Request

Create a New CERCLA 5-Yr Review Report Issue

### Show:

CERCLA Actions

Open

Request Date

Between



and



Well Services

Closed

5yr Review

Refresh List

<a href="#">Request Date</a>	<a href="#">Number</a>	<a href="#">Request Type</a>	<a href="#">Title</a>	<a href="#">Need Date</a>	<a href="#">Status</a>	<a href="#">Date Item was Closed</a>
1/23/2009 3:36:00 PM	<a href="#">WVS-2009-001</a>	Well	Replace broken protective post at ICPP-2018	6/1/2009	Closed	10/01/2009
2/5/2009 11:00:00 AM	<a href="#">WVS-2009-002</a>	Well	MW-4 wellhead rebuild	6/30/2009	Closed	04/12/2010
2/5/2009 11:12:00 AM	<a href="#">WVS-2009-003</a>	Well	MW-17 wellhead rebuild	6/30/2009	Closed	04/12/2010
4/7/2009 3:46:00 PM	<a href="#">WVS-2009-004</a>	Well	Repair pump in Well ICPP-2021		Closed	08/26/2009
4/8/2009 4:01:00 PM	<a href="#">WVS-2009-005</a>	Well	ICPP-MON-A-230		Closed	10/14/2009
4/14/2009 7:29:00 AM	<a href="#">WVS-2009-006</a>	Well	Install New Pump in MW-6		Closed	05/27/2009



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performance



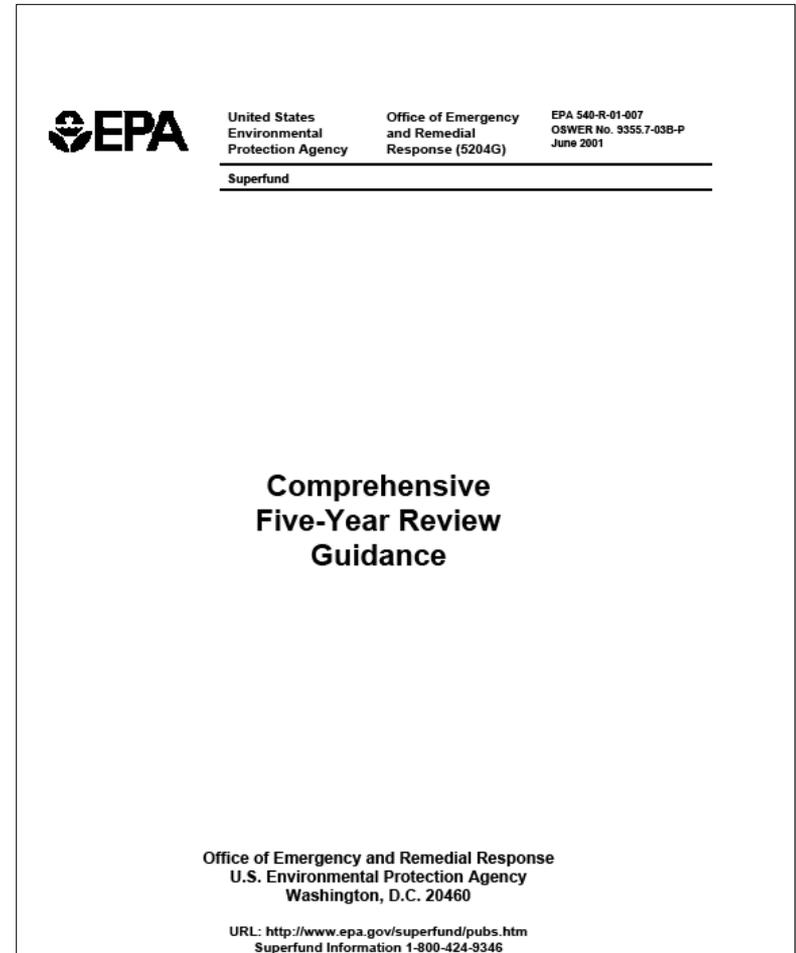
cleanup



closure

# 2015 5-Year Review

- **Evaluate Trends and Impacts**
  - Water level drop and effects on CERCLA monitoring well network
- **Corrective actions, if necessary**
  - Deepen wells
  - Construct new wells



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# Summary

- Pumps in several wells may need to be lowered if water levels decline further.
- Up to ten (10%) CERCLA monitoring wells may need to be deepened or replaced if water levels decline further.
- Well maintenance issues are tracked to completion by Well Services Group.
- 2015 5-Year Review will define future issues and actions as necessary to address lower aquifer levels at the Site.



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