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Title:	Water Quality Stewardship
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LANL Surface Water Overview

Presented by:

Sam Loftin

Storm Water Permitting/Compliance Team

LANL Water Quality & RCRA Group

June 22, 2011

Surface Water Sources

- **Precipitation**
  - Rain
  - Snow
  - 19 inches/year (avg.)
  - 45% of precipitation during monsoon season (July – Sept.)
- **Permitted Outfalls**
  - Point source discharges (i.e., cooling towers, waste water treatment)

Surface Water Regulations

- **National Pollutant Discharge Elimination System (NPDES)**
  - Part of Federal Clean Water Act
  - Under jurisdiction of EPA
  - Established to minimize discharge of pollutants
  - Nation-wide requirements

- **4 LANL NPDES Permits**
  - Outfall
  - Construction General Permit
  - Multi-Sector General Permit
  - Storm Water Individual Permit

NPDES Outfall Permit

Purpose:

- Minimize pollutant discharges to Waters of the US
- Sets regulatory discharge limits
- Requires weekly, quarterly, & yearly outfall sampling
- Monthly reporting to EPA

Outfall Permit

Monitored Constituents:

- Metals
- Total Residual Chlorine
- Temperature
- pH
- E. Coli
- Biological Oxygen Demand
- Chemical Oxygen Demand
- Total Suspended Solids
- Phosphorus
- High Explosives
- Total Toxic Organics
- Perchlorate
- Radium 226 & 228
- PCBs
- Whole Effluent Toxicity

All water samples are analyzed by independent, EPA-approved laboratories.

Examples of NPDES Permitted Outfalls

Outfall Permit

CY 2010 Monitoring Results:

- **Total residual chlorine (TRC)**
  - Daily maximum regulatory level 0.011 mg/L
  - Three exceedances,
    - TA-55 cooling tower (0.11 mg/L)
    - TA-53 cooling tower (0.72 and >2.2 mg/L)
  - Typical chlorine level in public pools is 1 mg/L but can be raised to 2 to 20 mg/L in case of an “accident”
  - Drinking water standard is 4.0 mg/L

Outfall Permit

CY 2010 Monitoring Results:

- **Arsenic**
  - Monthly average regulatory level 0.01 mg/L
  - One exceedance at TA-53 Cooling Tower (0.0135 mg/L)
  - Background for arsenic in storm water is 0.0346 mg/L
  - Drinking water standard is 0.010mg/L

Outfall Permit

Improvements:

- **LANL has reduced outfalls from 141 in 1993 to 15 today**
- **LANL goal is Zero Liquid Discharge**

Outfall Permit

Benefits from Outfall Reduction:

- 60-70% reduction in water use (labwide) through recycling and process elimination
- Decreased energy consumption
- Decreased operation expenses for facilities
- Decreased water costs by over $335,000 per year
- Improved environmental compliance

NPDES Construction General Permit

Purpose:

- **Minimize sediment and pollutant discharges from construction activities**
  - Construction (soil-disturbance) activities greater than 1 acre or "common plan of development"
- **Reduce storm water flow velocity and sediment yield**

Construction General Permit

Monitoring:

- **Visual Inspections**
  - Biweekly during construction
  - After each storm event yielding ½ inch or greater of precipitation


Perimeter control


Inlet protection

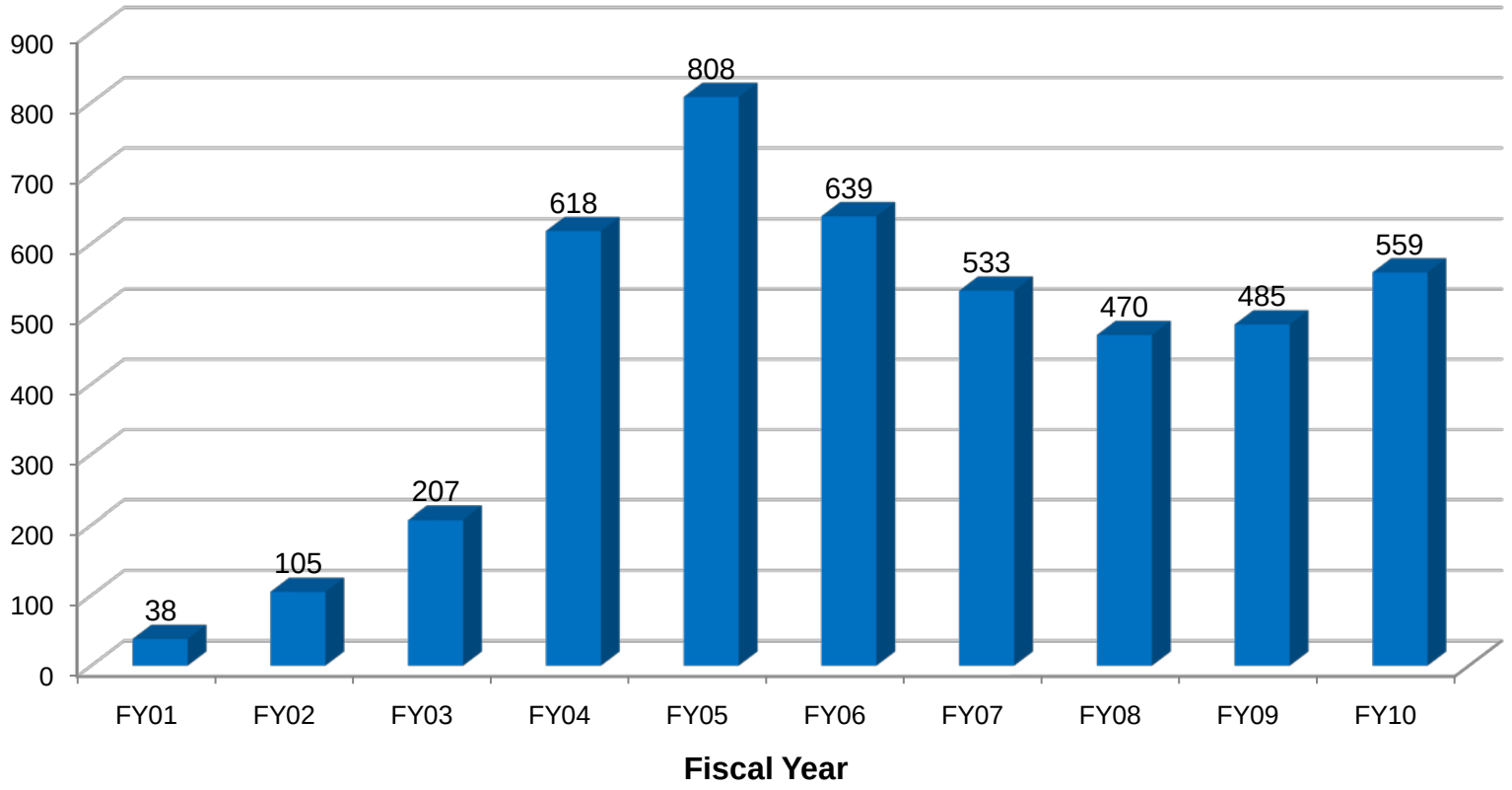

CAT
Installation of controls


Post construction
storm water controls

NPDES Construction General Permit

Before and after stabilization with
native perennial vegetation

Construction Storm Water Inspections Per Fiscal Year



Construction General Permit

Common Inspection Results:

- **Maintaining Controls**
- **Installation of new controls**
- **Off-site tracking**
  - Sweeping
  - Stabilize construction entrance
- **Housekeeping**
  - Improve good housekeeping

NPDES Multi-Sector General Permit

Purpose:

- **Minimize pollutant discharges from specified industrial activities**
- **Types of industrial facilities at LANL**
  - Metal shops, power plant, vehicle maintenance, asphalt plant, recycling facility, warehouse, etc.
  - 22 samplers currently monitoring 14 industrial sites

Multi-Sector General Permit

Example Facilities

Warehouse

Multi-Sector General Permit

Monitoring:

- Monthly or quarterly routine inspections at each facility
- Annual inspection of all facilities
- Quarterly storm water visual assessments
- Storm water discharge monitoring

Multi-Sector General Permit

Multi-Sector General Permit

Monitoring Constituents:

- Metals
- Total Suspended Solids
- Total Cyanide
- Chemical Oxygen Demand
- Nitrate and Nitrite Nitrogen
- PCBs
- Oil & Grease
- Gross Alpha
- pH
- Ammonia

Constituent concentrations are compared to benchmark and background levels, as appropriate.

Multi-Sector General Permit

CY 2010 Analytical Exceedances and Responses:

- **Copper and zinc at the Material Recycle Facility**
  - Stabilized soil surface with asphalt millings
  - Replaced filters associated with detention pond
  - Manage storm water release from detention pond to minimize sediment transport
- **Zinc at the TA-3-39 and 102 Metal Shop**
  - Tracked the source to zinc-plated fasteners associated with re-roofing the building. Cleaned up the fasteners.
  - Evaluated remainder of the yard several times for other potential sources.

Multi-Sector General Permit

Example Controls

Inlet Protection

Secondary Containment

Multi-Sector General Permit

Improvements:

- **Reduced the number of facilities that require monitoring from 22 to 14**
  - By eliminating processes and pollutant sources
  - By documenting contaminants are below benchmark or background levels (no pollutant sources)
- **Improved good housekeeping**
- **Installed additional controls**
- **Relocated samplers for more representative sample collection from sites**

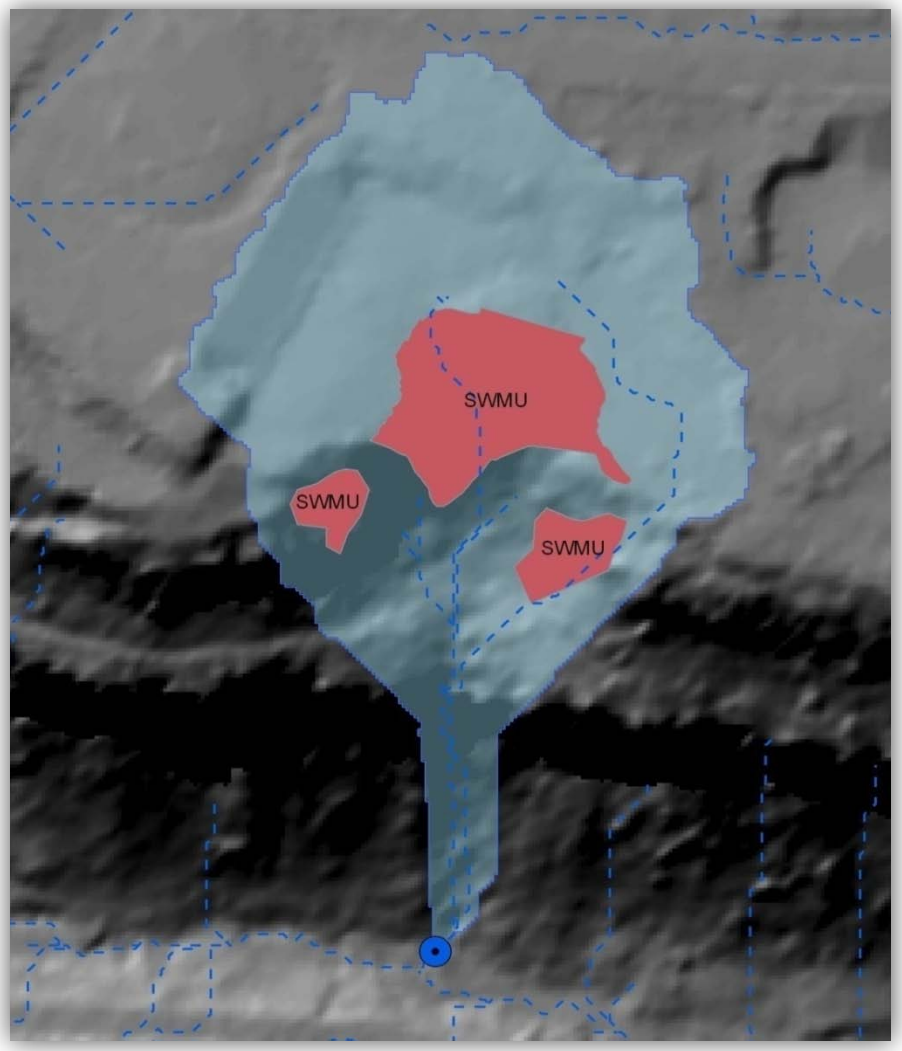
NPDES Individual Permit

Purpose:

- Reduce and/or eliminate discharges of pollutants in storm water from specified “Sites”.
- 405 Sites (Solid Waste Management Units, Areas of Concern)
- 250 Site Management Areas

Individual Permit

Conceptual Site Monitoring Area



NPDES Individual Permit

Strategy:

- Install control measures to manage storm water
- Confirmation sampling
- Monitoring parameters (Target Action Levels) are used to evaluate performance of controls
- Perform corrective actions


Former Septic Outfall
6/12/07
16-006(c)

- Former Surface Disposal


Example Baseline Controls
Earth Berm
Riprap Spillway
Straw Wattle
Compost Mulch and Seed

Individual Permit

Monitoring Constituents:

- Radioactivity – Radium isotopes, Gross Alpha
- Metal – 16 metals (14 dissolved, 2 total)
- Cyanide
- Dioxin – 2,3,7,8-TCDD
- Semivolatile Compounds – 3 organic pollutants
- Pesticides – 11 pesticide pollutants
- PCBs – Total PCB Congeners
- High Explosives – RDX, TNT

Surface Water Management Summary

- Four successful surface water management programs used to identify, monitor and reduce pollutant levels:
  - Outfalls
  - Construction Activity
  - Industrial Facilities
  - IP Sites

Permit Information

Web Addresses:

Outfall:
ftp://ftp.nmenv.state.nm.us/www/swqb/NPDES/Permits/NM0028355-LANL.pdf

CGP: http://cfpub.epa.gov/npdes/stormwater/cgp.cfm#final2008cgp

MSGP: http://cfpub.epa.gov/npdes/stormwater/msgp.cfm

IP: http://www.lanl.gov/environment/h2o/ip.shtml

NPDES Storm Water Individual Permit for SWMUs Implementation

Presented by:

Steve Veenis

Project Manager

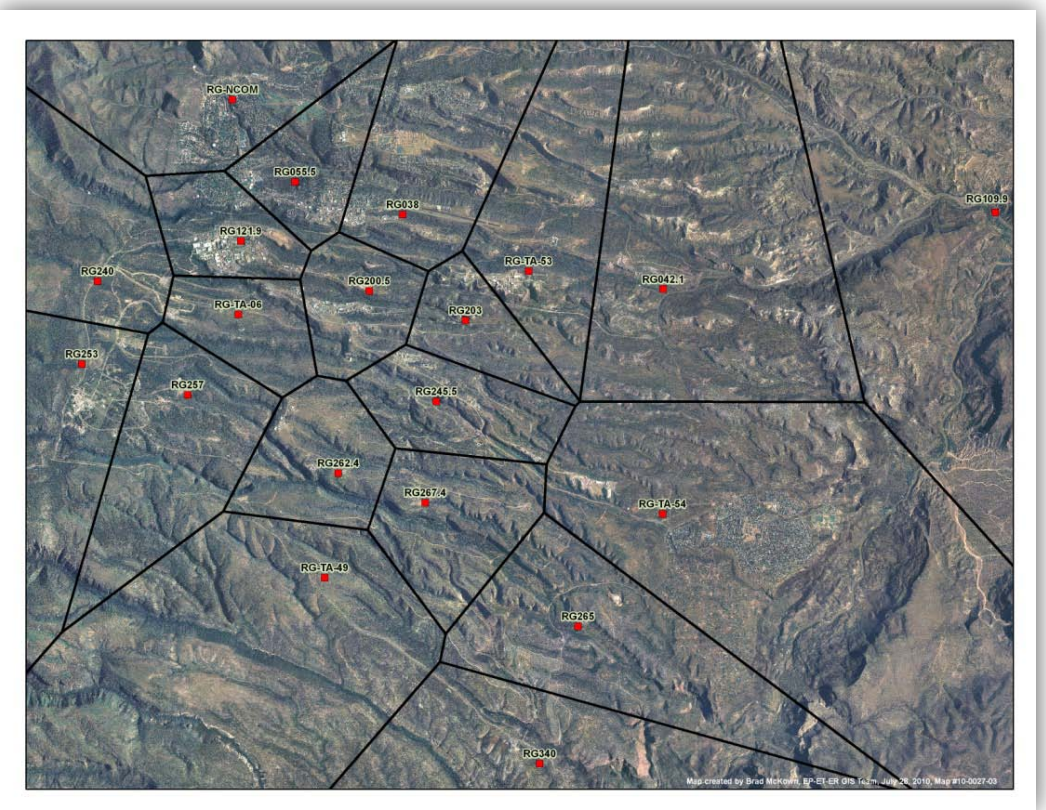
Environmental Programs Directorate

June 22, 2011

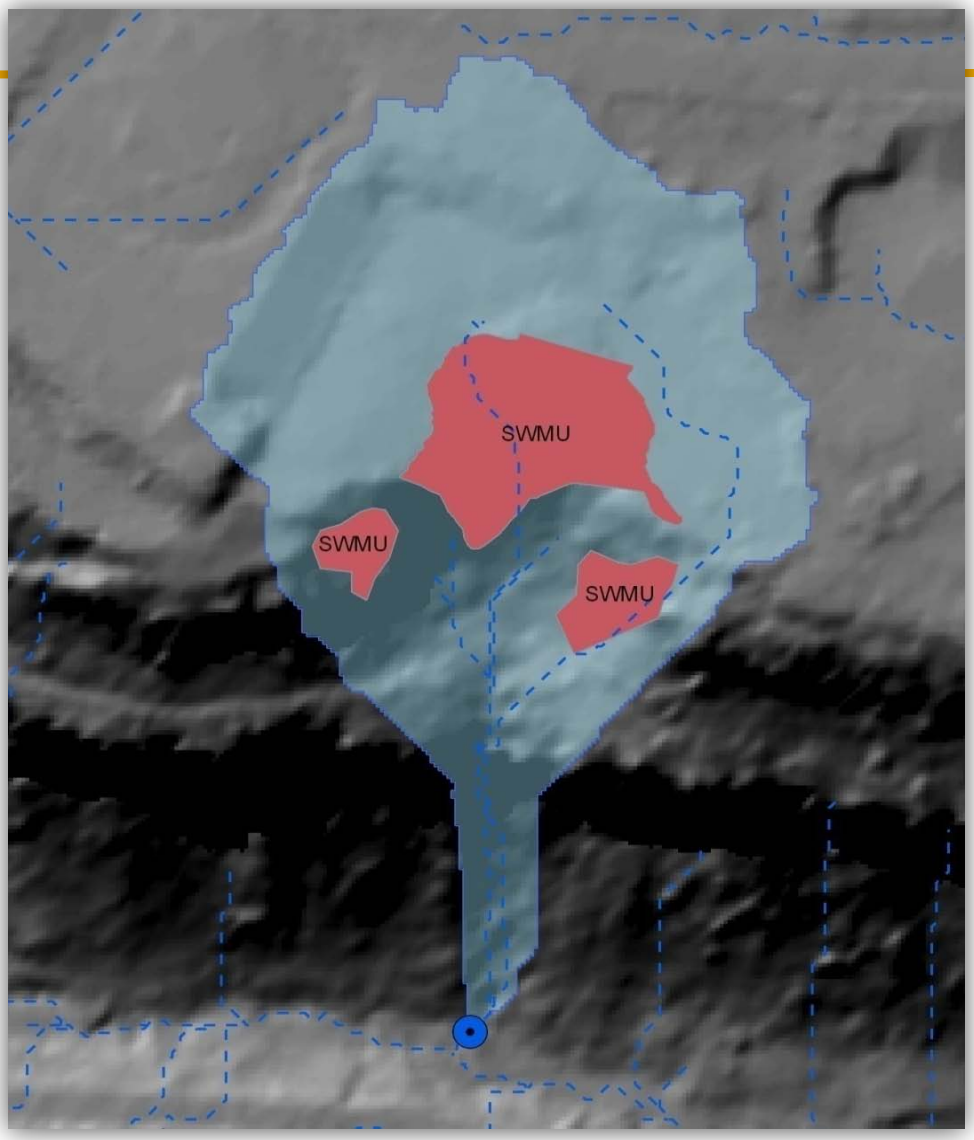
Pajarito Plateau Watershed

Rain Event Inspections & Maintenance

- **Use LANL Met Towers & rain gages**
- **0.25” Rain Event within 30-minutes**
- **Complete within 15-days**
- **Maintain Baseline Controls**



Monitoring: Site Monitoring Areas (SMA)



- **Conceptual Map Example**

SMA Monitoring Location - Automated

SMA Monitoring Location – Single Stage

FFCA Monitoring 2004-2009

Site-Specific Monitoring

- Metals, Radioactivity, Organics, SSC
- 147 SMA locations sampled
- Hundreds of samples collected
- Samples > comparison value
  - Al, Cu, Zn, Gross Alpha, PCB Aroclor

Corrective Action Management Planning

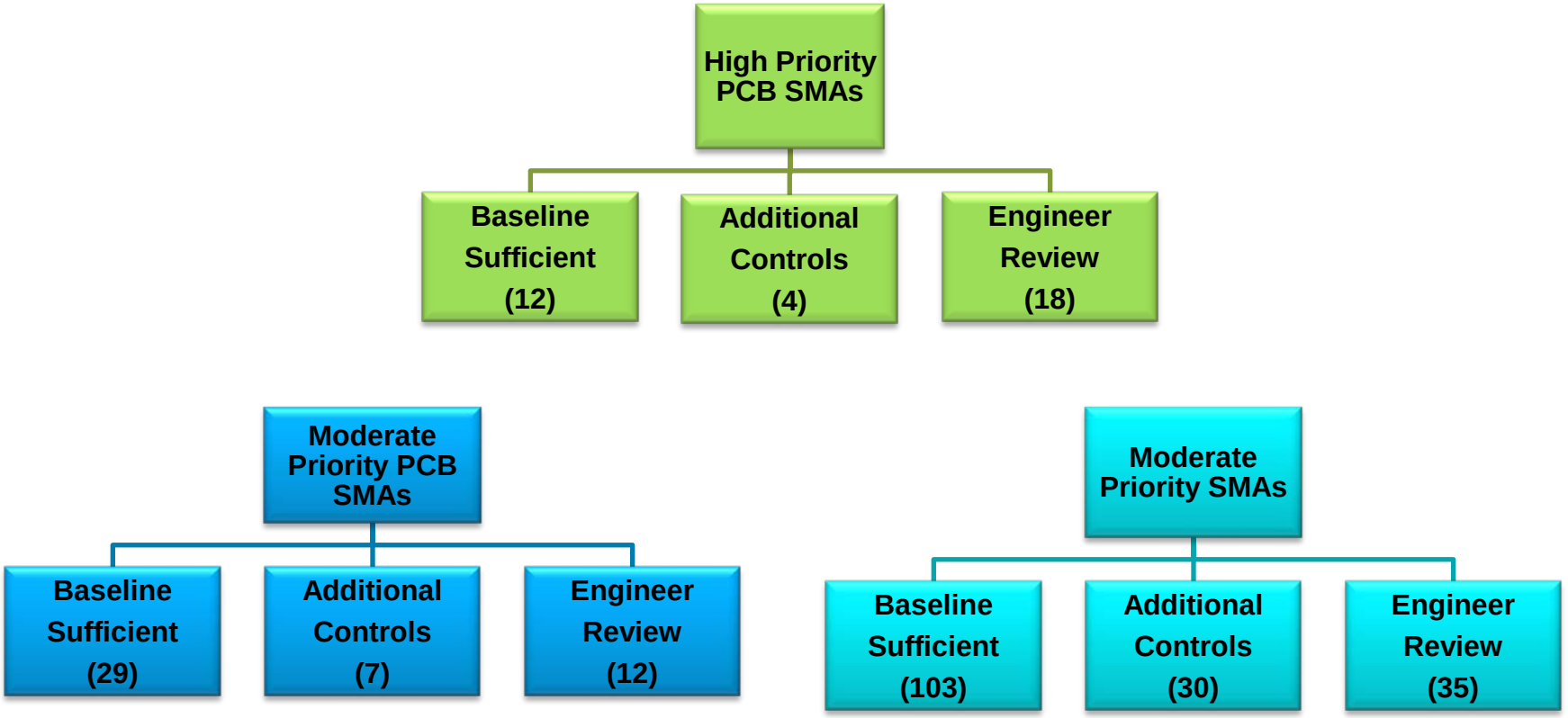
SMA Binning – 2 Step Process

1. High Priority SMAs – 3 year schedule

   Moderate Priority SMAs – 5 year schedule

2. Technical Feasibility (Enhanced or Design)
   - Project Planning/Definition
   - Design or Specifications
   - Procure/Build
   - Inspection/Hand off

FY 11 Planning & Implementation



Run-on Diversion

- Asphalt Channel
- Vegetative Swale
- Curbing
- Water Bars
- Drop Inlets
- Earthen Berm
- French Drains

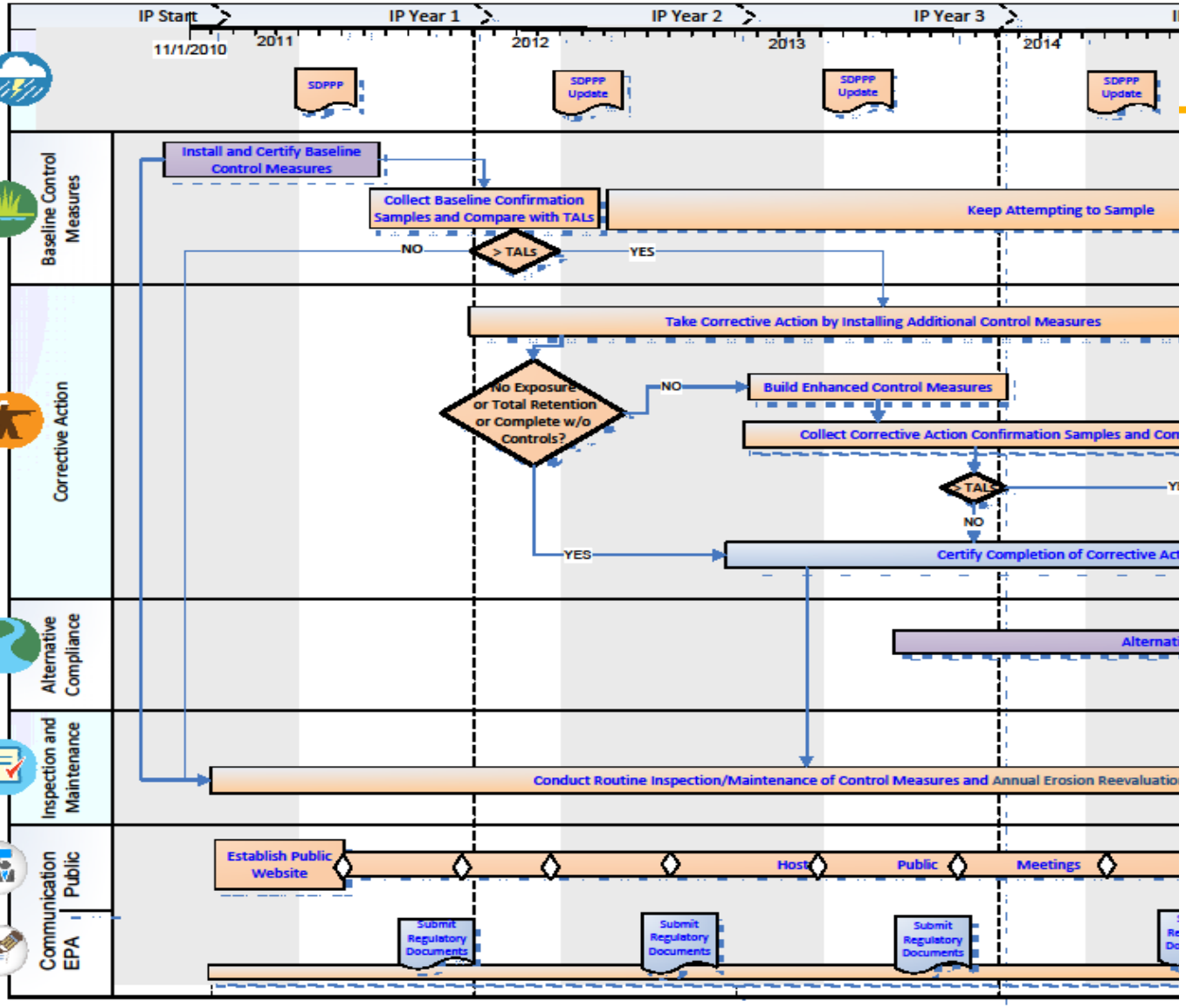
Run-on Diversion

Sediment Retention – Earthen Berms

Grade Control Structures

Sediment Control - Detention Basins

INDIVIDUAL PERMIT (NPDES NM0030759) - REQUIREMENTS OVERVIEW



IP Web Page

- **http://int.lanl.gov/environment/h2o/ip**
- **Connect directly to the permit by clicking Storm Water Individual Permit - NPDES Permit No. NM0030759**
- **See what new documents have been posted by clicking** 

- **Submit a Question or feedback** 

Canyons Stormwater and Groundwater Quality at LANL

Presented by:

Danny Katzman

Project Manager

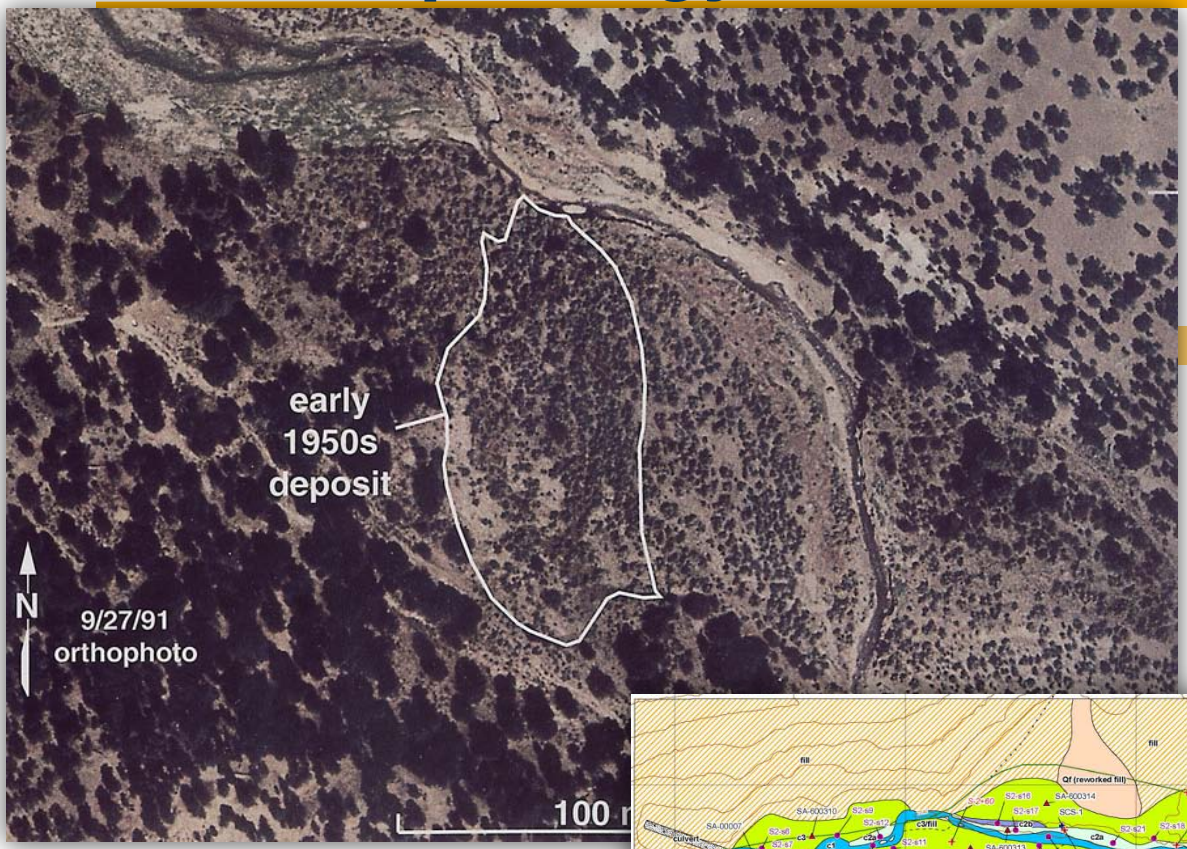
Environmental Programs Directorate

June 22, 2011

Presentation Objectives

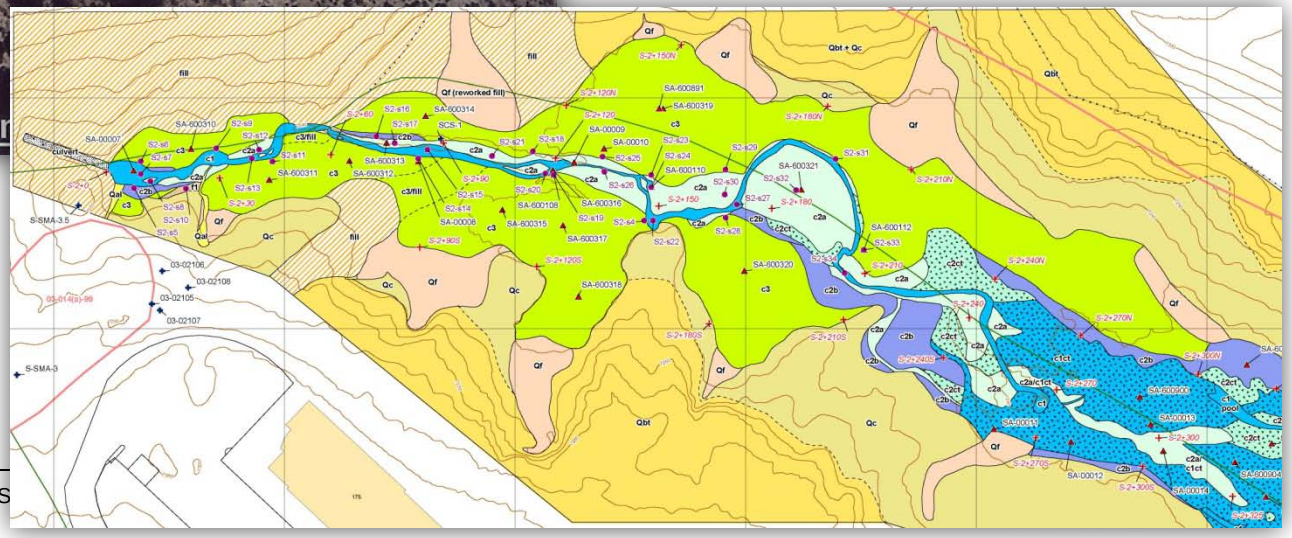
- **Describe Canyons and Groundwater Settings at LANL**
  - Sediment deposits
- **Contaminants in Groundwater**
- **Network Configuration**
- **Adequacy of Network**
- **Monitoring into the future**

Dynamic Canyon Streams - Geomorphology



- Photo Analysis

- Geomorphic-based Characterization



Storm Water Runoff

- Storm water runoff associated
- With summer precipitation

Wetland Erosion

- **Floods can be erosive under some conditions**

How is Canyons Stormwater Regulated?

- **DOE Orders**
  - 458.1 – Radiation Protection of the Public and the Environment
  - 450.1A – Environmental Protection Program
- **New Mexico Water Quality Control Commission regulations (20.6.4 NMAC)**
  - Water-quality standards
- **Consent Order**
  - Performance monitoring of stormwater mitigations

Mitigations Bank Stabilization
Willows (Spring 2009)

- **Approximately 6000 willow poles planted in Pueblo Canyon during Spring 2009**

Bank Stabilization

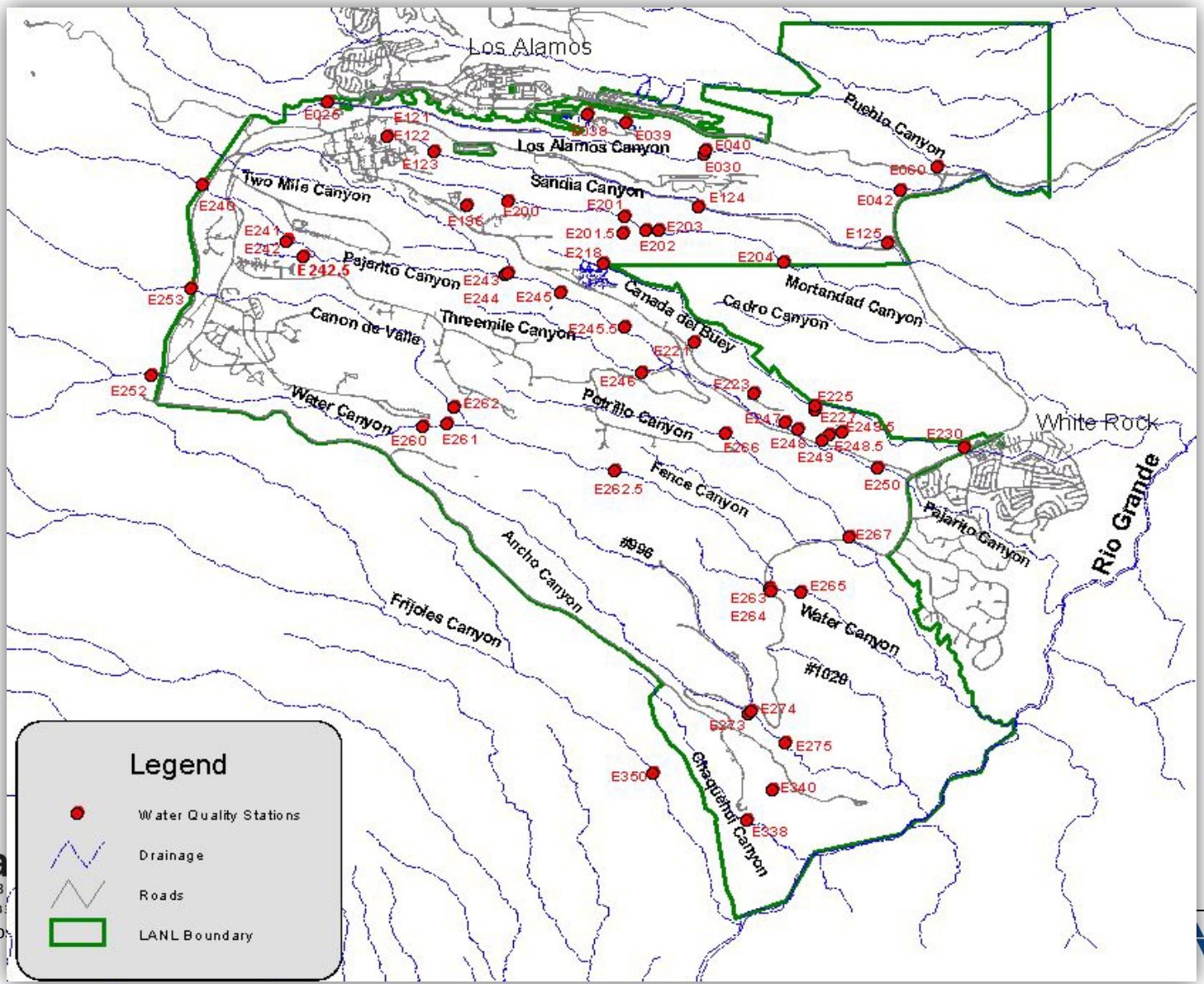
Willows (Summer 2010)

- Maintains bank stability, reduces flood peaks, traps sediment

Wetland Stabilization

Grade Control Structure

LANL's Canyon Gage Network

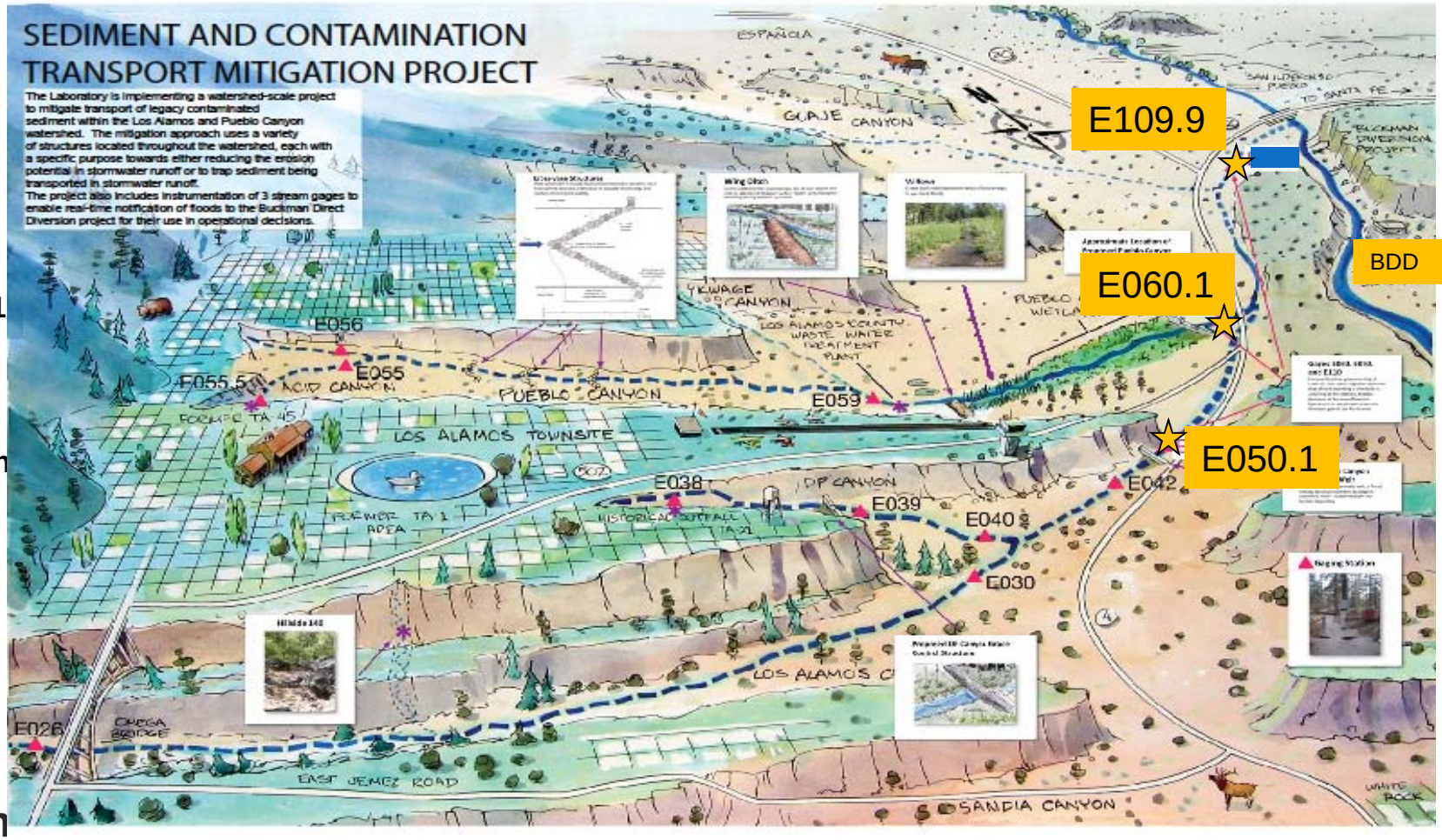


Storm Water Monitoring

Relation of Storm Water Monitoring to Buckman Direct Diversion Project

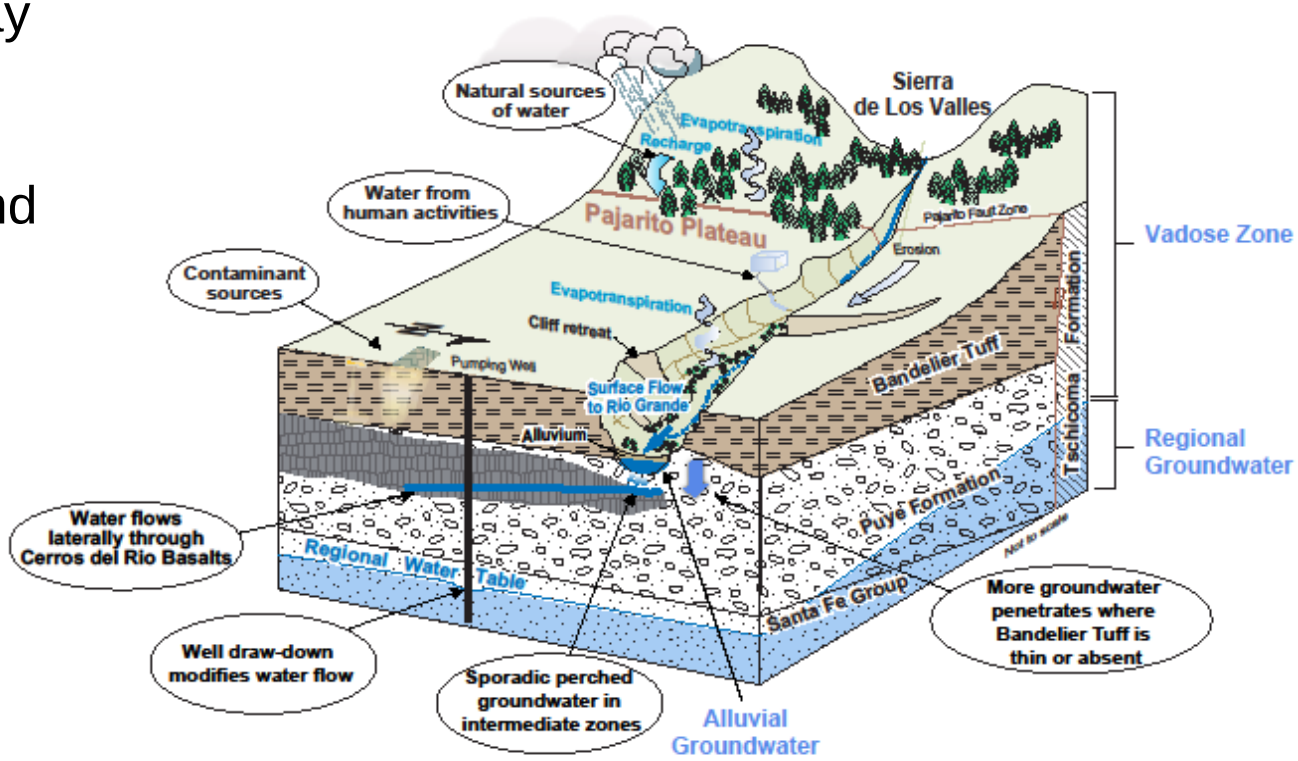
Early-Notification System

- **3 lower canyon gages (E050.1, E060.1 and E109.9)**
- **Real-time communication of flow for Buckman**
- **Water-quality data**

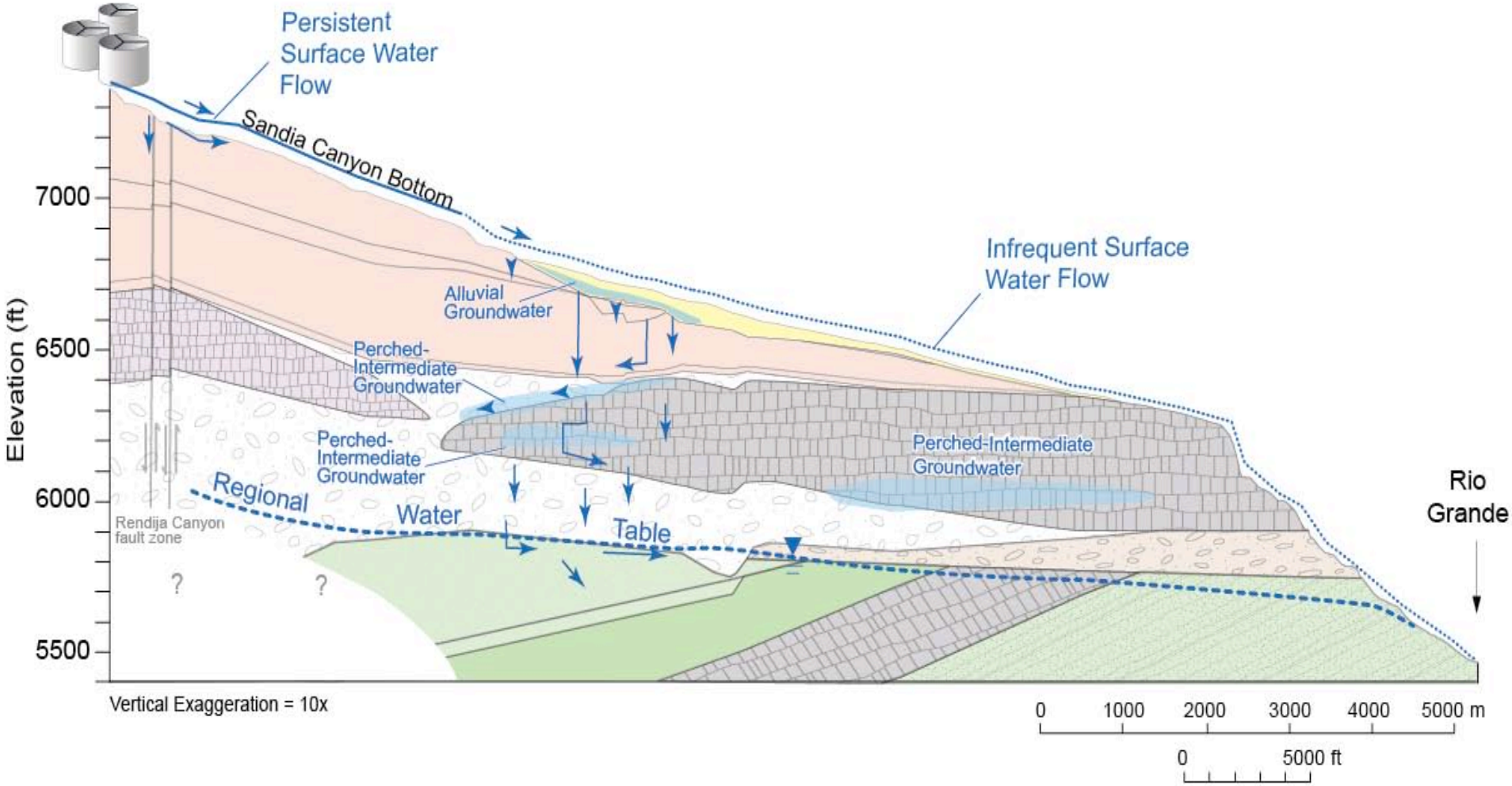


Groundwater zones at LANL

- Water pathway begins within constraints of watersheds and spreads in subsurface



Canyons Infiltration

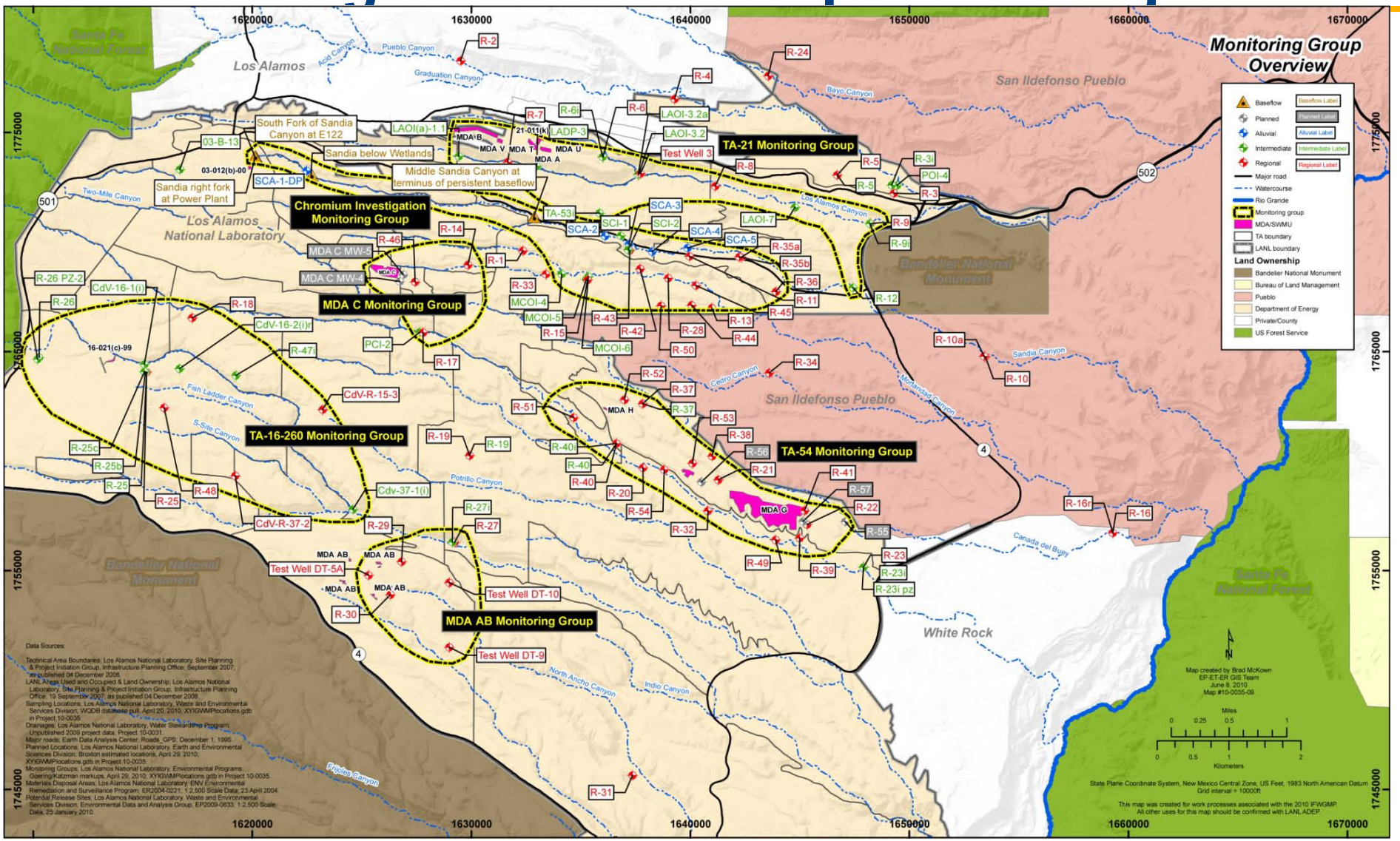


LANL's Monitoring Well Network

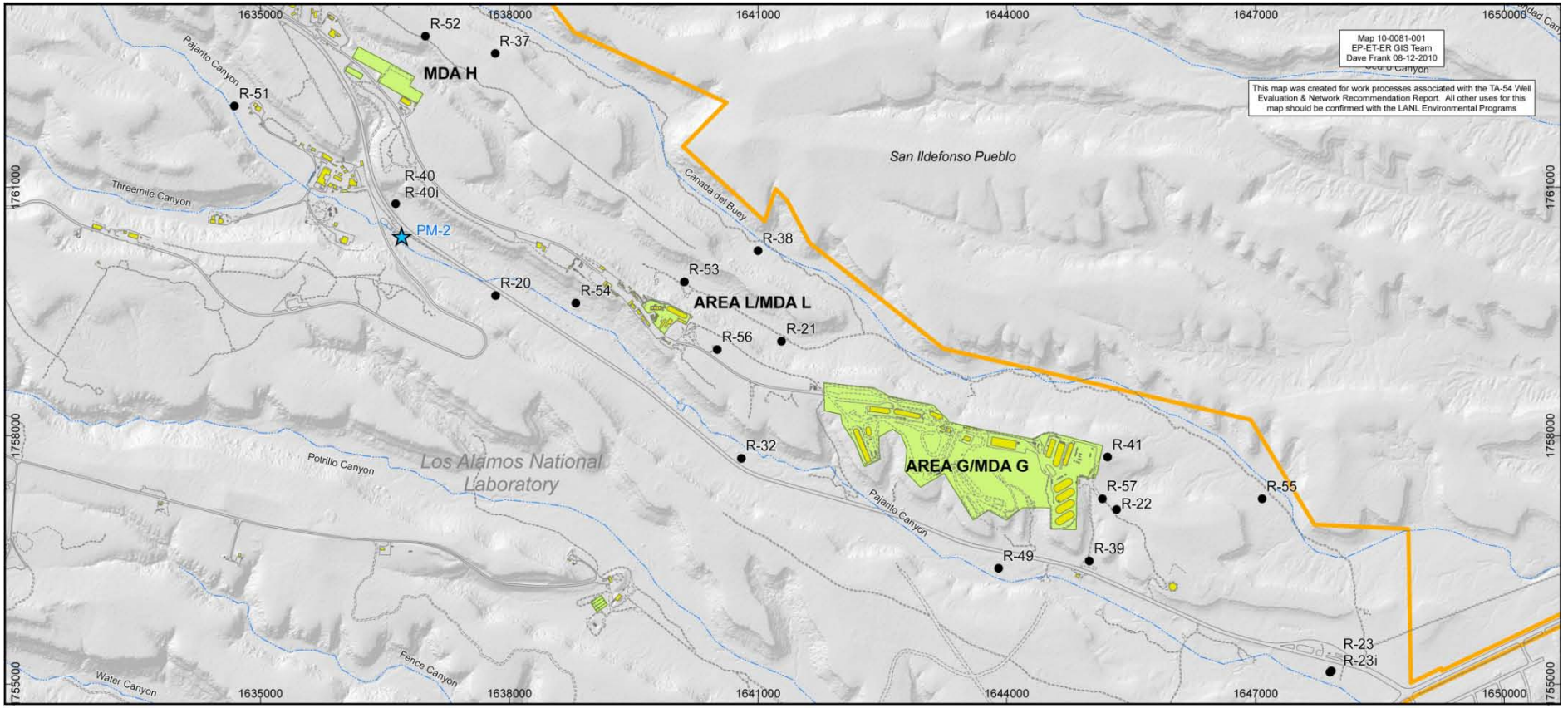
LANL's protective monitoring well network is targeted to monitoring of specific sources and for general surveillance

- Specific source areas include:
  - TA-16
  - TA-54 (MDAs H, L, and G)
  - TA-21 (MDAs T, B, etc)
  - Chromium project area
  - MDA C
- Water-supply wells are also directly monitored
  - City of Santa Fe
  - Los Alamos County
- Analyses include metals, radionuclides, organics

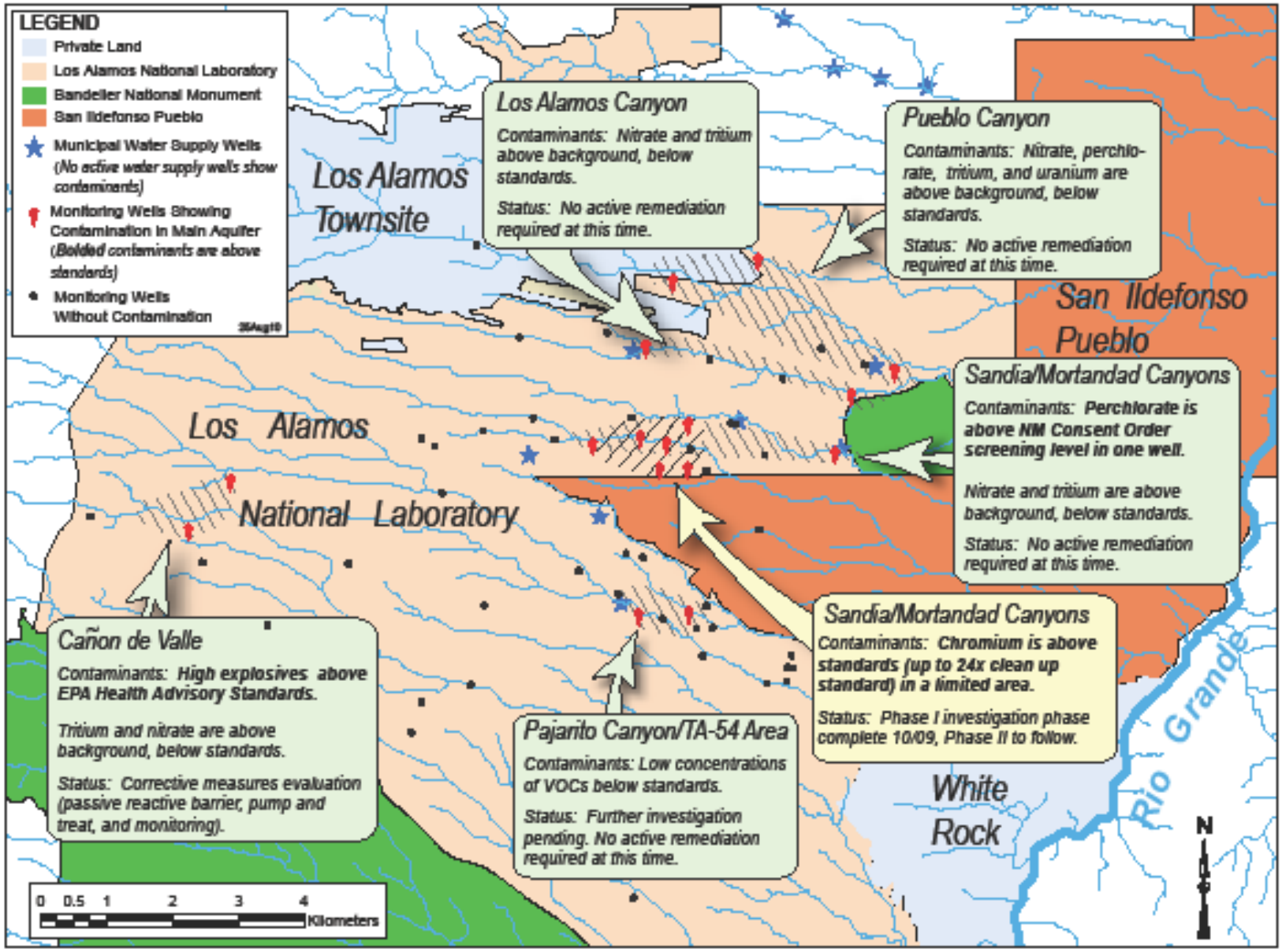
Monitoring Areas – Site-Specific Projects



Monitoring at Material Disposal Areas



Regional Groundwater




Questions?