# United States Environmental Protection Agency (USEPA)

# Radiological Study

# Santa Susana Field Laboratory (SSFL)

May 12, 2010

# Agenda

- Radiological Background Study
- Gamma Radiation Scanning
- Surface and Subsurface Soil Sampling
- Groundwater, Surface Water, Sediment Sampling
- Community Questions and Comments
- Adjourn

# Introductions

## EPA TEAM

- Mary Aycock, EPA Project Manager
  - (415) 972-3289
- Craig Cooper, EPA Project Manager
  - (415)  947-4148
- Nicole Moutoux, EPA Project Manager
  - (415) 972-3012
- Gregg Dempsey,  Senior Science Advisor
  - (702) 784-8232

## PRIME CONTRACTOR

- HydroGeoLogic Inc/HGL

# EPA's Role

- 2008 Federal Appropriations Law (HR2764)
- DOE and EPA interagency agreement
- Comprehensive radiological site characterization of Area IV and Northern Buffer Zone in accordance with CERCLA

# EPA Study Area Boundaries

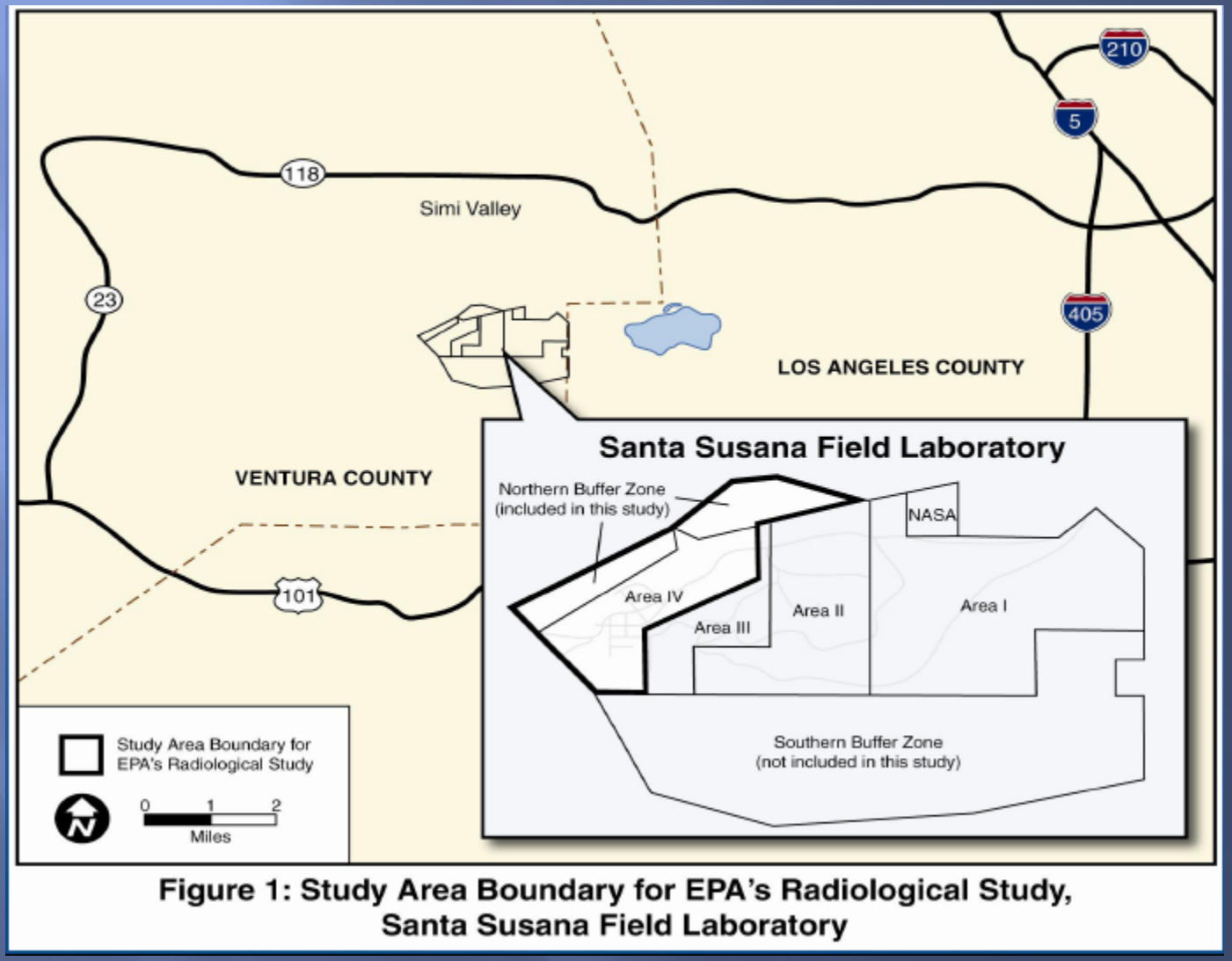



**Figure 1: Study Area Boundary for EPA's Radiological Study, Santa Susana Field Laboratory**

# EPA's Studies

- Radiological Background Study
  - Determine the level of "ambient or background" radioactivity found in soil
- Radiological Study of Area IV and Northern Buffer Zone
  - Characterize nature and extent of radiological contamination
  - Also known as EPA's on-site study

# EPA WebSite

- Fact Sheets
- Background to EPA's Work at SSFL
- Maps
- Technical Documents (workplans, reports)
- EPA PowerPoint Presentations
- Contacts

http://www.epa.gov/region09/SantaSusana

# Public Information Repositories

- **Simi Valley Library**
  2969 Tapo Canyon Rd
  Simi Valley, CA

- **Los Angeles Public Library, Platt Branch**
  23600 Victory Blvd
  Woodland Hills, CA

- **DTSC Chatsworth**
  Office 9211 Oakdale Avenue Chatsworth , CA 91311 (818) 717-6567

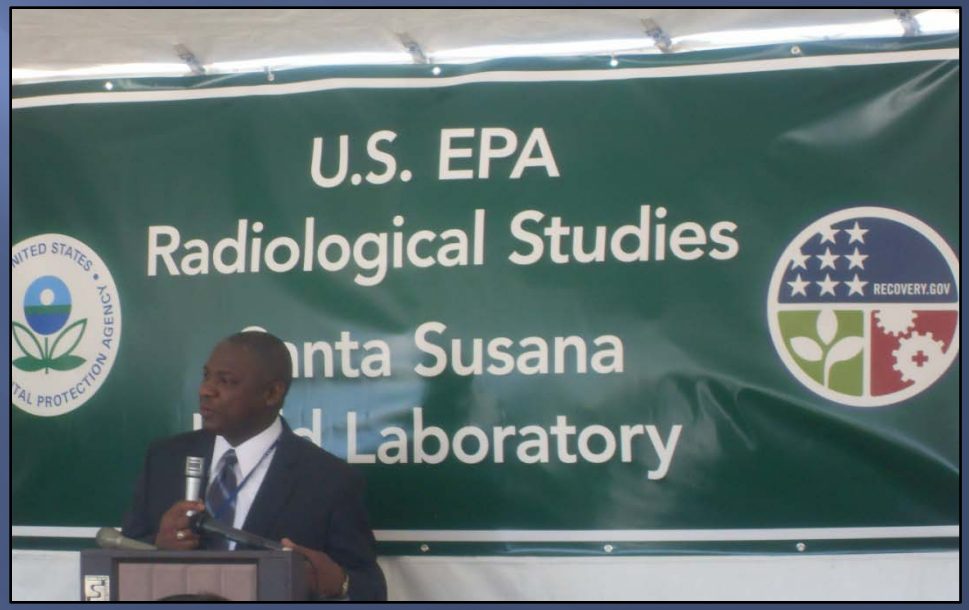
- **Superfund Records Center**
  Mail Stop SFD-7C
  95 Hawthorne Street
  Room 403
  San Francisco, CA

# EPA's Email Distribution List

- EPA will distribute a newsletter via email with technical information, photos, and video links to our work at SSFL

- To get EPA's E-Newsletter, please be sure to provide your email address at the sign-in sheet for this meeting

# EPA Field Office
# Open House/Project Kick-Off Event
# May 12, 2010

# EPA Field Office
# Open House/Project Kick-Off Event
# May 12, 2010

# Radiological Background Study

Presented by Nicole Moutoux, EPA Project Manager

# Radiological Background Study Objectives

- The purpose of the Background Study is to determine the level of "ambient or background" radioactivity found in soil.

- The results of the Background Study will be compared to radiological data collected at the SSFL to determine the extent of radiological contamination.

# Status of Radiological Background Study

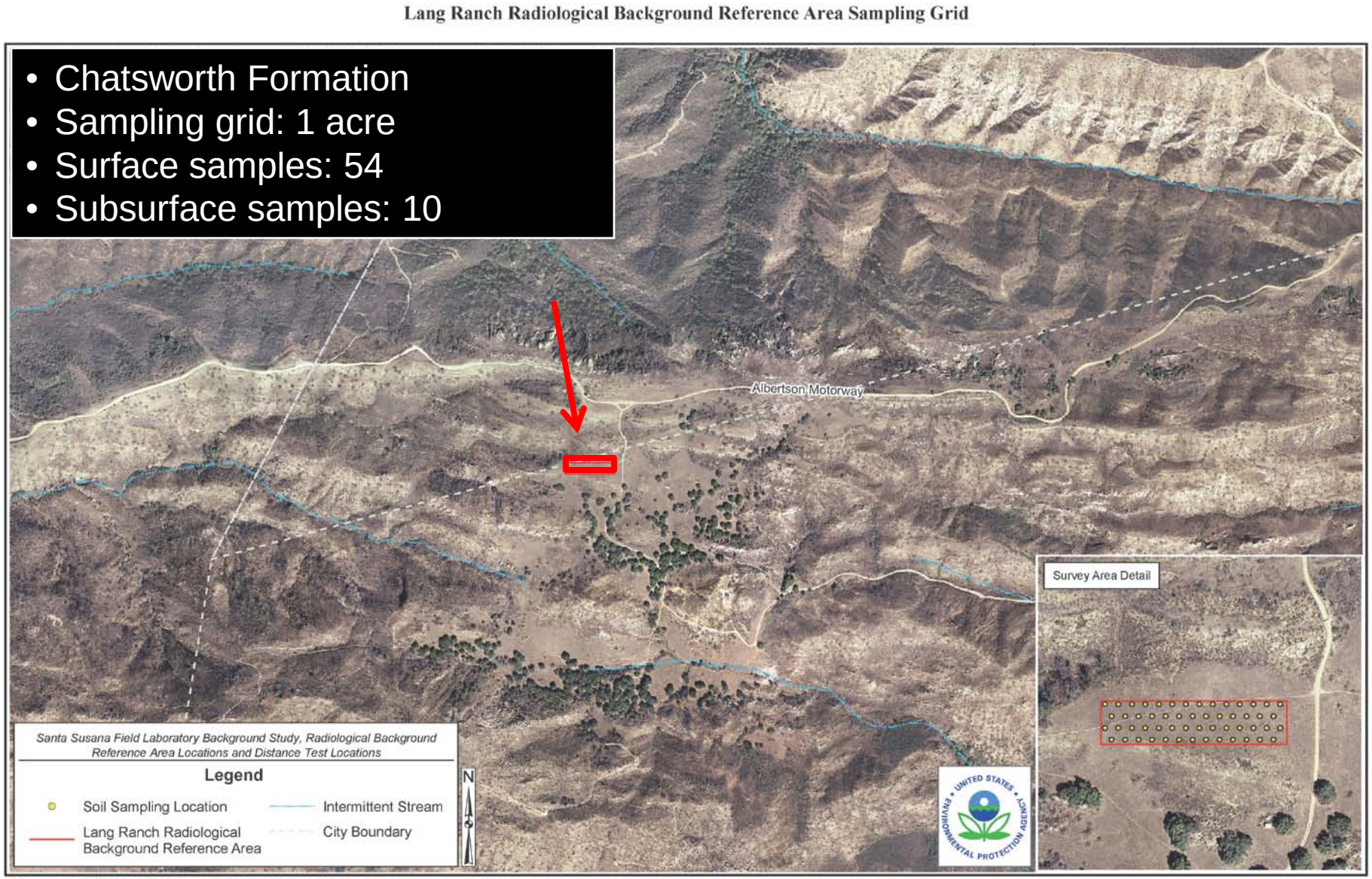
- ✓ Initial project planning
- ✓ Background location evaluation and selection
- ✓ Sampling Plan preparation
- ✓ Sampling preparation and mobilization
- ✓ Sampling
- ➢ Laboratory analyses
- ➢ Data validation, evaluation, and statistical analysis
- ➢ Report preparation

# Radiological Background Reference Areas

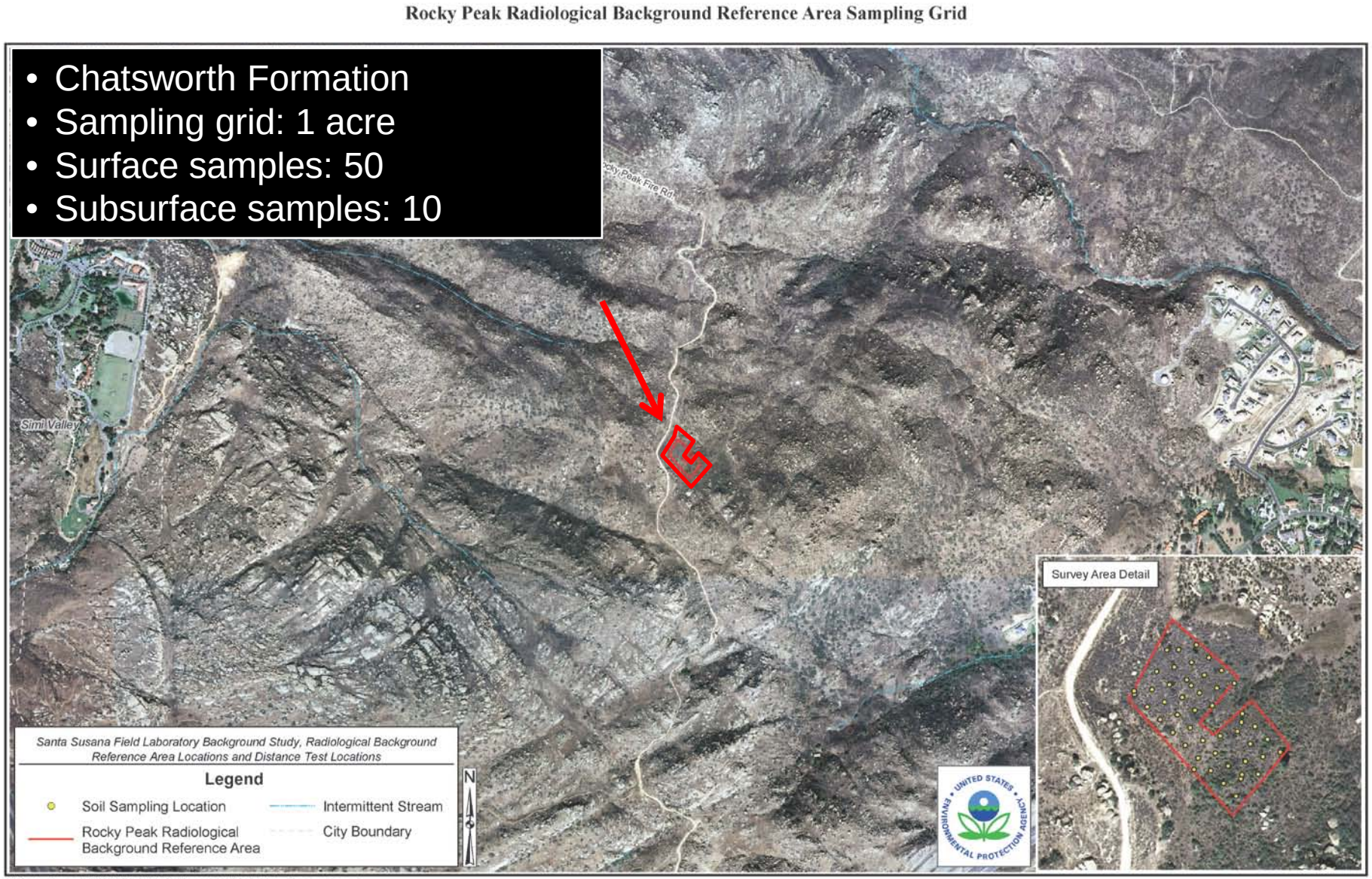
- Three locations were chosen for background sampling
- Two in the Chatsworth Formation and one in the Santa Susana Formation (Same geologic formations found at the SSFL)
- Conducted surface soil sampling, subsurface soil sampling, and gamma scanning at each location
- Data generated from this study will be used by DTSC to establish cleanup levels

# Radiological Background Reference Areas

# Lang Ranch Radiological Background Reference Area

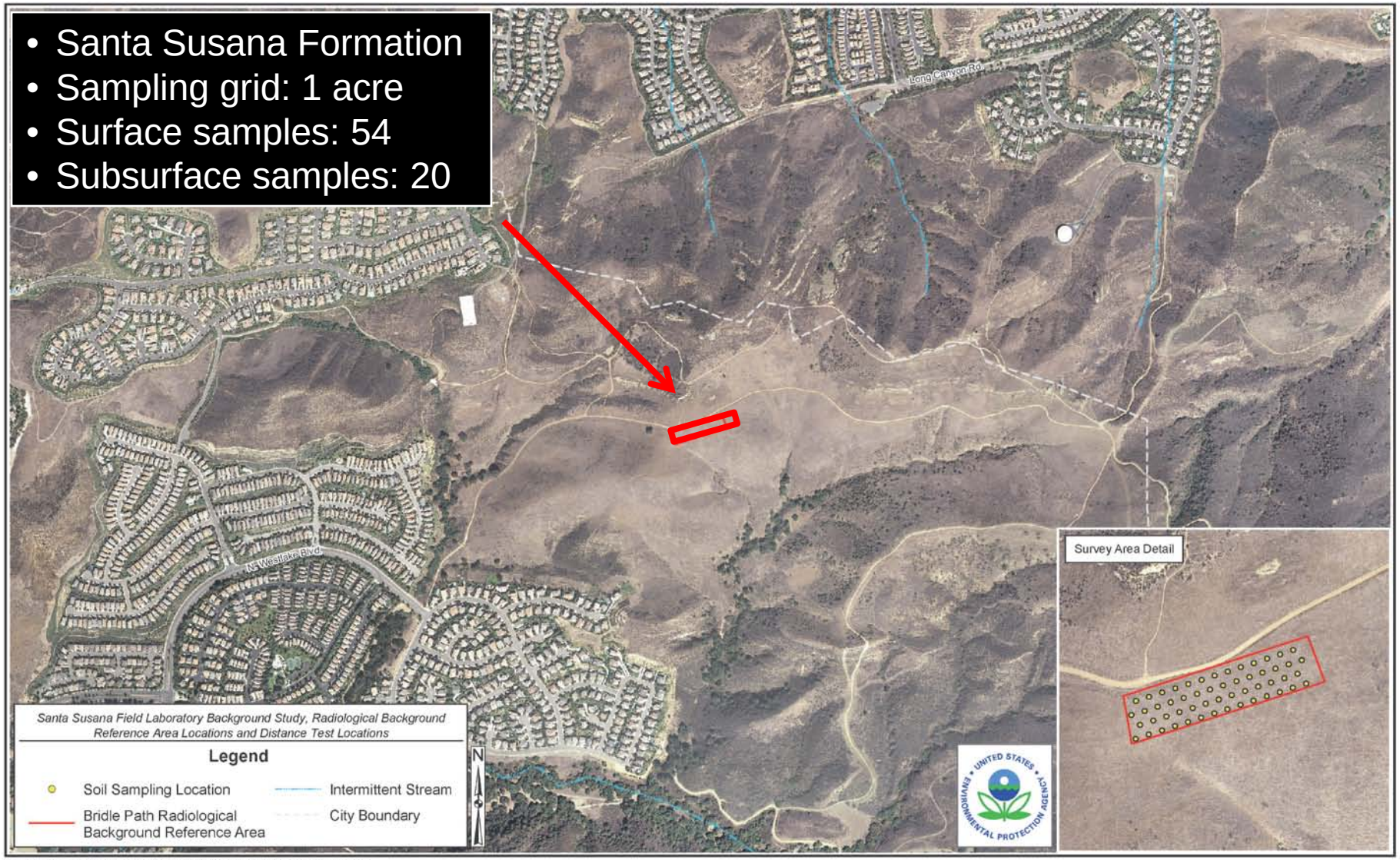


# Rocky Peak Radiological Background Reference Area



# Bridle Path Radiological Background Reference Area

**Bridle Path Radiological Background Reference Area Sampling Grid**



# Radiological Background Reference Area Sampling Activities

## Gamma Screening and Survey

# Radiological Background Reference Area

## Sampling Activities

## Surface Soil Sampling

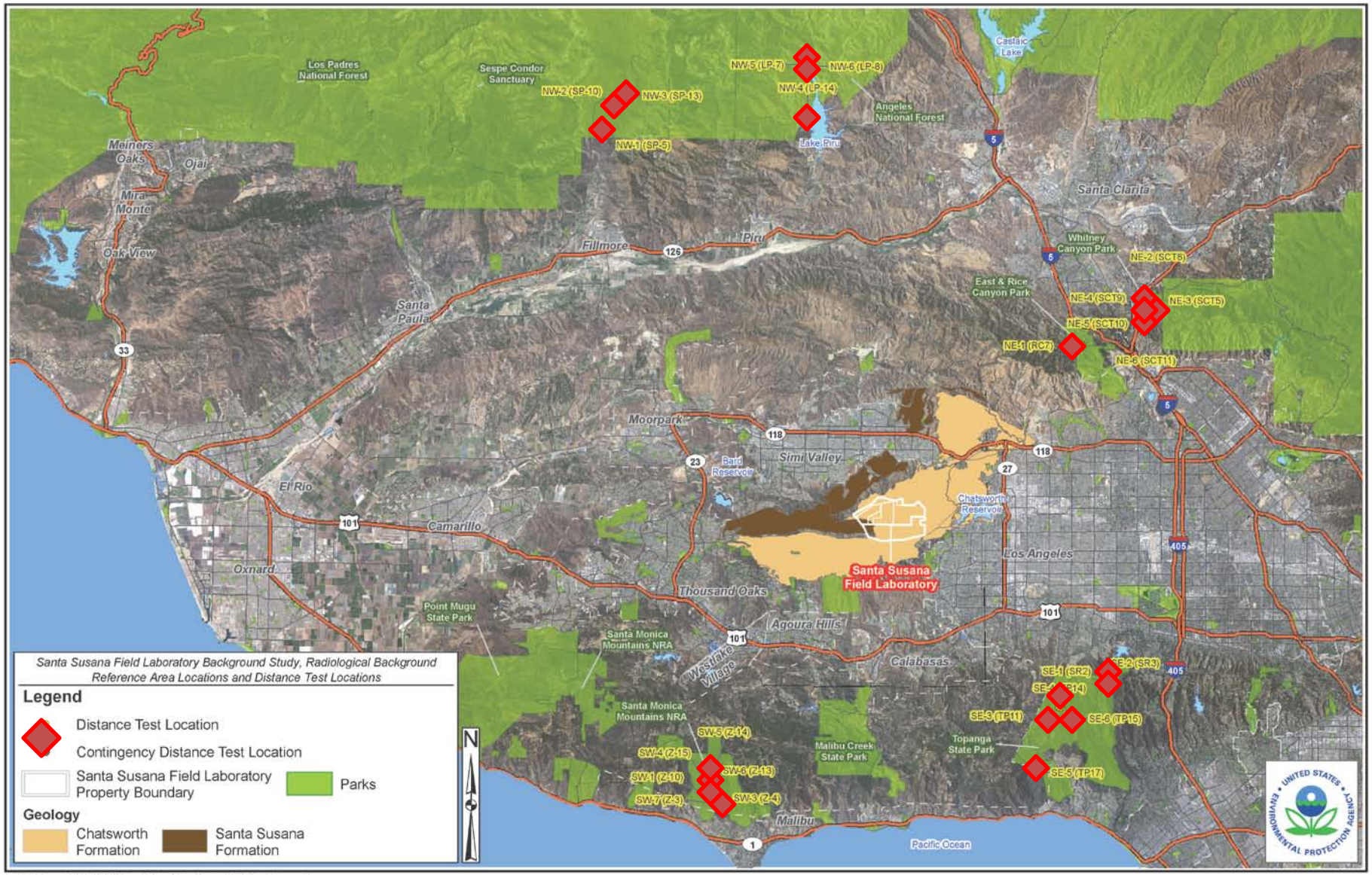
# Radiological Background Reference Area
## Sampling Activities
## Subsurface Soil Sampling


# Radiological Background Reference Area
# Sampling Activities
# Borehole Gamma Logging

# Distance Test Locations

- Address concern that the three background locations are too close to SSFL
- Collected 20 surface soil samples at distances at least 10 miles from SSFL
- Compare sampling results to ensure that the three background locations were not contaminated by the SSFL

# Distance Test Locations

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# Distance Test Locations Surface Soil sampling

- Collected 6 surface soil samples from each compass quadrant
  - Northeast quadrant
  - Southeast quadrant
  - Northwest quadrant
  - Southwest quadrant

# Distance Test Locations
## Gamma screening

- At each Distance Test Location, a surface gamma screening walkover survey was conducted
- A 50 by 50 foot area was surveyed surrounding each Distance Test Location

# Radionuclides of Interest

- Naturally occurring radionuclides (e.g., U-238, U-235, Th-232, etc.)
- Radionuclides found in fallout (e.g., Cs-137, Sr-90, etc.)

<u>Produced at SSFL</u>

- Radionuclides found in nuclear fuel (e.g., Pu-238, U-235, etc.)
- Fission Products (e.g., Cs-137, Sr-90, etc.)
- Activation Products (e.g., U-233, Eu-152, Co-60, etc.)

# Data Evaluation

1. Compare data from distance test locations to radiological background areas
2. Conduct a statistical analysis/evaluation of data from the radiological background areas
3. Calculate a background value for each radionuclide

# Project Schedule

| Activity | Planned Date |
|---|---|
| Preliminary analytical results for all samples | June 2010 |
| Validated results for all samples | July 2010 |
| Technical Memo | June 2010 |
| Data Evaluation and Stakeholder Meetings | July 2010 – September 2010 |
| Draft Final Report | October 2010 |
| Final Report | December 2010 |

# Elements of the On-site Characterization Study

- Gamma Scanning
- Historical Site Assessment
- Surface and Subsurface Soil Sampling
- Groundwater, Surface Water, and Sediment Sampling

# Gamma Radiation Scanning

Presented by Mary Aycock, EPA Project Manager

# Gamma Scanning Objectives

- Determine the presence of Gamma Radiation Anomalies in surface soil
- Limited identification of Gamma Radiation Anomalies in subsurface soil
- Support the design of soil and water sampling plans

# Gamma Radiation Scanning Technologies

- Enhanced Radiation Ground Scanner (ERGS)
  - High detection sensitivity
  - Relatively flat surfaces
- Mule-Mounted Gamma Scanner (MMGS)
  - Moderate detection sensitivity
  - Rough terrain
- Wheel-Mounted Gamma Scanner (WMGS)
  - Low to moderate detection sensitivity
  - Moderately rough terrain
- Hand-held Gamma Scanner (HHGS)
  - Low detection sensitivity
  - Rough terrain

# ERGS II Detectors

# ERGS II Shield

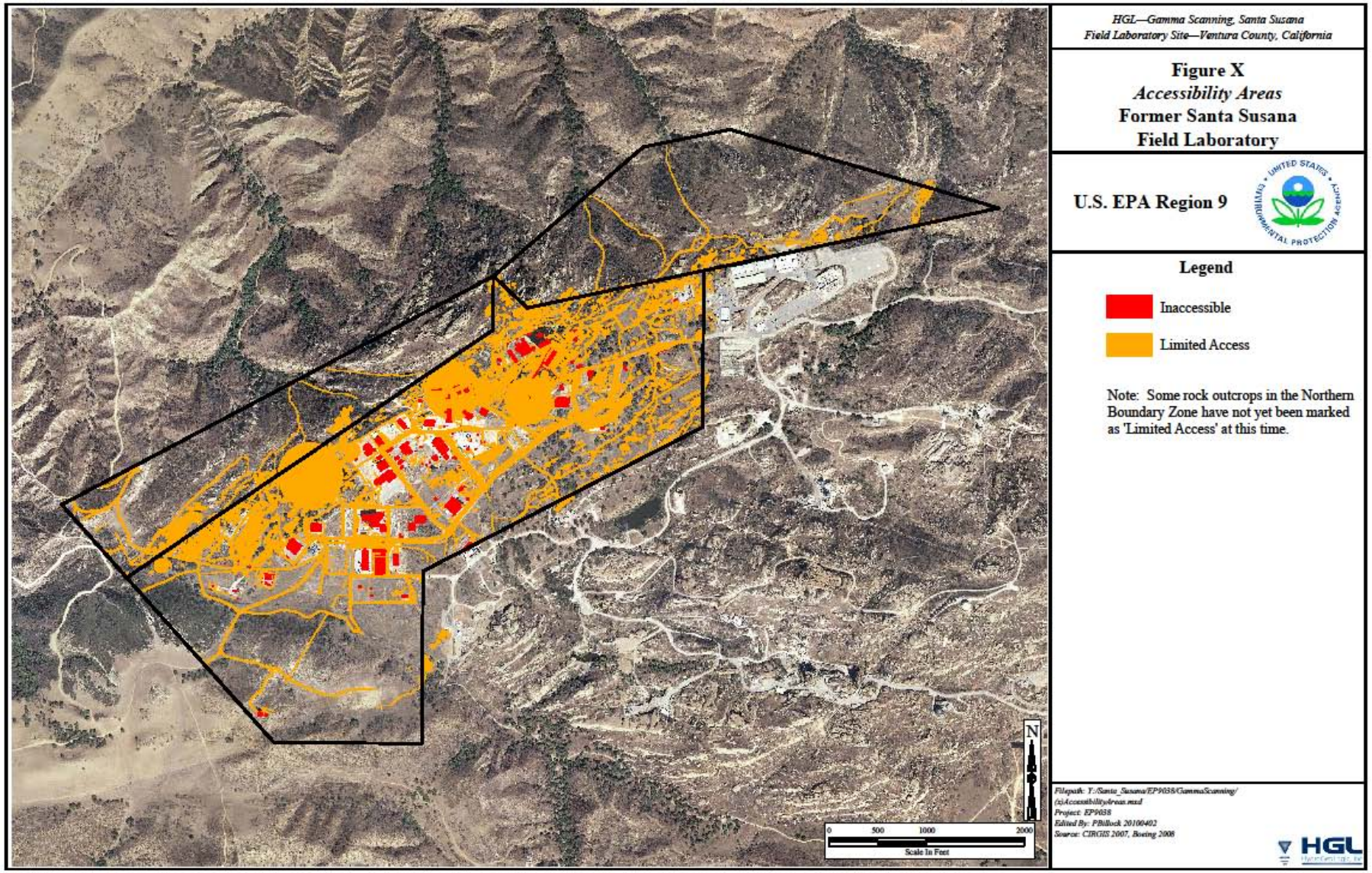
# MMGS and WMGS Detectors and Shields


# MMGS

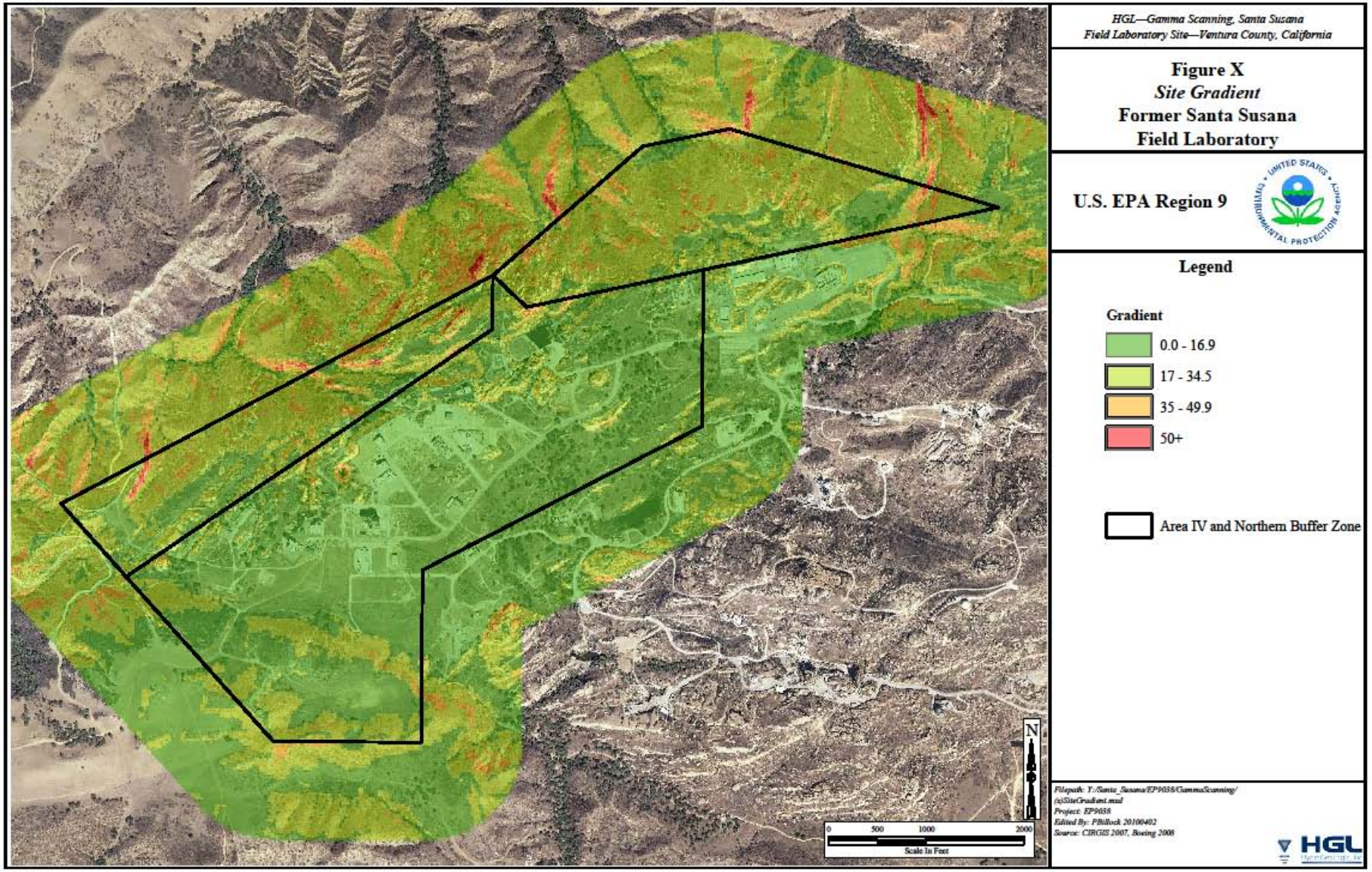
# WMGS


# HHGS Detectors and Shields

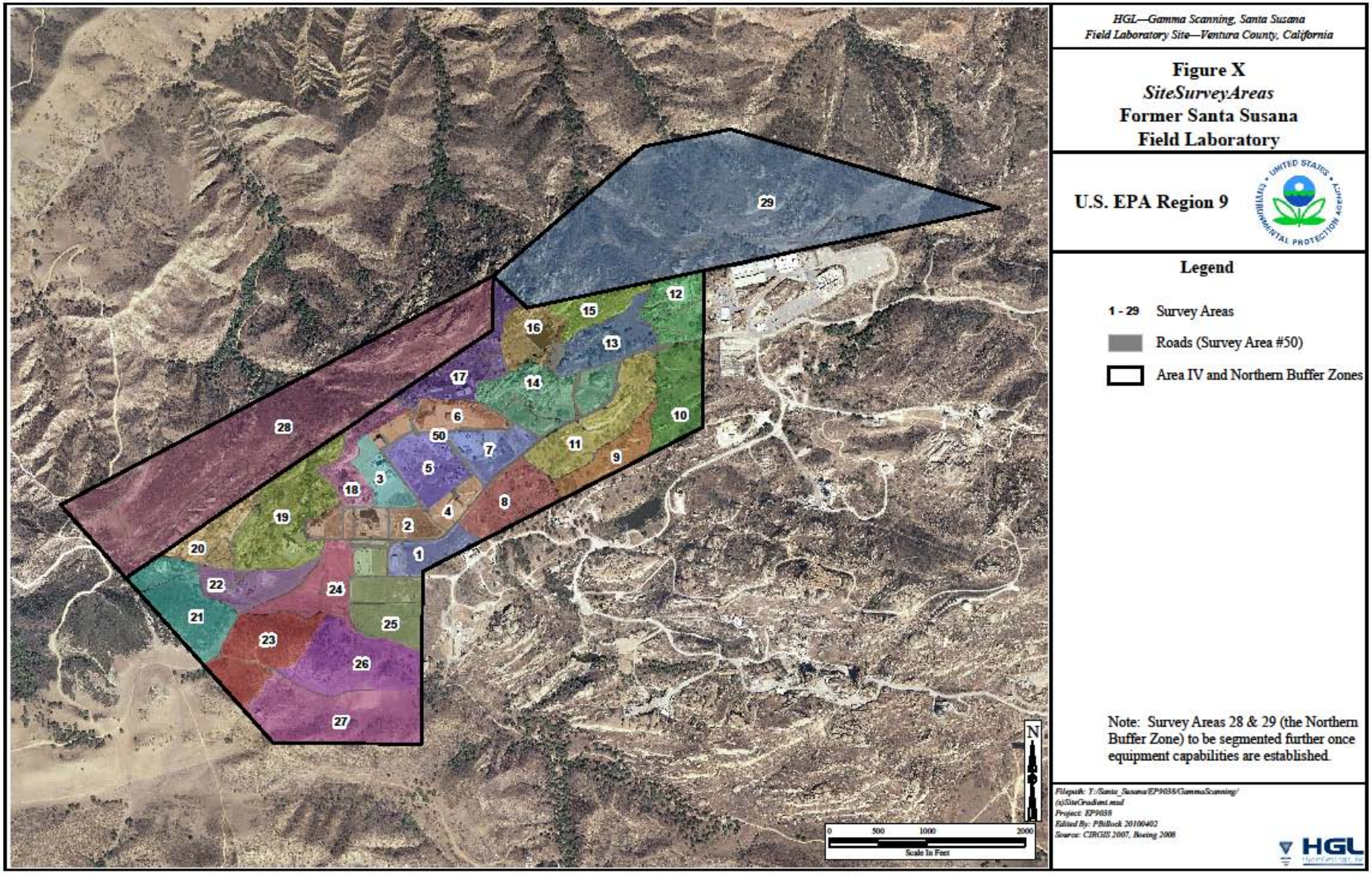
# Preliminary Map of Limited Access & Inaccessible Access Area



# Preliminary Map of Gradient



# Preliminary Map of Survey Area Categories



# Schedule

- May
  - Conduct sensitivity tests at Walker Field pads, Grand Junction, CO
  - Conduct terrain accessibility testing
  - Conduct subsurface sensitivity testing
- June
  - Conduct radiation worker and gamma scanning training
  - Collect background data
  - Begin gamma radiation scanning

# Historical Site Assessment and Soil Sampling

Presented by Craig Cooper, EPA Project Manager

# Historical Site Assessment Objectives

- Confirm list of potential radionuclides of concern
- Aid in determining appropriate targeted soil sampling locations
- Guide the density of samples based on the likelihood of finding contamination

# Site History Technical Memorandum

- Technical Memorandums are prepared in advance of the Historical Site Assessment to provide:
  - Timely information to EPA's sampling teams
  - A means of facilitating stakeholder feedback to refine Historical Site Assessment findings
  - First Site History Technical Memorandum is on EPA website

# SSFL Former Employee and Stakeholder Input

- Seeking a collaborative effort with both SSFL former employees and public stakeholders on site history
- Advice and input on former uses, spills and releases of radioactive materials
- Site history process will aid in design of upcoming soil sampling efforts

# Soil Sampling Objectives

- Primary Objective
  - Define the nature and extent of radiological soil contamination

- Potential Secondary Objectives
  - Collect data of sufficient quality that could be used by DTSC to support :
    - Ecological risk assessment
    - Human health risk assessment
    - Development and evaluation of remedial alternatives
    - Identify areas that may qualify as not contaminated

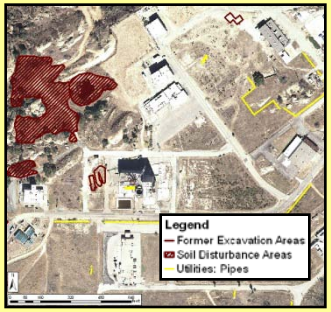
# Sampling Considerations


- Targeted and random samples will be collected
- Surface and subsurface sampling
- EPA will sample and then based on results further investigate contamination detected in soil

# Data Integration to Select Targeted Soil Sampling Locations

## Geophysical Survey

- Utilities
- Former excavation areas
- Areas of soil disturbance



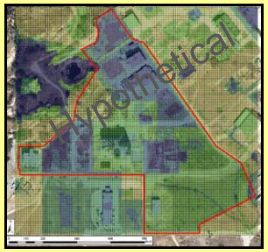

## Historic Site Assessment (HSA)

- Drains, septic beds & historic buildings
- Former worker interviews

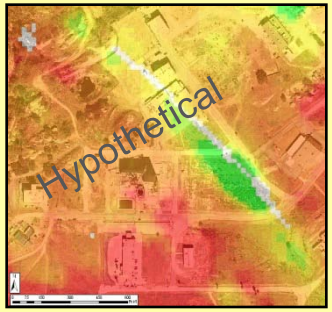

## Field Observations

- Drainage
- Topography
- Deposition or erosion areas

## Targeted Soil Sample Locations



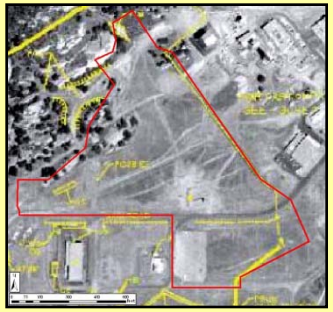

## Gamma Survey




Hypothetical Gamma Survey Results

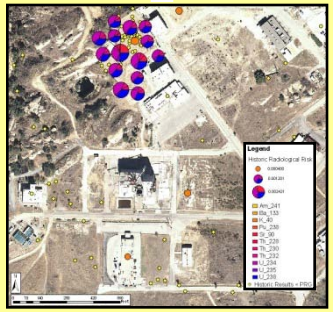
- Gamma radiation anomalies

## 1959 Aerial Photo Analysis



- Physical land forms
- Potential waste storage areas

## Aerial Photo Analysis

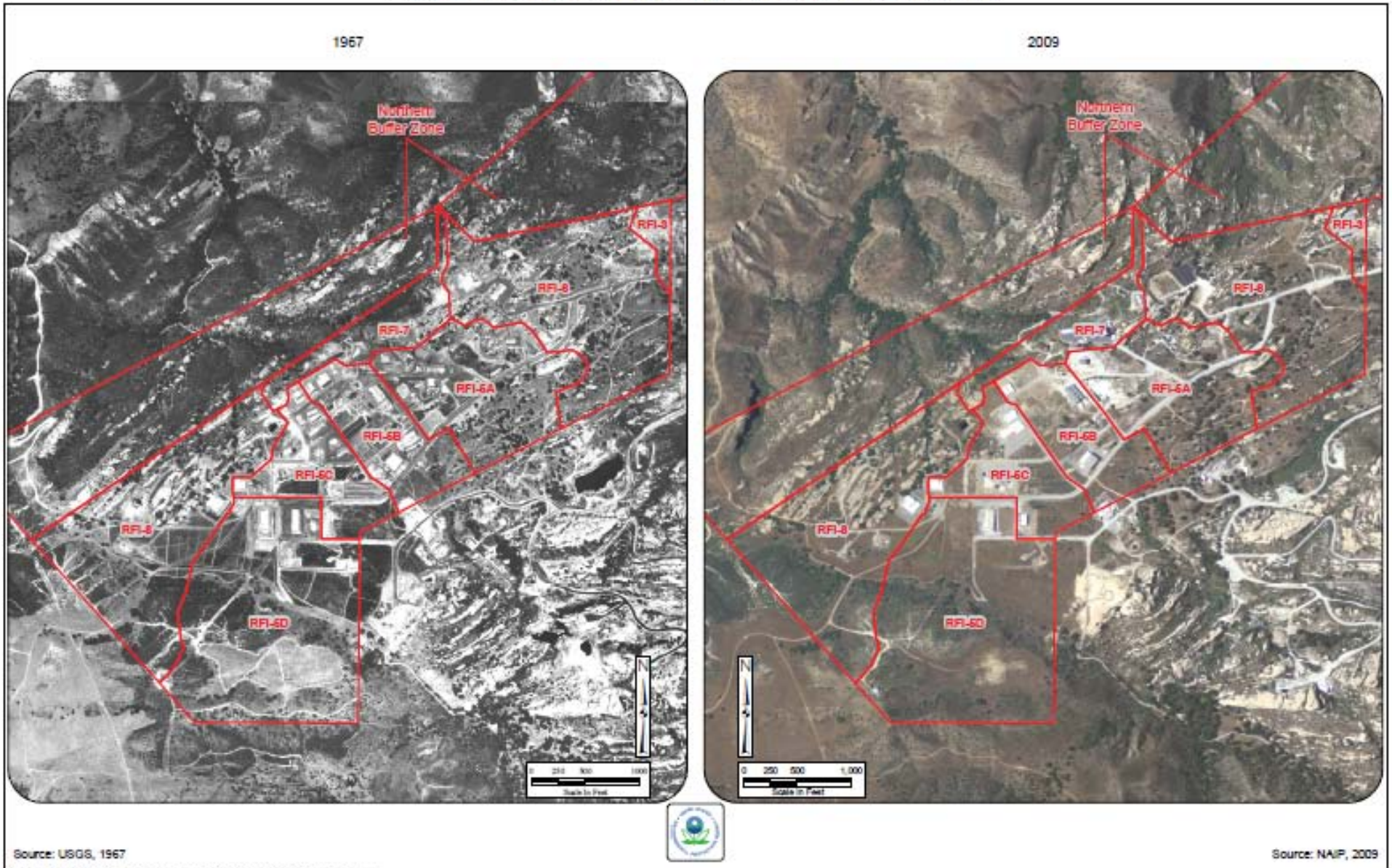


- X,Y plots
- Remediation areas
- Historic sample concentrations

## Historic Environmental Data

# Aerial Photo Comparative Analysis

Comparative Analysis of Area IV Layout—Santa Susana Field Laboratory—1967 and 2009

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# Random Sampling Approach

- **Class 1** – Areas with the greatest potential for radioactive contamination
  - Survey unit size is 1 acre
- **Class 2** – Areas that have a potential for radioactive contamination but are not expected to exceed regulatory levels
  - Survey unit size is 5 acres
- **Class 3** – Areas not expected to contain any residual contamination
  - Survey unit size is 10 acres

# Analytical Laboratory Acquisition Schedule

- Writing Contract Terms: Late May 2010
- Bids for Contract Due: Late June 2010
- EPA to conduct inspections of labs prior to award of contract
- Target date for completion: October 2010

# Off-Site Sampling

- EPA's authorization is for Area IV and Northern Buffer Zone sampling
- Chasing contamination into other areas may be warranted

# Next Steps

- Issue Soil Field Sampling Plan in June
- Determine random and targeted soil sampling locations
- Prepare Field Sampling Plan Addendums
- Begin Sampling in September

# Groundwater, Surface Water, and Sediment Sampling

Presented by Nicole Moutoux, EPA Project Manager

# Objectives

- Confirmation of historical data
- Provide information on radionuclides not previously tested
- Identify data gaps

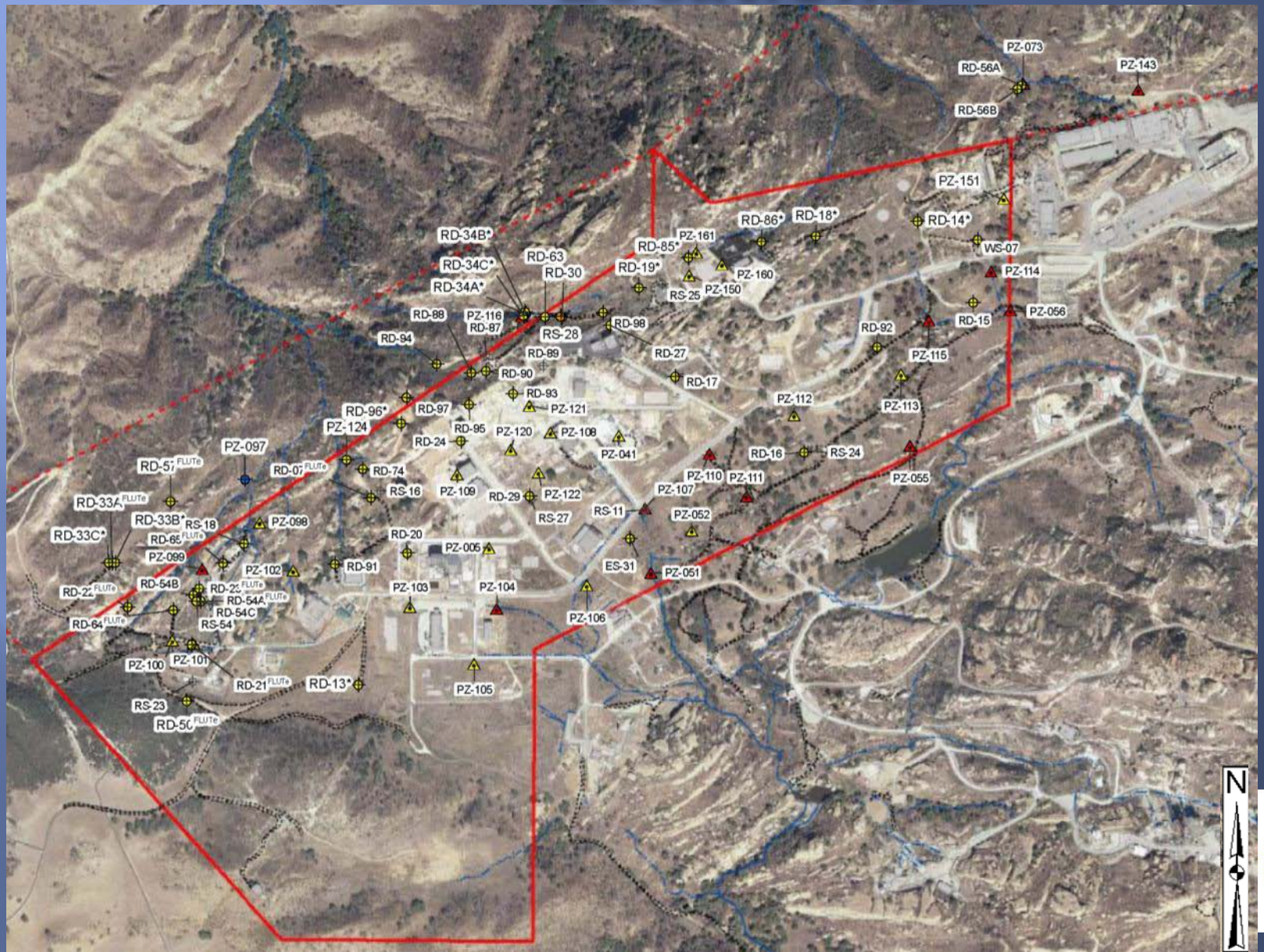
# Sampling Activities

- On-site groundwater
- Off-site groundwater
- Spring/seep
- Surface water
- Sediment

# Groundwater Sampling

- On-site
  - Viable monitoring wells in Area IV and Northern Buffer Zone
  - 70 existing monitoring wells identified
  - Two events (July 2010 and winter 2011)
- Off-site
  - 20 locations
    - SSFL off-site monitoring network
    - Additional wells identified within one mile of SSFL boundary
  - Negotiate access agreements

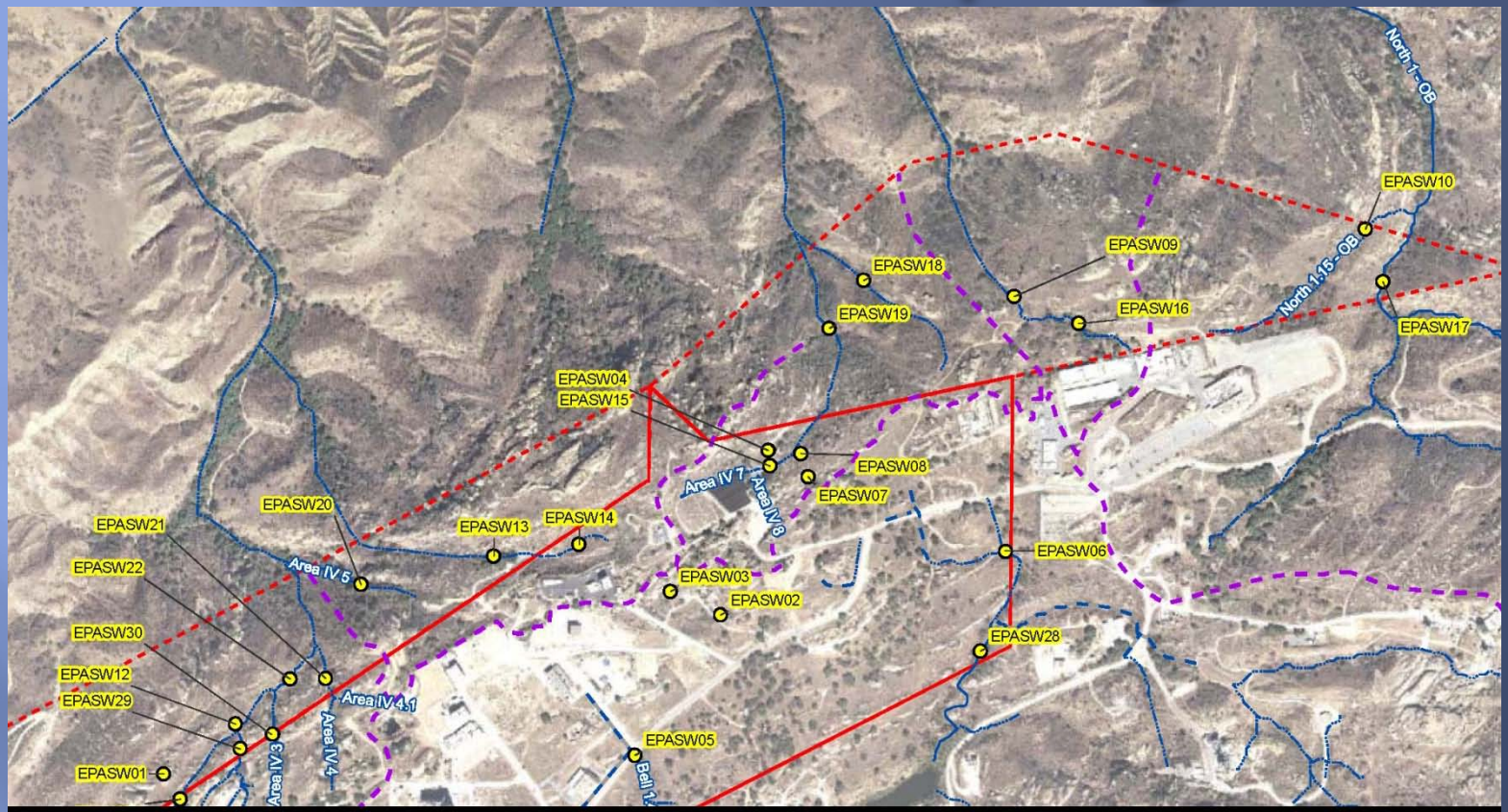
# On-Site Groundwater Sampling Locations



# Surface Water Sampling Locations

- Sample all major drainages leading from Area IV and drainages in Northern Buffer Zone
- 20 locations – 2 events.
- Collected immediately after a rainfall event

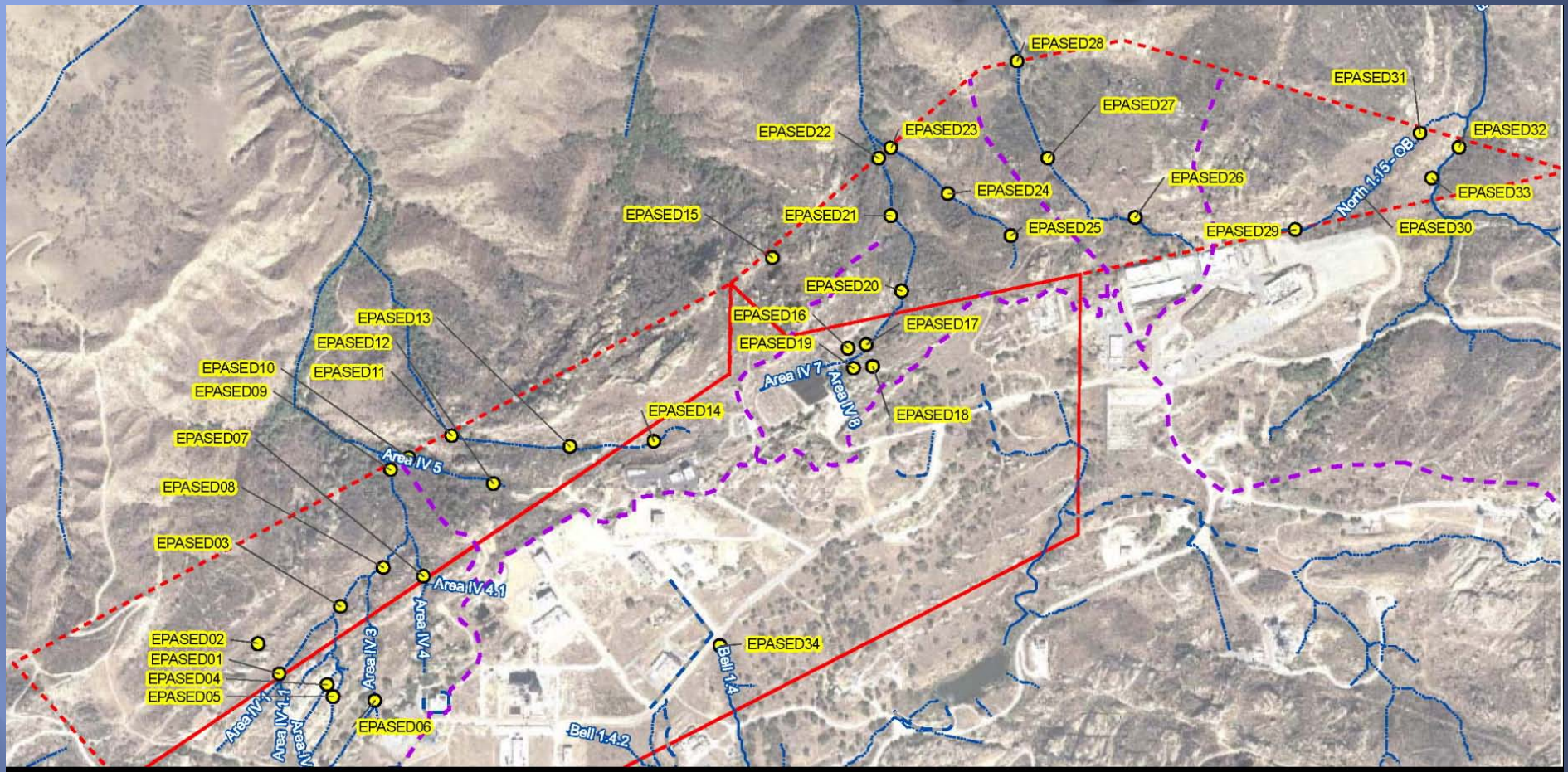
# Surface Water Sampling Locations



# Sediment Sampling Locations

- Sample all major drainages leading from Area IV and Northern Buffer Zone
- 1st event -- 40 locations spatially distributed across major drainages
- 2nd event -- 40 additional locations based on results of 1st event

# 1st Event Sediment Sampling Locations



# Spring/Seep Sampling

- 10 samples collected from locations:
  - where flowing water is observed
  - that have been sampled previously
- Distributed to represent each major drainage
- On-site staff to survey viable locations immediately after rainfall event

# Next Steps/Schedule

- July 2010 – 1st round groundwater sampling
- Winter 2011 – 2nd round groundwater sampling event and Off-site well sampling
- Sediment Sampling (TBD)
- Surface water and seep/spring sampling (precipitation dependent)

# Key Dates

- June, 2010 -- Gamma Scanning
- July, 2010 – Groundwater Sampling
- September, 2010 – Soil Sampling

# Questions?

# Keeping Informed

- Remember to sign in for this meeting and include your email to receive EPA's E-newsletter

- Contact David Cooper for questions about postal mailing and email lists

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