

LA-UR-15-29170

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*Title:* **December 2015 Public Meeting Presentation, Individual Permit for Storm Water, NPDES Permit No. NM0030759**

*Author(s):* Veenis, Steven J.

*Intended for:* Public, NMED, USEPA

*Purpose:* This presentation was prepared for the Individual Permit for Storm Water (IP) public meeting held at the Holiday Inn Express in Los Alamos, NM, on December 9, 2015. The purpose of the meeting was to update the public on implementation of and compliance with the IP and to provide the opportunity for public comment as required under Part 1.1(7) of the IP (National Pollutant Discharge Elimination System Permit No. NM0030759). This presentation will be available on Los Alamos National Laboratory's public website.



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**Individual Permit for Storm Water  
Project Update Public Meeting  
*Wednesday, December 9, 2015*  
Holiday Inn Express, Los Alamos, NM  
5:30 – 7:30**

Part 1: Presentations Binder, v. 2

LA-UR-15-29170



# Individual Permit 2015 Compliance Summary

December 9, 2015





# IP Compliance Summary

- 405 Sites in 250 SMAs (455 Site/SMA combinations)
- 135 Sites/SMAs have not sampled and remain in Extended Baseline Monitoring
  - No measurable storm events at the SMA
    - Primarily due to site conditions and baseline controls
  - Occasional sampler malfunction



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# IP Compliance Summary

- Sites/SMAs that have sampled go to Corrective Action if results  $>$  TAL and to Inspection and Maintenance if results  $<$  TAL (13).
- Corrective Actions Include:
  - NMED HWB Certificate of Completion (50) – Force Majeure (27)
  - Certified No Exposure (16)
  - Certified Total Retention (0)
  - Certified Enhanced Control (1) – EC Confirmation Monitoring (132)
- Inspection and Maintenance



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# IP Compliance Summary

- Alternative Compliance (81)
  - Unable to certify completion of corrective action
    - POCs from urban runoff
    - POCs associated with background



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# IP Compliance Summary

- All Sites/SMAAs in compliance with current permit deadline (November 1, 2015).
- We will maintain compliance with current permit until new permit is issued (administrative continuance).
- New Permit:
  - LANL, NMED-SWQB and CCW worked on new permit language.
  - Waiting for EPA to issue permit.



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# IP Corrective Actions Update

William Foley

December, 2015

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# Certifications Submitted in 2015

- No Exposure Certifications
  - 5 Site Monitoring Areas (SMAs)
  - 5 Site / SMA combinations
- Enhanced Controls
  - 37 SMAs
  - 76 Site / SMA combinations
  - Treatment train approach where applicable



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# Enhanced Controls

- Based on monitoring results.
- SMAs with confirmation samples exceeding TALs are visually inspected.
- All existing control measures are re-evaluated.



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# Installation Update

- Current Activities
  - 2015 enhanced controls installed/certified
- Future Activities
  - Additional activities planned/completed at 3 SMAs for additional water quality improvements
  - Evaluating potential certifications for 3 year-24 hour storm at all or portions of 5 SMAs



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# Challenges Completing Field Work Encountered in 2015

- Health & safety issues
  - Accessibility
  - Site specific hazards
- Seasonal Restrictions
  - Lightning
  - Red flag conditions
  - Endangered species
  - Nesting Season
- Operational Restrictions
- Permit Requirements
- Cultural Issues
  - Archaeological sites
  - Historical sites/trails
- Property ownership
  - Access agreements



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# F-SMA-2



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# CHQ-SMA-6



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# 3M-SMA-4



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# CHQ-SMA-2



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# LA-SMA-5.52



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# PJ-SMA-5



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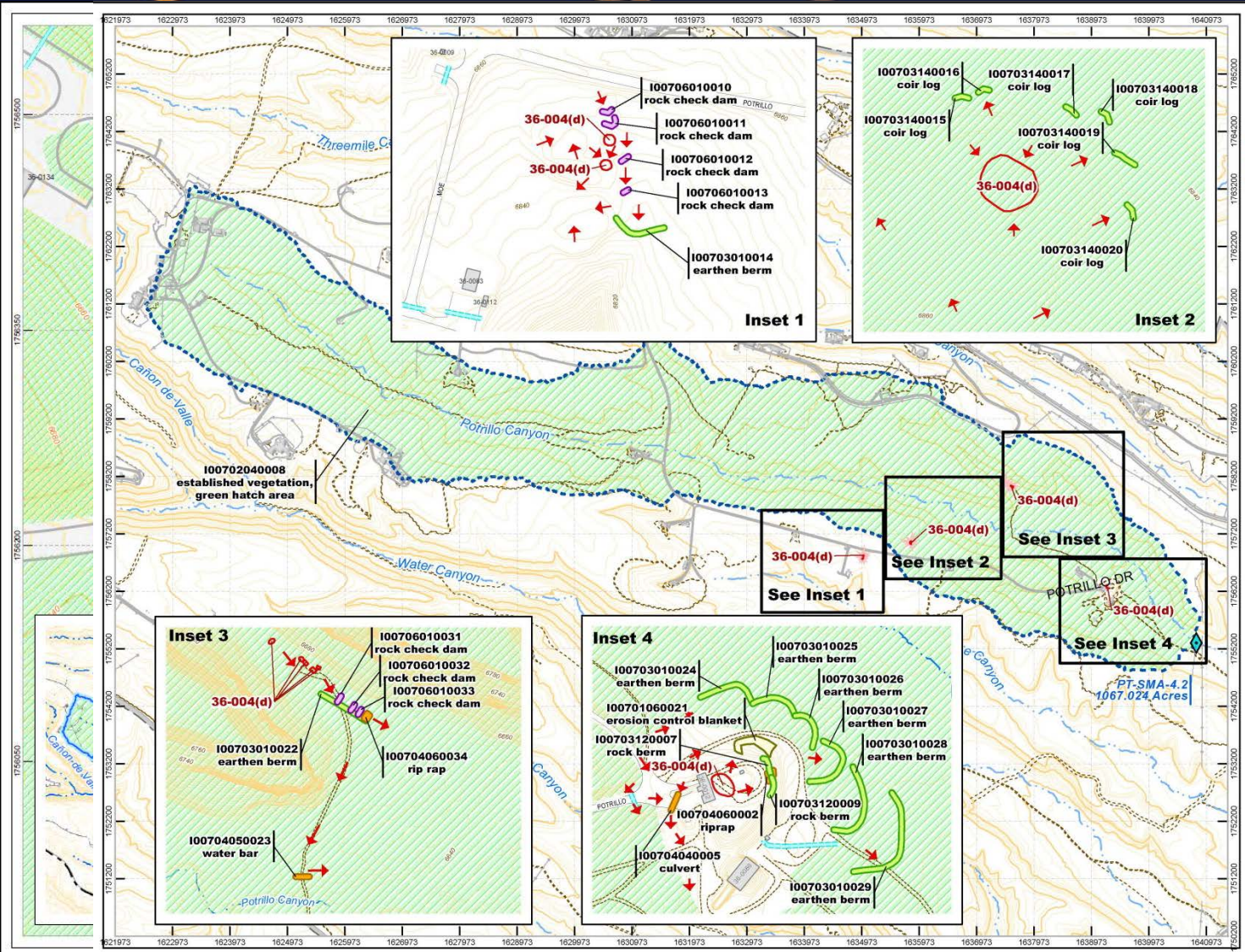
# PT-SMA-2



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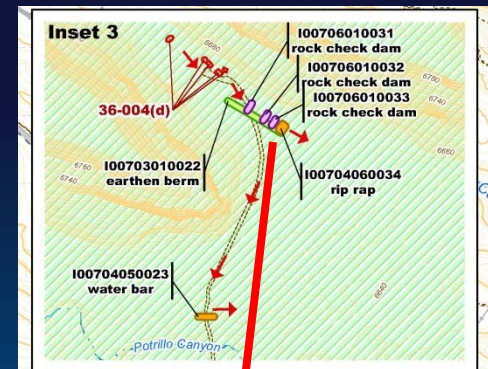
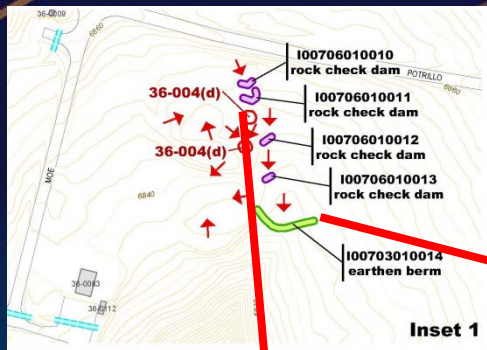
# PT-SMA-4.2



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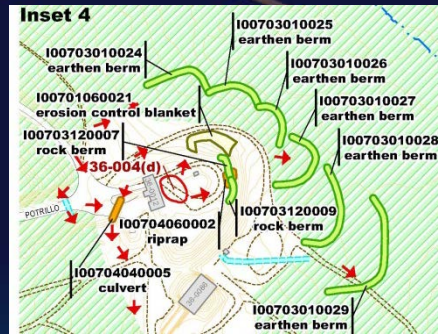
# PT-SMA-4.2



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# PT-SMA-4.2



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# PJ-SMA-1.05



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# 2M-SMA-1.44



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# Precipitation Network and 2015 Monitoring Year

Amanda White

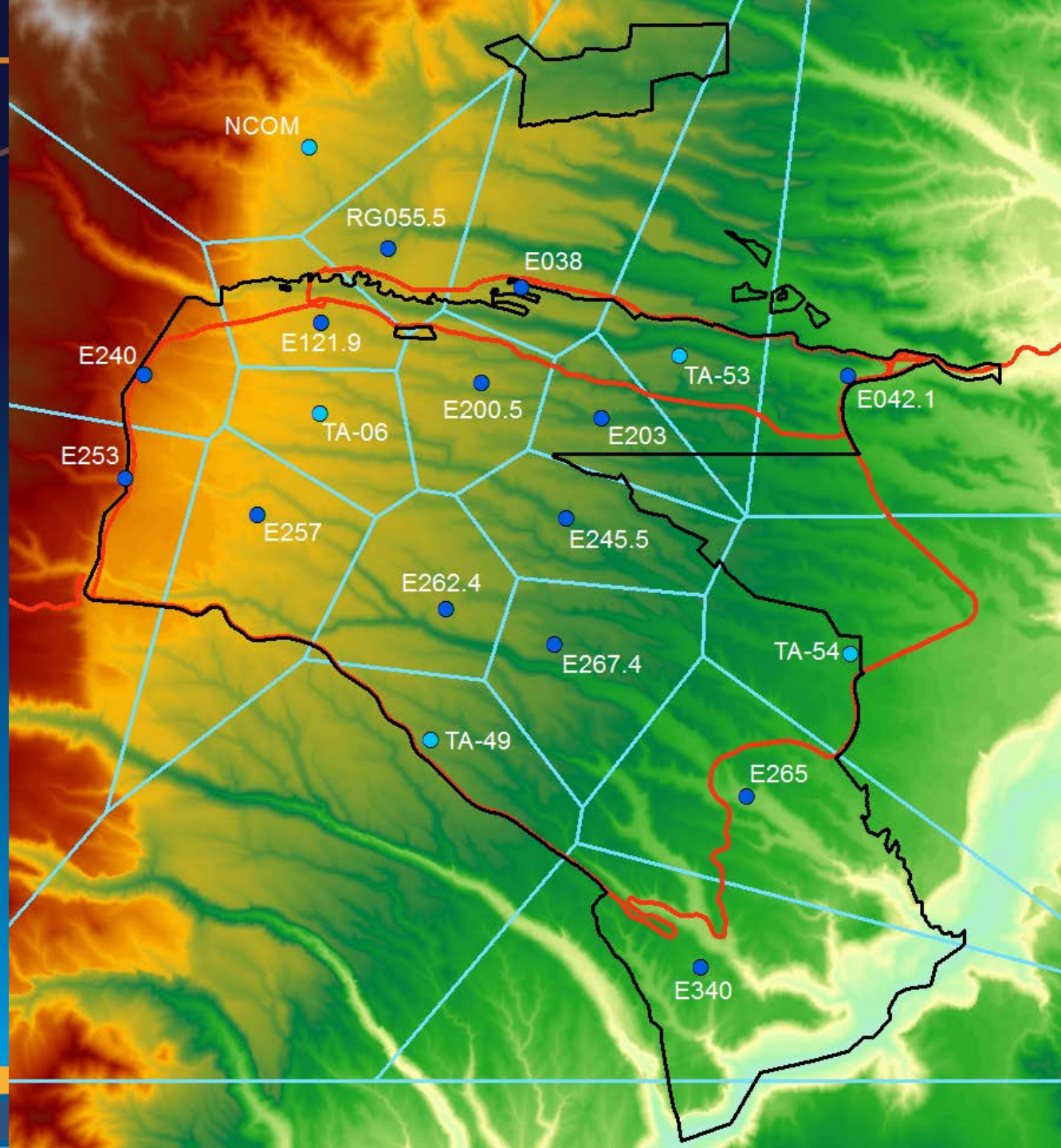
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# Summer Precipitation Network

## Legend

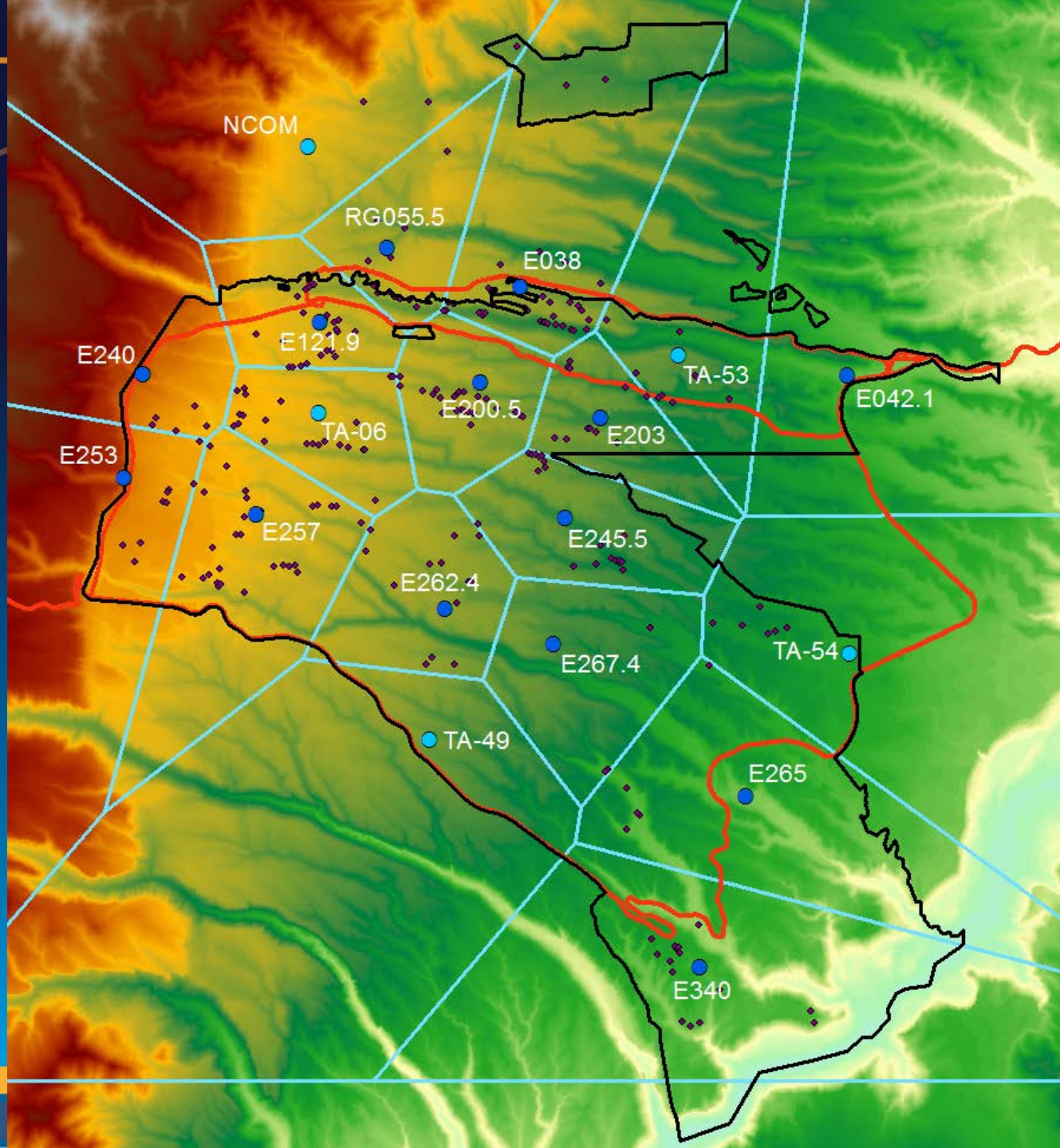
-  Met Towers
-  Extended Network
-  LANL Boundary
-  Major Roads
-  Summer Theissen Polygons
-  Elevation



# Summer Precipitation Network

## Legend

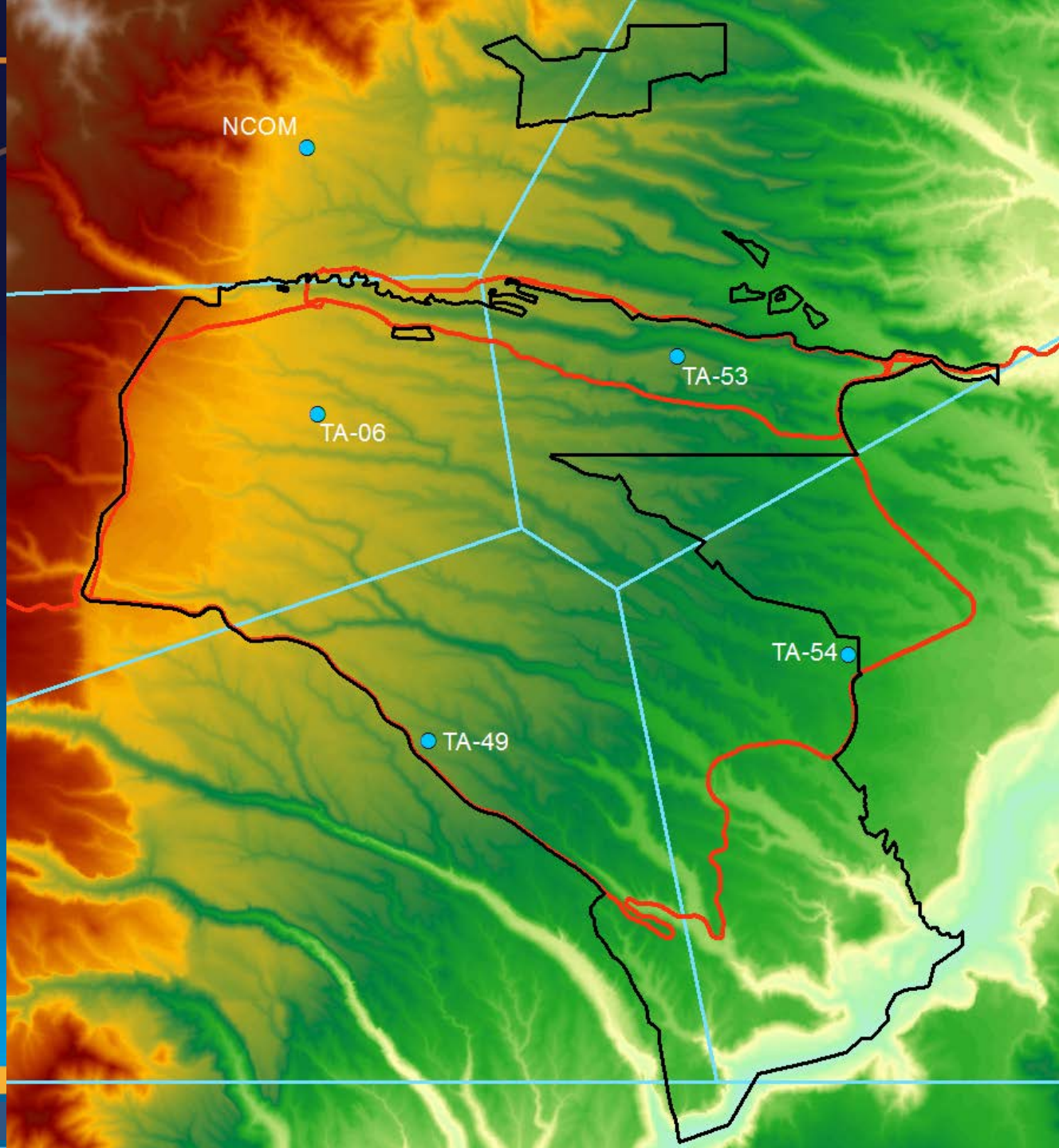
-  Met Towers
-  Extended Network
-  LANL Boundary
-  Major Roads
-  Summer Theissen Polygons
-  Elevation
-  SMA Samplers



# Winter Precipitation Network

## Legend

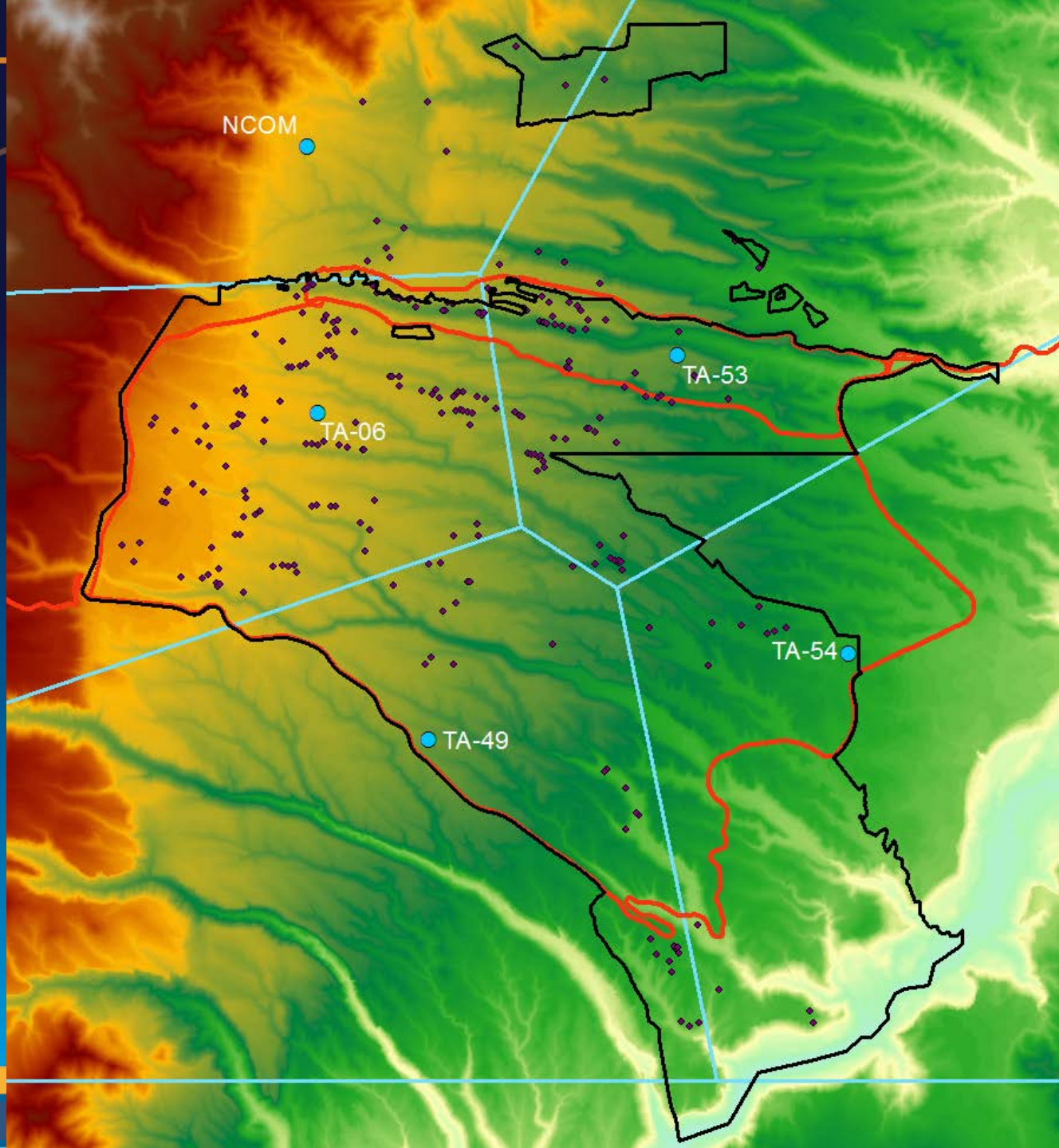
-  Met Towers
-  LANL  
Boundary
-  Major Roads
-  Winter  
Theissen  
Polygons
-  Elevation



# Winter Precipitation Network

## Legend

-  Met Towers
-  LANL  
Boundary
-  Major Roads
-  Winter  
Theissen  
Polygons
-  Elevation
-  SMA  
Samplers



# IP Samples Collected in 2015

## Legend

- LANL Boundary
- Major Roads

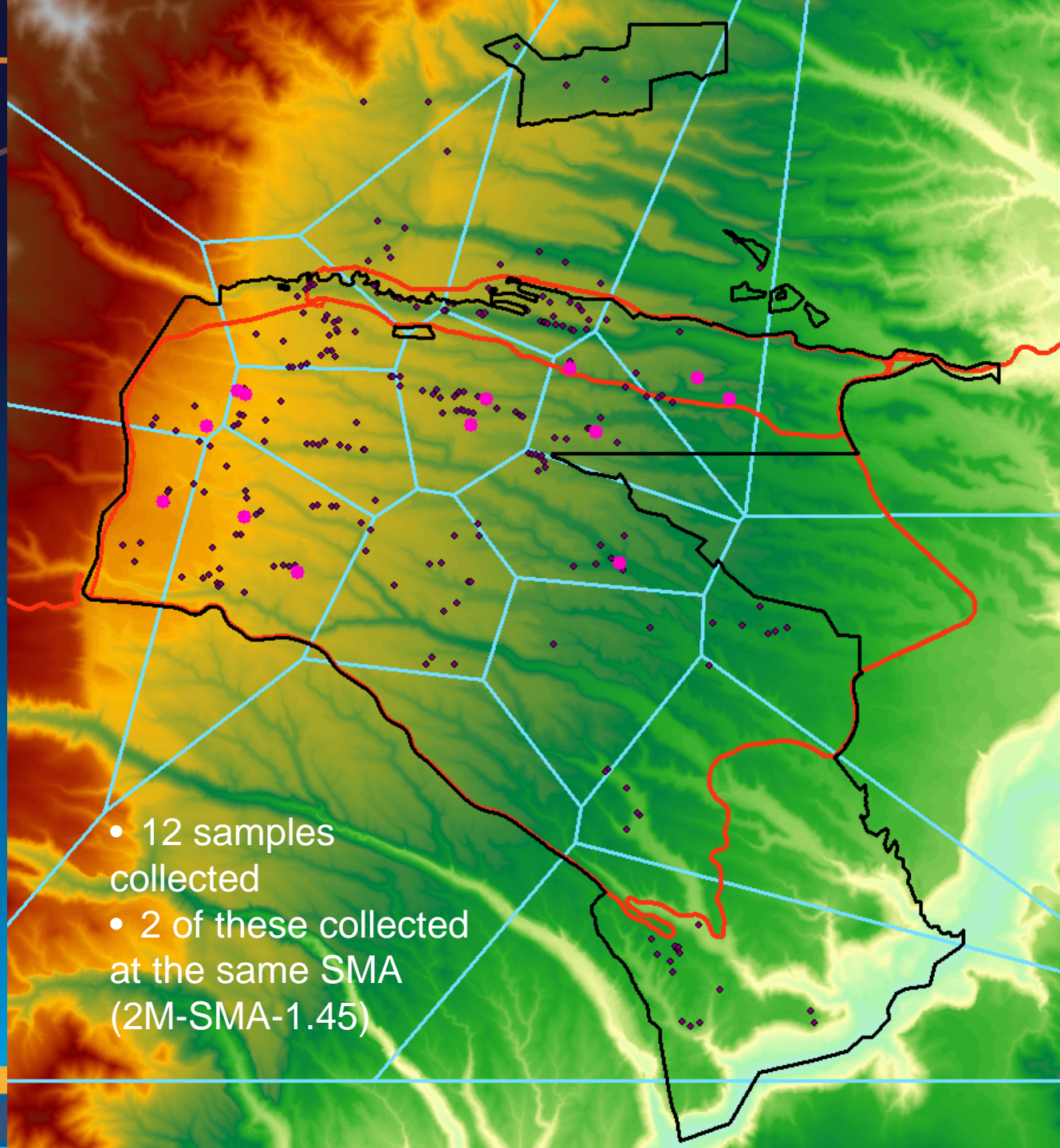
- Summer Theissen Polygons

- Elevation

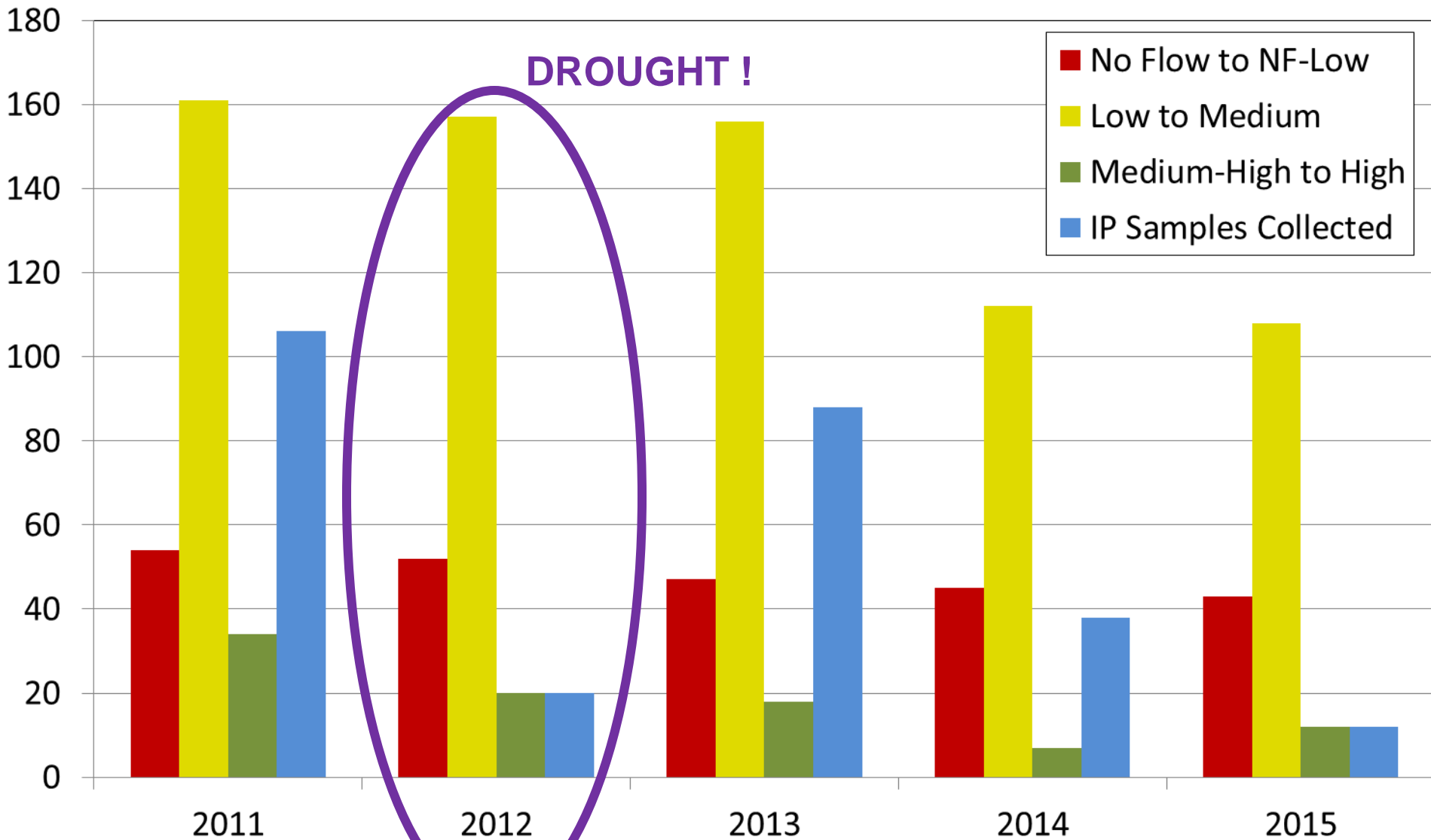
- SMA Samplers

- SMA Samplers that Collected in 2015

- 12 samples collected
- 2 of these collected at the same SMA (2M-SMA-1.45)



# Number of IP Samples vs. Flow

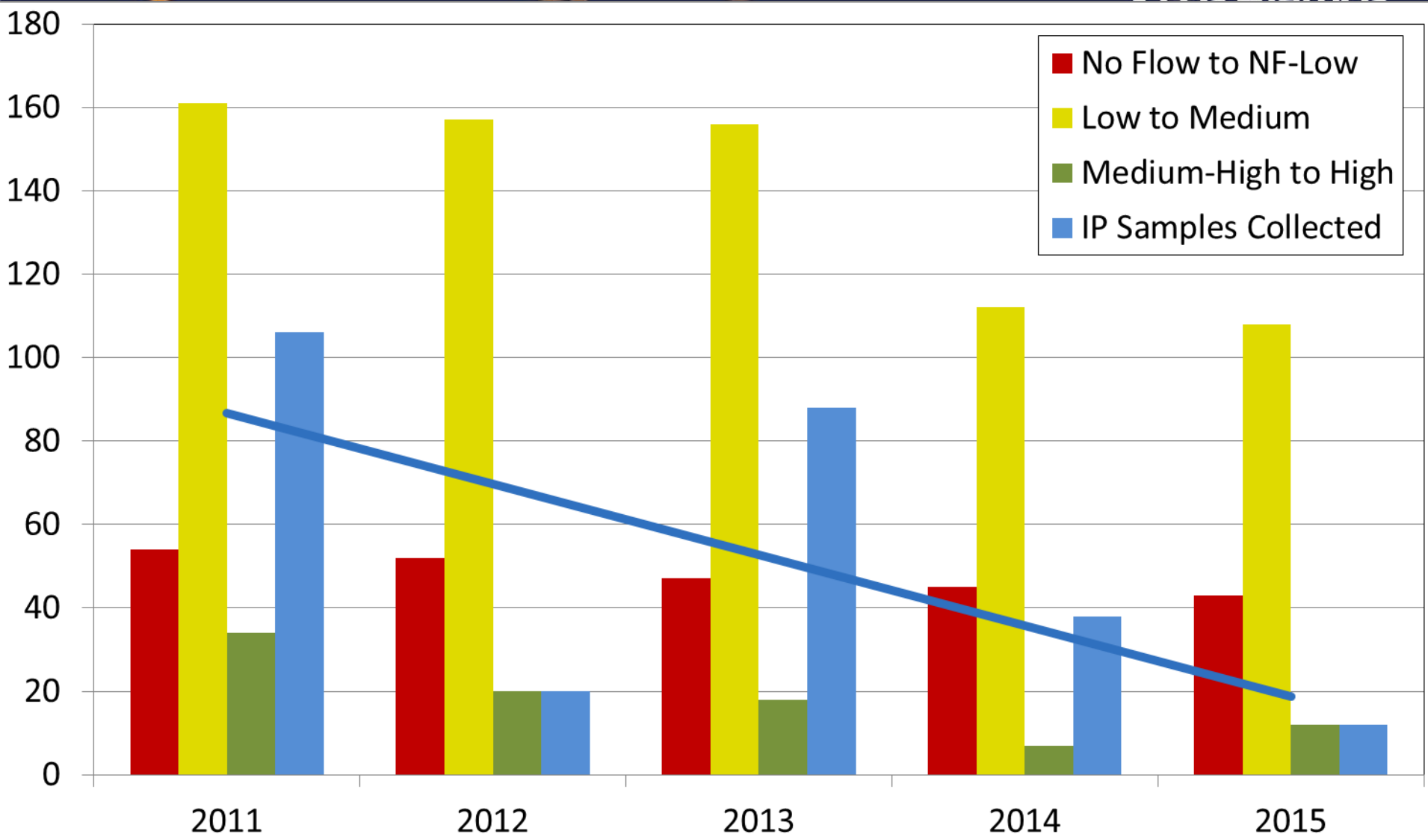


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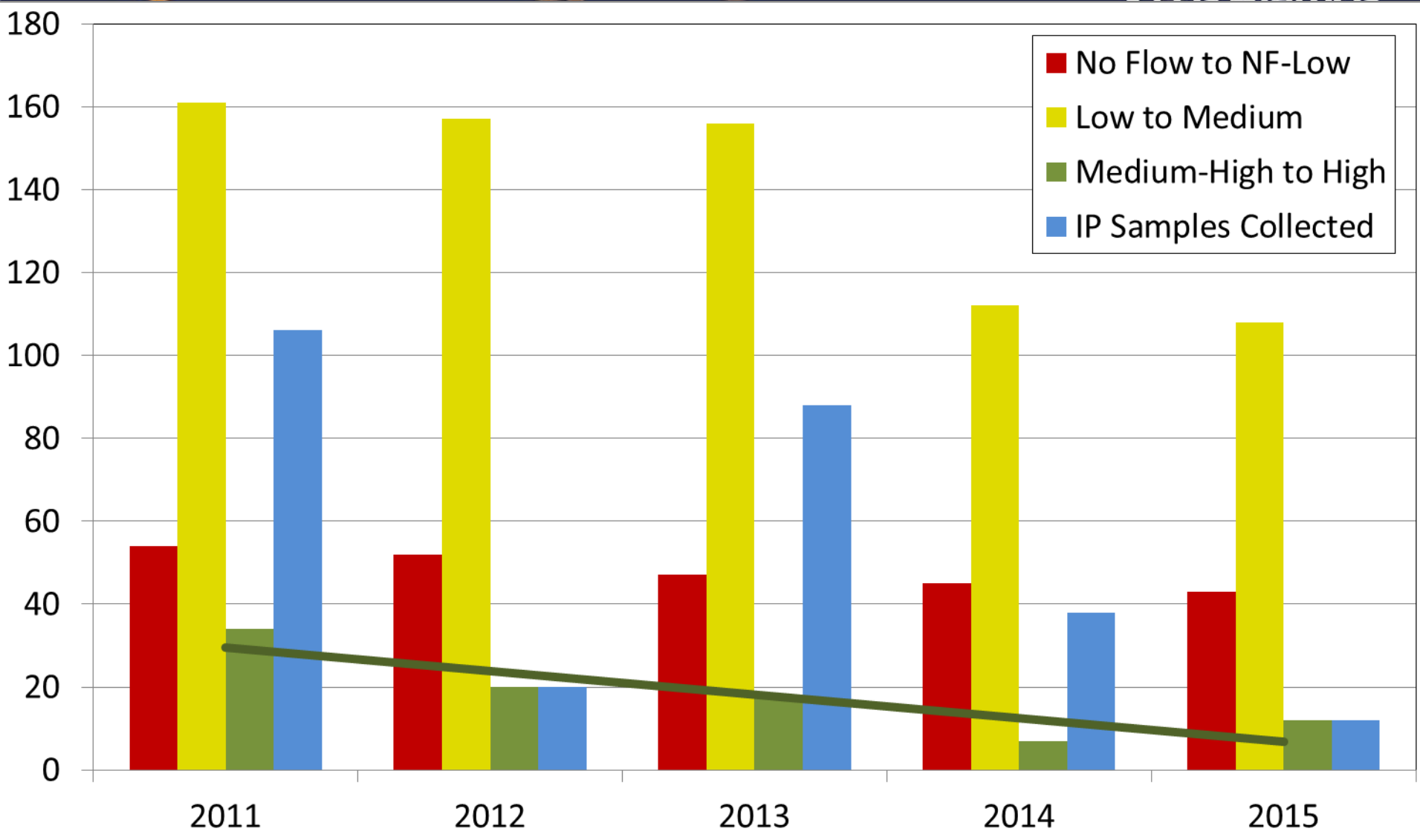


# Number of IP Samples vs. Flow Potential



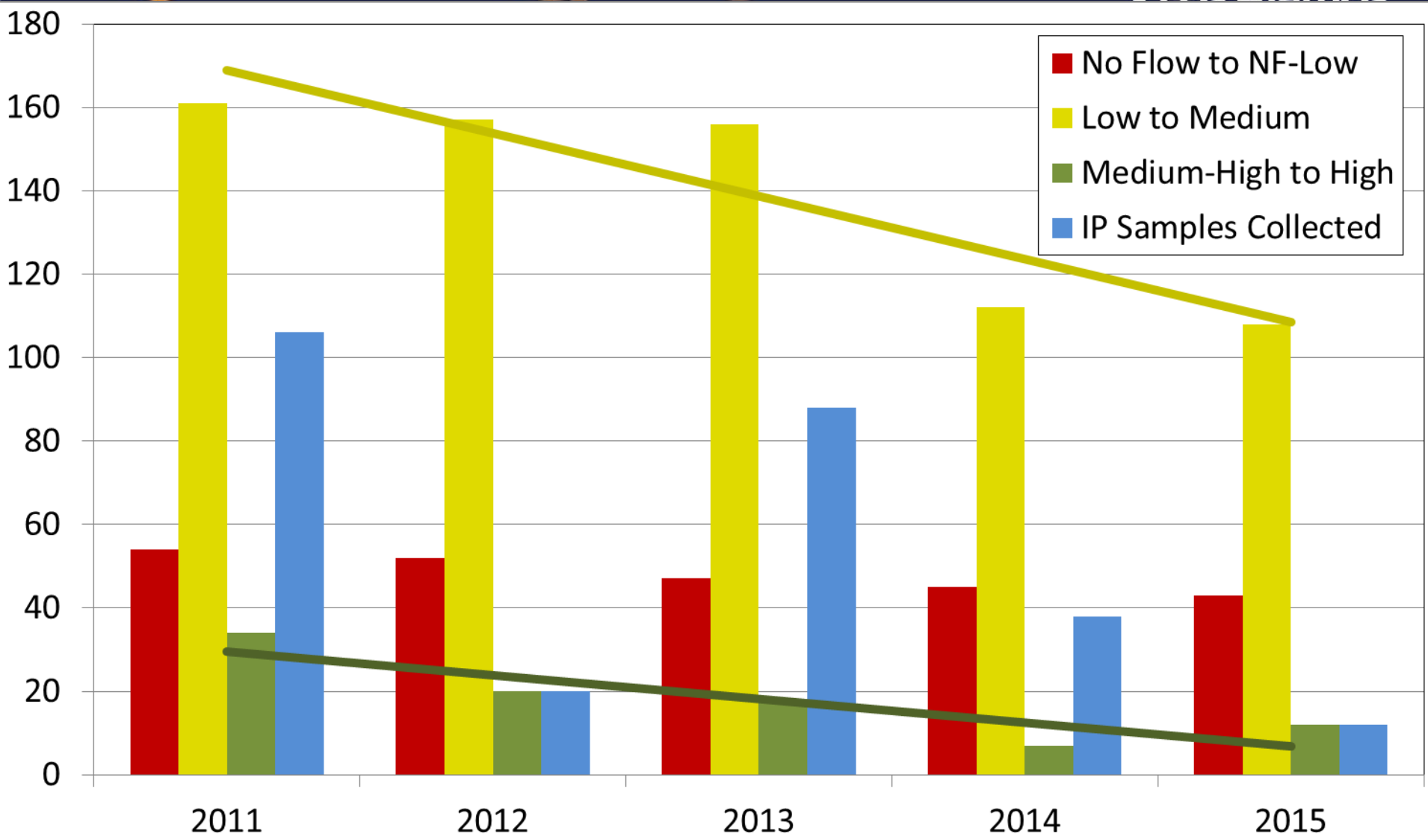
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# Number of IP Samples vs. Flow Potential



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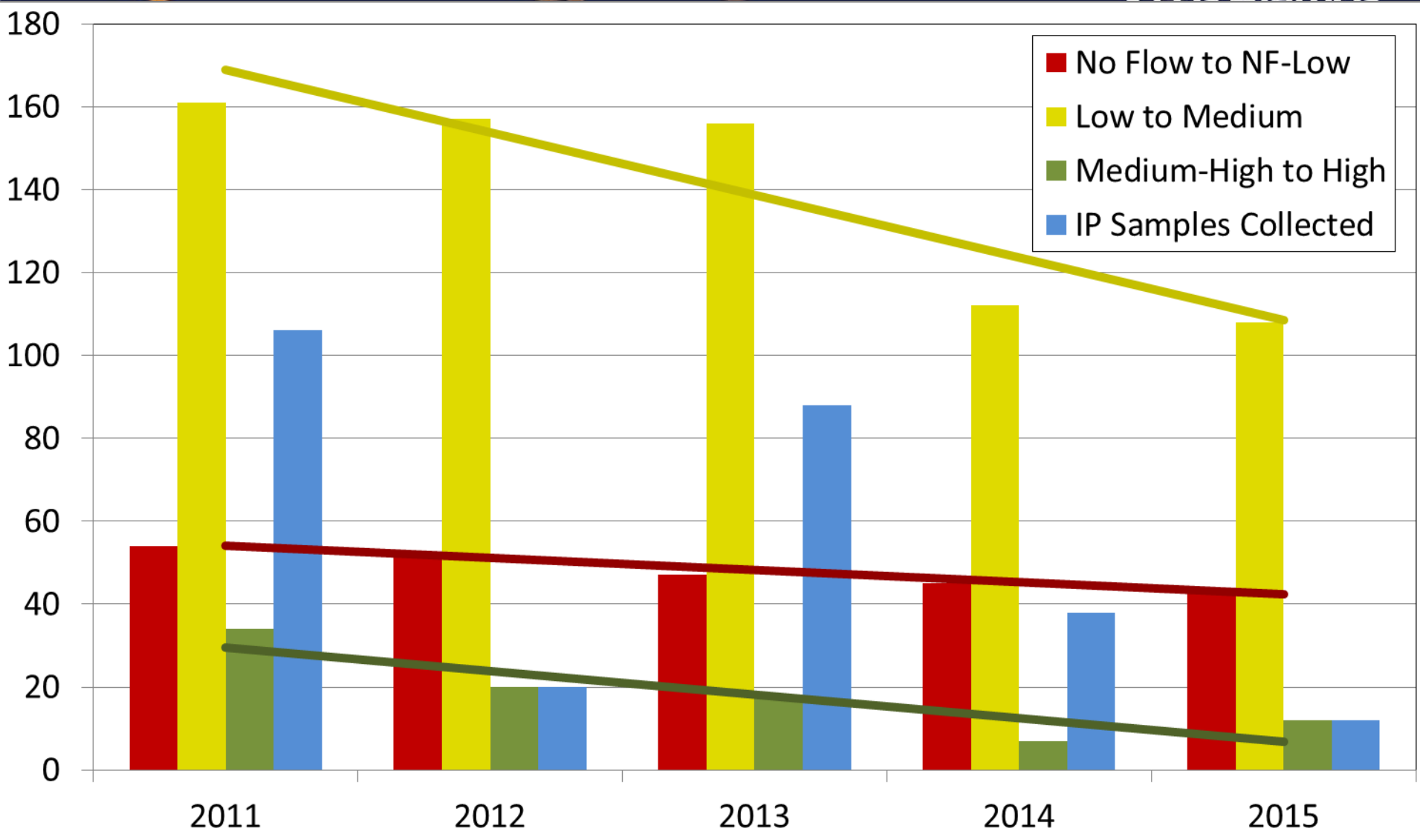
# Number of IP Samples vs. Flow Potential



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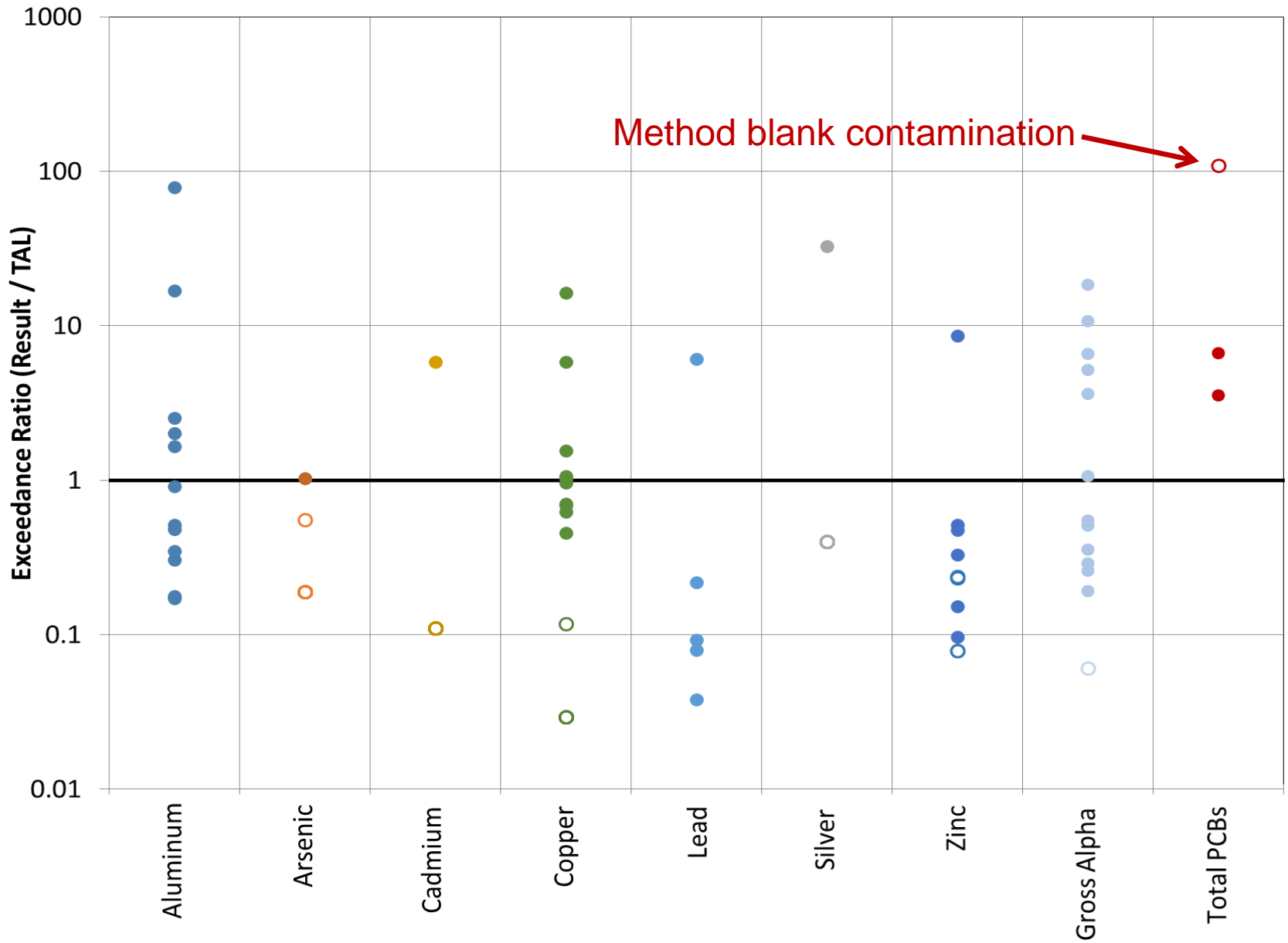
# Number of IP Samples vs. Flow Potential



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# IP Results from 2015



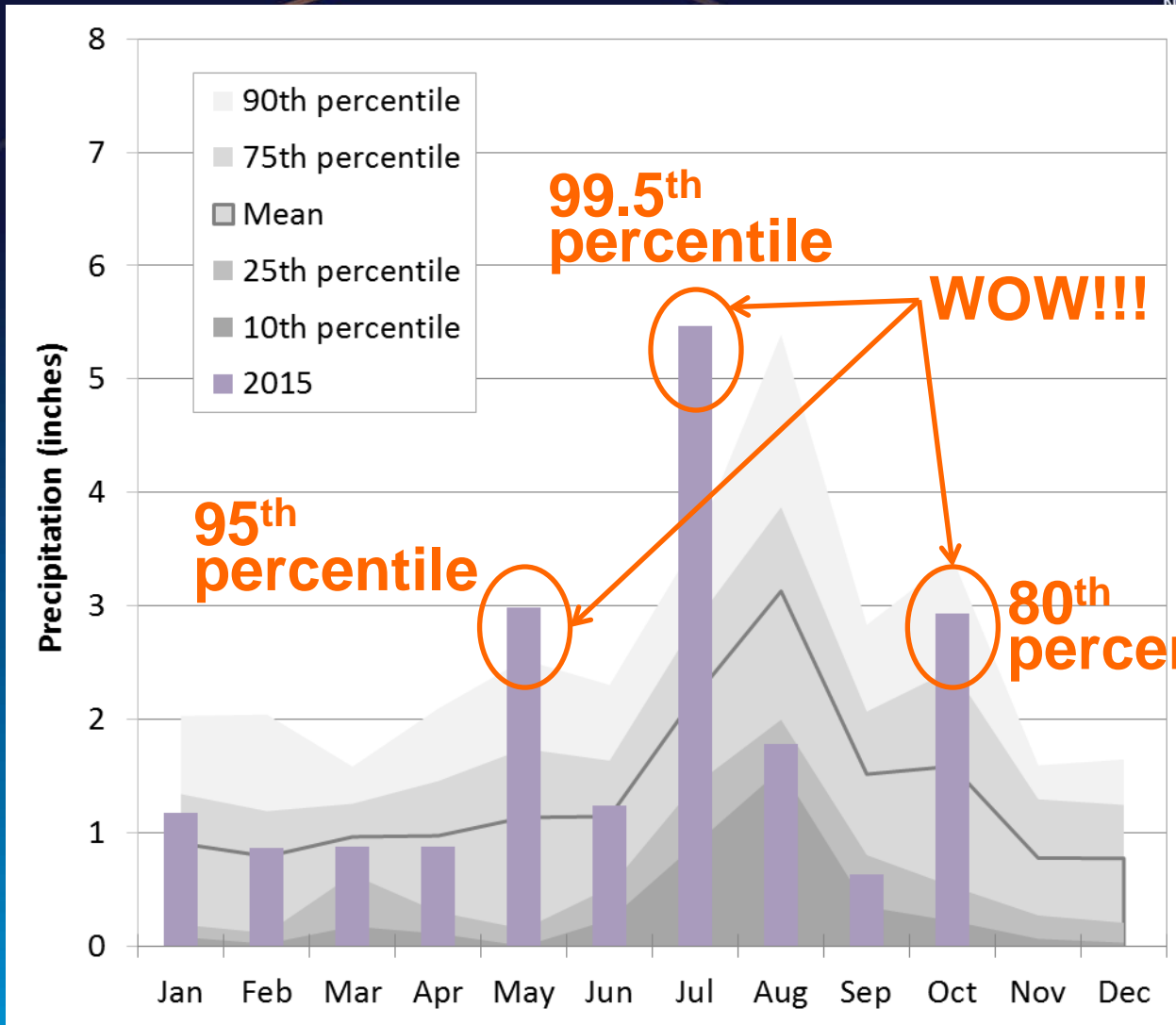
# IP Results from 2015

- Aluminum and gross alpha – associated with local geology
- Copper and zinc – associated with urban areas
- PCBs – associated with humans (in the atmosphere, precipitation, and runoff)
- Lead, silver, cadmium – potential LANL-related contaminants



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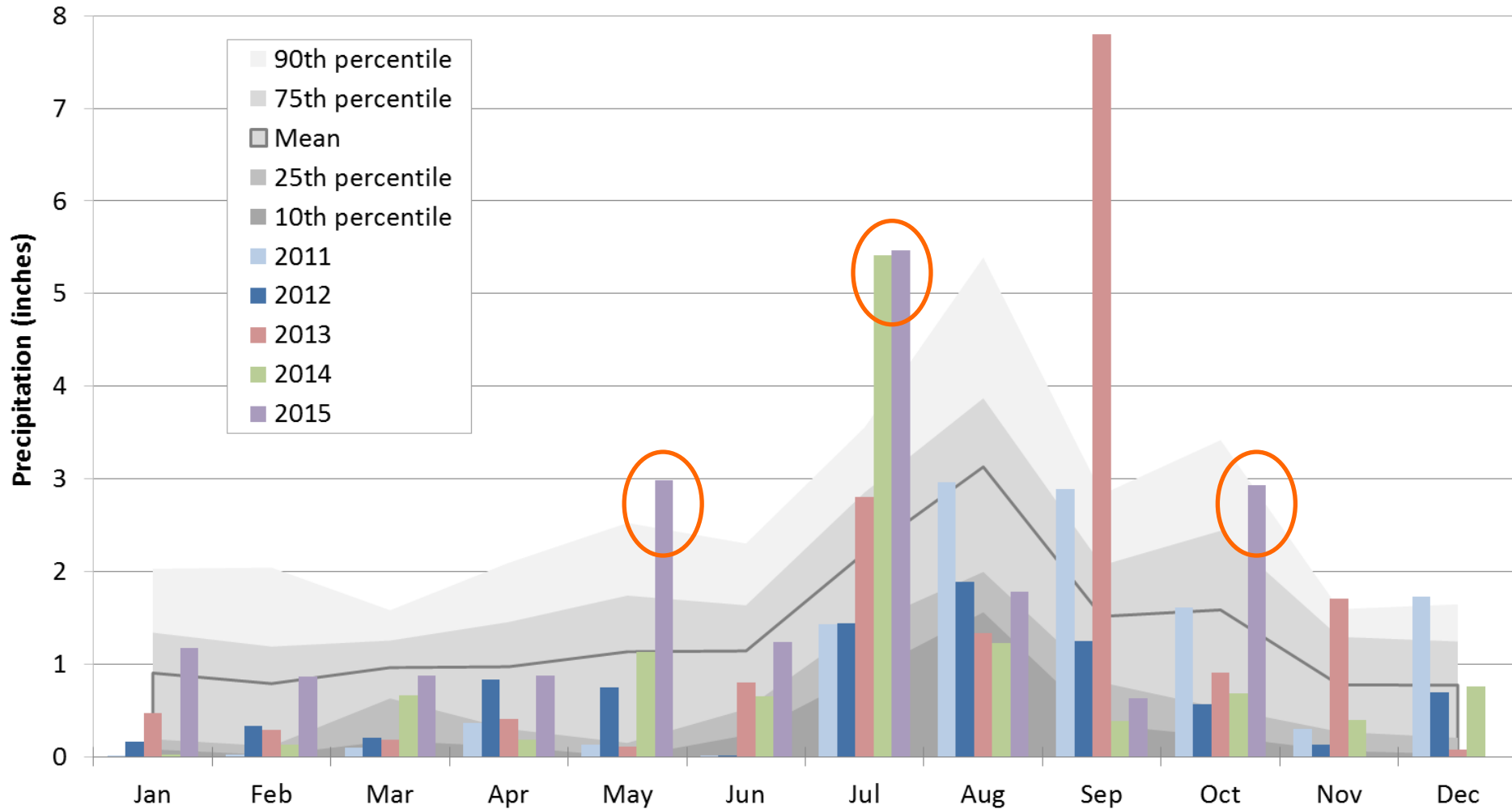
# 2015 Monitoring Year



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# 2015 Compared to Past Years



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# El Niño Video

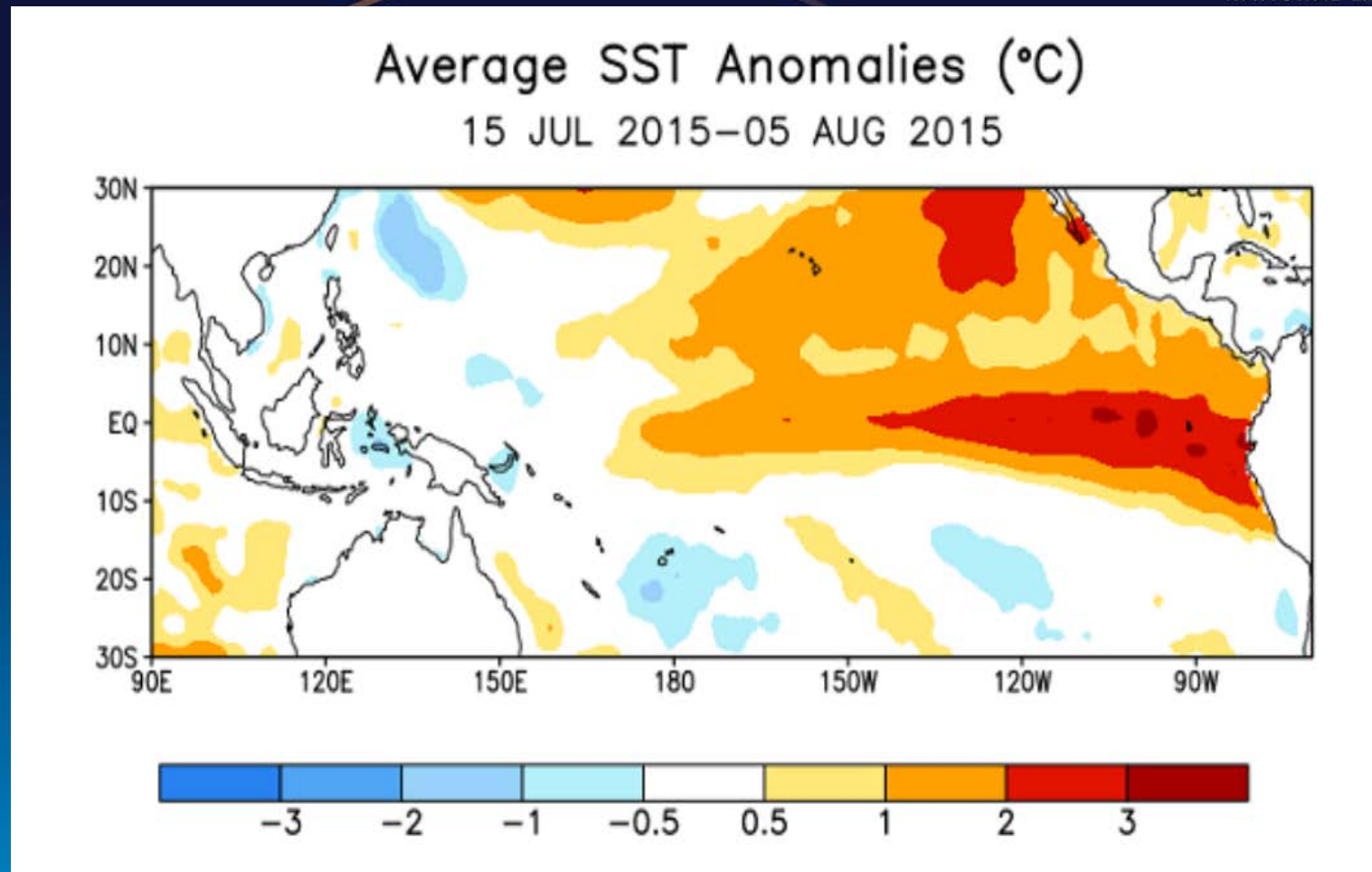
If the internet works, this a great video  
by the Met Office (Meteorological  
Office in the UK, similar to the National  
Oceanic and Atmospheric  
Administration (NOAA) in the US:

<https://www.youtube.com/watch?v=WPA-KpldDVc>



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# 2015 Monsoon El Niño



\*Anomalies are computed with respect to the 1981-2010 averages

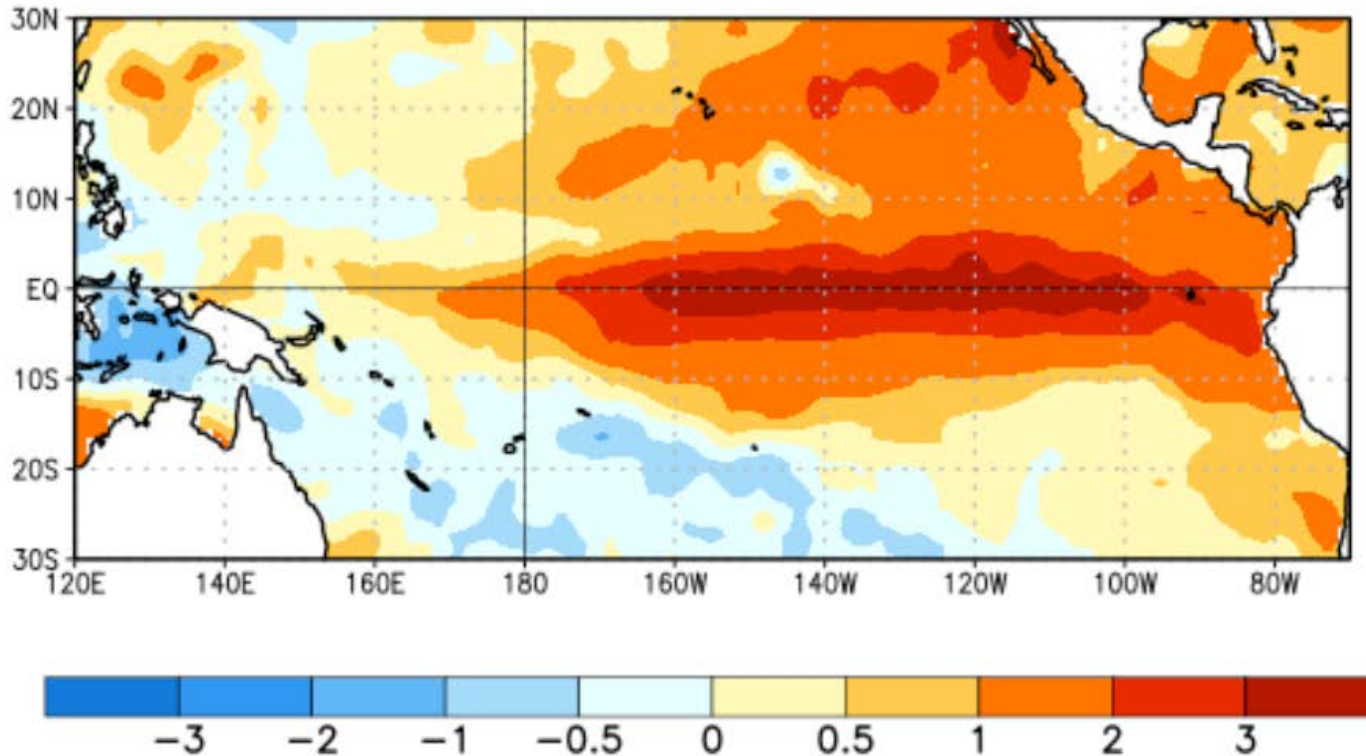
\*\*NOAA Climate Prediction Center

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# Current El Niño

SST Anomalies (°C)  
01 NOV 2015 – 07 NOV 2015



\*Anomalies are computed with respect to the 1981-2010 averages

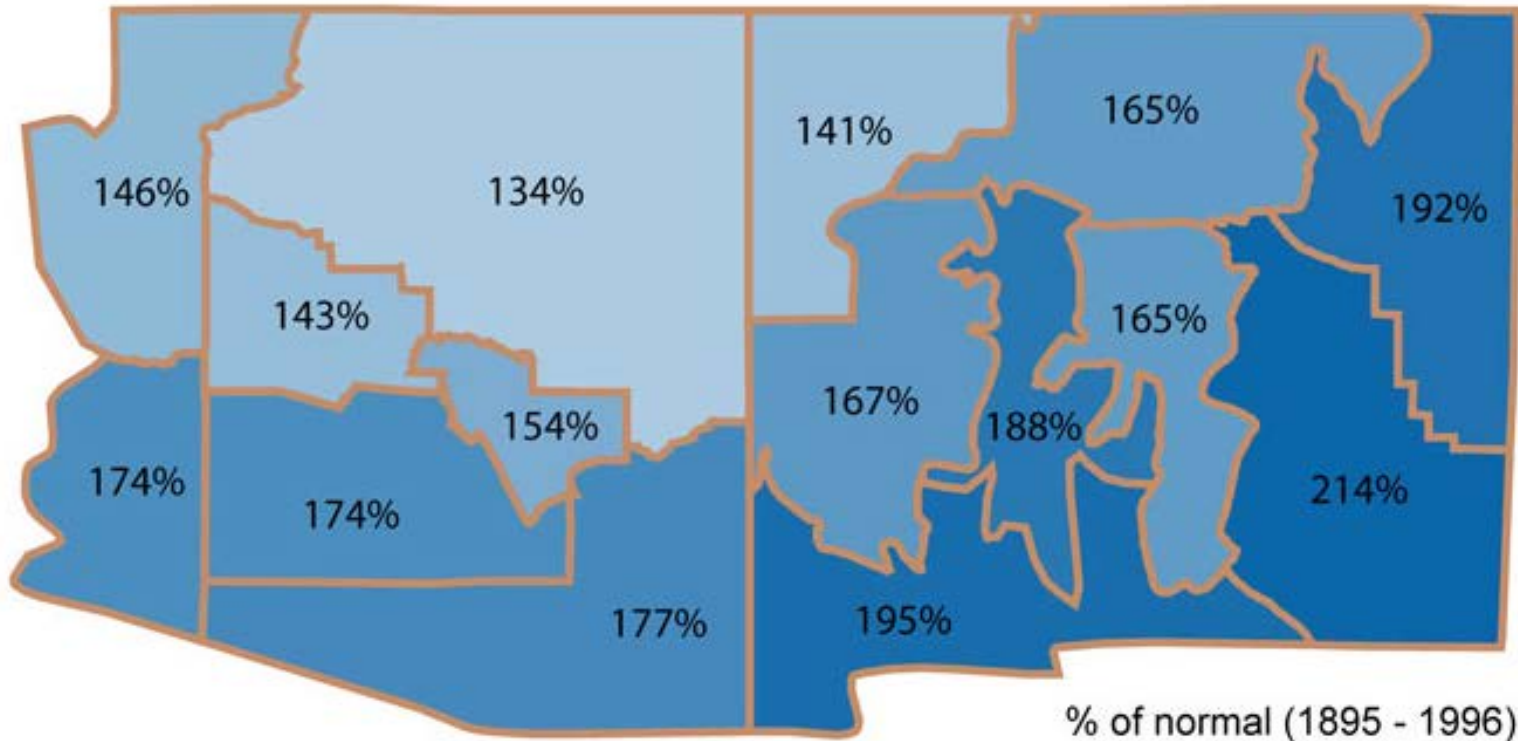
\*\*NOAA Climate Prediction Center

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# What does the El Niño mean to New Mexico?

## Arizona and New Mexico are Wetter during El Niño Winters

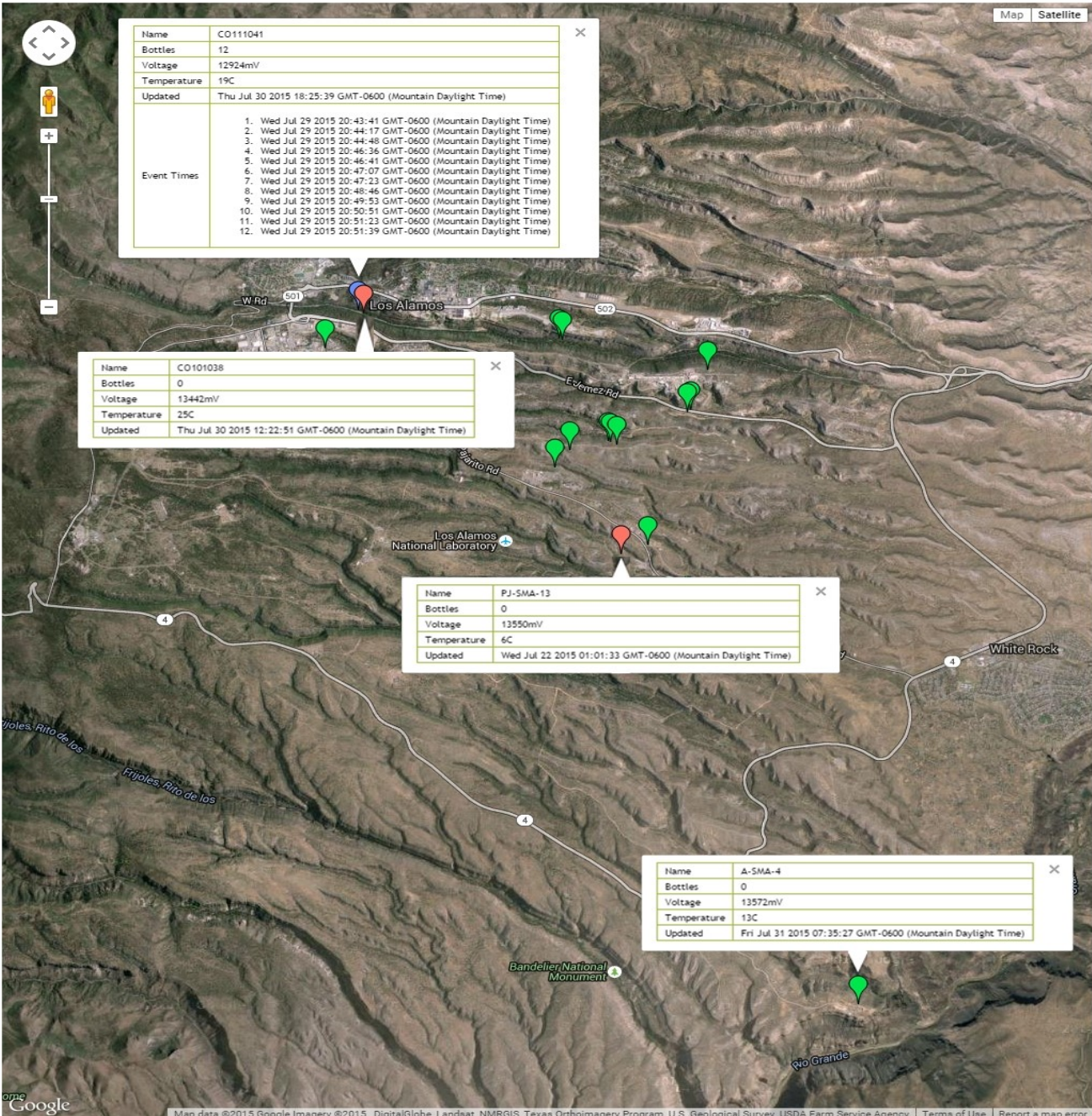


\*NOAA Climate Prediction Center

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ID	Name	Bottles	Location		Reset All
2	CO111041	12	Latitude	35.879285	reset
			Longitude	-106.310765	
4	PJ-SMA-14	0	Latitude	35.843467	reset
			Longitude	-106.264164	
6	S-SMA-5	0	Latitude	35.863755	reset
			Longitude	-106.257841	
7	S-SMA-3.51	0	Latitude	35.873519	reset
			Longitude	-106.316154	
8	TA-53-20_rel	0	Latitude	35.870184	reset
			Longitude	-106.254598	
9	M-SMA-12.9	0	Latitude	35.858772	reset
			Longitude	-106.269263	
11	S-SMA-5.2	0	Latitude	35.864072	reset
			Longitude	-106.257309	
12	M-SMA-12.5	0	Latitude	35.857906	reset
			Longitude	-106.276776	
13	LA-SMA-6.3'	0	Latitude	35.874771	reset
			Longitude	-106.277958	
15	LA-SMA-6.3	0	Latitude	35.874966	reset
			Longitude	-106.278520	
16	CO101038	0	Latitude	35.878826	reset
			Longitude	-106.309936	
17	A-SMA-4	0	Latitude	35.773200	reset
			Longitude	-106.230425	
18	CDB-SMA-1	0	Latitude	35.855185	reset
			Longitude	-106.279173	
19	M-SMA-12.7	0	Latitude	35.859224	reset
			Longitude	-106.270663	
20	M-SMA-12.8	0	Latitude	35.859182	reset
			Longitude	-106.270226	
21	PJ-SMA-13	0	Latitude	35.841974	reset
			Longitude	-106.268458	

Administrators

Z#	<input type="text"/>	delete
Z#	<input type="text"/>	delete
Z#	<input type="text"/>	delete
Z#	<input type="text"/>	delete
	<input type="text"/>	add

# RTU Google Earth Website

- Blue – sample collected
- Red – problem status (a lapse in communication or low battery voltage)
- Green – OK status (sufficient battery voltage and recent State-of-Health contact)



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# Remote Telemetry Units (RTUs)

- First Testing Phase
  - 15 locations
  - Easy access with a variety of terrain
- Second Testing Phase
  - 7-day hold times behind the fence
  - 7-day hold times outside the fence or that are difficult to access (RCT scan required or private property or long hike)
  - Remainder behind the fence
  - Remainder outside the fence



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# Urban Storm Runoff and Atmospheric Deposition Updates



Armand Groffman, ADEP-ER, LANL  
Courtney Perkins, NMED DOE Oversight Bureau  
Don Carlson, NMED DOE Oversight Bureau

# Urban Storm Water Runoff Collaborative Study

**Goal: Evaluate Metals and Total PCB concentrations in urban storm water runoff from areas in Los Alamos with no known history of industrial activity**

## Collaborative study 2014-2015

- Los Alamos National Laboratory (LANL)
- New Mexico Environment Department  
Department of Energy Oversight  
Bureau (NMED DOE OB)



# Urban Storm Water Runoff Collaborative Study

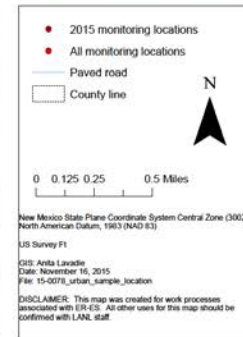
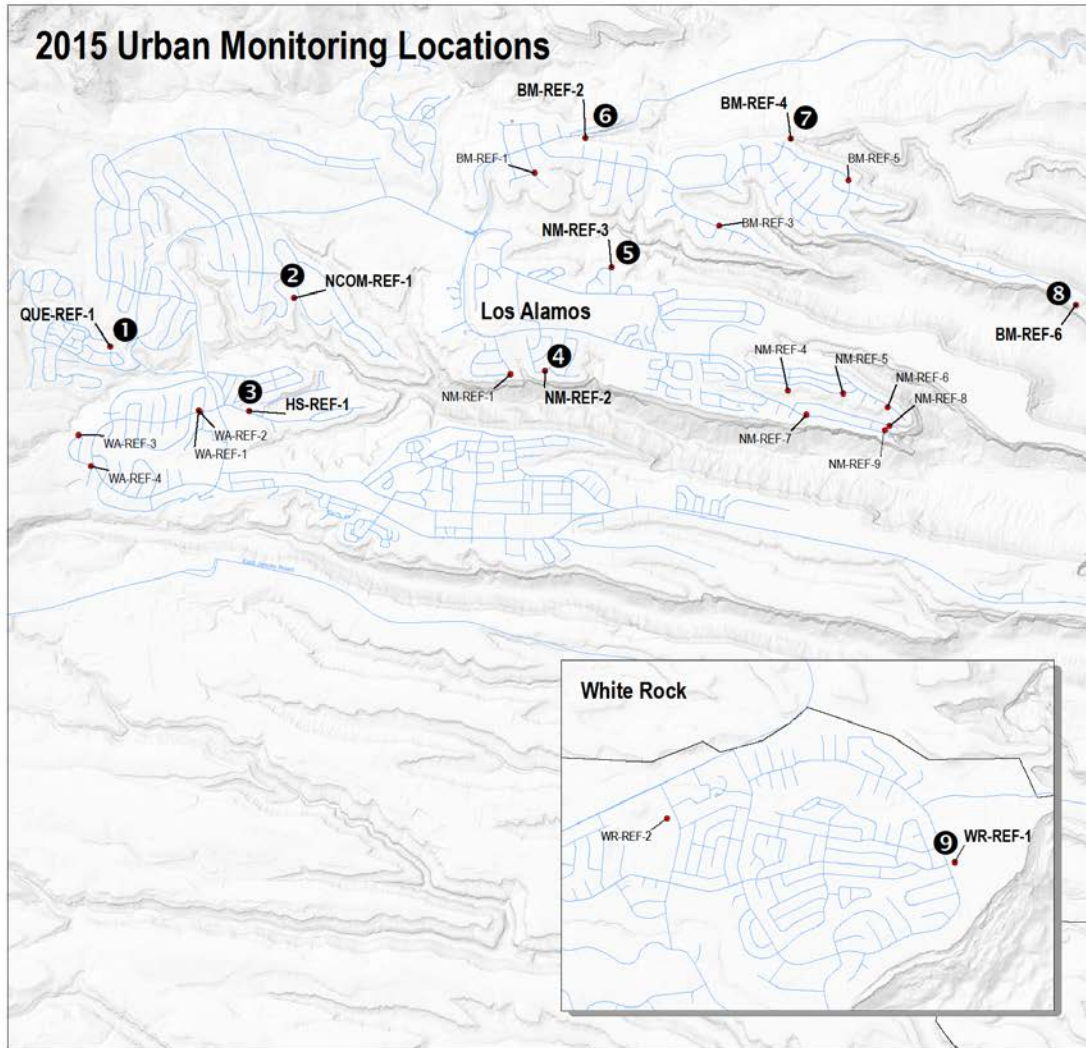
Storm water runoff from Los Alamos County (LAC) town site urban residential areas monitored during the summers of 2014 and 2015.



Global Water automated sampler

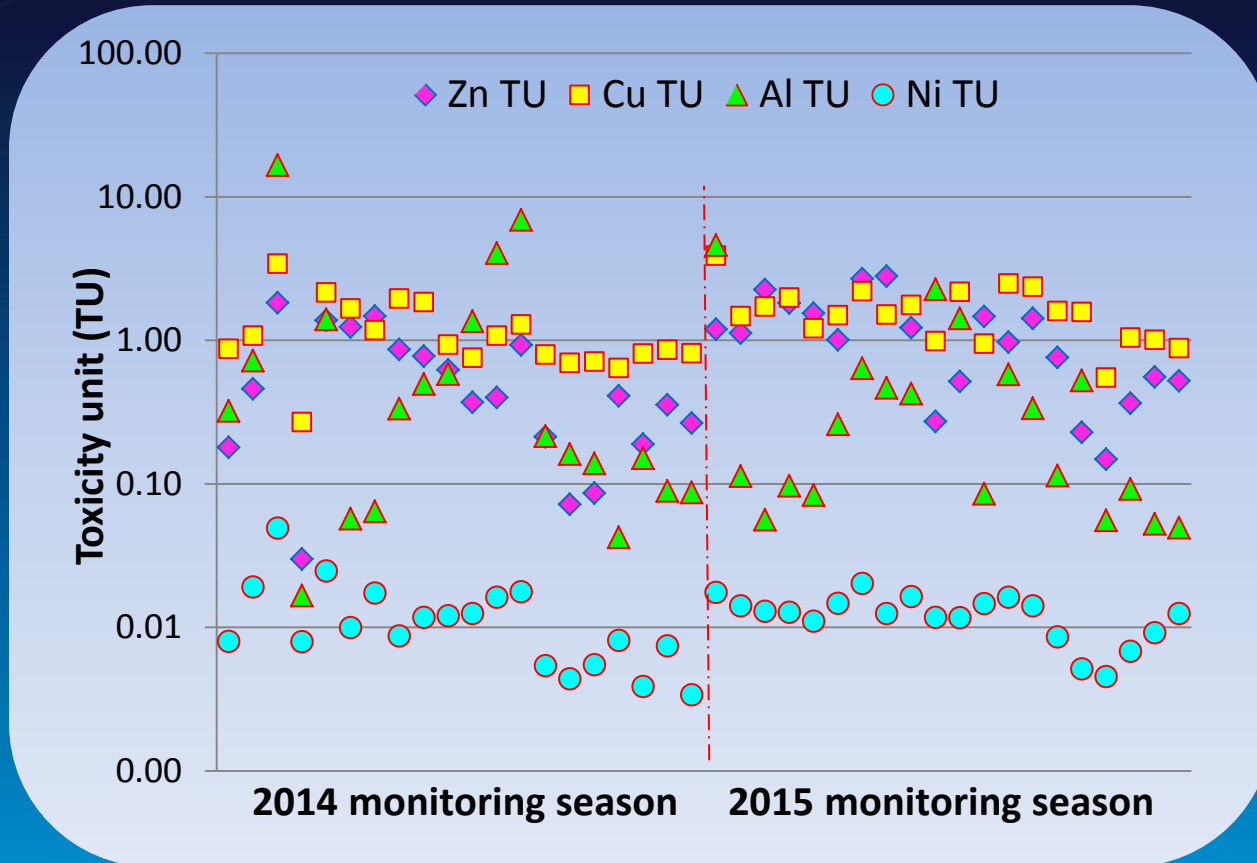
# Urban Study Locations

## 2015 Urban Monitoring Locations



# 2014-2015 Los Alamos County Urban Neighborhood Results (n=40)

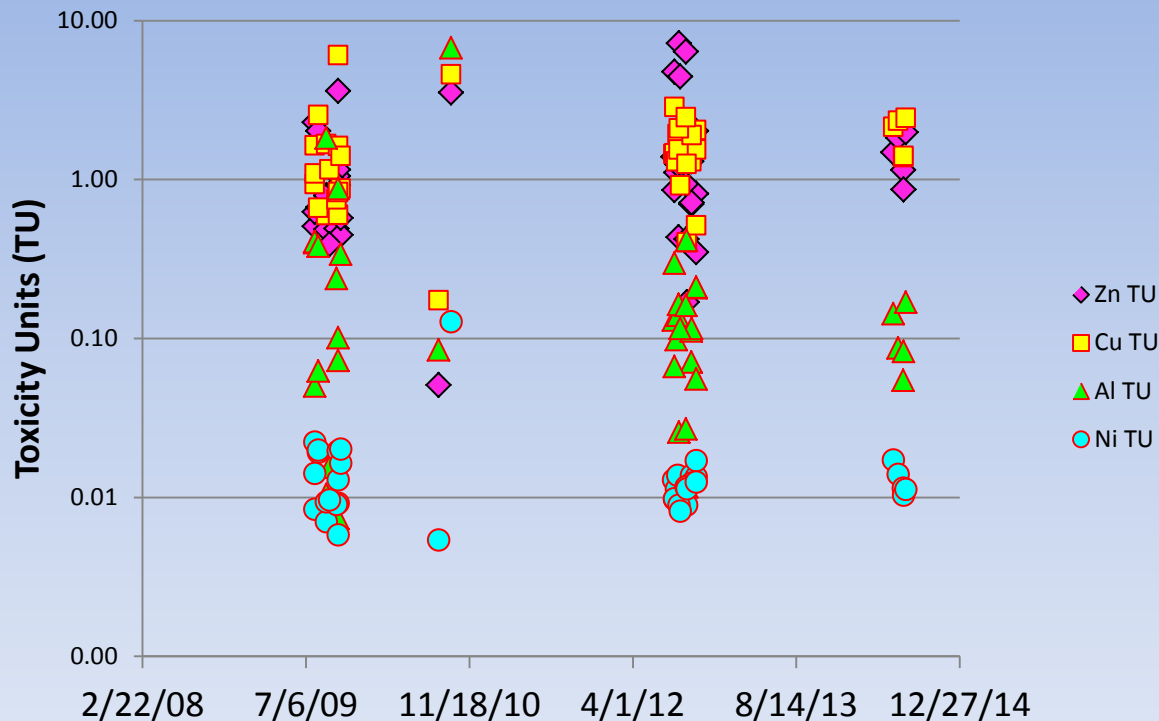
Toxicity Unit (TU) is defined as the  
Analytical Result/Acute Aquatic Life Criteria (20.6.4.1 NMAC)



Metal-specific aquatic life criterion =  $\exp(m_A[\ln(\text{hardness})] + b_A)(CF)$

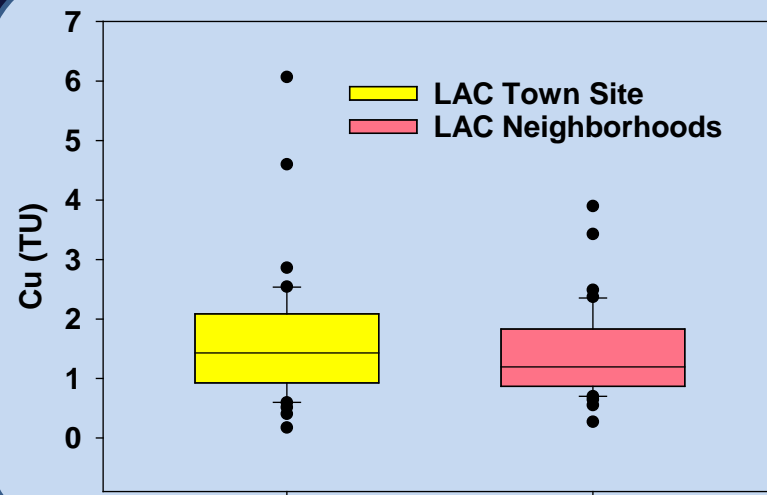
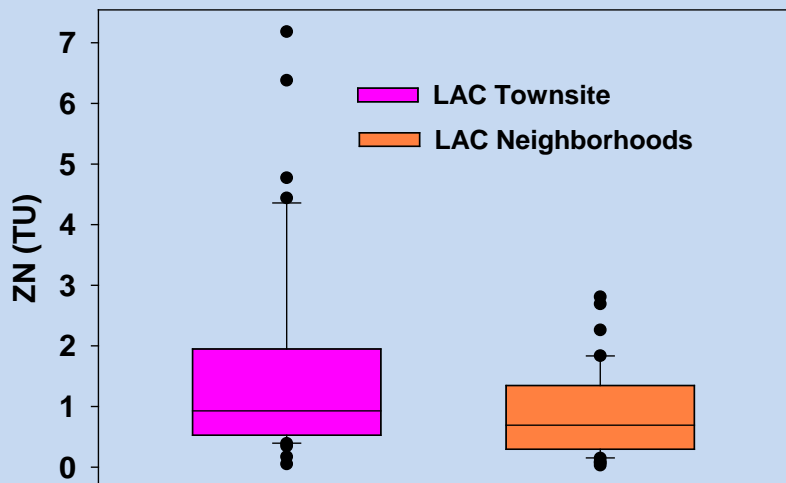
# 2009-2014 Los Alamos County Town Site (n=40)

Toxicity Unit (TU) is defined as the  
Analytical Result/Acute Aquatic Life Criteria (20.6.4.1 NMAC)



$$\text{Metal-specific aquatic life criterion} = \exp(m_A[\ln(\text{hardness})] + b_A)(CF)$$

# Comparison of LAC Town Site and Neighborhoods

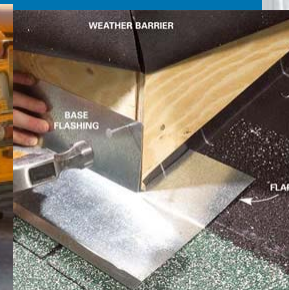
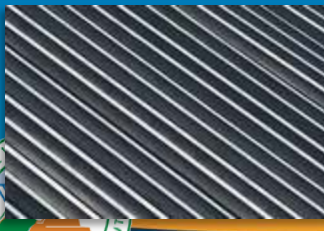


Category	Mean	Median	Min	Max	Std Dev	N
Hardness (mg/L)	22.30	21.15	3.29	66.30	13.34	40
Zn TU TS	1.55	0.93	0.05	7.18	1.64	40
Zn TU Nbr	0.88	0.69	0.03	2.81	0.71	40
Cu TU TS	1.64	1.43	0.17	6.07	1.08	40
Cu TU Nbr	1.42	1.19	0.27	3.90	0.76	40



## Common Sources of Zinc and Copper in Storm Water Runoff from Urban Landscapes and Industrial Facilities

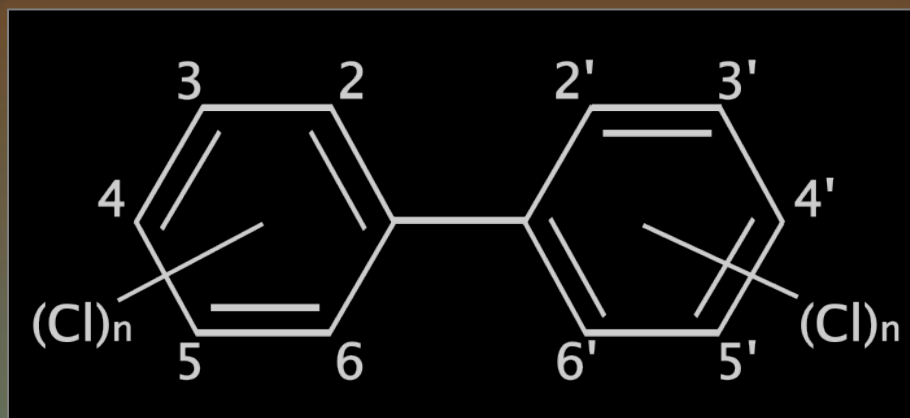
- Roofs—galvanized HVAC, ducts, ventilation fans, turbines, galvanized downspouts and flashing, guard rails, cooling water systems, copper pipes.
- Urban transportation—automobiles, trucks, forklifts, motor oil, tire particles, hydraulic fluid, truck/trailer or bus parking, vehicle break pads, culverts.
- Material storage, galvanized metals, chain link fences, printed circuit boards, and vehicles (as above).





# PCBs in Urban Runoff

**Polychlorinated biphenyls (PCBs):** two benzene rings (12 carbon atoms) form a biphenyl with 1-10 chlorine atoms replacing Hydrogen atoms



Chemical Structure of PCBs

**Congeners (209):** based on the number and location of chlorine atoms attached to carbon atoms in the benzene rings

**Homologs:** groups of PCB congeners containing same number of chlorine atoms (1 – 10)

# PCBs

- **Polychlorinated Biphenyls**

- Production began in 1929, banned in 1977
- Capacitors and transformers contained most

- **Toxicity**

- Cancer in animals
- Other effects in animals (immune, reproductive, nervous, endocrine systems)
- Bioaccumulate (build up in plants/animals)
- Probable human carcinogens

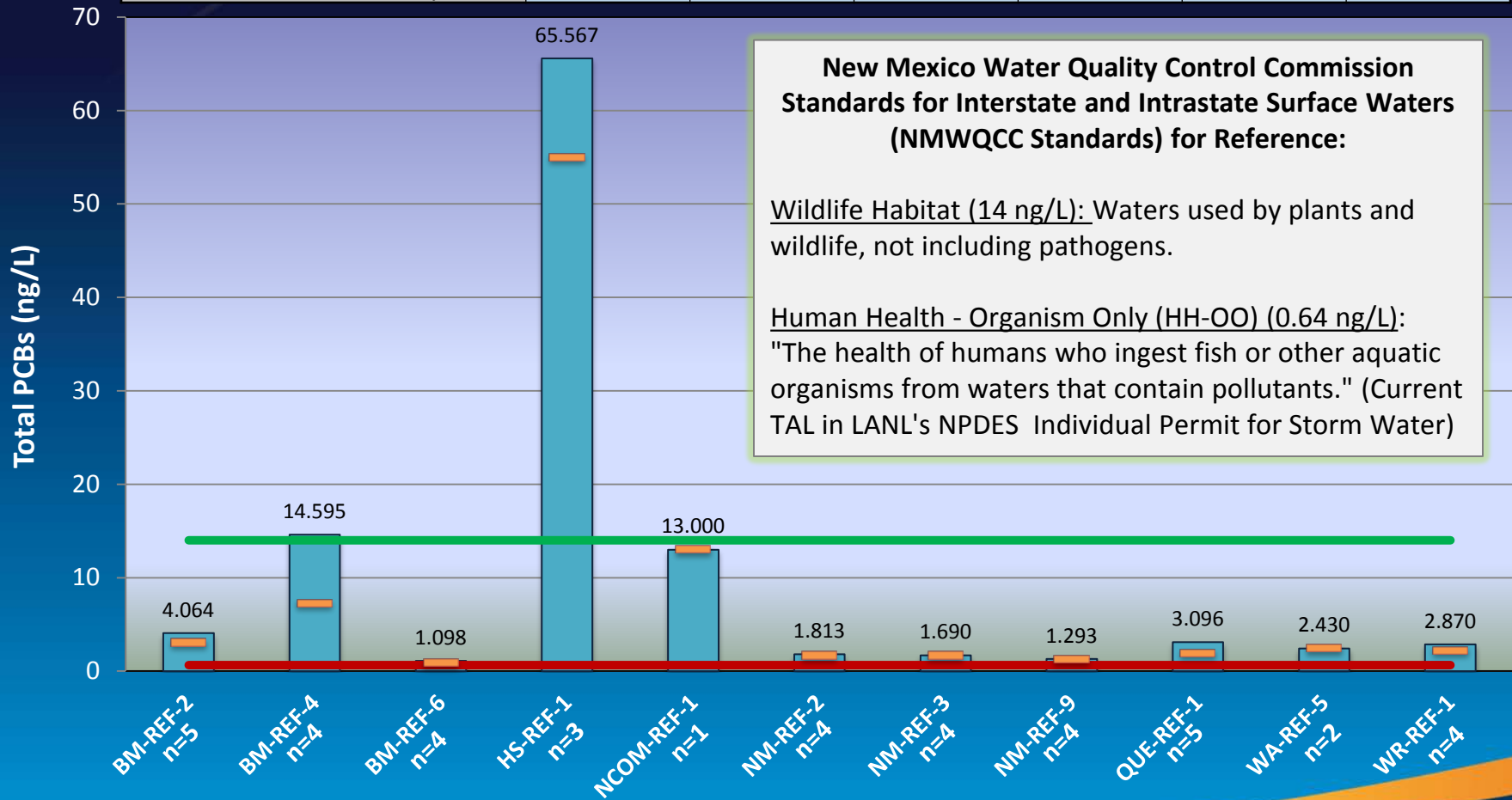
- **Sources**

- Transformers and capacitors
- Other electrical equipment including voltage regulators, switches, bushings, and electromagnets
- Oil used in motors and hydraulic systems
- Fluorescent light ballasts and carbonless copy paper
- Cable insulation
- Thermal insulation material including fiberglass, felt, foam, and cork
- Adhesives and tapes, oil-based paint, caulking
- Plastics

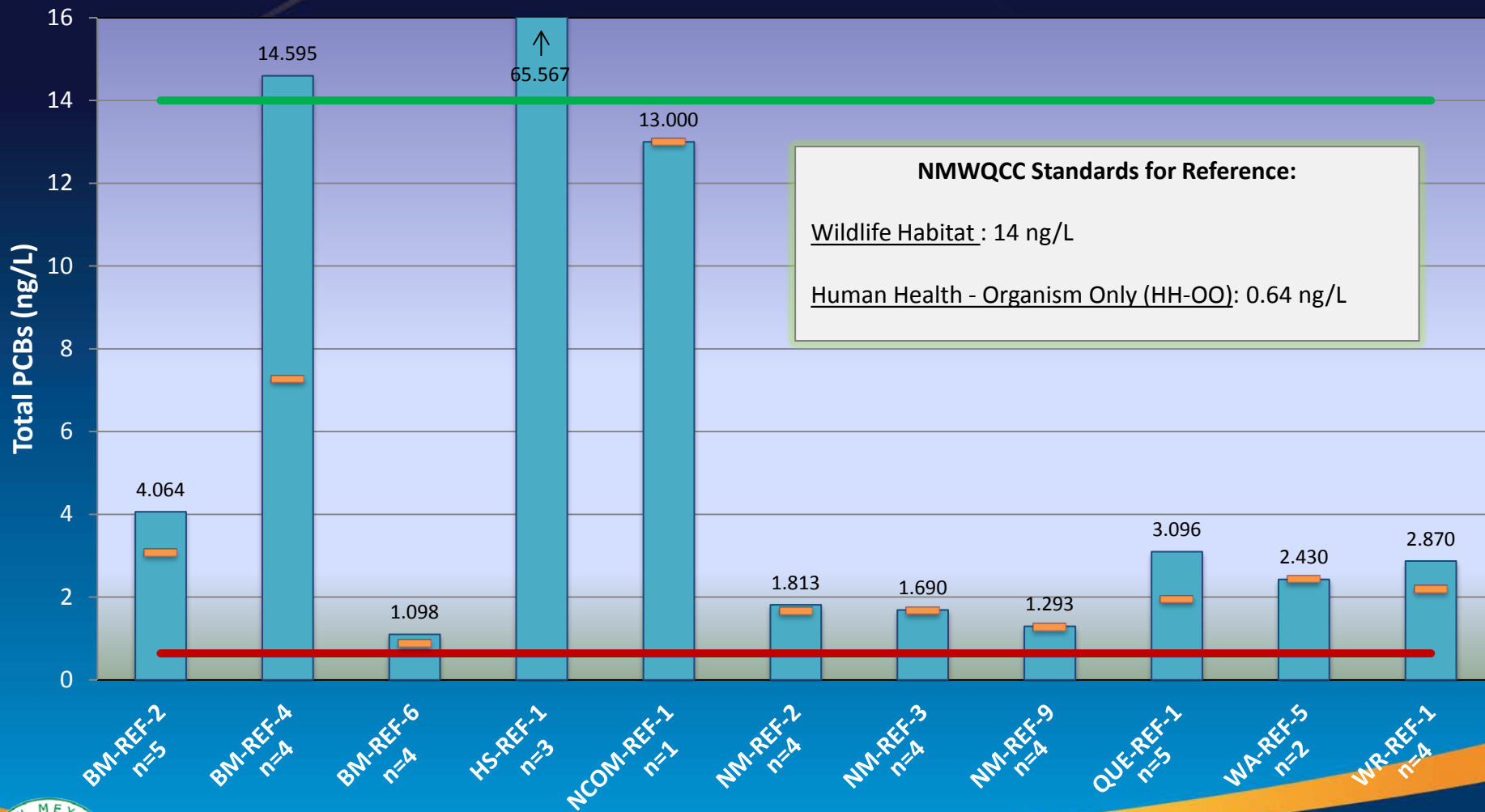


# Mean Values by Location for Total PCBs in Urban Study Samples 2014-15

Total PCB Concentration	n	Min (ng/L)	Max (ng/L)	Median (ng/L)	Mean (ng/L)	SD (ng/L)
2014-15 Urban Study Dataset	40	0.67	128.00	2.11	8.59	22.11



# Detail of Mean Values for Total PCBs in Urban Study Samples 2014-15

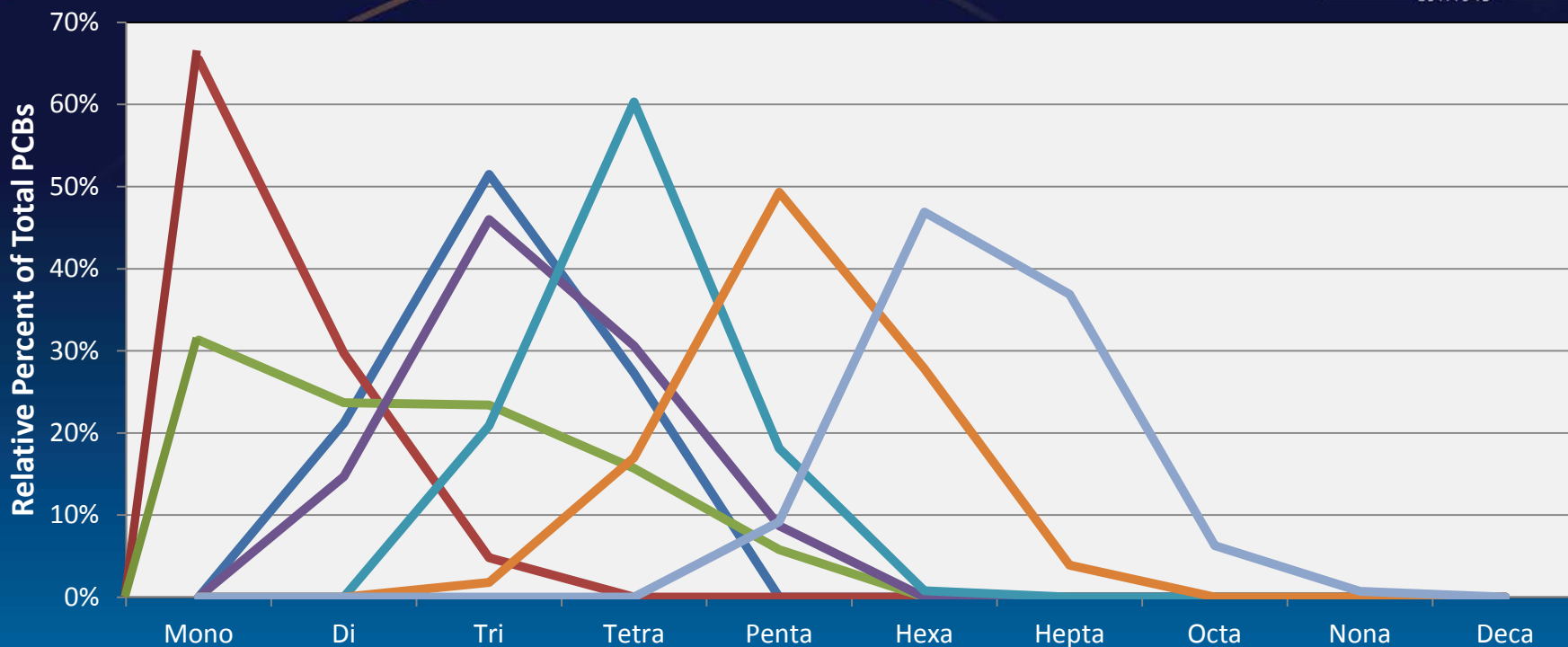


Mean of Total PCBs  
 HH-OO (NMWQCC Standard)

Wildlife Habitat (NMWQCC Standard)  
 Median of Total PCBs



# Typical Homolog Distributions for Some Common Aroclors

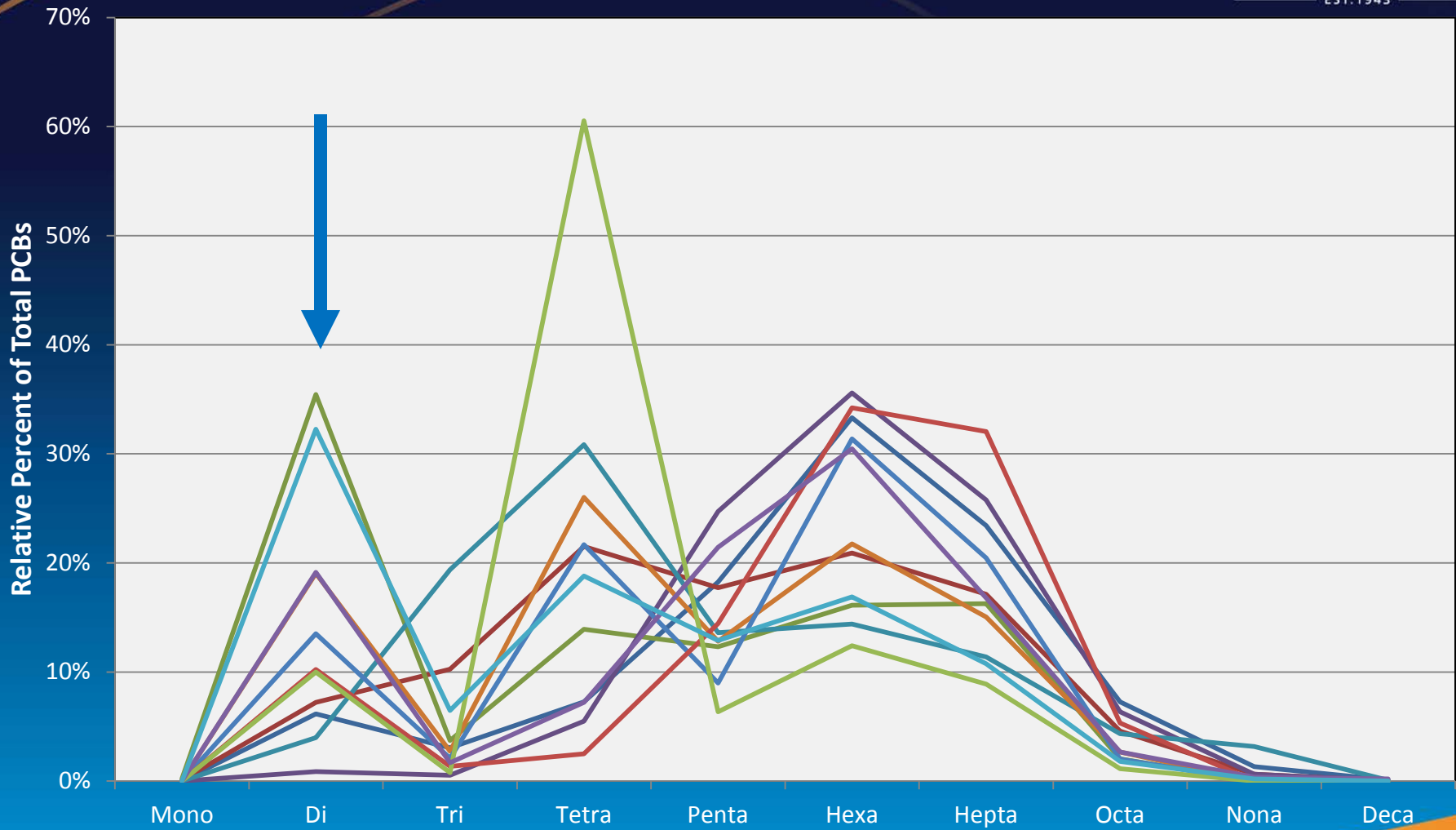


- 1016 - Capacitors (distillation of 1242)
- 1221 - Capacitors, rubbers, adhesives
- 1232 - Hydraulic fluids, rubbers, adhesives (blend of 1221 & 1242)
- 1242 - transformers, hydraulic fluids plasticizers, adhesives
- 1248 - hydraulic fluids plasticizers, adhesives
- 1254 - Capacitors, transformers, hydraulic fluids, plasticizers adhesives, wax and pesticide extenders, de-dusting agents, inks, cutting oils, sealants, caulking compounds
- 1260 - Transformers, hydraulic fluids, synthetic resins, de-dusting agents

**Aroclors:**  
Monsanto brand-name mixtures of PCB congeners (1930-1977), distinct homolog distributions



# Homolog Distributions for All Urban Study Locations 2014-15



**NMED DOE OB**

# Atmospheric Deposition Monitoring

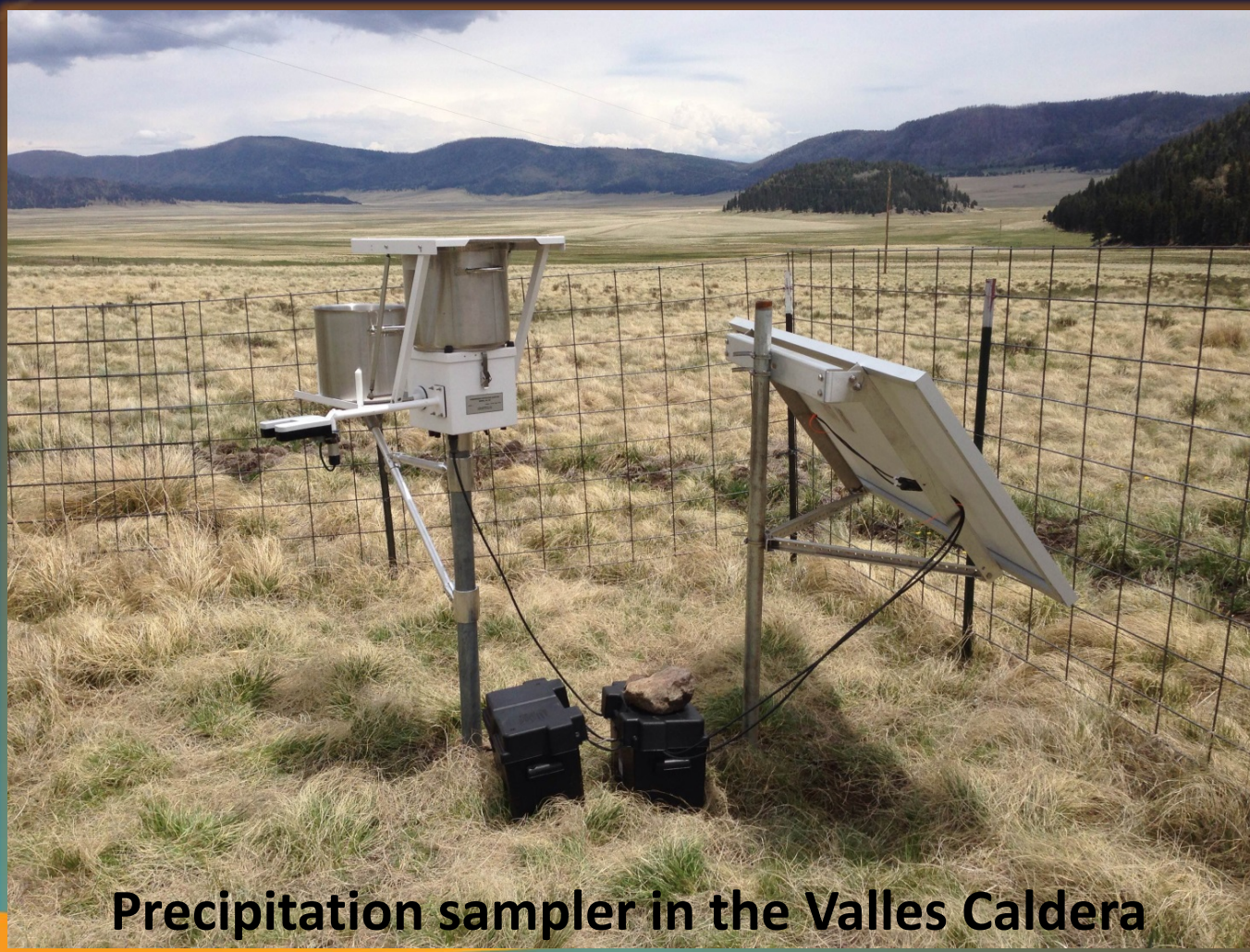
**Goal: Evaluate PCB concentrations in wet (precipitation) and dry deposition around Los Alamos/Pajarito Plateau in order to quantify atmospheric PCB deposition**

**Collect and analyze precipitation (rain, snow, etc) and dry atmospheric deposition (dust, particulates) for PCBs**



# NMED DOE OB

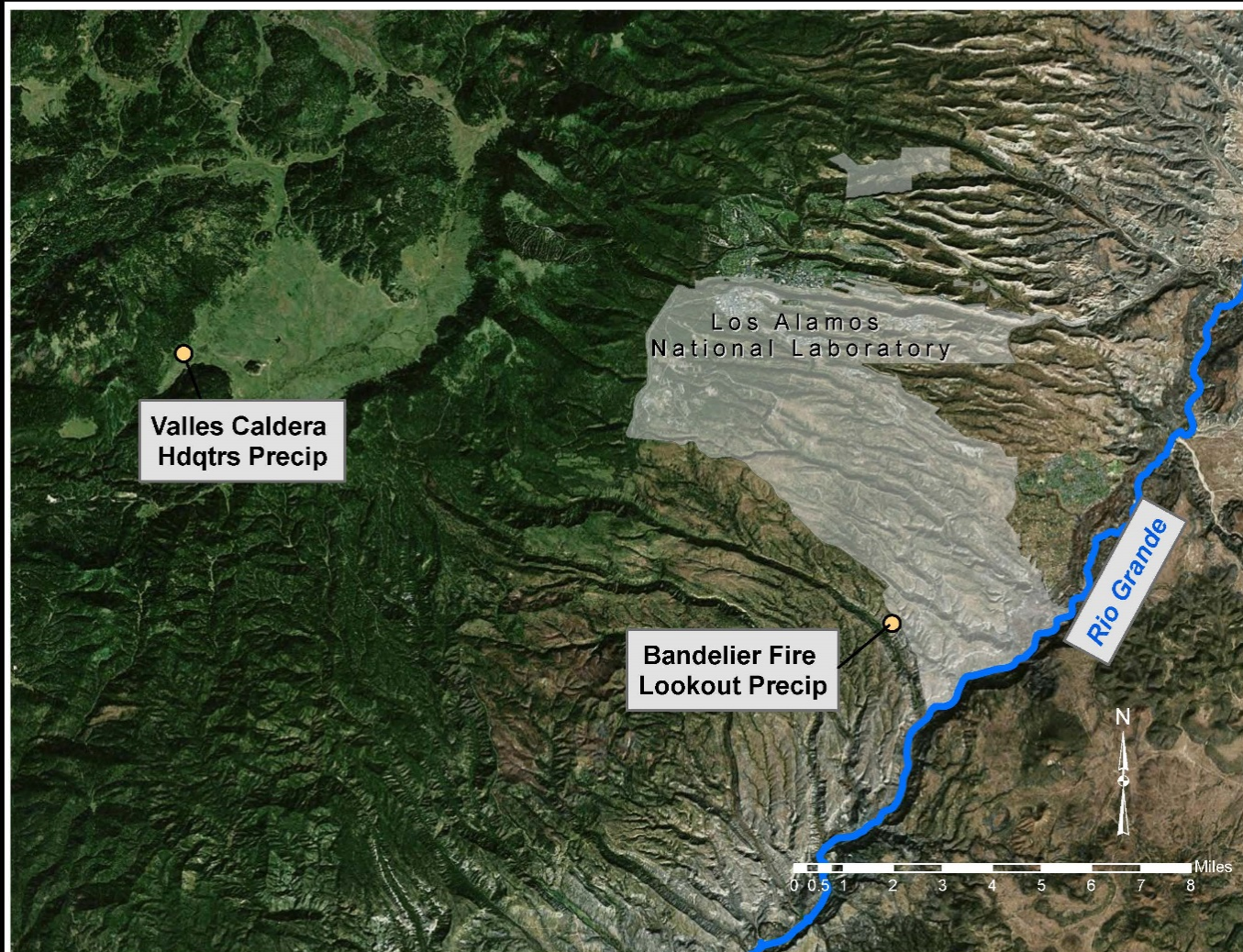
# Atmospheric Deposition Monitoring



Precipitation sampler in the Valles Caldera



# NMED DOE OB Atmospheric Deposition Monitoring Locations



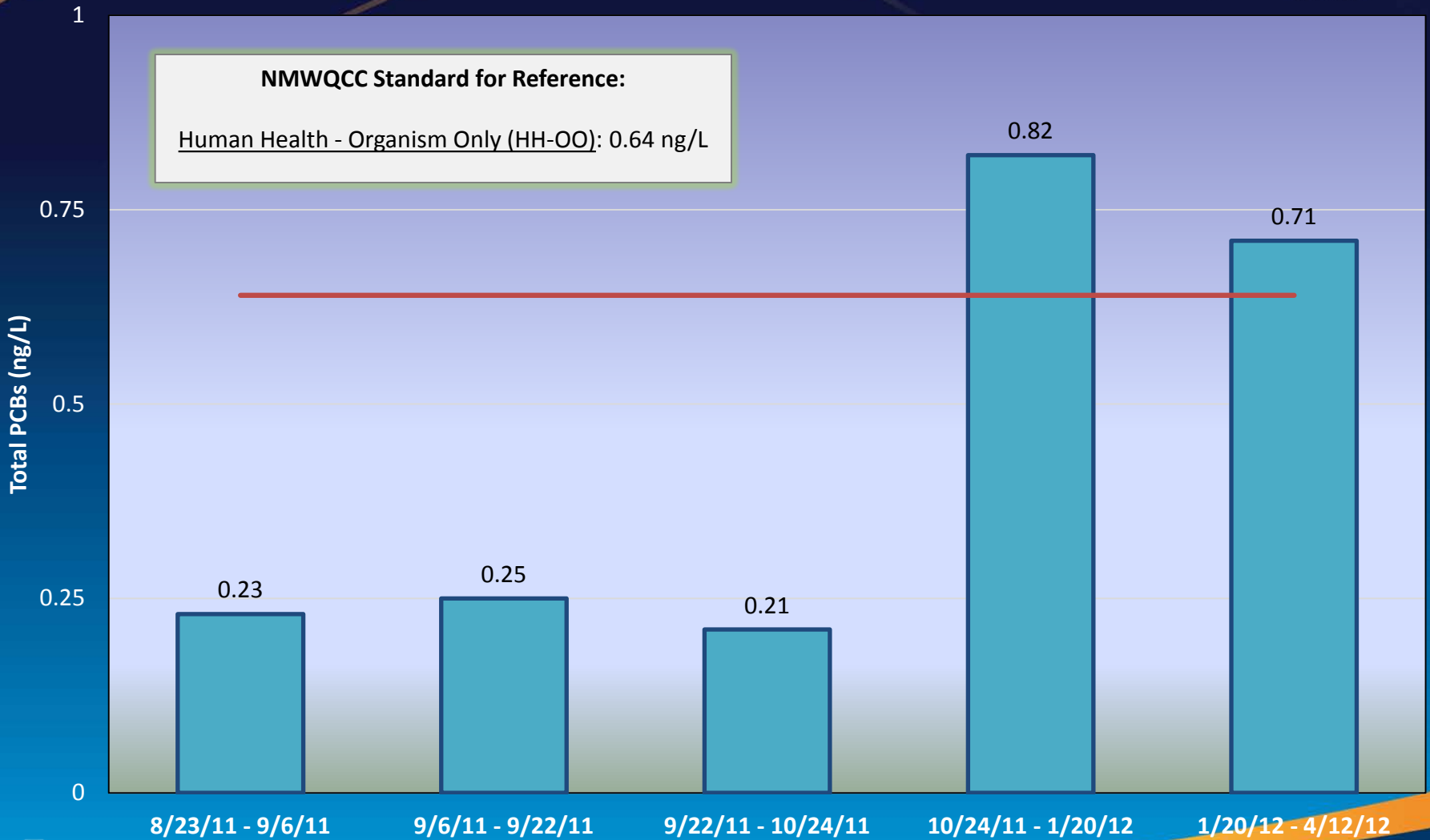
NMED DOE OB

# Atmospheric Deposition Monitoring



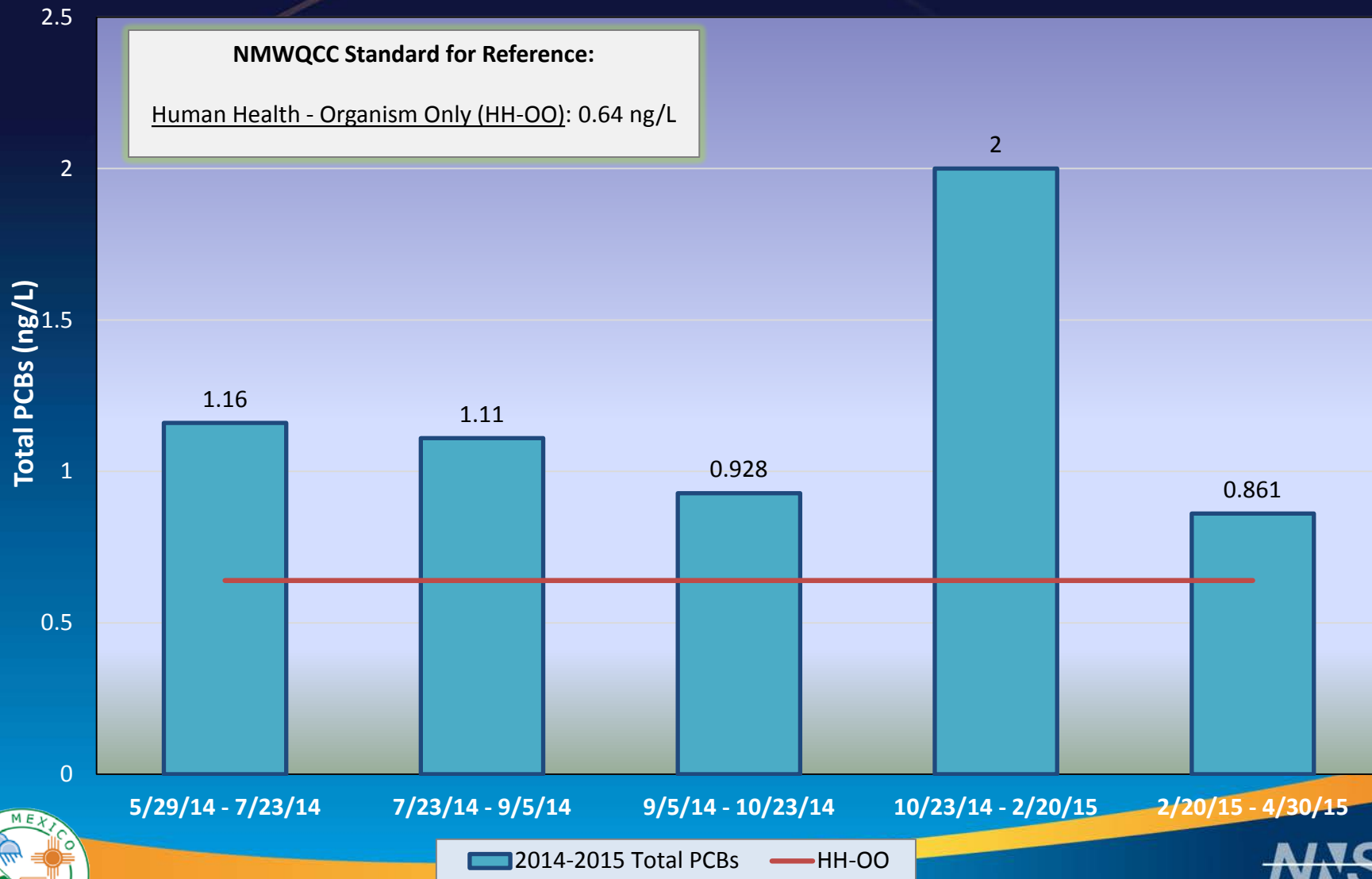
Precipitation sampler at Bandelier National Monument  
in dry and wet conditions

# Total PCBs in Wet Deposition from Bandelier 2011 - 2012

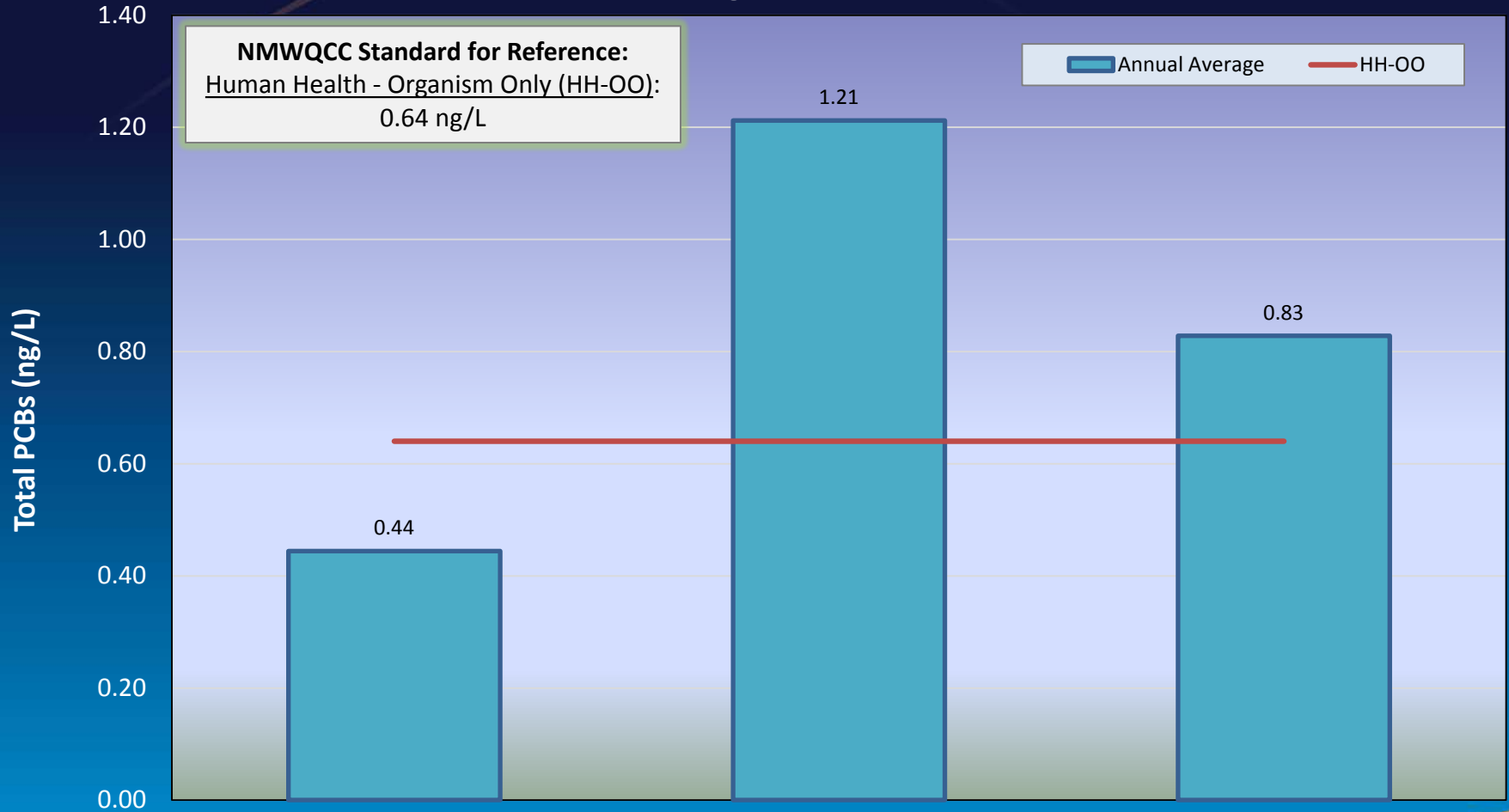


2011-2012 Total PCBs HH-OO

# Total PCBs in Wet Deposition from VCNP 2014 - 2015



# Annual Average of Total PCBs in Wet Deposition



# Collecting and Analyzing Dry Deposition

- Annual collection to accumulate sufficient sample for analysis
- Worked with analytical laboratory to develop unique method for retrieving deposition from collection vessel
- Total mass of dry atmospheric deposition collected = 0.2g

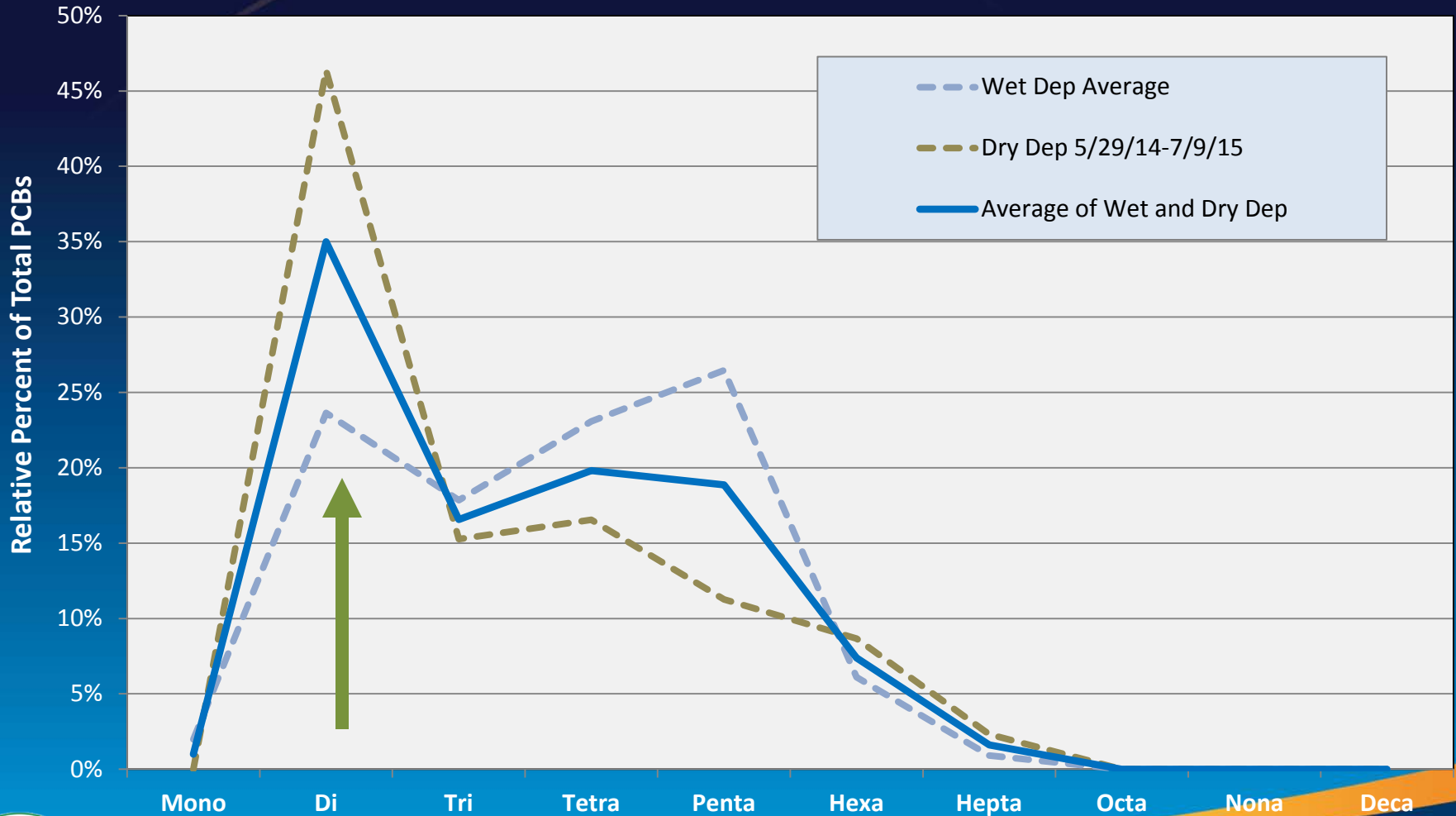
➤ **Collection period:**  
05/29/14 – 07/09/15

➤ **Total PCB concentration:**  
11 ng/g

➤ **Long-term study to  
build dataset!**



# Homolog Distributions for VCNP Wet and Dry Atmospheric Deposition



All data are available online through Intellus  
New Mexico ([intellusnmdata.com](http://intellusnmdata.com))



**NMED DOE OB Acknowledgement:**

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