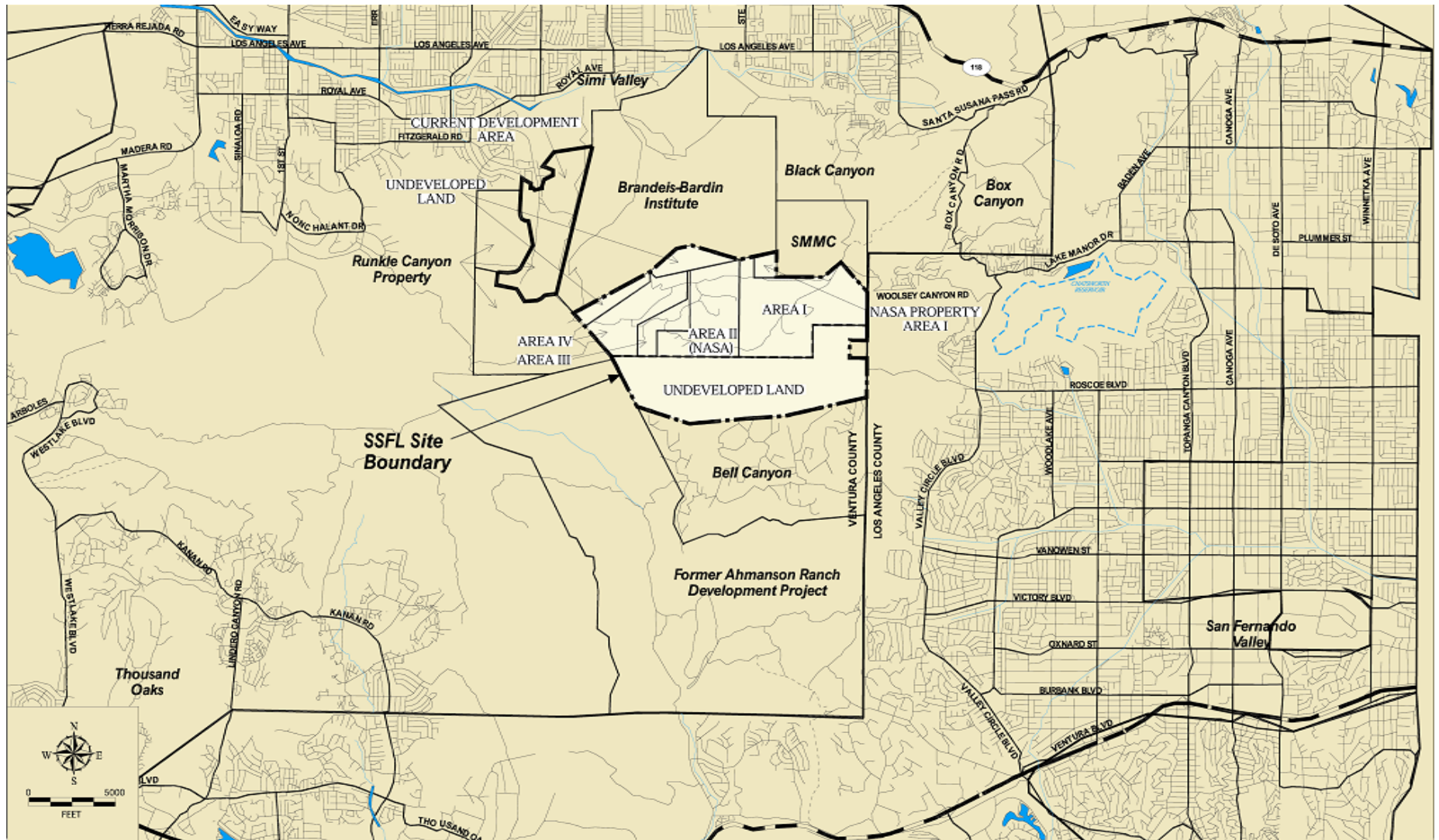


December 13, 2005 Meeting Status of NPDES Post Fire BMPs

Agenda

- Overview of Current Operations At SSFL
- Impacts of Fire At SSFL
- Rebuilding & Improvement of BMPs
- Future Activities
- Site Tour
- Close-out

Santa Susana Field Laboratory Regional Map



SSFL Operations Generating Discharges

Current & Future Operations

Rocket Engine Testing

- 2005 – Approximately 17 engine tests
- 2006 – Possibly one more

Sewage Treatment Plant Operations

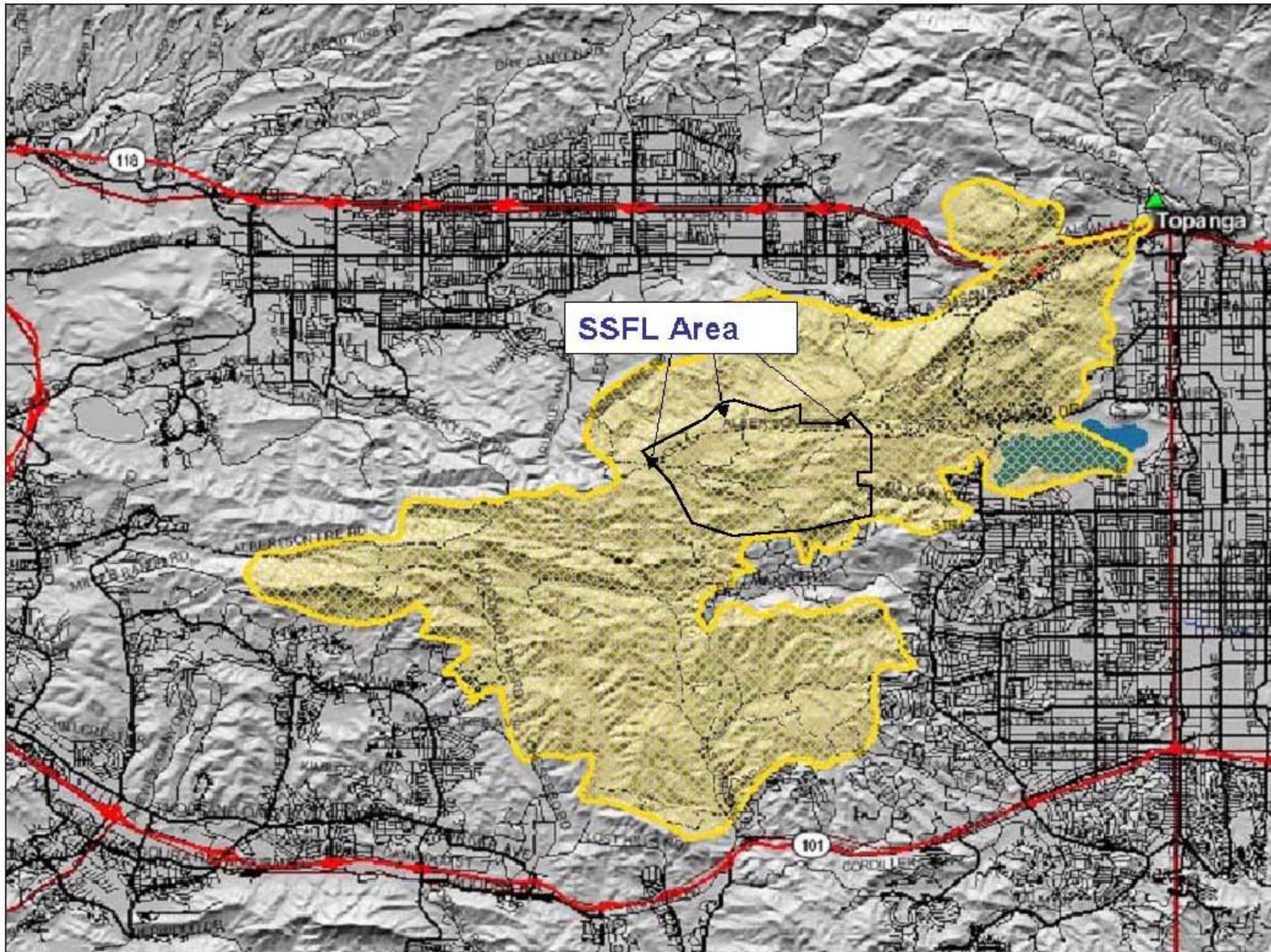
- 2005 - Two days of operation due to high volume of flow from rain.
- 2006 - None expected due to sewer line repairs and capping of old sewer lines.

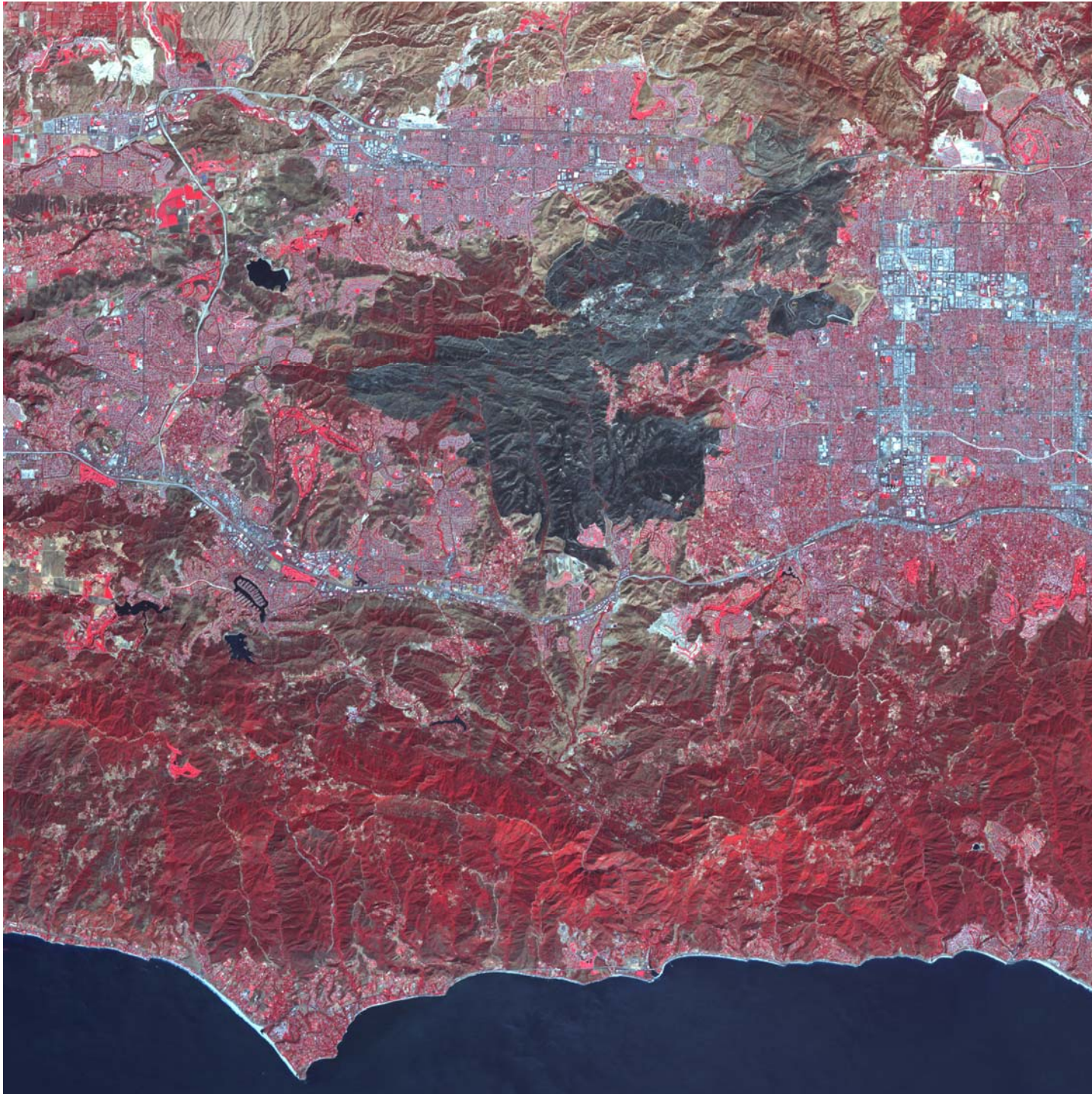
Groundwater Treatment Systems

- 2005 – Treatment occurred using some systems.
- 2006 – Resumption of treatment to be coordinated with DTSC.

Impact To SSFL as a Result of September 2005 Fire

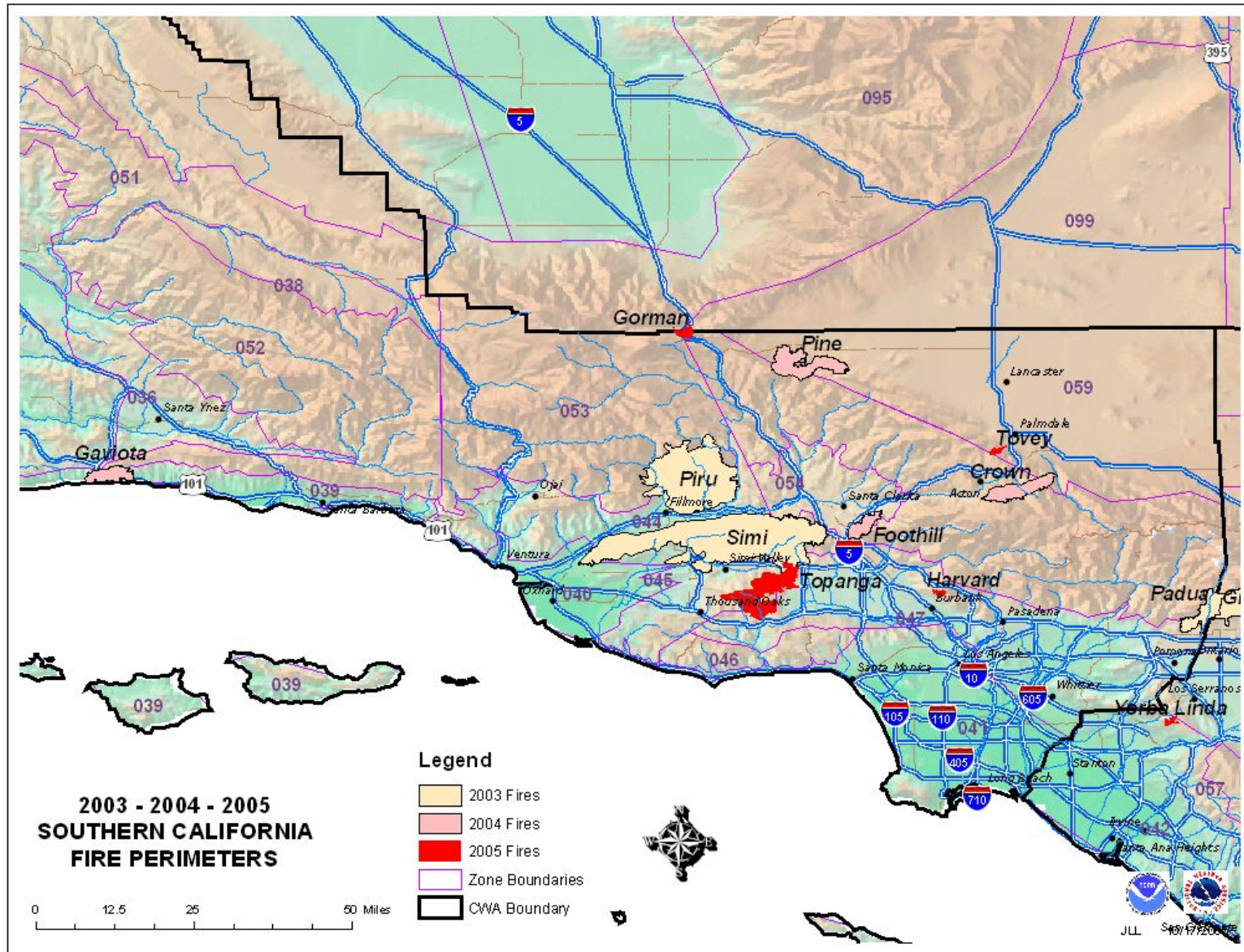
2005 Fire Boundary





October 4th
NASA
IR-Image

Fires Not Uncommon in Area



Impact of September 2005 at SSFL

- Brush burned on over 2,000 acres of the site.
- 10 of the 200 structures were damaged by fire with 7 destroyed.
- Over 300 telephone and power poles were destroyed.
- High Density Polyethylene (HDPE) pipelines from the groundwater remediation systems were destroyed.
- DTSC, DOE, DHS, VCEHD, RWQCB and various fire departments have been on site to inspect and assess the fire damage.

September 2005 Fire At SSFL



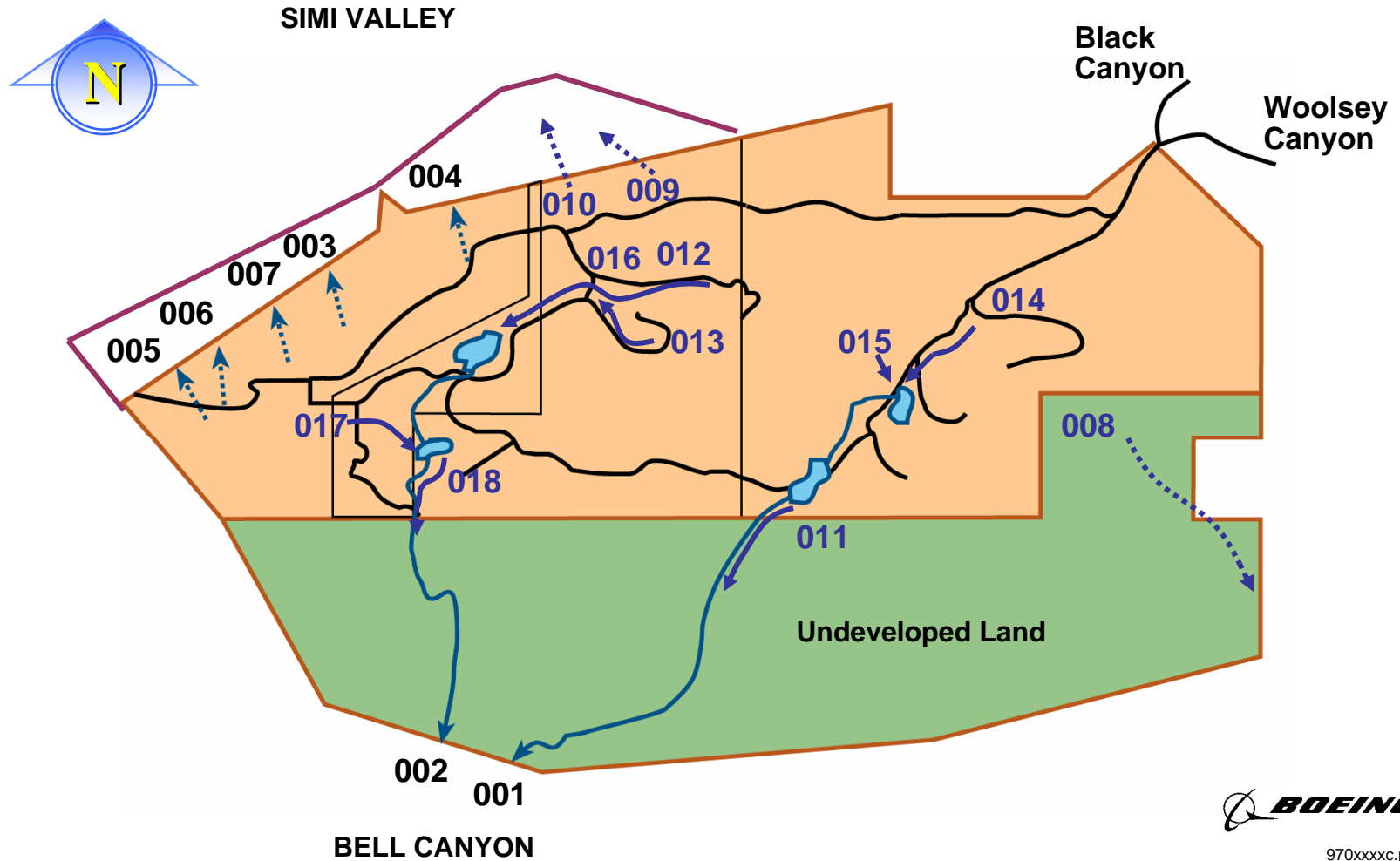
A Few Days After



Post Fire Re-building Efforts

- Debris from destroyed buildings removed.
- Electricity restored to the site, phone & internet connections still being restored.
- Telephone poles being removed.
- BMPs re-built & improved.

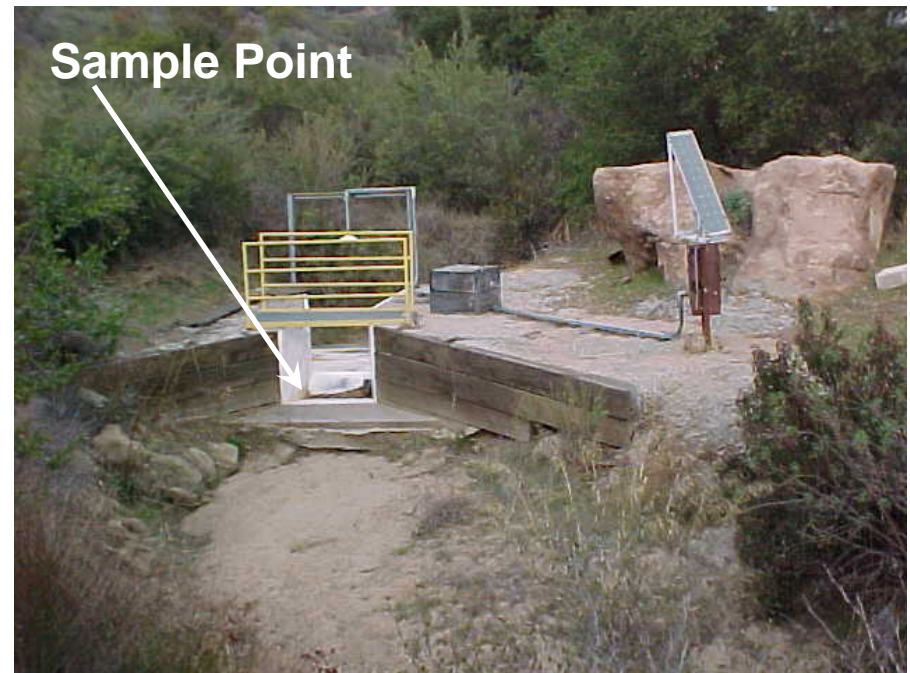
Santa Susana Field Laboratory Surface Water NPDES Outfall Locations



Outfall 001 (Southeast) Before 2005 Fire

BMPs In Place

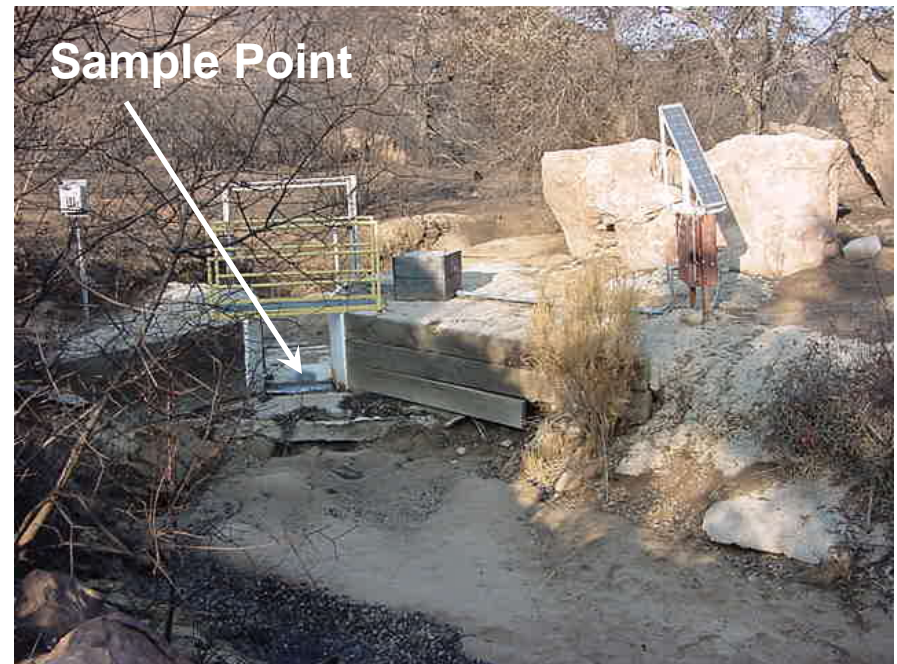
- Upstream settling pond (Perimeter Pond).
- Dense natural vegetation along entire length of drainage.



Outfall 001 (Southeast) After 2005 Fire

BMPs Damaged

- Vegetation along streambed either completely destroyed or heavily damaged.
- Hillsides along drainage covered in ash that is known to contain elevated levels of naturally occurring metals and dioxins.



Outfall 001 (Southeast) 2 Months after 2005 Fire

BMPs Implemented

- Straw wattles installed along burned areas of drainage.
- Straw bales placed in 001 streambed.
- Straw bales placed in tributary streambeds.
- Straw wattles and bales placed upstream.



Outfall 002 (Southwest) Before 2005 Fire

BMPs In Place

- Upstream settling ponds (R-2 Pond).
- Dense natural vegetation along entire length of drainage.



Outfall 002 (Southwest) After 2005 Fire

BMPs Damaged

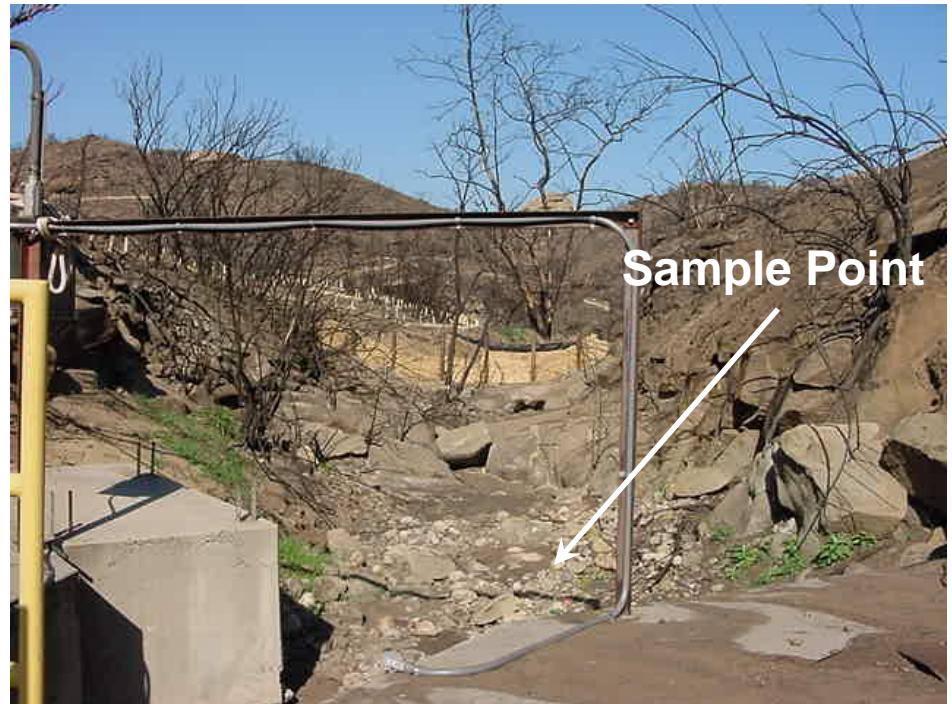
- All vegetation along streambed either completely destroyed or heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.



Outfall 002 (Southwest) 2 Months after 2005 Fire

BMPs Implemented

- Straw wattles installed along burned areas of drainage.
- Straw bales placed in 002 streambed.
- Straw bales placed in tributary streambeds.
- Straw wattles and bales placed upstream.



Outfall 003 (RMHF) Before 2005 Fire

BMPs in place

- Dense natural vegetation along entire length of drainage and hillsides.
- Silt fencing in place.
- Filter bags including vermiculite and activated carbon.



Outfall 003 (RMHF) After 2005 Fire

BMPs Damaged

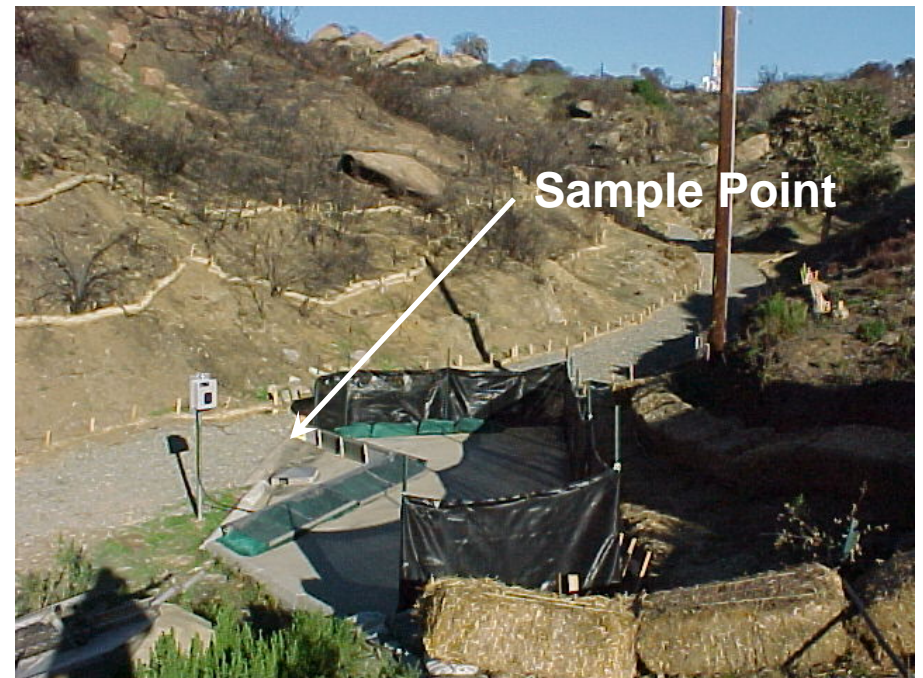
- All vegetation along northern side of drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 003 (RMHF) 2 Months after 2005 Fire

BMPs Implemented

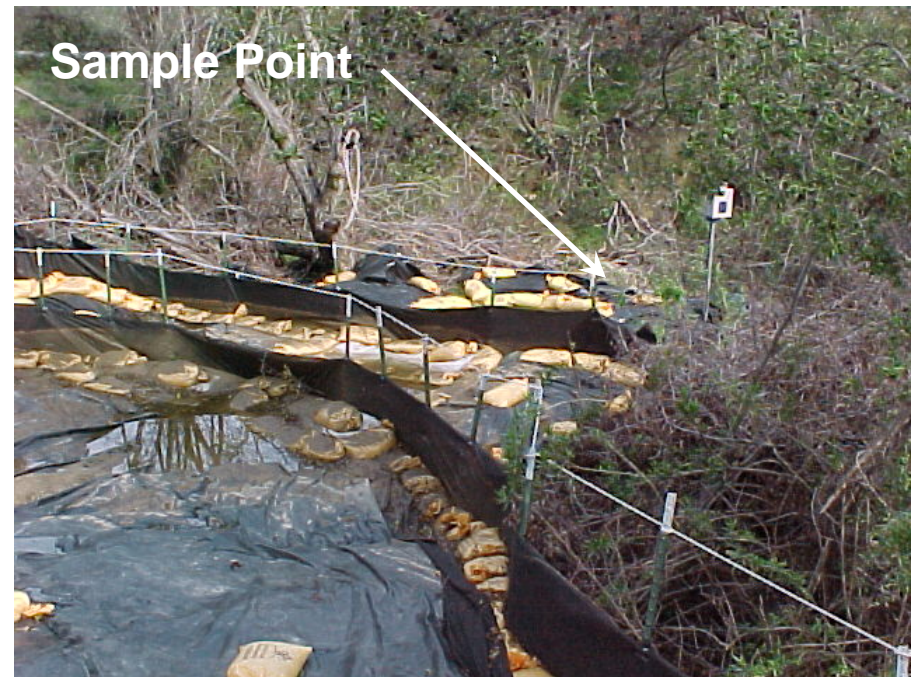
- Straw wattles installed along burned areas of drainage and hillside.
- Straw bales placed at toe of hill.
- Loose gravel to diffuse flow
- Silt fence.
- Activated carbon filter bags.



Outfall 004 (SRE) Before 2005 Fire

BMPs in place

- Dense natural vegetation along entire length of drainage and hillsides.
- Plastic sheeting covering potentially impacted areas.
- Silt fencing in place.
- Filter bags including vermiculite and activated carbon.



Outfall 004 (SRE) After 2005 Fire

BMPs Damaged

- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 004 (SRE) 2 Months after 2005 Fire

BMPs Implemented

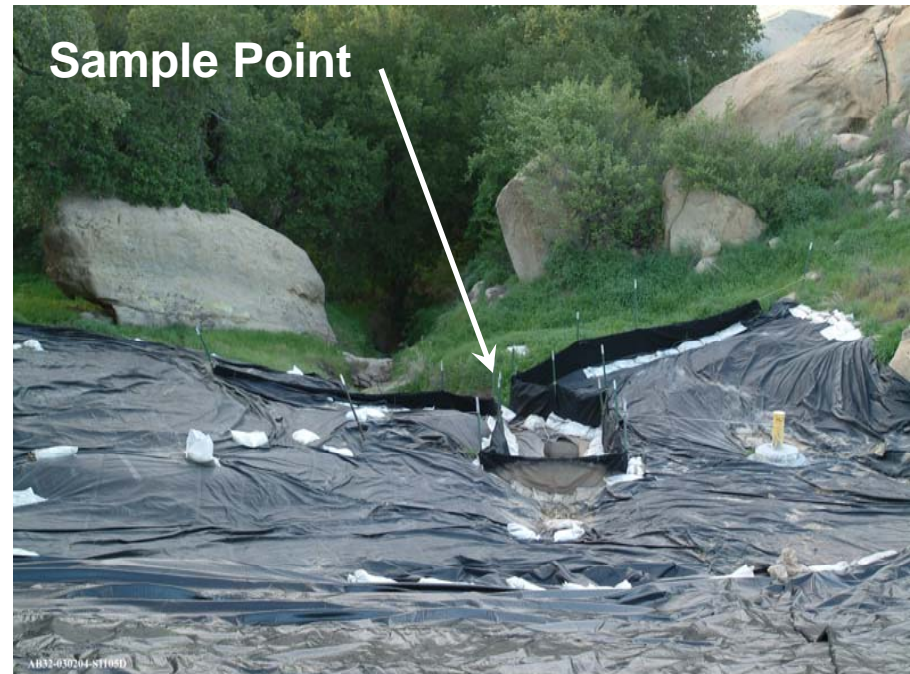
- Straw wattles and silt fence installed along burned areas of drainage and hillside.
- Plastic sheeting replaced.
- Sand filter with underdrain.
- Activated carbon filter bags.



Outfall 005 (FSDF 1) Before 2005 Fire

BMPs in place

- Dense seeded vegetation above drainage
- Plastic sheeting.
- Silt fencing in place.
- Filter bags including vermiculite and activated carbon.



Outfall 005 (FSDF 1) After 2005 Fire

BMPs Damaged

- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 005 (FSDF 1) 2 Months after 2005 Fire

BMPs Implemented

- Straw wattles installed along burned areas of hillside.
- Sand filter trenches with underdrain.
- Straw wattles installed upstream and downstream of the trenches to protect system until vegetation can take root.
- Activated carbon filter bags.



Outfall 006 (FSDF 2) Before 2005 Fire

BMPs in place

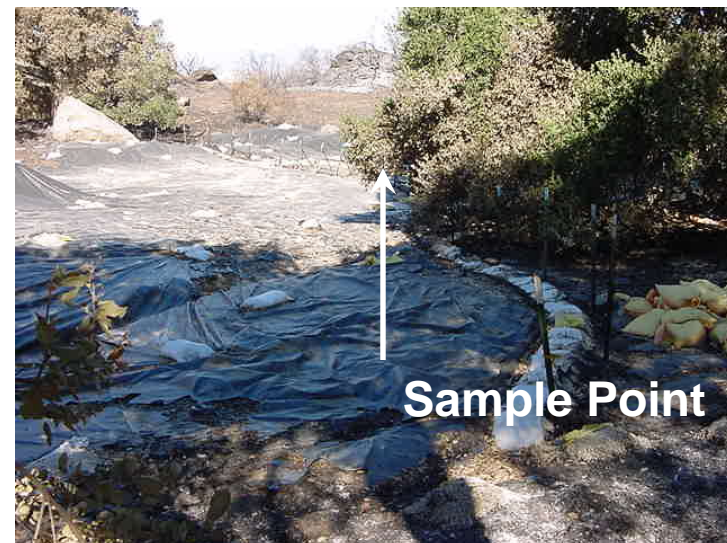
- Rip rap swale
- Plastic sheeting.
- Multiple silt fences in place.
- Filter bags including vermiculite and activated carbon.



Outfall 006 (FSDF 2) After 2005 Fire

BMPs Damaged

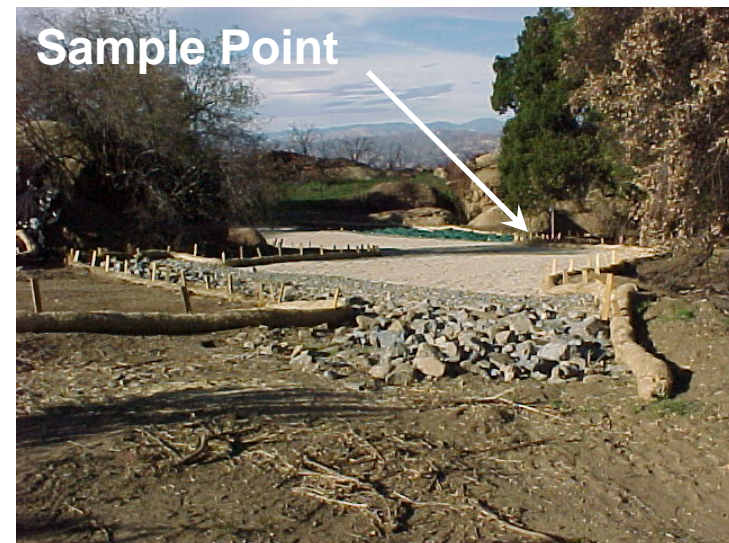
- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 006 (FSDF 2) 2 Months after 2005 Fire

BMPs Implemented

- Rip rap installed upstream.
- Sand filter with underdrain.
- Activated carbon filter bags.
- Straw wattles installed around entire system until vegetation can take root.



Outfall 007 (B/100) Before 2005 Fire

BMPs in place

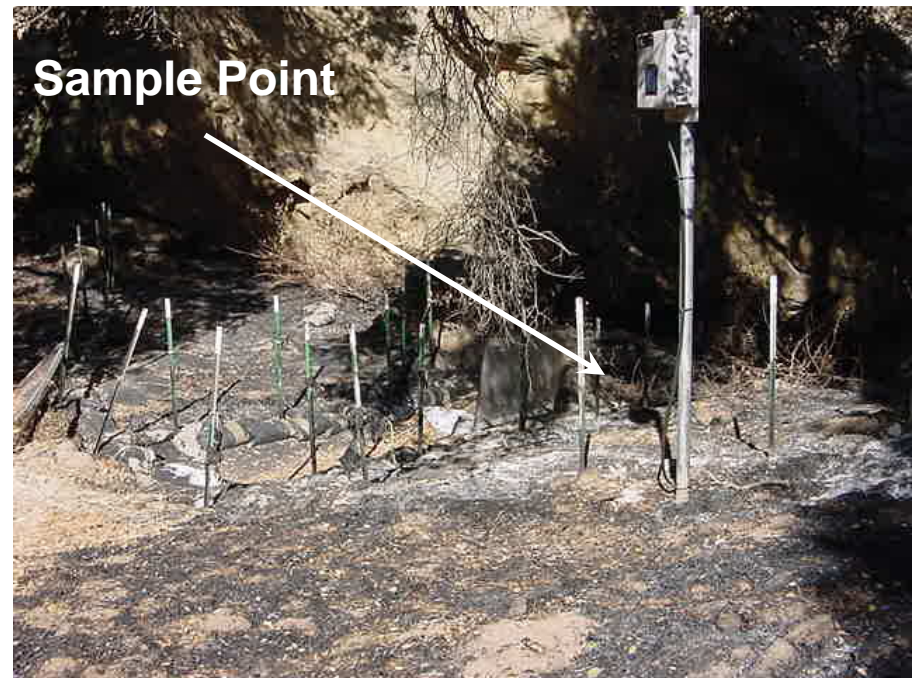
- Dense seeded vegetation above drainage.
- Silt fencing in place.
- Filter bags including vermiculite and activated carbon.



Outfall 007 (B/100) After 2005 Fire

BMPs Damaged

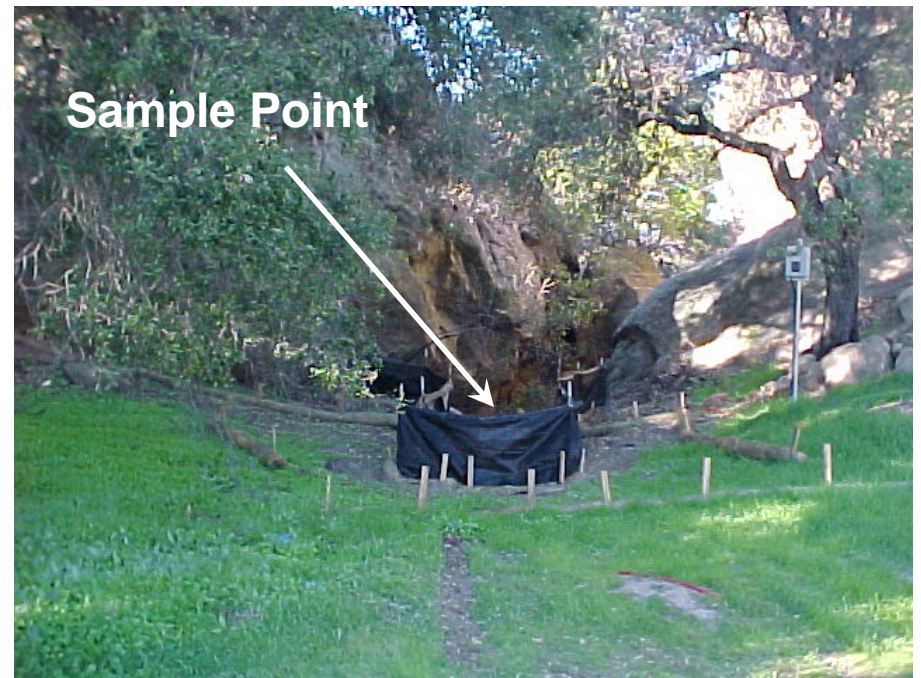
- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 007 (B/100) 2 Months after 2005 Fire

BMPs Implemented

- Straw wattles installed upstream
- Straw wattles and Silt fence around drainage.
- Activated carbon filter bags.



Outfall 008 (Happy Valley) Before 2005 Fire

BMPs in place

- Extensive Interim measure perchlorate clean up.
- Rip rap beds.
- Straw hay bales installed.



Outfall 008 (Happy Valley) After 2005 Fire

BMPs Damaged

- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs completely destroyed.



Outfall 008 (Happy Valley) 2 Months after 2005 Fire

BMPs Implemented

- Rip rap installed upstream
- Straw wattles and straw bales lining drainage and former source area.
- Multiple silt fences installed.
- Straw wattles lining drainage and tributaries until vegetation can take root.
- Drainage vacuumed to removed accumulated ash



Outfall 009 (WS 13) Before 2005 Fire

BMPs in place

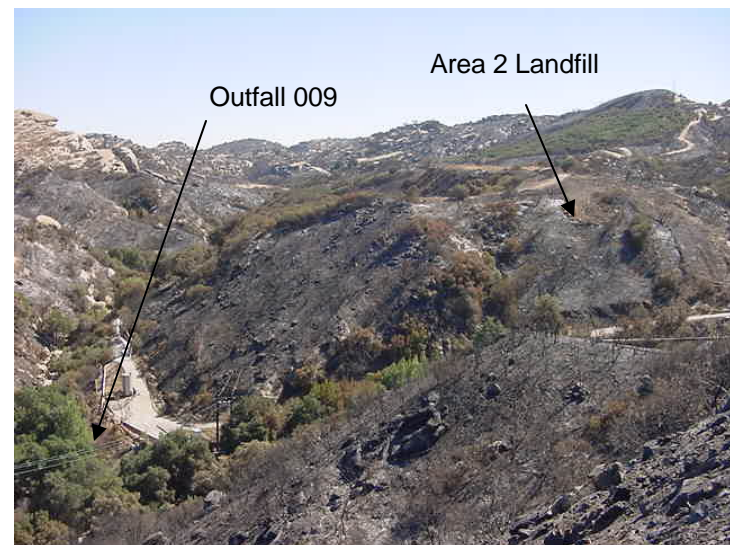
- Rip rap at upstream Area 2 landfill.
- Straw wattles and straw bales at Area 2 landfill.
- Silt fences in place below Area 2 landfill.



Outfall 009 (WS 13) After 2005 Fire

BMPs Damaged

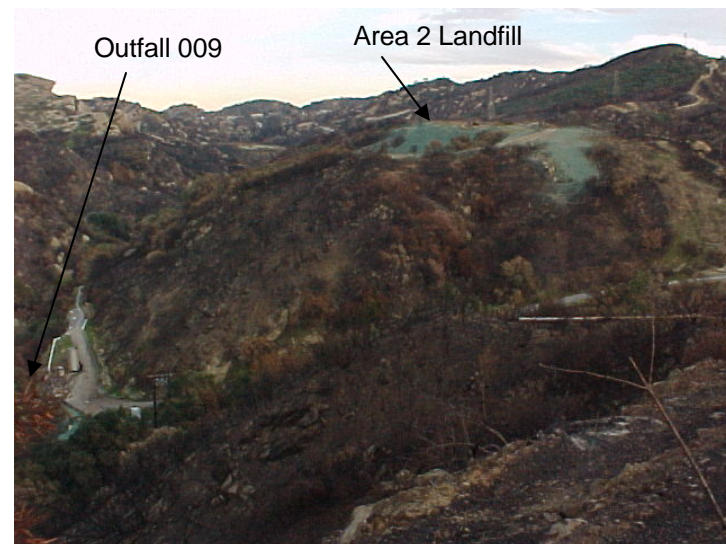
- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- Most BMPs completely destroyed.



Outfall 009 (WS 13) 2 Months After 2005 Fire

BMPs Implemented

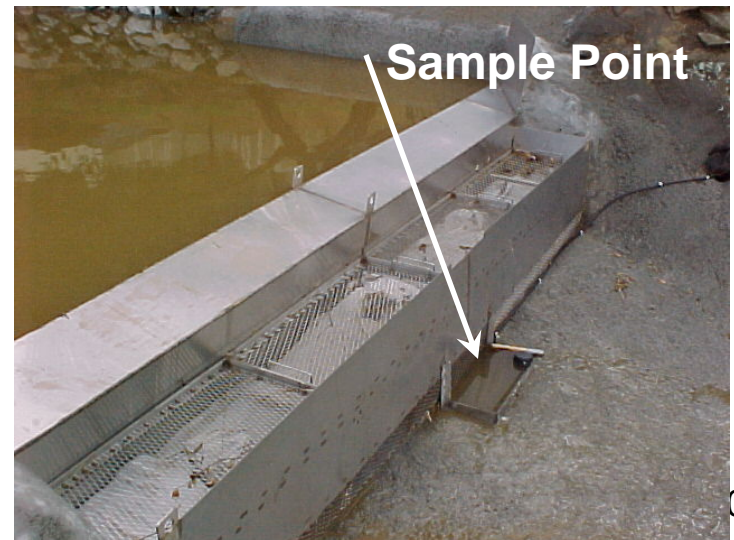
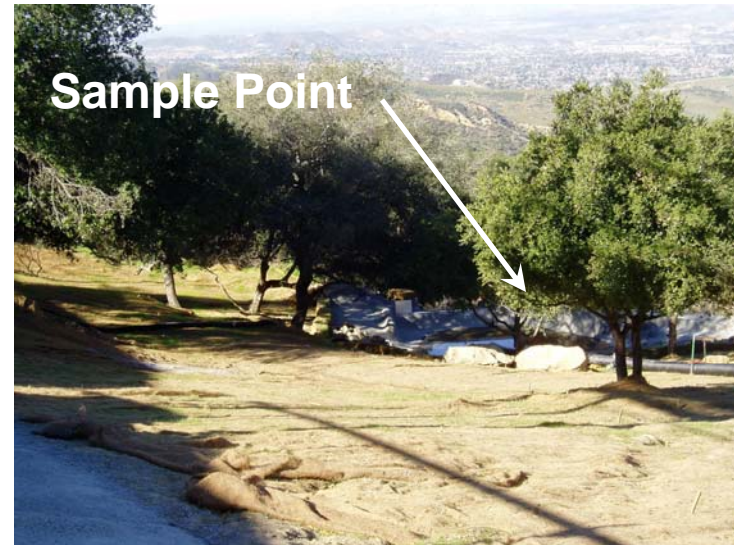
- Straw bales, Straw wattles and silt fences replaced at Area 2 landfill.
- Land based hydro-seeding at Area 2 landfill and Outfall 009.



Outfall 010 (B/203) Before 2005 Fire

BMPs in place

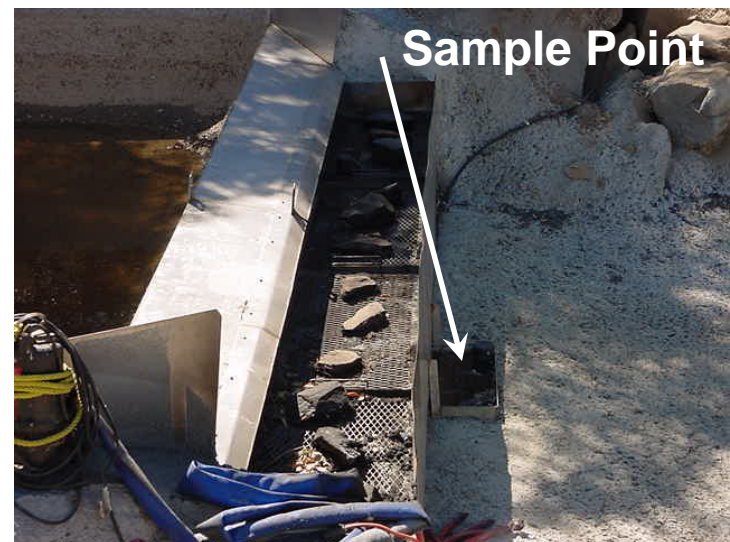
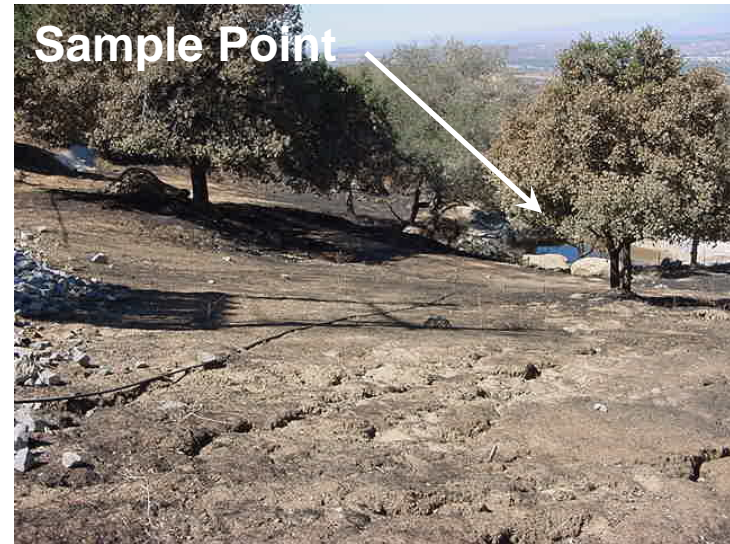
- Extensive Interim measure to remove mercury impacted soil.
- Gunite retaining wall and water retention basin.
- Coco mat reseeding.
- Straw bales around retention basin.
- Vermiculite filter bags in S.S. box.



Outfall 010 (B203) After 2005 Fire

BMPs Damaged

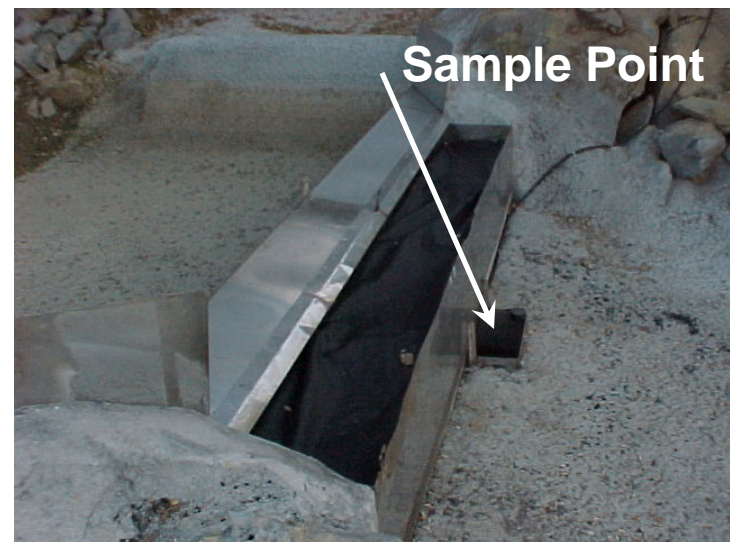
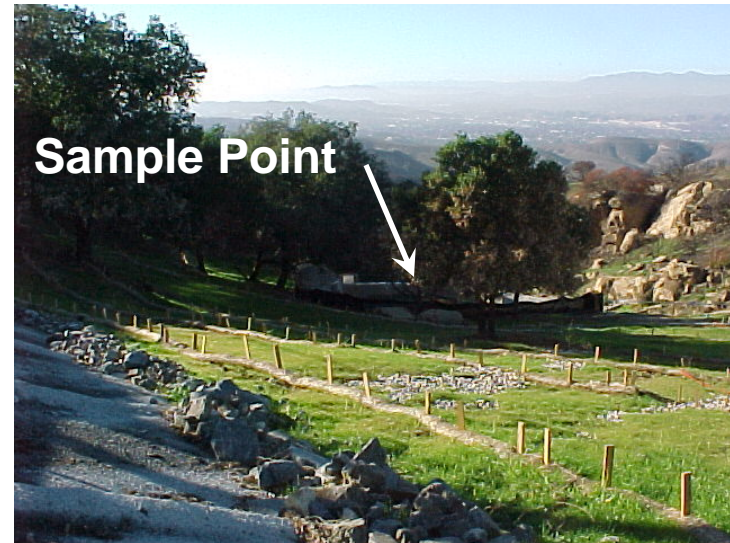
- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.
- All BMPs damaged.



Outfall 010 (B203) 2 Months After 2005 Fire

BMPs Implemented

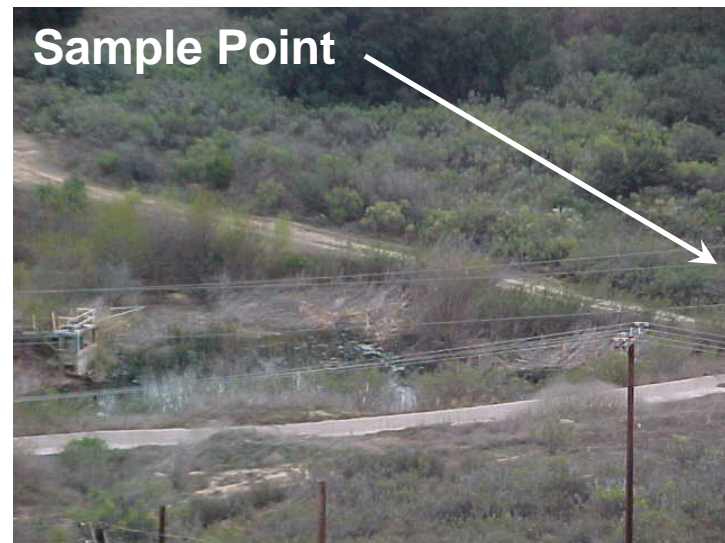
- Added Rip rap below gunite.
- Added rocks to dissipate flow.
- Installed straw wattles.
- Installed silt fence around retention basin.
- Installed carbon filter bags.



Outfall 011 (Perimeter) Before 2005 Fire

BMPs in place

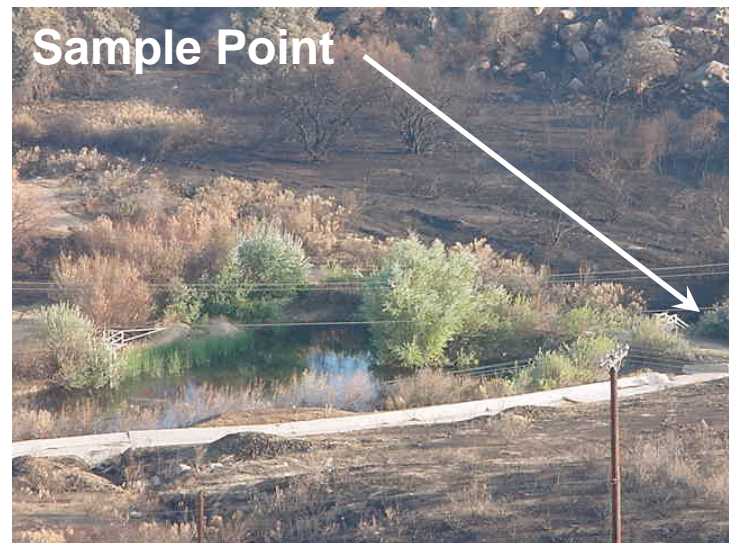
- Dense natural vegetation along entire length of drainage and hillsides.
- Settling pond to aid sediment retention.



Outfall 011 After 2005 Fire

BMPs Damaged

- All vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.



Outfall 011, 2 Months After 2005 Fire

BMPs Implemented

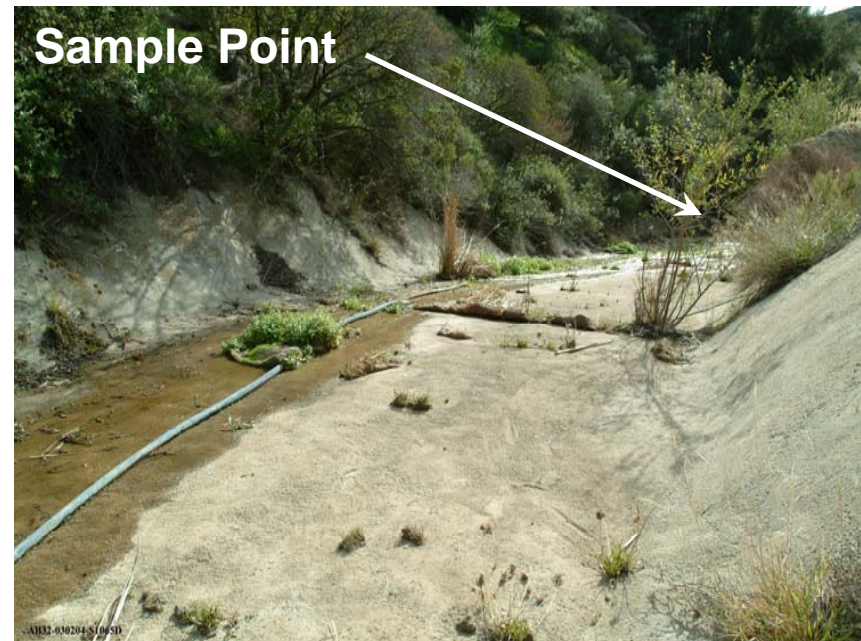
- Silt fence installed at discharge to Perimeter Pond.
- Installed gravel on road to prevent muddy conditions.
- Installed stainless steel gravity filter structure.
- Straw wattles, straw bales and hydromulching.



Outfall 018 Before 2005 Fire

BMPs in place

- Dense natural vegetation along entire length of drainage and hillsides.
- Settling pond to aid in sedimentation retention.
- Pilot sand/carbon dual media filter system being tested.



Outfall 018 After 2005 Fire

BMPs Damaged

- Vegetation around drainage heavily damaged.
- Hillsides along drainage covered in ash known to contain elevated levels of naturally occurring metals and dioxins.



Outfall 018, 2 Months After 2005 Fire

BMPs Implemented

- Repaired Pilot filter piping and electrical.
- Upstream placement of straw wattles, straw hay bales and hydromulching.



Additional Activities

- Vacuumed drainage areas.
- Nearly 7 miles of straw wattles installed.
- Over 430 straw bales placed.
- 6 acres of hydromulch applied around SWMUs.
- 610 acres of hydromulching to be aerially applied by late December/early January
- Carbon filter bags being used for additional solids removals.

Recent Cleanup Projects:

Soil Removal Near Outfall 008 (Happy Valley Area)

Perchlorate Interim Measure (Boeing – Area 1)

- *Total soil excavated: ~8,000 cubic yards*
- Backfilling, re-vegetation and installation of erosion control measures completed
- Surface water monitoring (Outfall 008) confirm success of perchlorate driven Interim Measure



Recent Cleanup Projects: Soil Removal near Outfall 010. (Building 203)

Mercury Interim Measure (NASA – Area 2)

- 2004 soil removal action
- 3,000 cubic yards of soil removed



Recent Cleanup Projects: Soil Removal Near Outfalls 005 & 006 (Former Sodium Disposal Facility)

Completion of DOE (Area 4) FSDF Interim Measure

- 2000 soil removal action
- 14,900 tons of soil/sediment removed
- Helicopter lift
- Onsite soil borrow area



Compliance History

- SSFL has experienced and reported storm water violations for:
 - TCDD
 - Mercury
 - Copper
 - pH
 - Iron
 - Lead
 - Manganese
 - Sulfate
 - TDS
 - Surfactants
- Exceedances are generally sporadic, and reveal no clear patterns.

Boeing's Source Testing Program

- Testing has been expanded to include:
 - On-site soils, ash, and rainfall
 - Off-site soils, ash, and storm water runoff
 - From Topanga fire area, but off-site
 - From Burbank fire area
- Preliminary (unvalidated) results indicate similar concentrations on and off-site.
- Literature review from other post-fire data collection programs.
- Testing not required, but Boeing is undertaking proactively

Boeing's Source Testing Program

- Goal is to understand sources and variability of constituent concentrations in storm water, and to use this information to improve BMP effectiveness.

Boeing's BMP Testing Program

- Concentrations of key constituents in runoff through various BMP materials has been measured in lab tests:
 - Aggregate and sand
 - Hay
 - Runoff from plastic tarps
 - Hydromulch materials
- Testing not required, but Boeing is undertaking proactively

Boeing's BMP Testing Program

- Goal is to select cleanest BMP materials and to understand the potential contribution of BMP materials to storm water runoff