

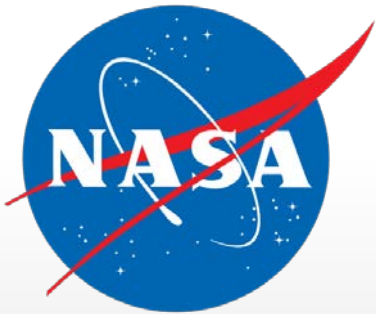
# AFTEERS: Automated Fuels Treatment Effectiveness Evaluation using Remote Sensing

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for

TFRSAC  
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November 5th, 2013



**STi**

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## AFTEERS Project Outline: Angora Fire Mock Up

- Briefly discuss the AFTEERS project
- Quick summary of IFTDSS
- Show select results from Angora Fire Case Study
  - Data produced manually but used to mock up how the AFTEERS process would be used operationally

# AFTEERS Problem Statements

- Land managers are using fuels treatments to mitigate adverse fire effects.
- GAO report determined need for assessing efficacy of fuels treatment
- Lack of easy to apply, rapid methods for assessing fuels treatment effectiveness.
- Earlier work with decision support systems indicates a disconnect between science producers and resource managers

## Phase I Objectives

- Identify if Fuels Treatments could be evaluated using NASA satellite derived products
- Determine if the process could be automated
- Determine if process is useful

# AFTEERS project

- Use remote sensing and GIS products to rapidly assess fuels treatment effectiveness within a decision support framework such as IFTDSS
  - Remote sensing products
    - **Monitoring Trends in Burn Severity (MTBS)**
    - LANDFIRE Existing Vegetation Type (EVT)
    - MODIS Land cover type
    - MODIS Land cover percent
    - MODIS fire detects
    - HMS fire detects
  - GIS Products
    - **GeoMac Fire Perimeters**
    - NFPORS Fuels Treatment locations
    - **FACTS Fuels Treatment locations**
    - User supplied Fuels Treatment locations
  - Weather Data
    - **RAWS weather stations**
  - Incident Reports
    - **ICS-209s**
  - Topographic Data
    - Slope, Aspect, Elevation

- **NASA Landsat**
- NASA Landsat
- NASA MODIS
- NASA MODIS
- NASA MODIS
- GOES, AVHRR, MODIS

# AFTERS

- Will output
  - Maps
  - Data tables
  - Comparison Figures
  - Regression Trees
  - Spatial Autoregression (SAR) data tables
- All within an online framework
  - Data is collected automatically
  - Summarized

# Interagency Fuels Treatment Decision Support System: IFTDSS

- Existing design support tool for designing and simulating fuels treatment effects
- Web-based Software Integration Framework
- Organizes
  - Computer programs
  - Data
- Produces exportable
  - Maps
  - Data tables and figures

**JOINT FIRE SCIENCE PROGRAM**

**Interagency Fuels Treatment Decision Support System**  
Version 2.0 Beta

**PROTECTING COMMUNITIES & ENVIRONMENTS**  
Fuels Management Committee

Home Request Account Log In

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**Interagency Fuels Treatment Decision Support System**

**Watch this video to learn about IFTDSS**

Browse the [IFTDSS Documentation](#)

**Welcome to IFTDSS**

Welcome to the Interagency Fuels Treatment Decision Support System (IFTDSS). IFTDSS is a web-based software and data integration framework that organizes previously existing and newly developed fire and fuels software applications to make fuels treatment planning and analysis more efficient and effective. IFTDSS has been developed for fuels treatment specialists by fuels treatment specialists.

IFTDSS is a result of the [Software Tools and Systems study](#) conducted by the Joint Fire Science Program (JFSP). All project planning and accomplishment documents are published on the web location [www.frames.gov/ift-dss](http://www.frames.gov/ift-dss). For a brief and very readable overview of IFTDSS, please see [A Powerful New Planning Environment for Fuels Managers: the Interagency Fuels Treatment Decision Support System](#) in the December 2009 issue of *Fire Science Digest*.

**Benefits of IFTDSS**

IFTDSS provides a single portal for access to several sources of data and models for fuels treatment planning. IFTDSS software...

**What's New**

As of October 2012, IFTDSS version 2.0 beta is available for testing and evaluation by members of the various cooperating stakeholder groups. Extensive guidance from a broad range of fuels treatment specialists over the last three years has resulted in the identification of four critically important workflow processes:

1. Hazard Analysis
2. Risk Assessment
3. Fuels Treatment
4. Prescribed Burn Planning

IFTDSS 2.0 beta contains each workflow that will be present in the final release. However, ongoing development to improve usability and performance may result in changes to those workflows. You are invited to become an IFTDSS user for testing and evaluation. Please [request](#) an account and test drive the system!

If you have any issues using the system or if you have suggestions for improvements, please contact us.

## Select project area of interest

Data Set Name

West Lake Tahoe FT

North

38.1645186

West

-122.6111095

East

-122.5446984

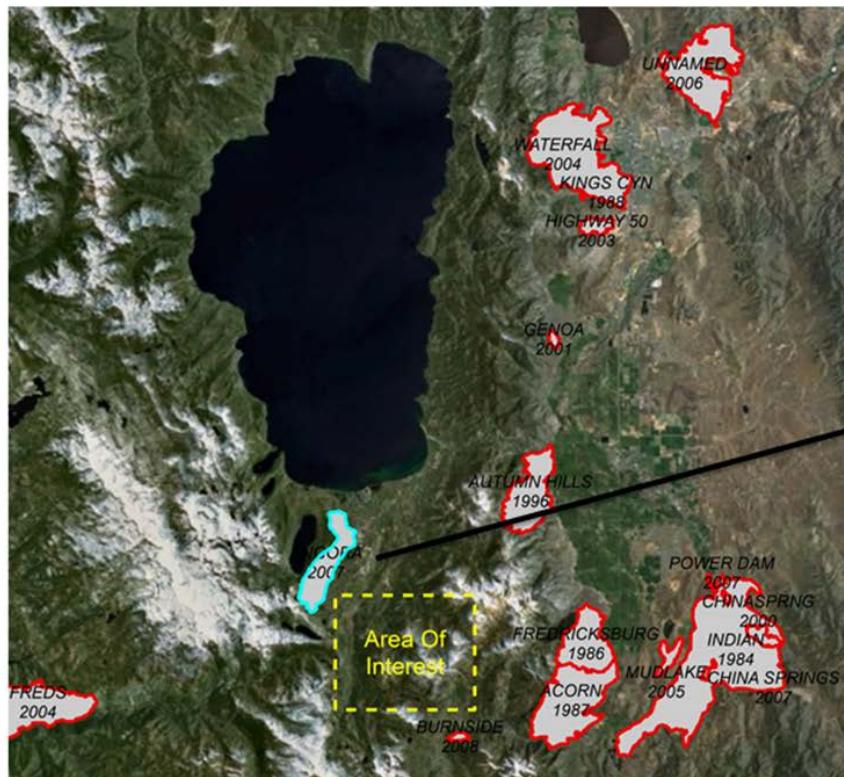
South

Nearest fires in MTBS

Angora Fire 2007

Contains Fuels Treatments

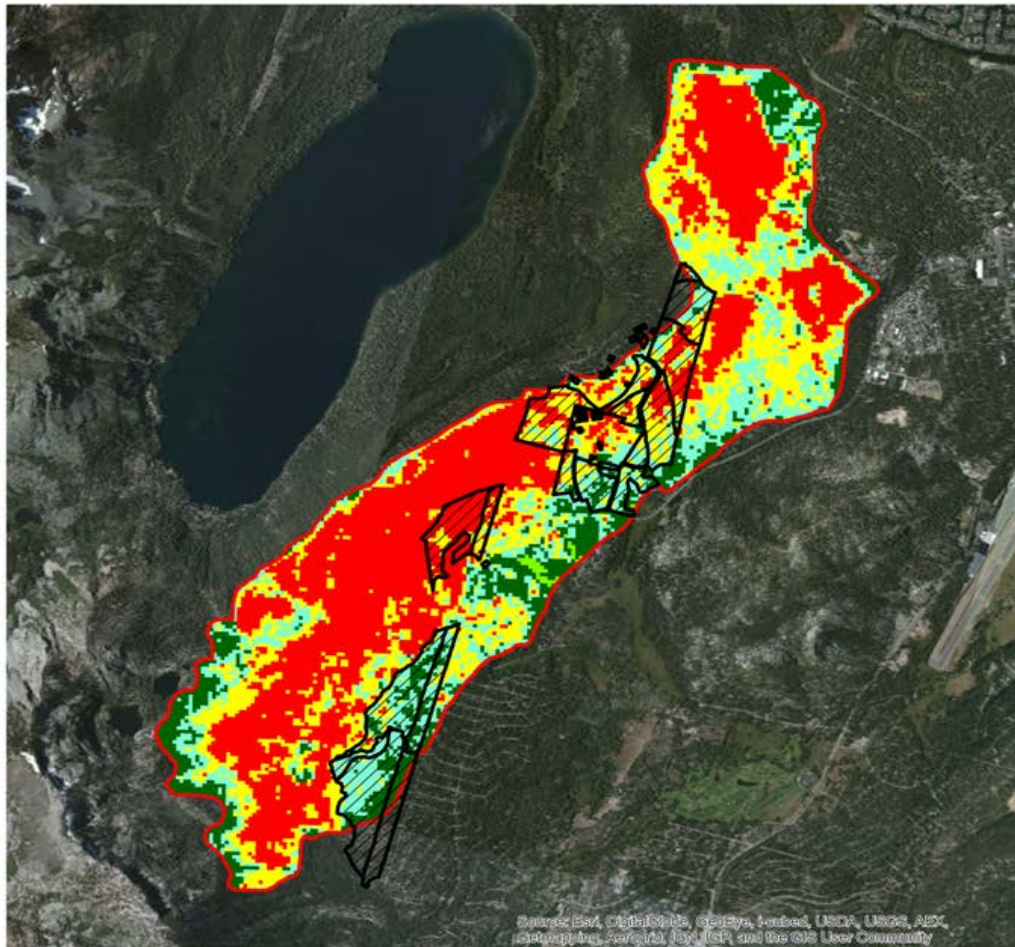
Yes



Fire Name	Angora
Start End	June 24, 2007
End Date	~July 2007
Size	3,014 acres
Vegetation	Jeffrey Pine (12%)
	Mixed Conifer (66%)
	Red Fir (6%)
	Chapparral (5%)
	Developed (3%)
	Other (8%)
Treated Area	Yes
Treatment Type	Sanitation Cut
	Precommercial Thin
	Commercial Thin
	Yarding
	Piling of Fuels
	Burning of Piles
Land Manager	Forest Service



## Angora Fire Area Summary



Source: Esri, DigitalGlobe, GeoEye, IGN, USDA, USDA, AXC, Intergraph, AeroGRID, IGN, IGP, and the GIS User Community



### Angora

Total size: 3,014 acres

Start date: June 24, 2007

End date: July, 2007

### Legend

Angora

Treatments

Historical Fires

### Fire Severity (MTBS)

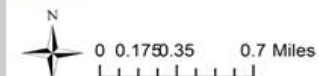
Unburned to Low

Low

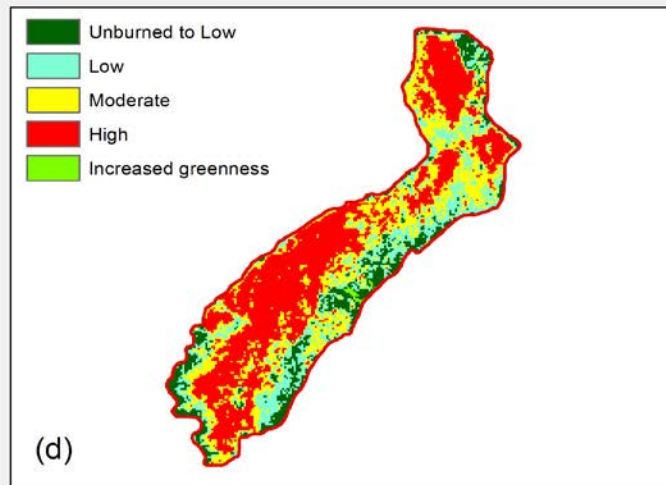
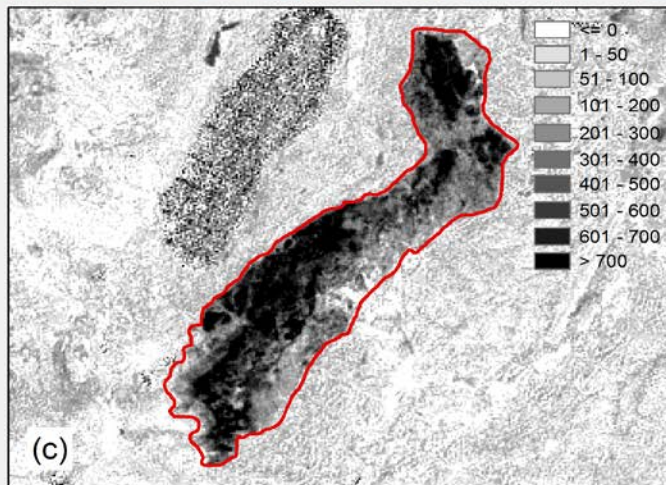
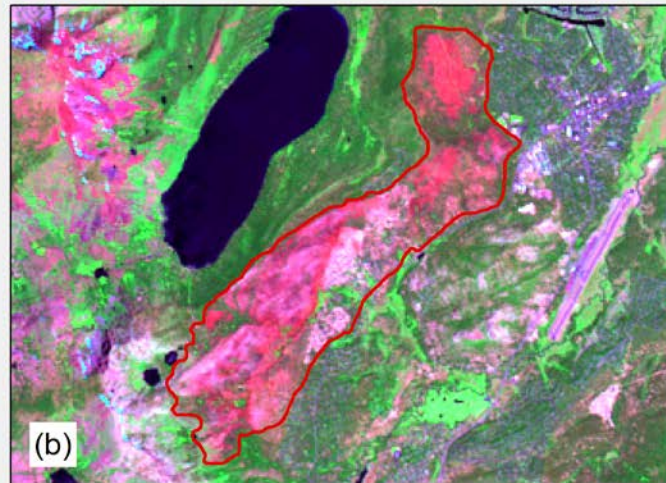
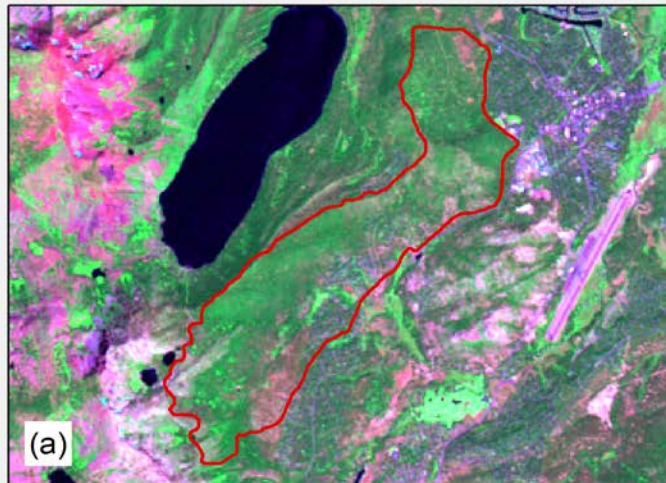
Moderate

High

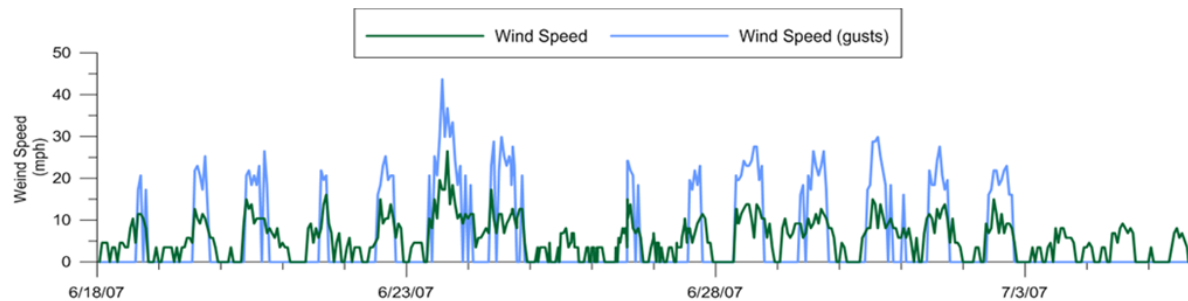
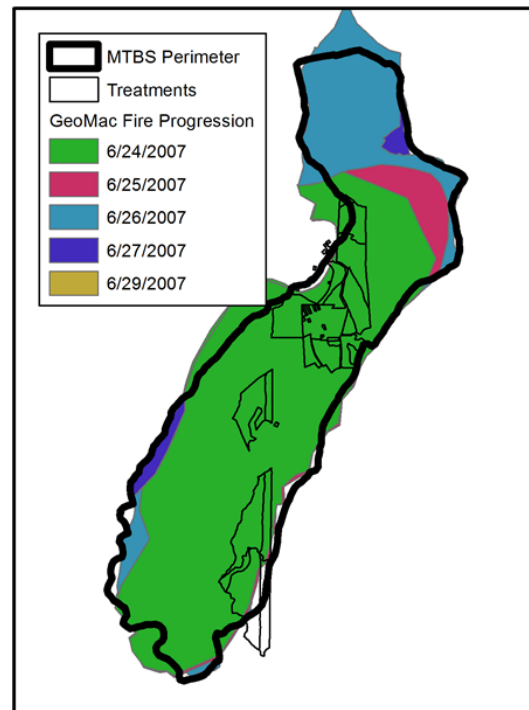
Increased Greenness



## MTBS Data: Angora Fire Area

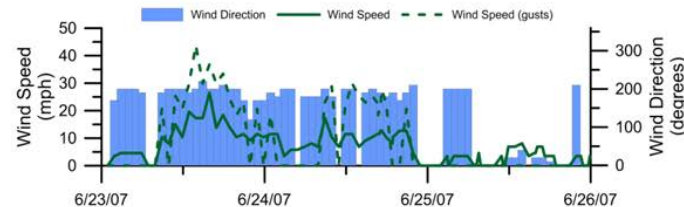
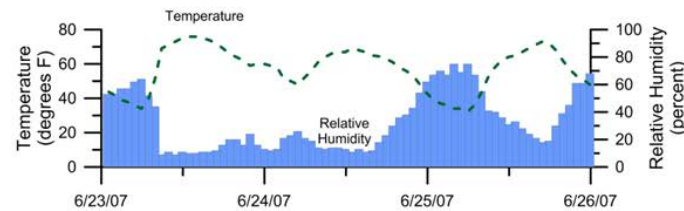
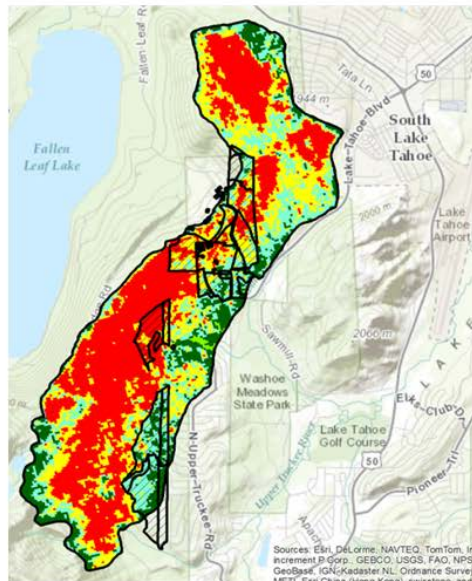


## Angora Fire Progression –GeoMac Daily fire progression polygons



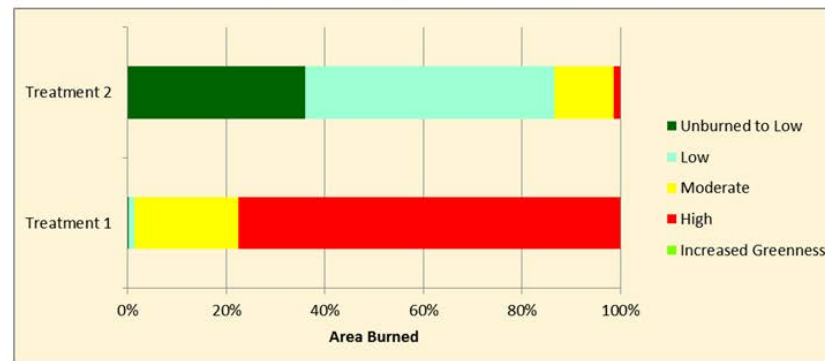
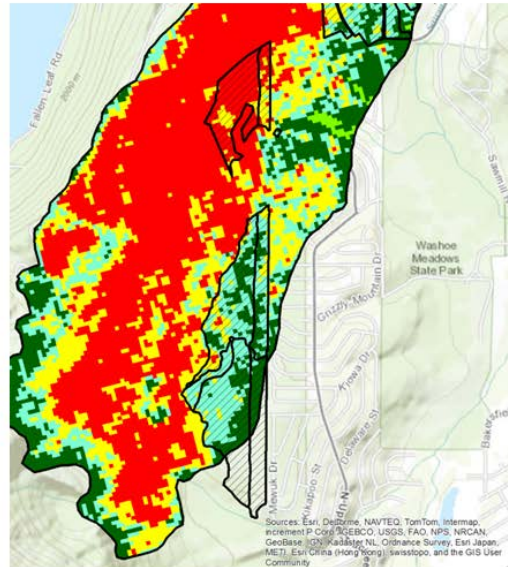


## Angora Fire Progression 6/24/2007



Date	Time	Fire Size	Temperature	Relative Humidity	Wind Speed	Wind Direction
06/24/2007	1414	345 acres	65 F	10 %	10 mph	SW
	Fuels	Heavy timber, grass, and understory				
	Fuel Model	2				
	Fire behavior narrative	Extreme fire behavior with strong erratic winds preventing aircraft from flying on the fire. Spotting .5 mile ahead of the main fire..				
	Fire Management Activities	Structure protection, public and firefighter safety.				

## Fuels Treatment Interactions



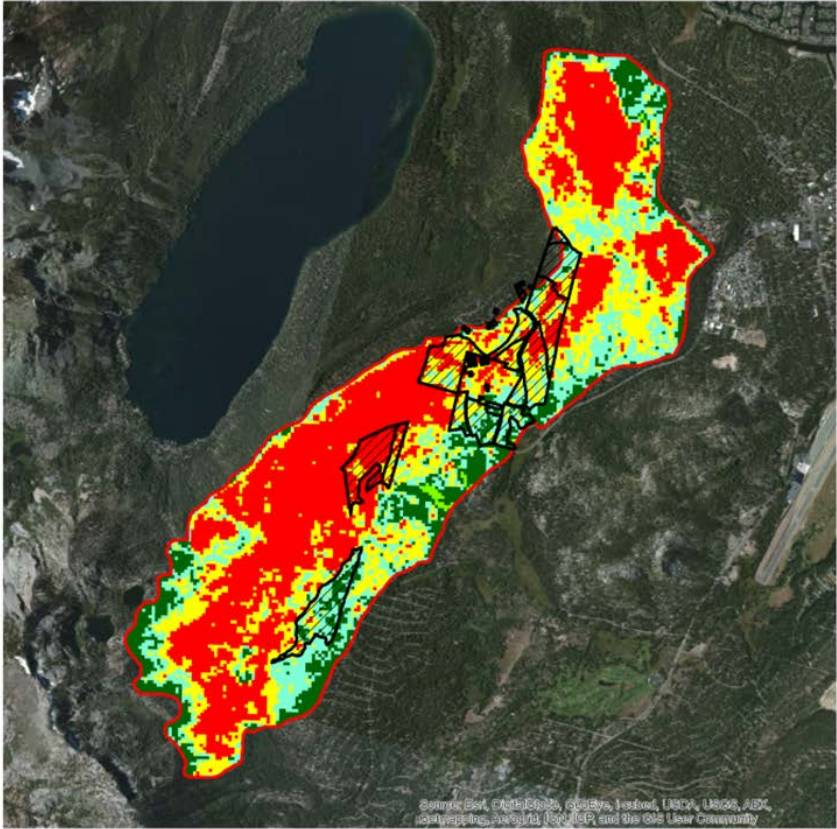
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Logged in as Drury, Stacy

### Area treated by thinning and piling fuels (hand and machine piling)



Source: Govt. of British Columbia, Forests, Lands, Natural Resource Development, and the First Nations Community

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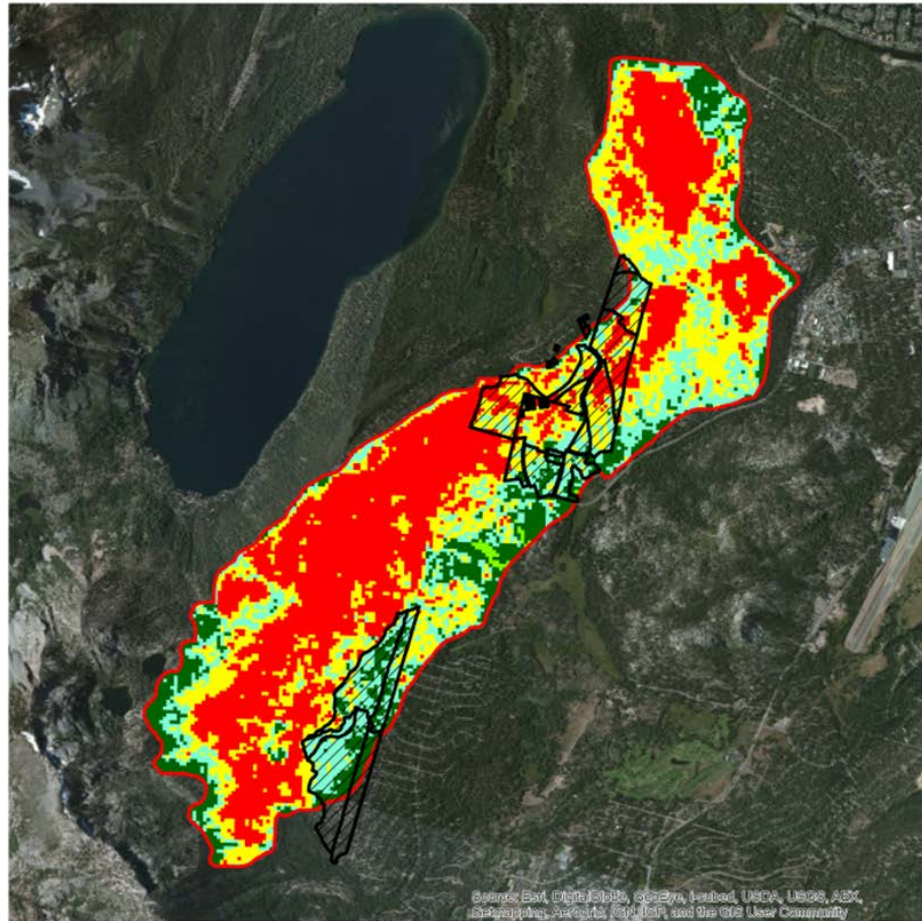
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Logged in as Drury, Stacy

Area treated by burning piles – classified as fuel removal



## Phase I Conclusions

- NASA satellite derived products can be used to evaluate fuels treatment effectiveness within decision support systems
- It was possible to automatically gather and summarize satellite data and GIS data used in AFTEERS
- Collaboration with partner land managers indicated that the AFTEERS provides useful information for evaluating fuels treatment effectiveness



## Phase II

- Implement AFTEERS process into IFTDSS and WFDSS
  - Set up data acquisition framework
  - Develop data analysis pathway
  - Produce reporting tools
- Continue working with JFSP, BIA, NPS, Forest Service partners to ensure that AFTEERS will aid decision support