AFTEERS: Automated Fuels Treatment Effectiveness Evaluation using Remote Sensing

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for

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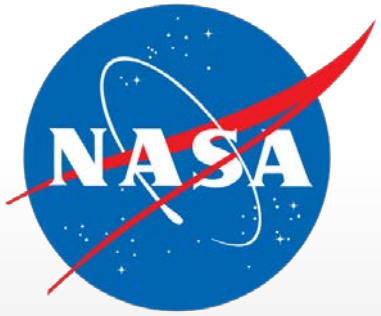

AFTEERS Project Outline: Angora Fire Mock Up

- 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)** **- NASA Landsat**
    - LANDFIRE Existing Vegetation Type (EVT) - NASA Landsat
    - MODIS Land cover type - NASA MODIS
    - MODIS Land cover percent - NASA MODIS
    - MODIS fire detects - NASA MODIS
    - HMS fire detects - GOES, AVHRR, MODIS
  - 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

AFTEERS

- 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

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Select project area of interest

Data Set Name: West Lake Tahoe FT

North: 38.1645186

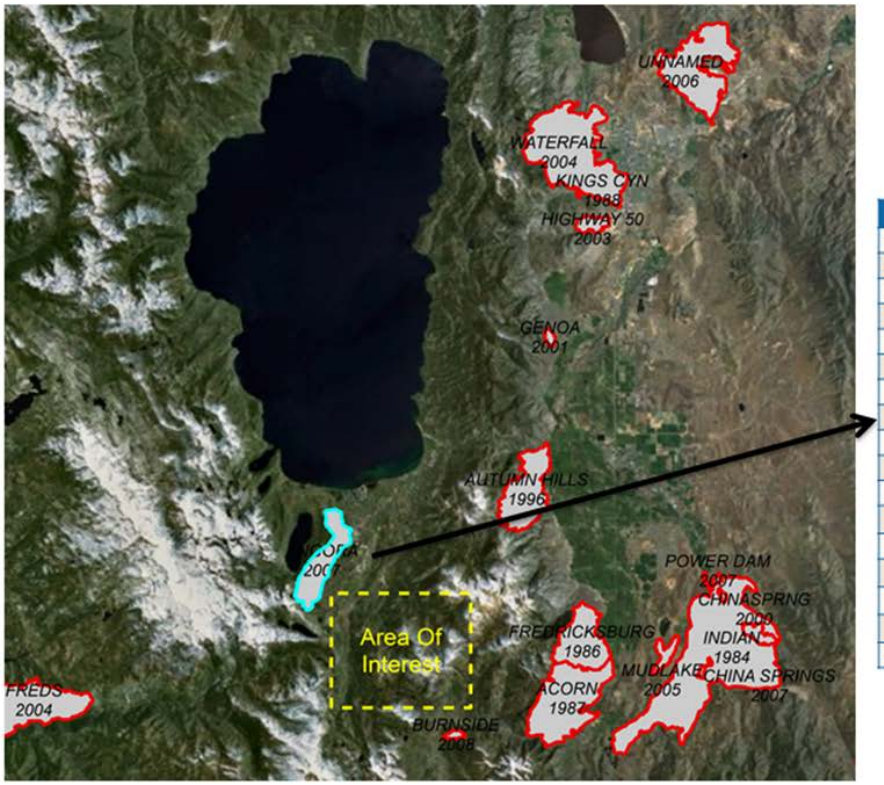
West: -122.6111095

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%)
	Chapparal (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

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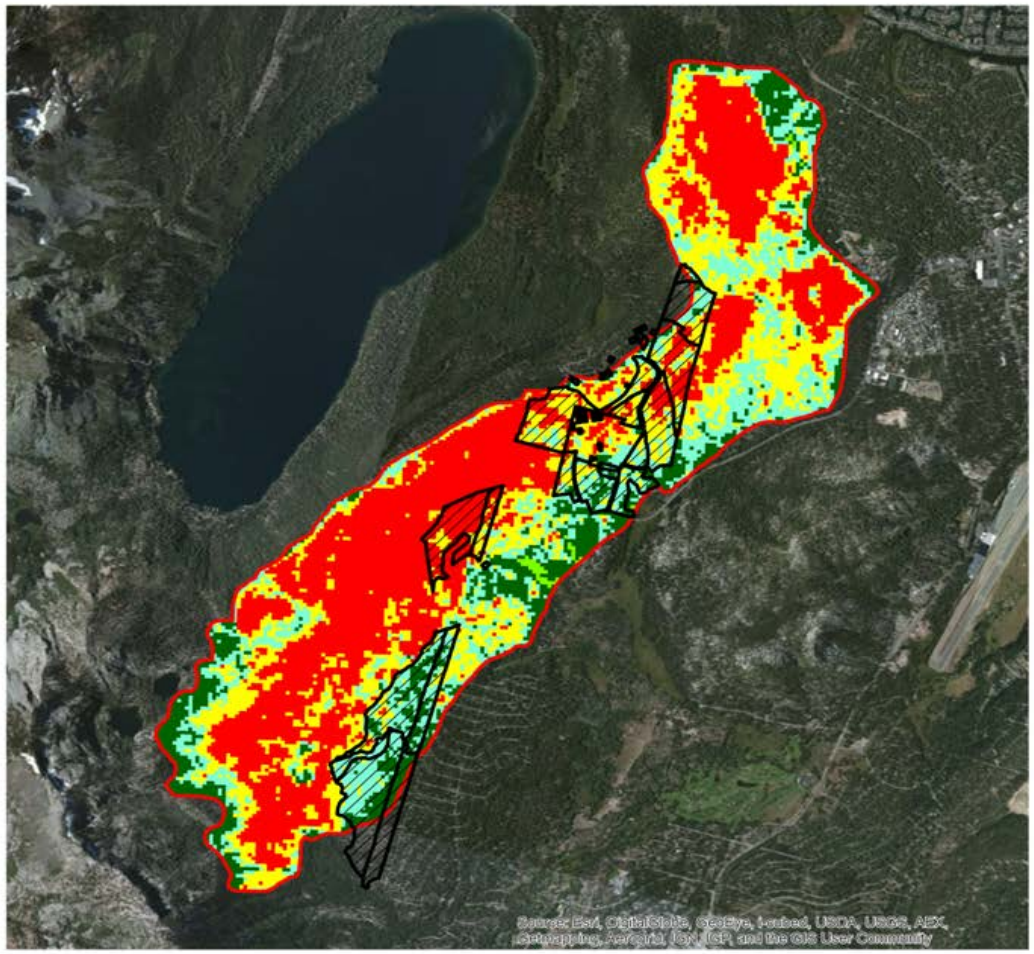
Angora Fire Area Summary



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

N

0 0.175 0.35 0.7 Miles

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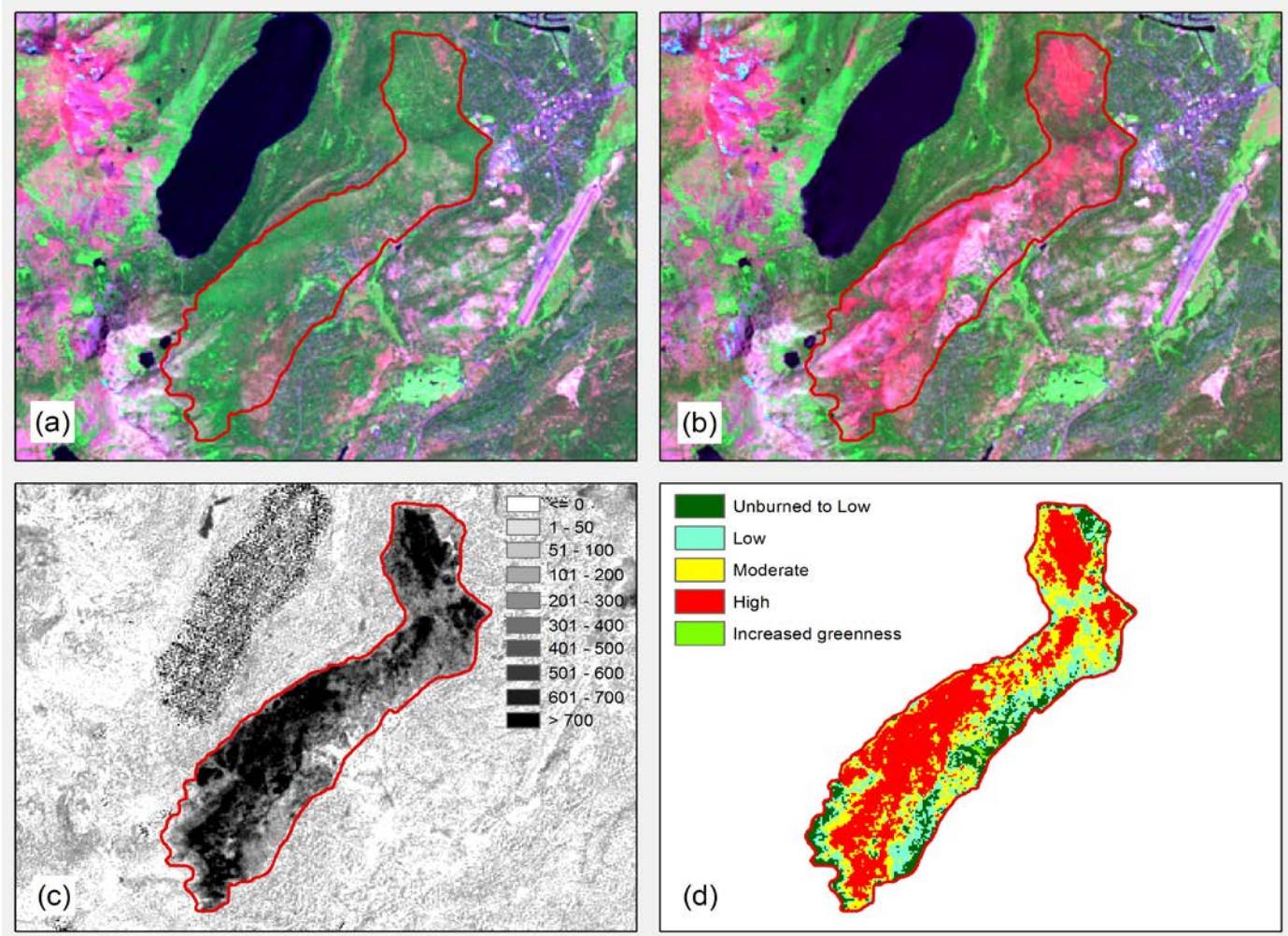
MTBS Data: Angora Fire Area



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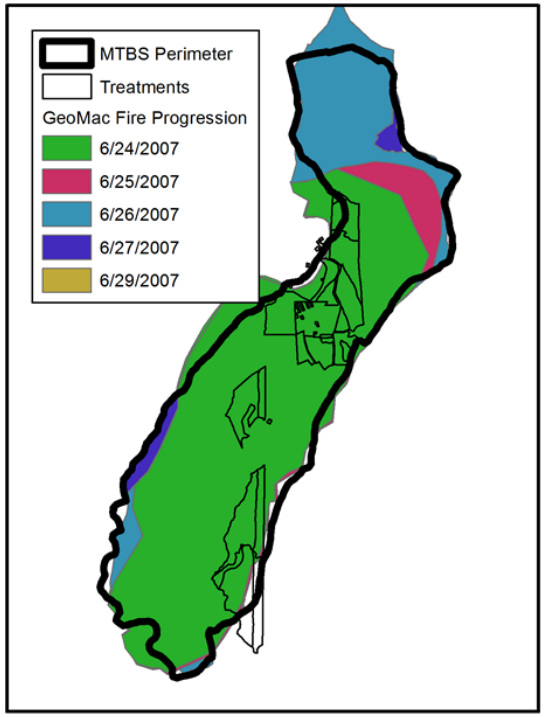
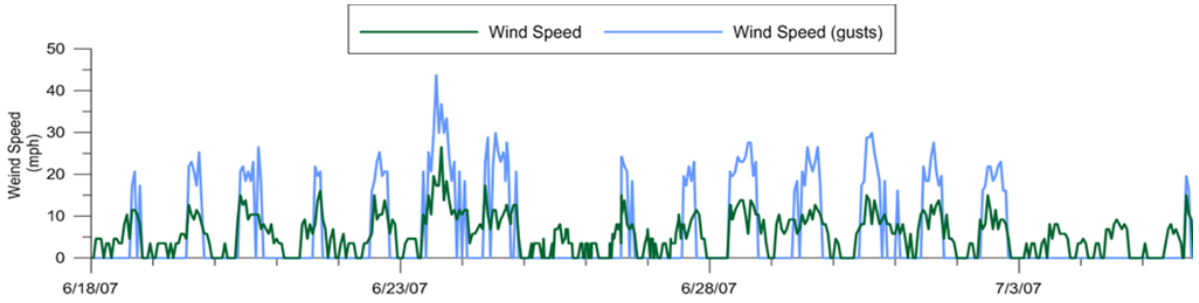
Angora Fire Progression –GeoMac Daily fire progression polygons





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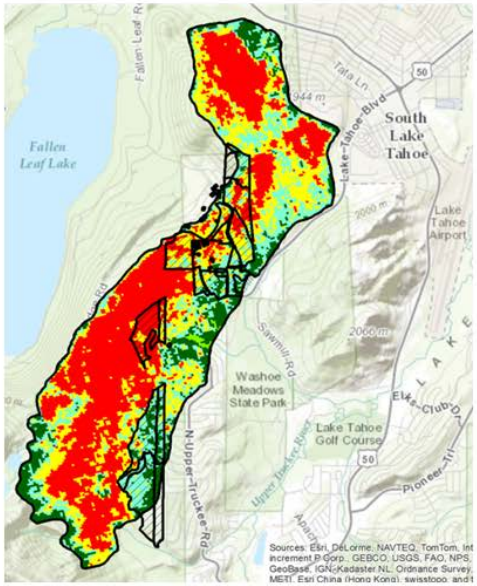
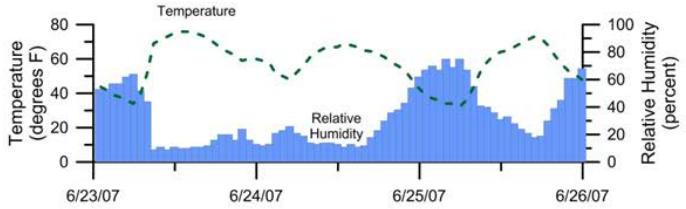
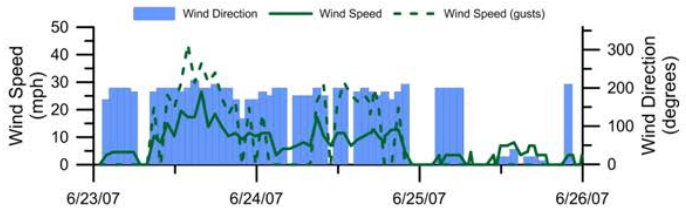
Angora Fire Progression 6/24/2007







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.				

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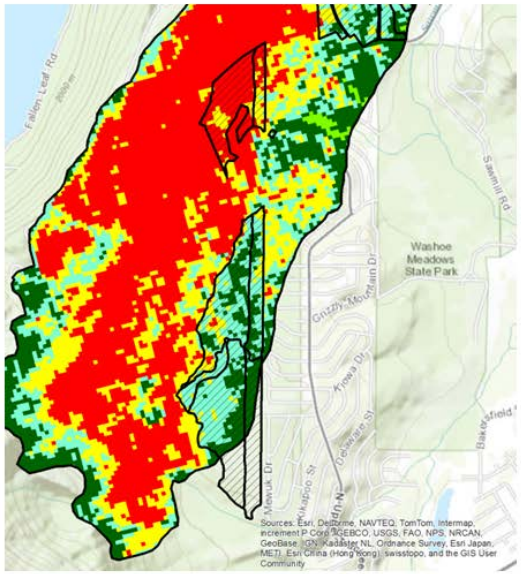
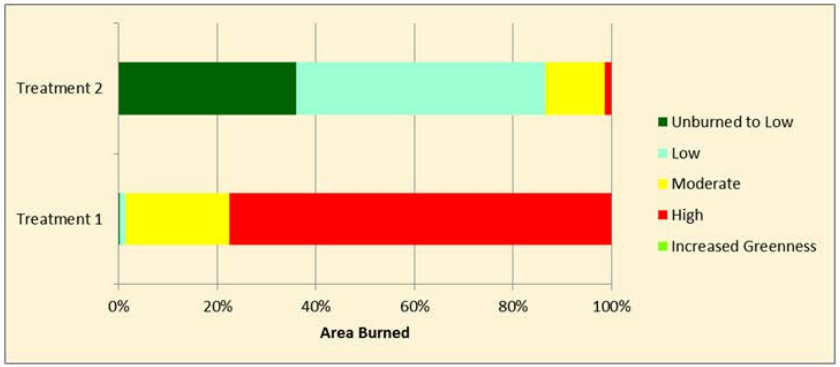
Fuels Treatment Interactions





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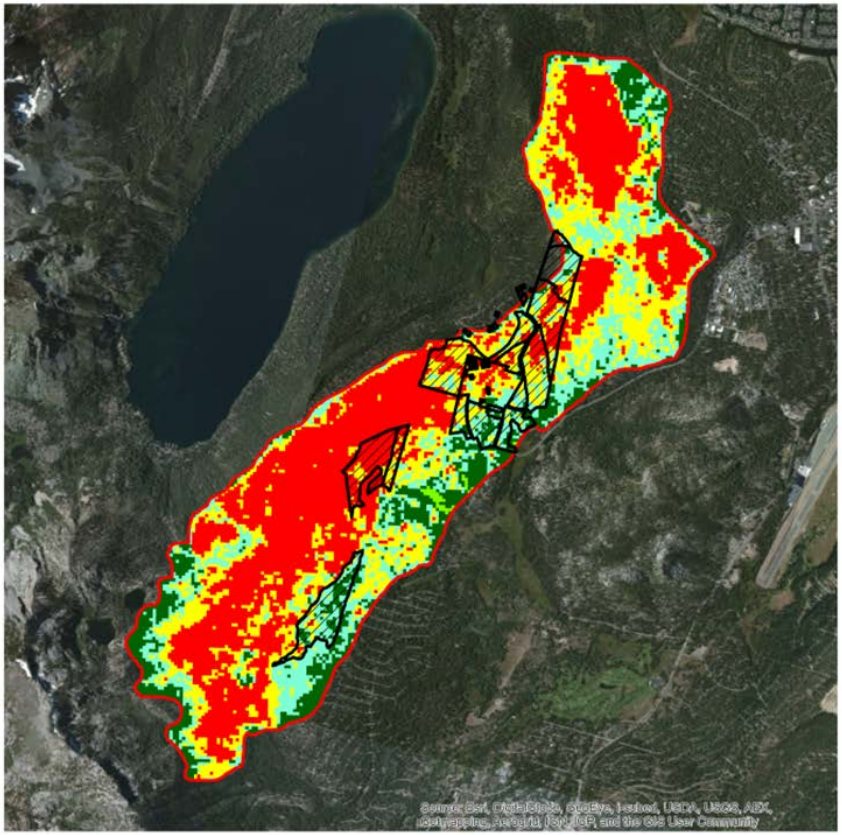
Area treated by thinning and piling fuels (hand and machine piling)



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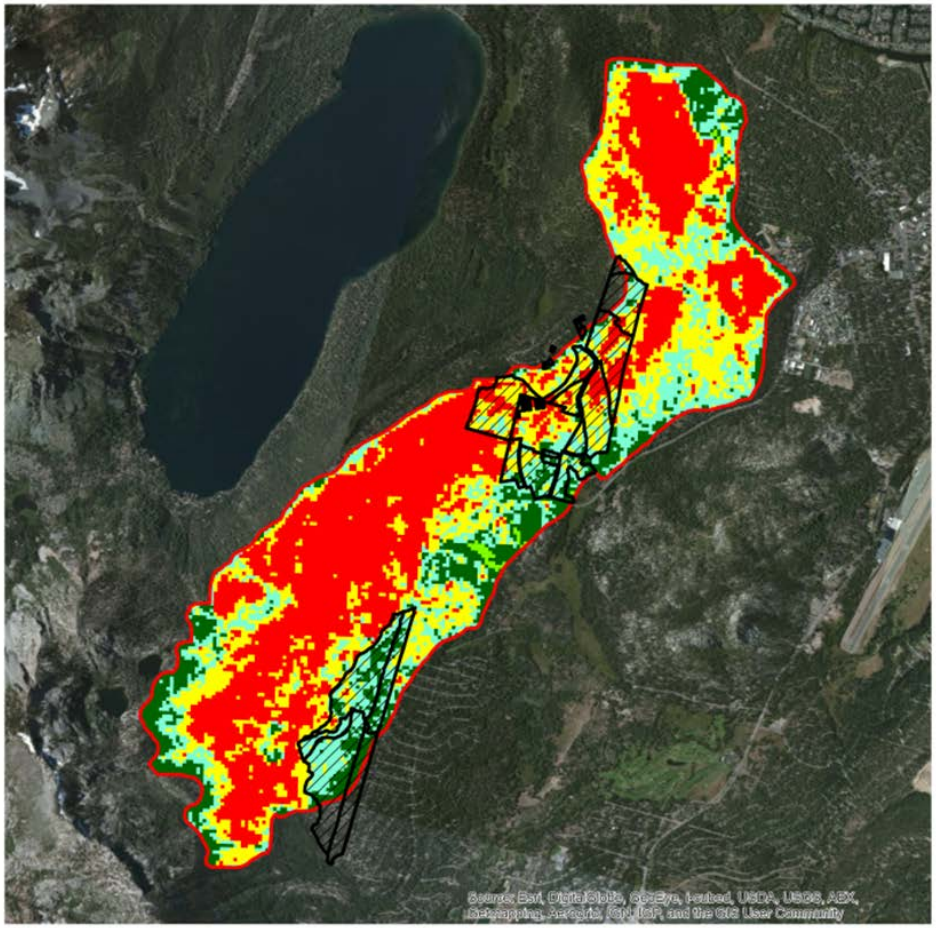
Area treated by burning piles – classified as fuel removal



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