Michigan Tech Research Institute

www.mtri.org

Enhancing Fire Management with Earth Observations

Pitch Team:

Mary Ellen Miller, PhD
Nancy French, PhD
Michigan Tech Research Institute, Ann Arbor, MI

Mathew Dickinson
U.S. Forest Service, Northern Research Station, Delaware, OH

Sam Batzli, PhD
University of Wisconsin-Madison, Madison, WI

WISCONSIN UNIVERSITY OF WISCONSIN-MADISON

JOINT FIRE SCIENCE PROGRAM

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

NASA

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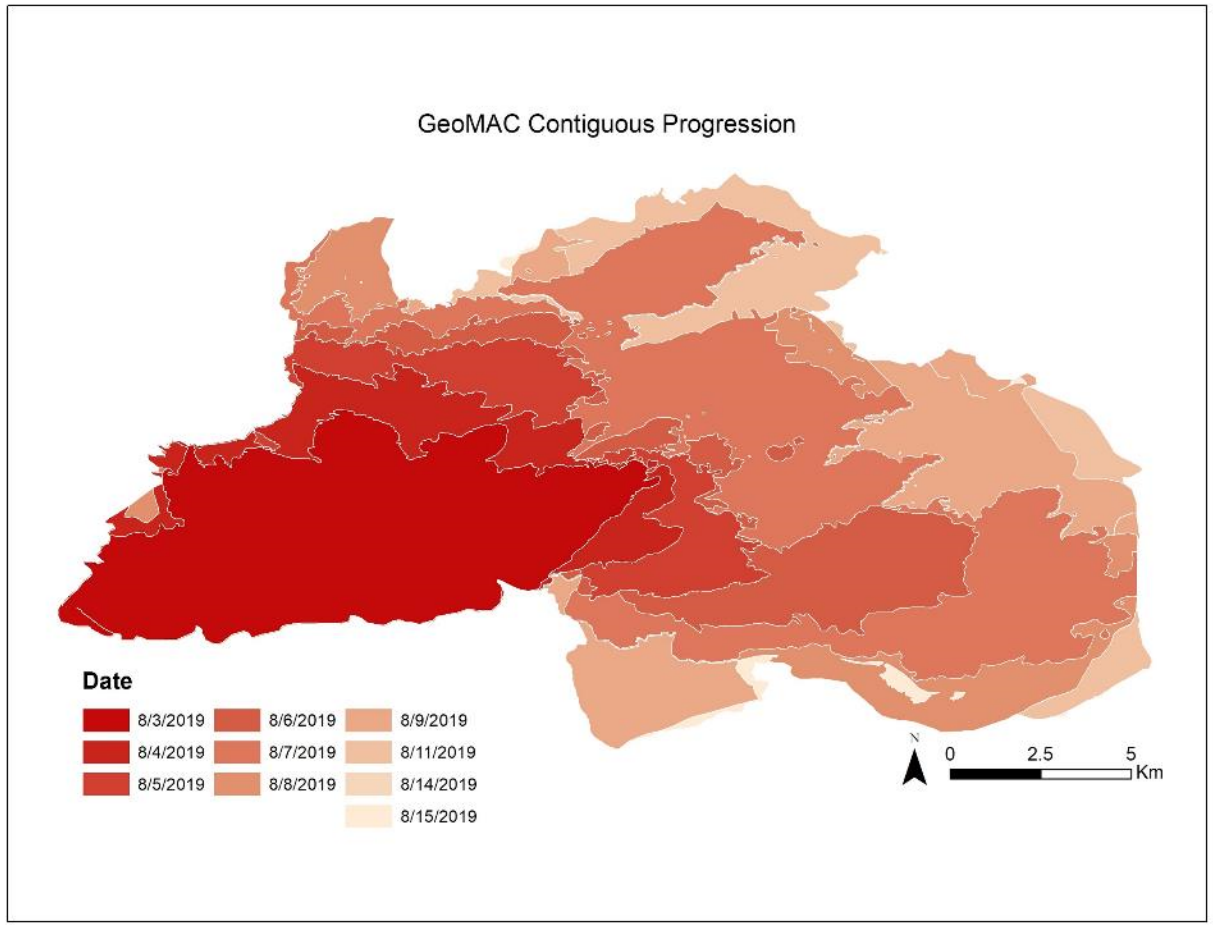
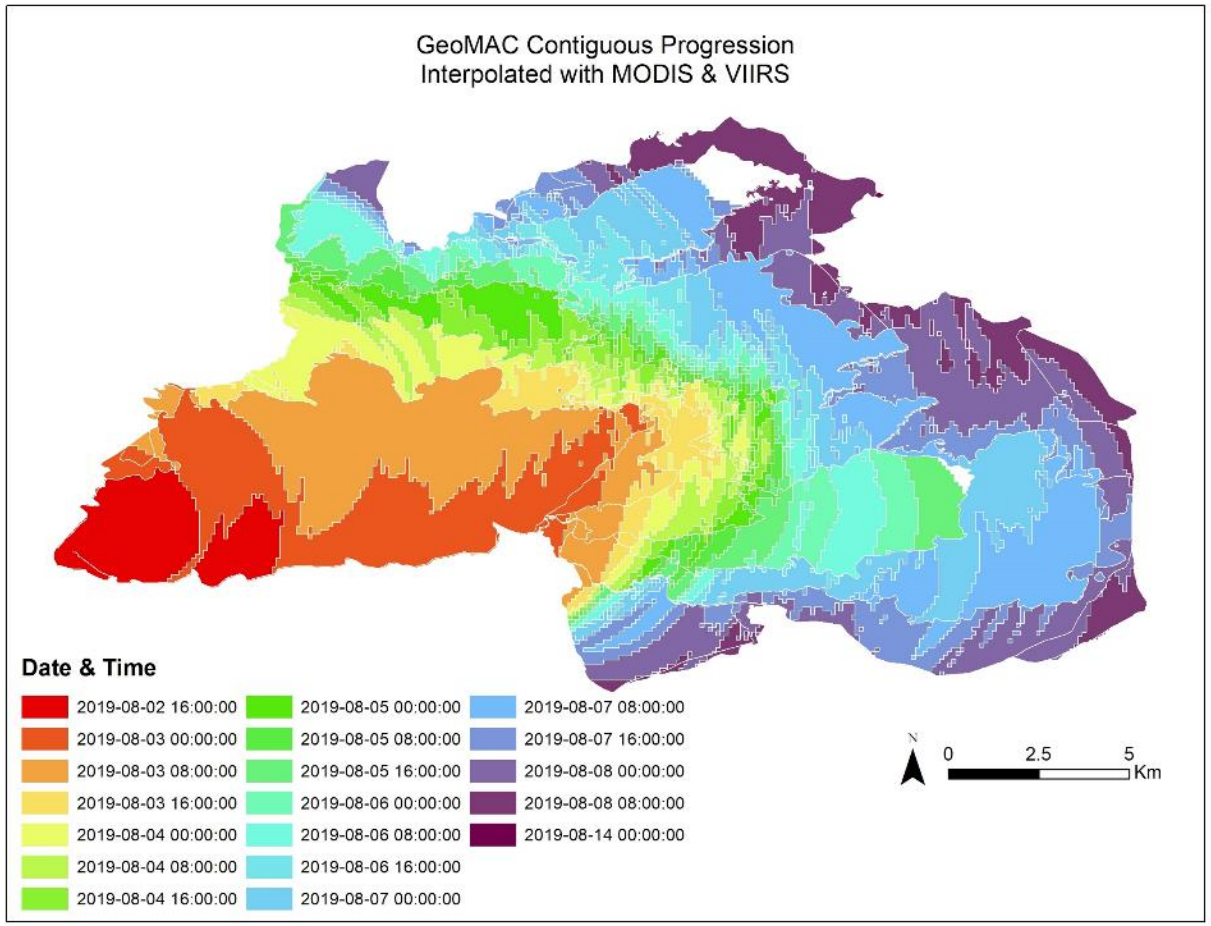
Fusion of Thermal Imagery





ECOSTRESS: ECOsystem Spaceborne Thermal Radiometer Experiment

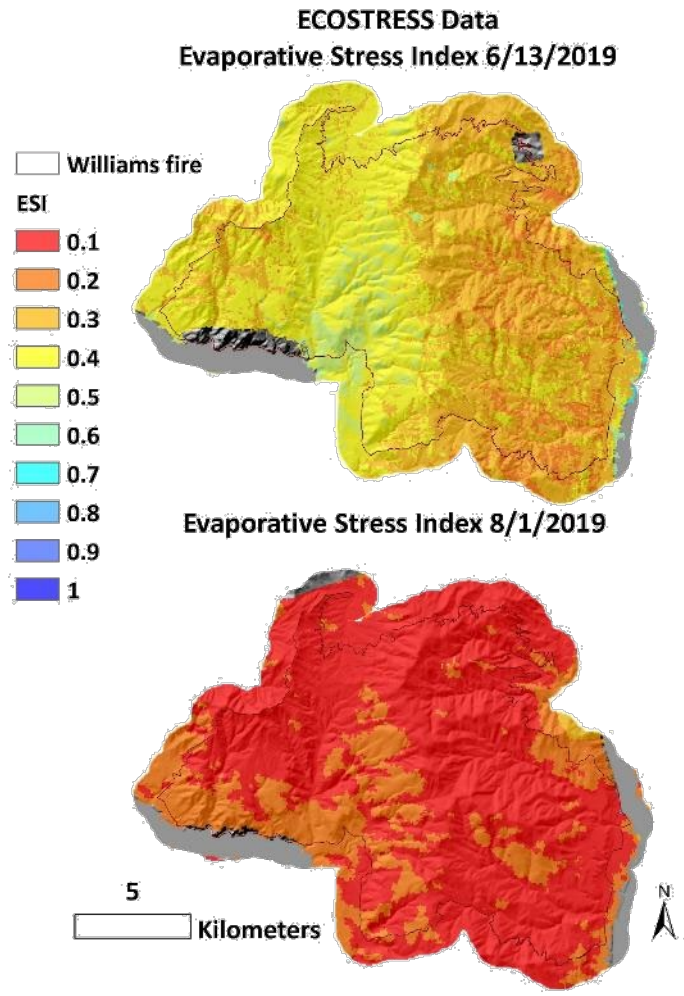
Relies on multiple instruments, models and datasets to perform energy balance modeling in order to derive ET and Evaporative Stress Index.

$$ESI = ET / PET$$

Potential evapotranspiration (PET) is the amount of water that would be transpired and evaporated occur with an ample water supply.

Evapotranspiration (ET) is the actual amount of water that is evaporated and transpired.

ESI is a unitless ratio of mm/hr ranging from 0 (very water stressed) to 1 (no water stress)



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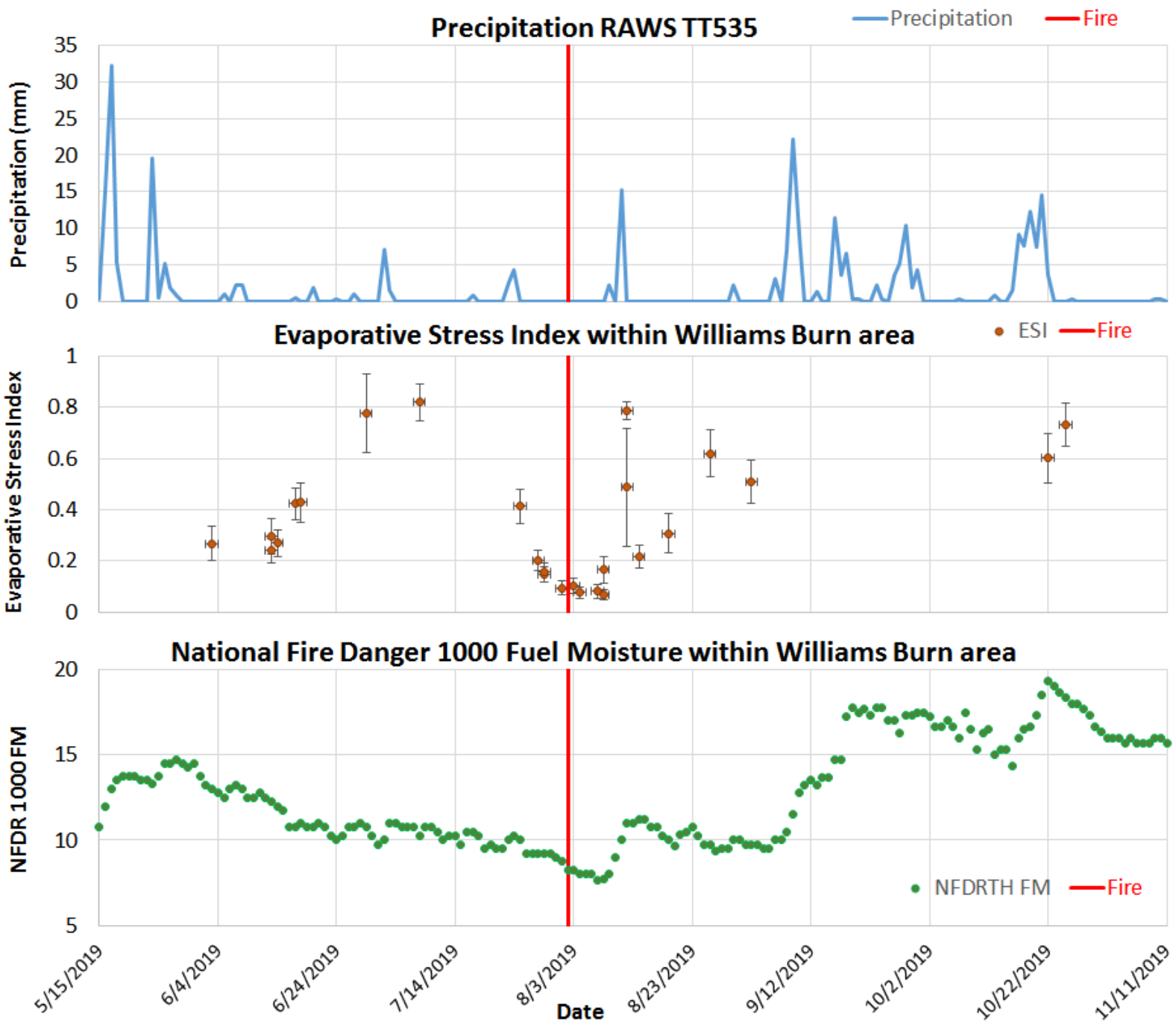
Explore ECOSTRESS Fire Applications:

Can ECOSTRESS help map Fire Danger?

Improve live and dead estimates of fuel moisture?

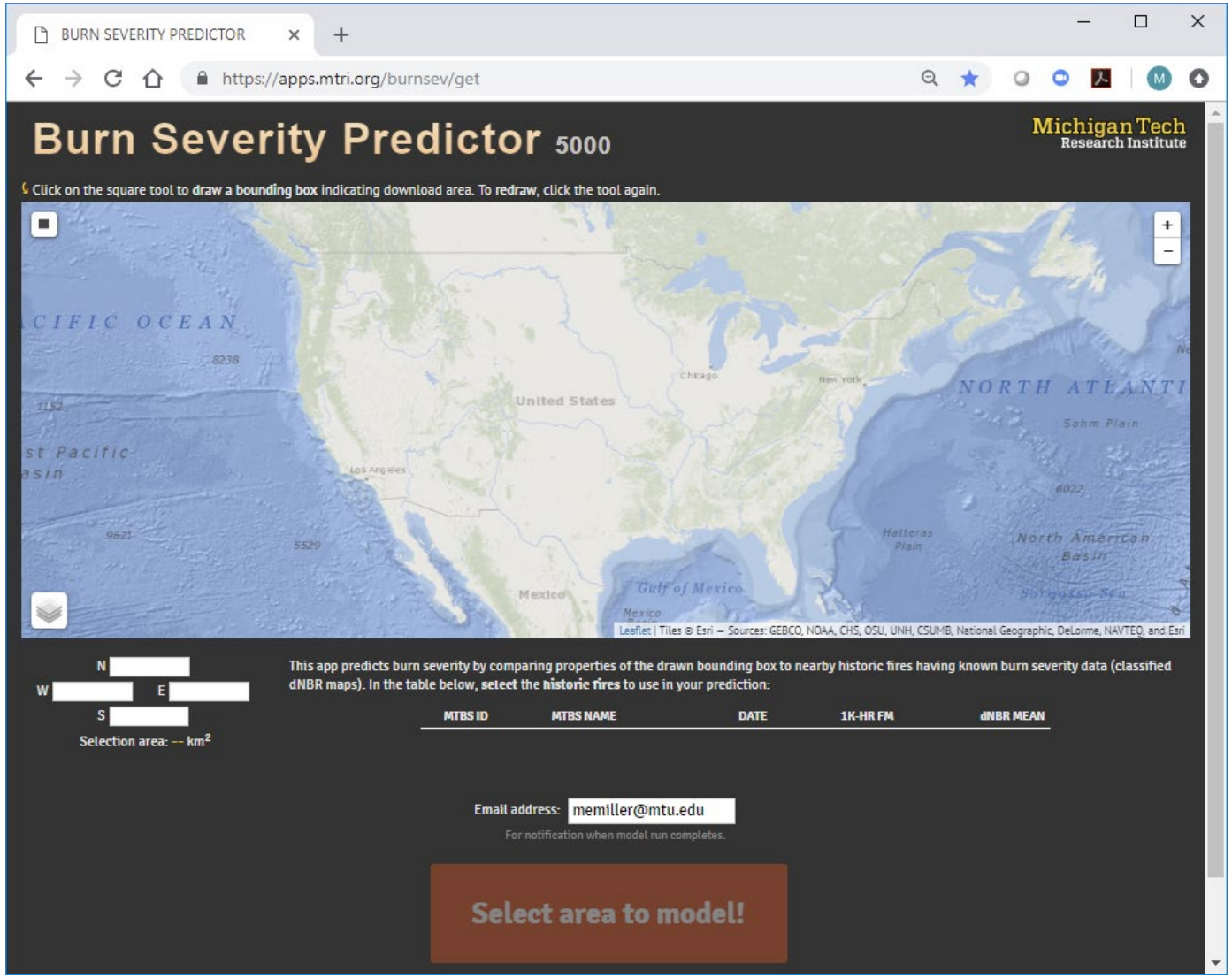
Can better estimates of fuel moisture improve estimates of emissions?

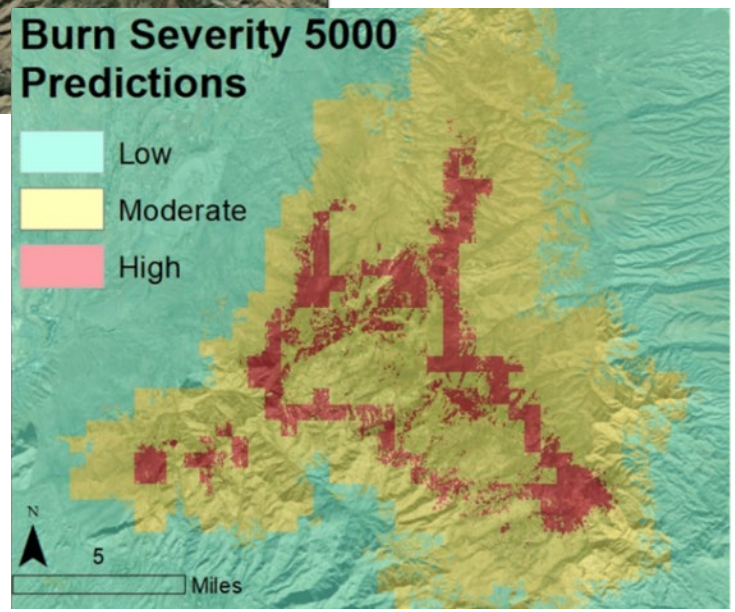
Improve predictions of potential burn severity?



Burn Severity Prediction Tool

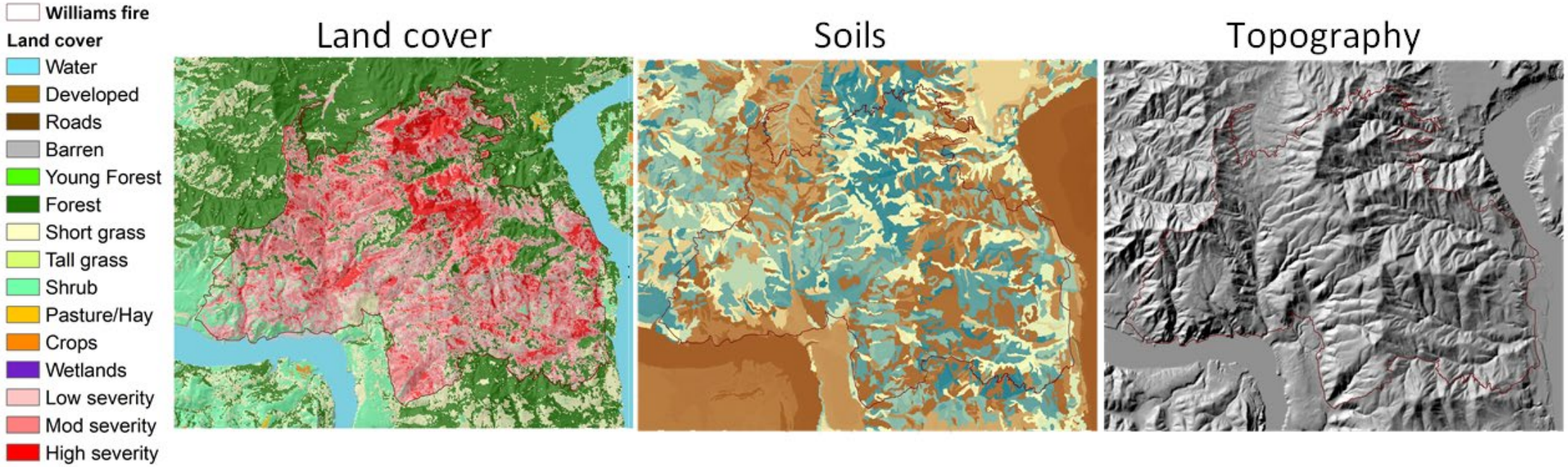
https://apps.mtri.org/burnsev/get





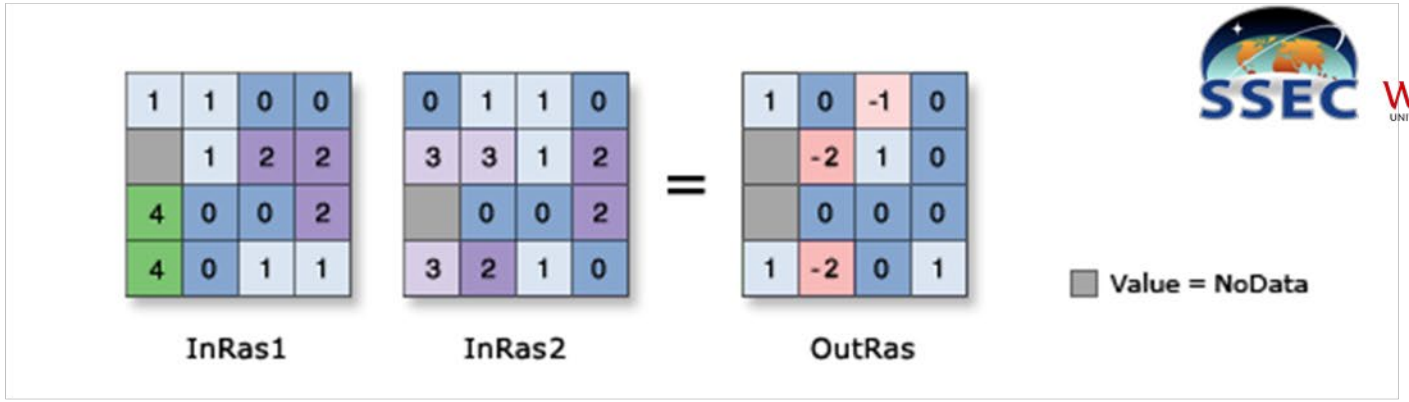
Rapid Response Erosion Database
RRED http://rred.mtri.org/rred/

- The removal of protective cover from soil by wildfire can dramatically increase runoff and erosion.
- RRED combines earth observations of burn severity with model inputs to allow for rapid assessment of post-fire erosion hazards.

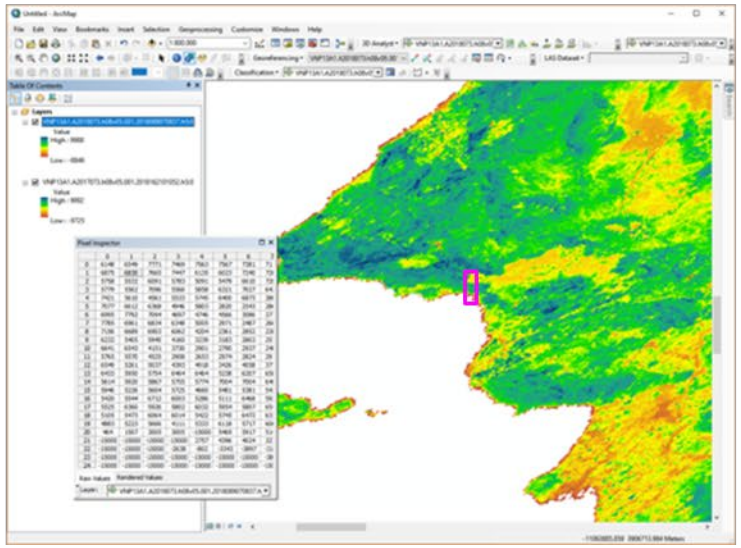


BRIDGE Map: Raster Math with NDVI

Burn Intensity Delta Greenness Estimation (BRIDGE) Map:
To quantify change, we subtract NDVI values of the before-fire product from the values of the after-fire product.



NDVI After - NDVI Before = dNDVI (Change)



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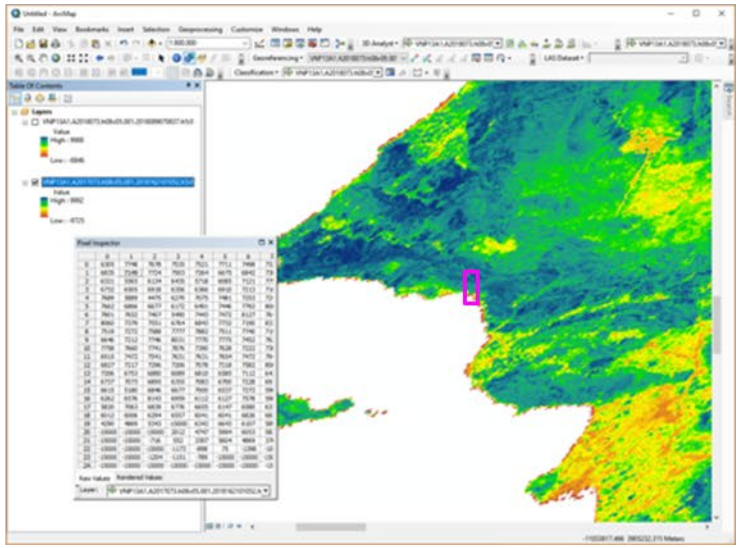

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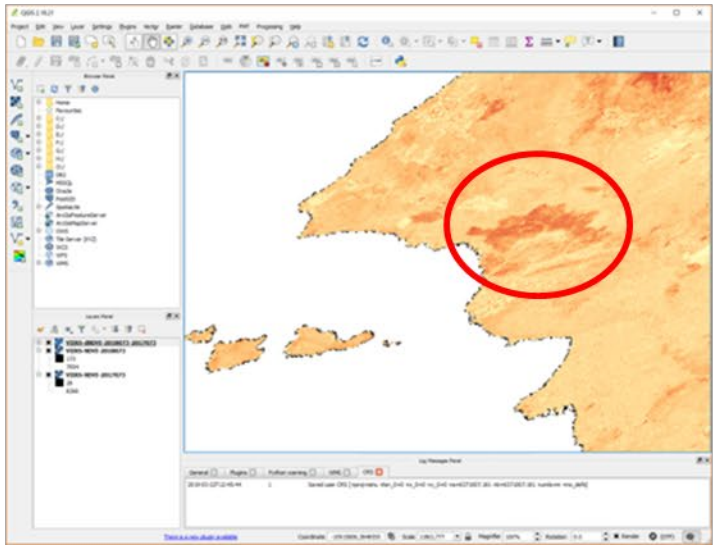

RRED and new **BRIDGE** VIIRS early burn severity assessment maps

Can **RRED** and **BRIDGE** provide an even faster response?

Yes! – using **BRIDGE** data a new early assessment burn severity map derived from VIIRS NDVI data.

BRIDGE burn severity map was created without information from Landsat data.