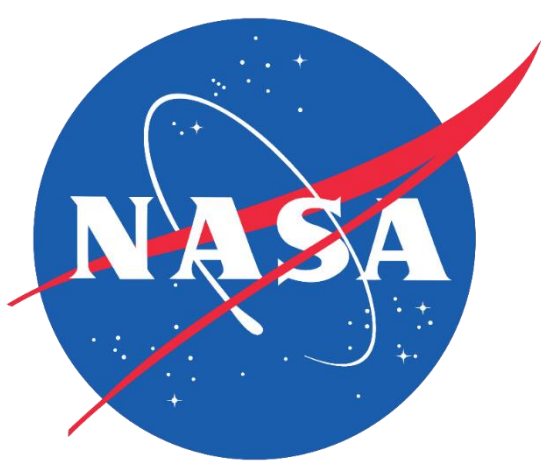




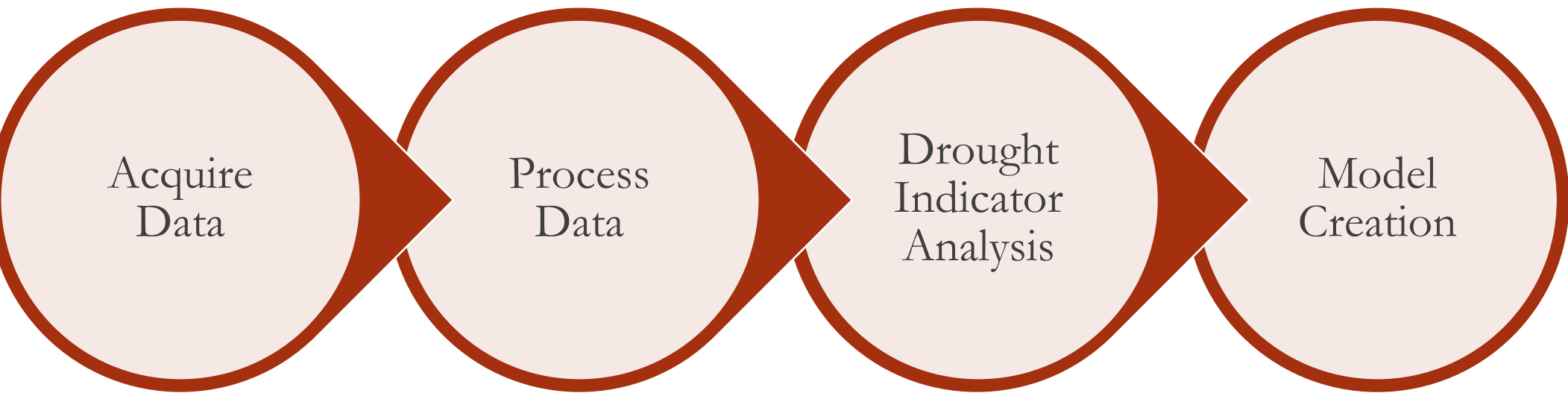
Assessing Drought and Fire Conditions, Trends, and Susceptibility to Inform State Mitigation Efforts and Bolster Monitoring Protocol in North Central Idaho



Abstract

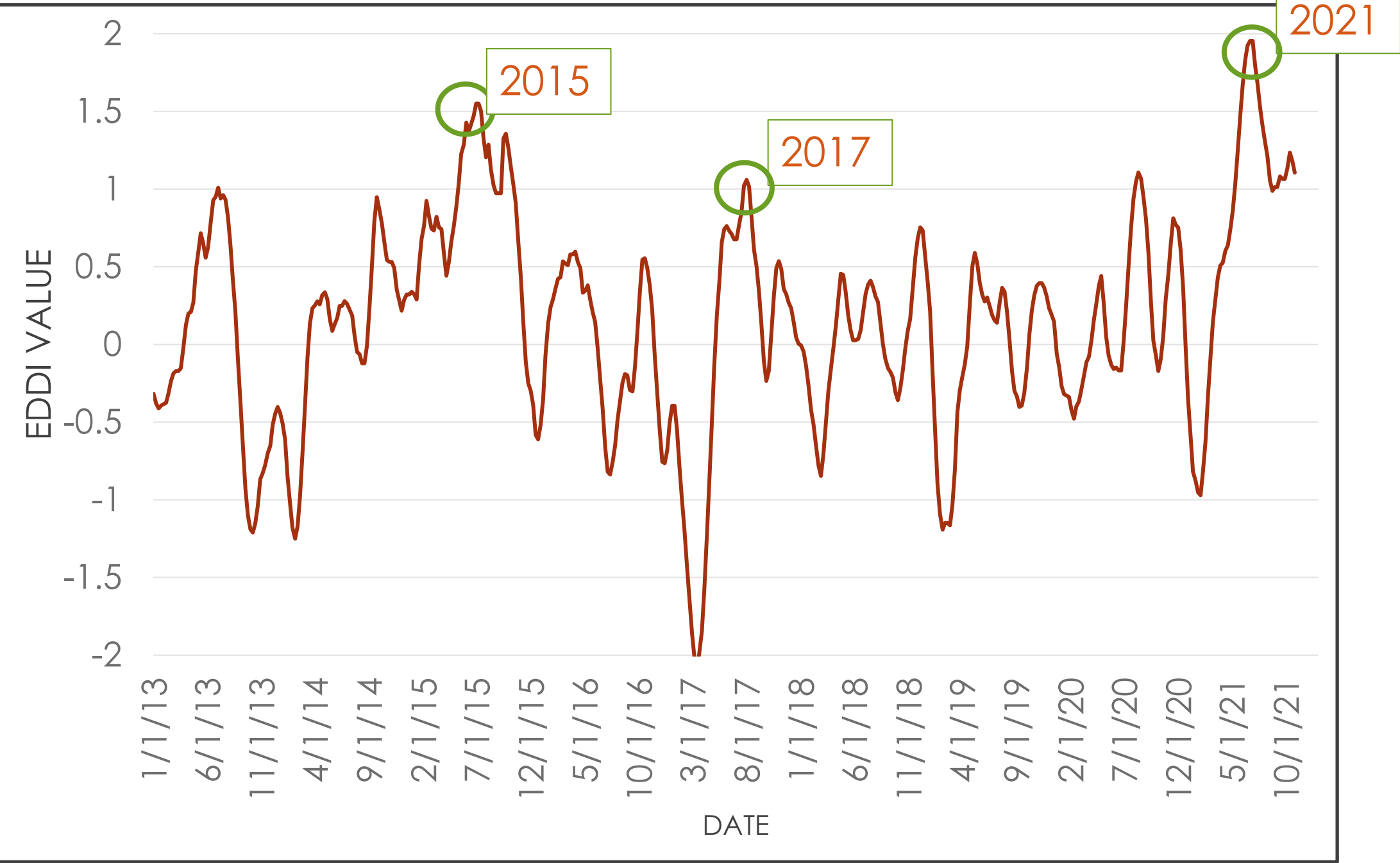
Escalating severity and frequency of drought and wildfire call for effective and cost-efficient mitigation planning and monitoring protocols. The Palouse ecoregion, an agricultural epicenter in North-central Idaho, is of particular concern as both drought and wildfire present substantial economic threats. The DEVELOP team implemented Earth observation data to assist the Idaho Office of Emergency Management, Idaho Department of Water Resources, and Idaho Department of Lands in updating the state's Hazard Mitigation Plan by enhancing their drought and fire monitoring capabilities. The team utilized Landsat 8 Operational Land Imager (OLI), and Aqua and Terra's Moderate Resolution Imaging Spectroradiometer (MODIS), along with ancillary datasets, to assess drought indicators and map hazard susceptibility. The team upgraded the state's current fire hazard model by updating existing data layers and adding drought indicator data to support partners' continued assessment of fire hazard conditions. The team observed Evaporative Demand Drought Index (EDDI) spikes during the highest fire occurrence and burned area years in the study period: 2015 and 2021. Models from dry, high fire occurrence and burned area year 2015 outperformed models from mesic, low fire occurrence and burned area year 2016. The increased understanding of drought conditions and fire susceptibility in this ecosystem will assist partners in improving land management practices.

Methodology



Results

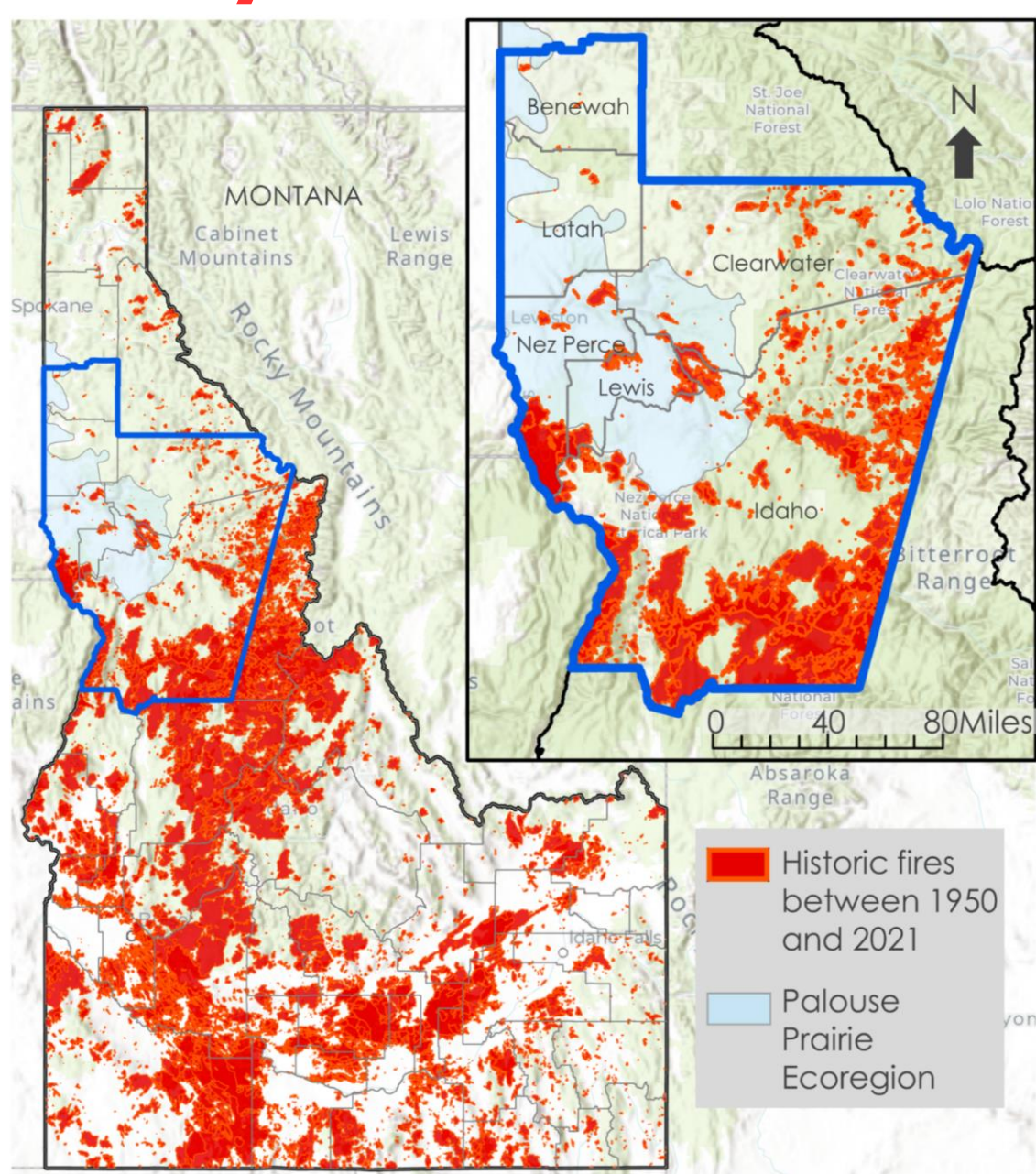
2013 – 2021 EDDI: 8-Week Moving Average



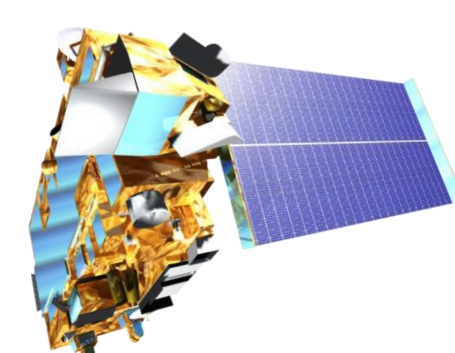
Objectives

- Drought Indicator Analysis**
Determine efficacy of drought indicators EDDI & ESI by comparing to established vegetative health indicators NDMI & NDVI
- Drought & Fire Susceptibility Analysis**
Create a model and maps to visualize susceptibility
- Wildfire Hazard ArcGIS Guide**
Provide to partners for mitigation planning

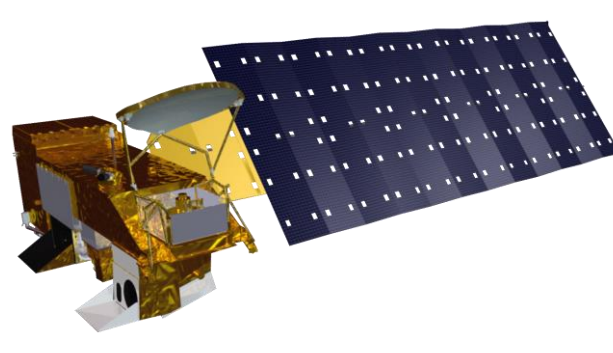
Study Area



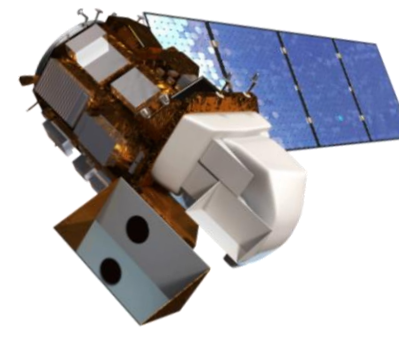
Earth Observations



Terra MODIS

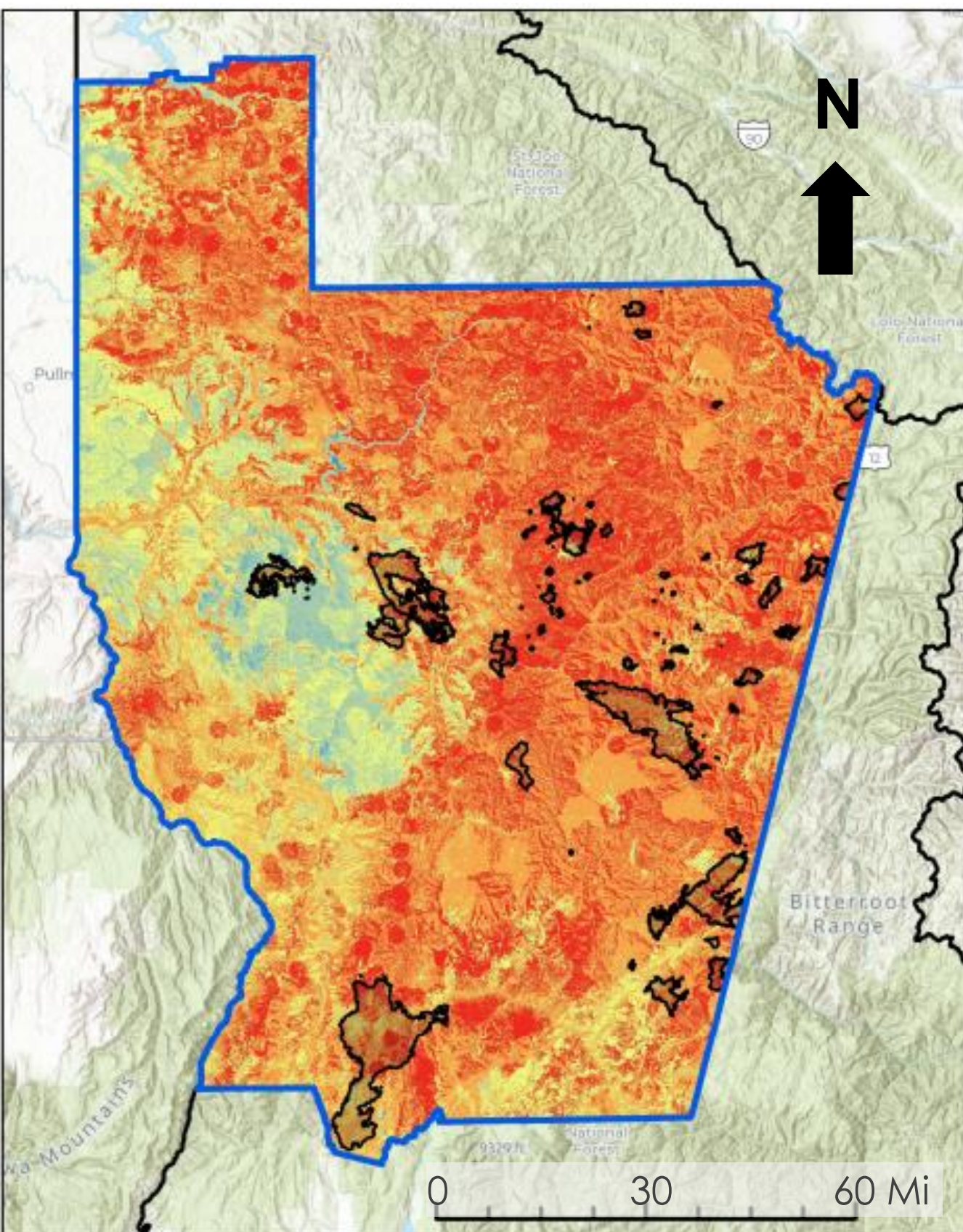


Aqua MODIS



Landsat 8 OLI

2015 EDDI Enhanced



2015 EDDI Enhanced Model		
Class	Acres Burned	% of Burned Area
1	57	0.02%
2	3,341	1.03%
3	52,473	16.17%
4	160,679	49.53%
5	107,869	33.25%
	324,418	

2016 EDDI Enhanced Model		
Class	Acres Burned	% of Burned Area
1	18	0.55%
2	198	6.07%
3	2,509	77.04%
4	530	16.28%
5	2	0.06%
	3,257	

Project Partners

- Idaho Office of Emergency Management
- Idaho Department of Water Resources
- Idaho Department of Lands

Conclusions

- EDDI correlated with NDVI at some lag intervals, though the relationship is complex and additional analysis is necessary.
- Spikes in EDDI values occurred during big fire seasons 2015, 2017, and 2021.
- Wildfire Hazard Model performance improved with addition of drought indicator(s) for 2015.
- EDDI-Enhanced Model outperformed ESI-Enhanced Model in dry year (2015) while ESI-Enhanced Model outperformed EDDI-Enhanced Model in wet year (2016).

Acknowledgements

Partners:

- Idaho Office of Emergency Management: Susan Cleverly, Lorrie Pahl, Mary Mott
- Idaho Department of Water Resources: David Hoekema
- Idaho Department of Lands: Tyre Holfetz

Advisor: Keith Weber

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Idaho Wildfires