SOUTHEAST IDAHO DISASTERS II

USING EARTH OBSERVATIONS TO CHARACTERIZE JUNIPER INVASION AND ASSESS CHANGES IN SOIL MOISTURE WITHIN CHEATGRASS DOMINATED SITES RELATIVE TO WILDFIRE SUSCEPTIBILITY IN EAST IDAHO GO AHEAD AND GET STARTED.

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DATASETS UTILIZED

NASA Earth Observations

- SMAP Passive Radiometer
- Landsat 5 TM
- Landsat 8 OLI

Ancillary Datasets

- 2009 NAIP
- 2011 NAIP
- 2013 NAIP
- 2015 NAIP
- 2014 Surface Management Agency
- RECOVER Historic Fire Dataset
- GAP Northwest Land cover
- BLM Pleasantview and Samaria layers
- Idaho Disasters III classification sites dataset

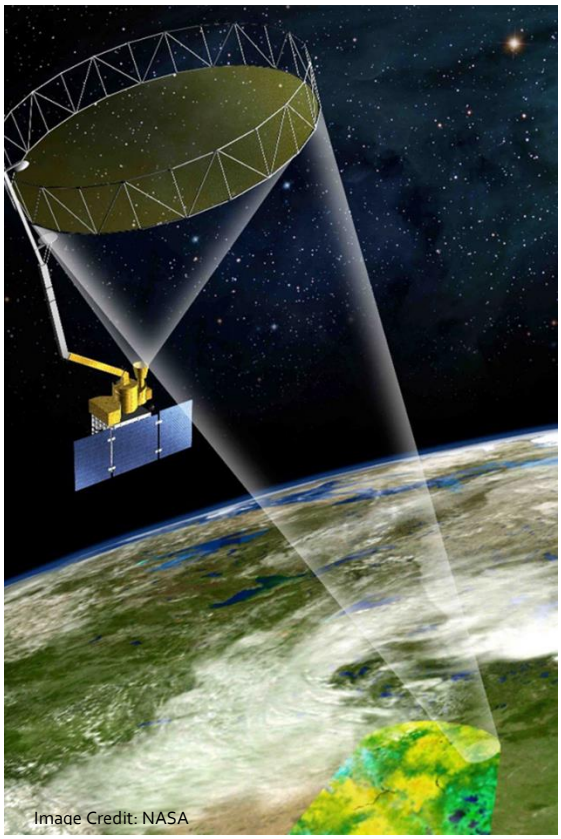


Image Credit: NASA

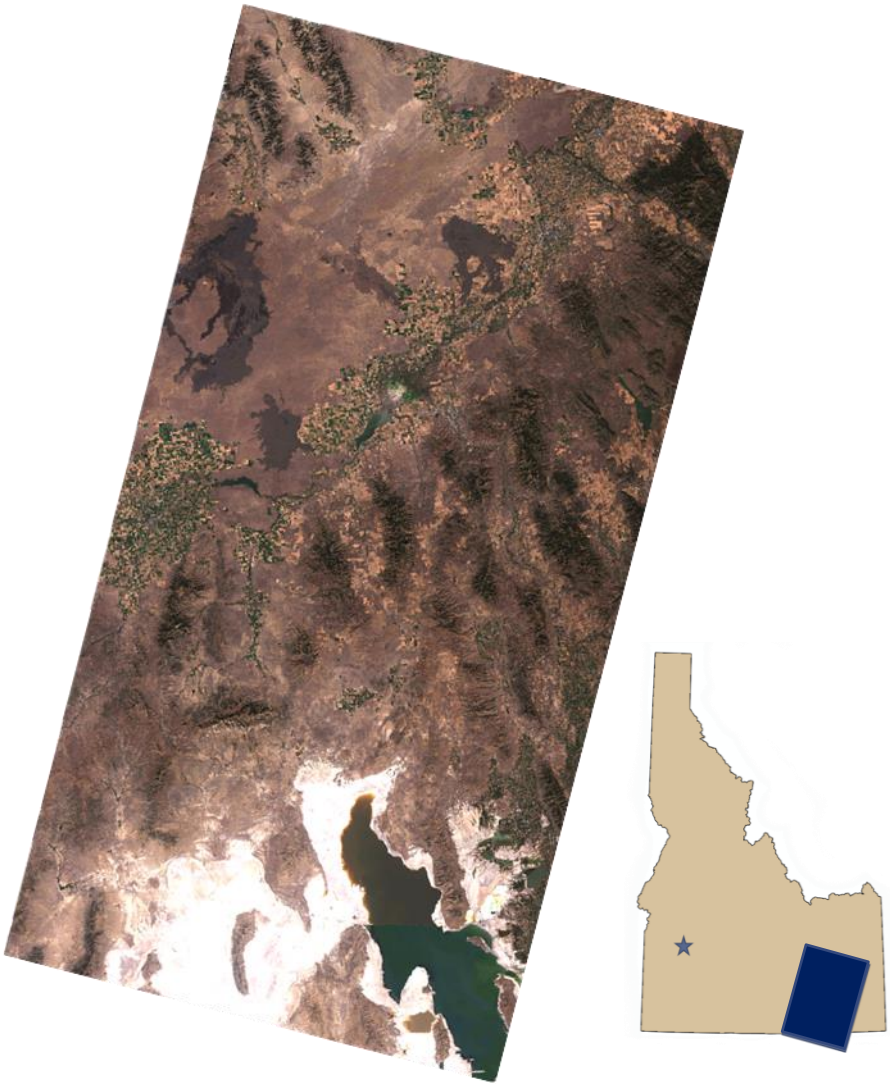
STUDY AREA

Southeast Idaho

- WRS-2 Path 39 Row 30
- WRS-2 Path 39 Row 31

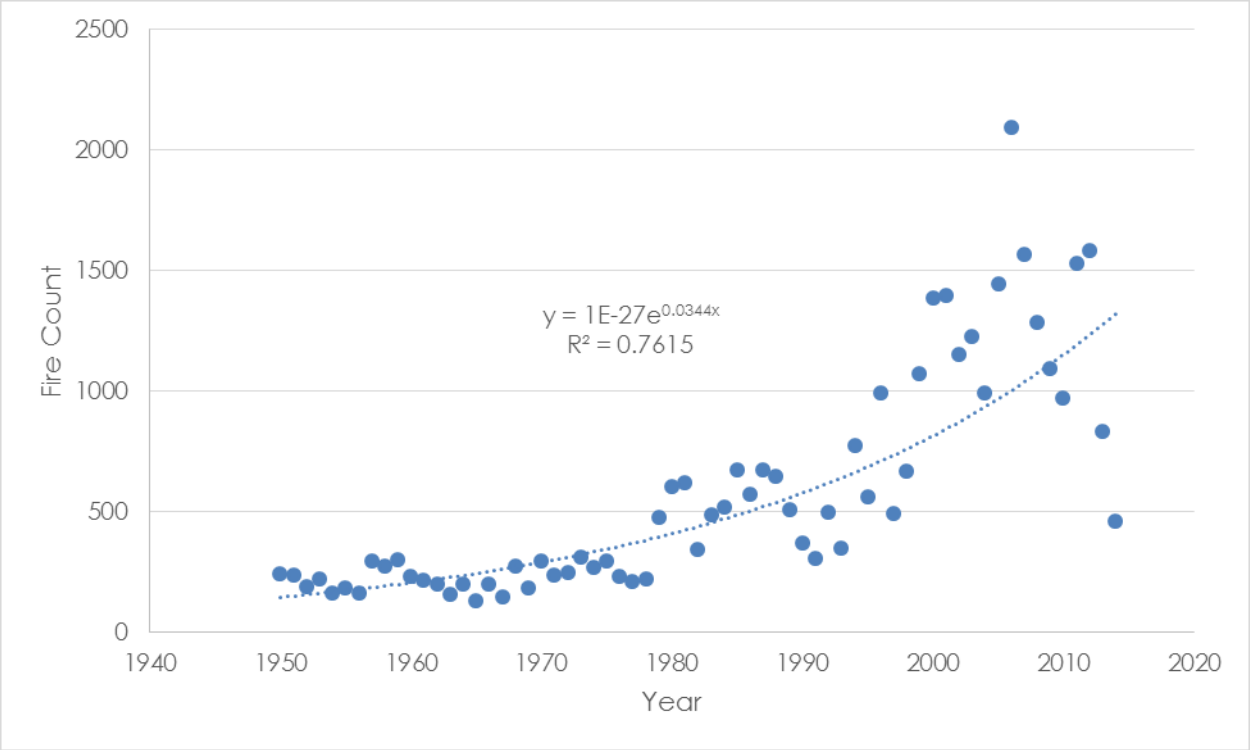
Study Period

- Juniper Analysis
  - August/September
  - 1985 to 2015
- Soil Moisture Analysis
  - April to September
  - 2015



OBJECTIVES AND COMMUNITY CONCERNS

- Characterize juniper encroachment by analyzing 30 meter Landsat imagery from 1985 to 2015. Juniper encroachment across the west has been a land management concern for decades, with wildfires perhaps one of the only natural processes to keep the populations in check. Understanding how juniper is move across the landscape, and if juniper expansion can be predicted, will help land managers better distribute resources for pre-fire fuel load reduction management.
- Assess temporal changes in soil moisture based upon dominant land cover types using SMAP passive radiometer data and other datasets. Changes in soil moisture affect fire intensity—the degree to which the heat of a fire impacts the soil, seed bank, and stand structure.
- Both of these research questions relate directly to improving understanding of wildfire susceptibility, and answering these questions will promote improved management.

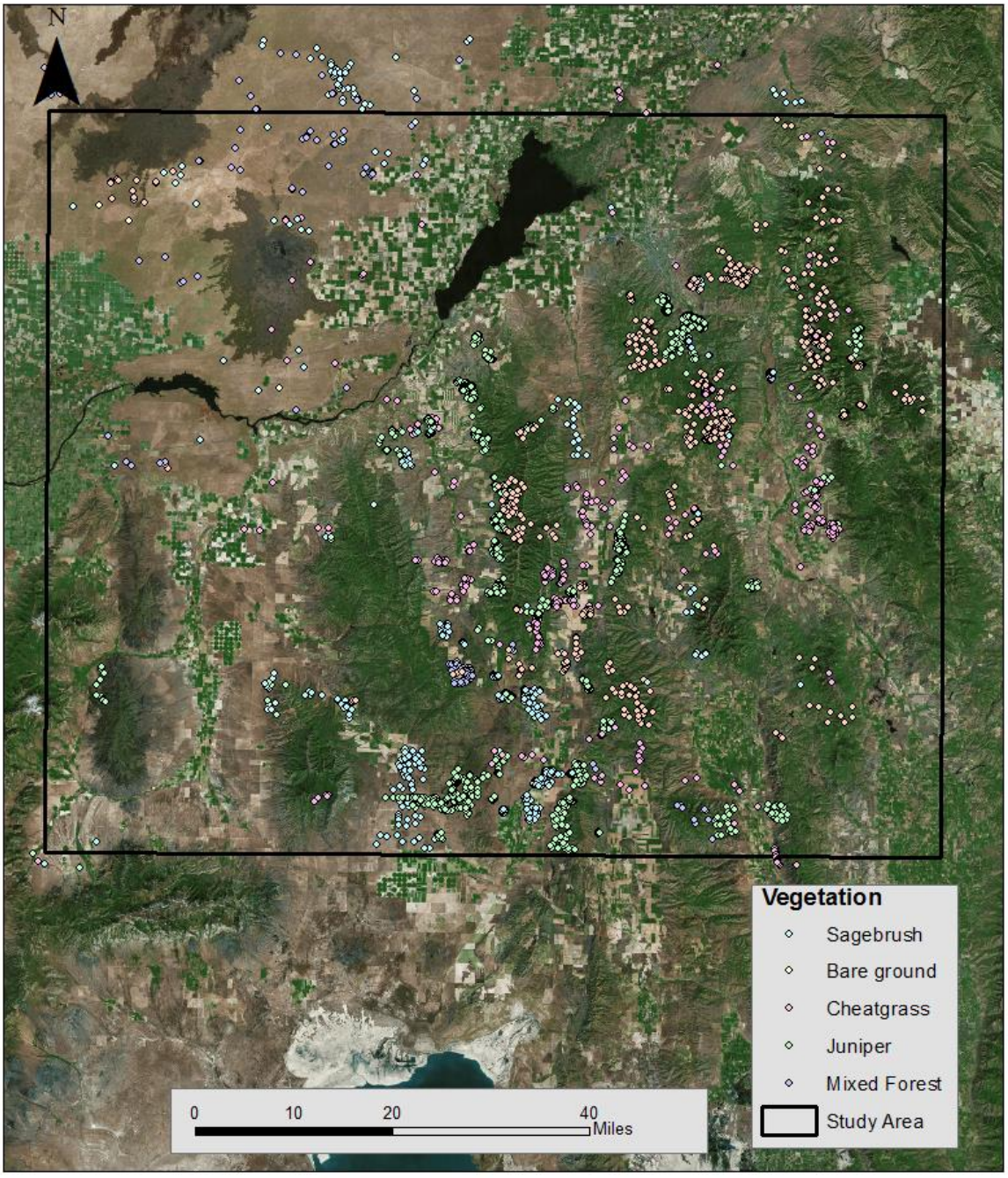


Fire Frequency in the Western United States (1950-2014)) based upon the comprehensive RECOVER Historic Fires Database.

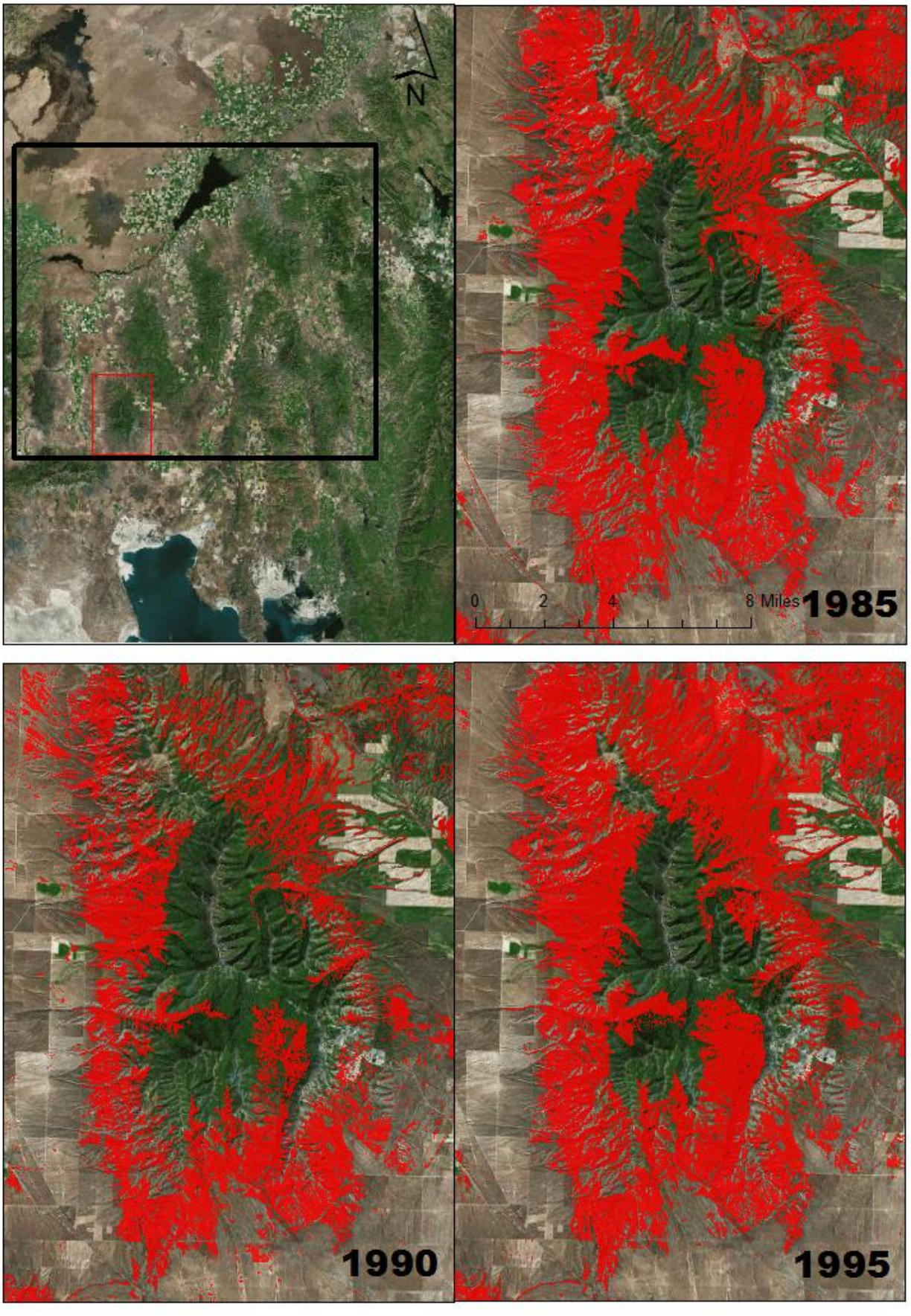
VEGETATION CLASSIFICAION POINTS

The classification points were further refined by using the historic fire dataset compiled by NASA and the GIS TReC center at ISU. Classification points that intersected with fires that occurred between each 5 year Landsat image were identified and removed. cheatgrass and bare ground points were reintroduced and sagebrush points were replaced after 15 years.

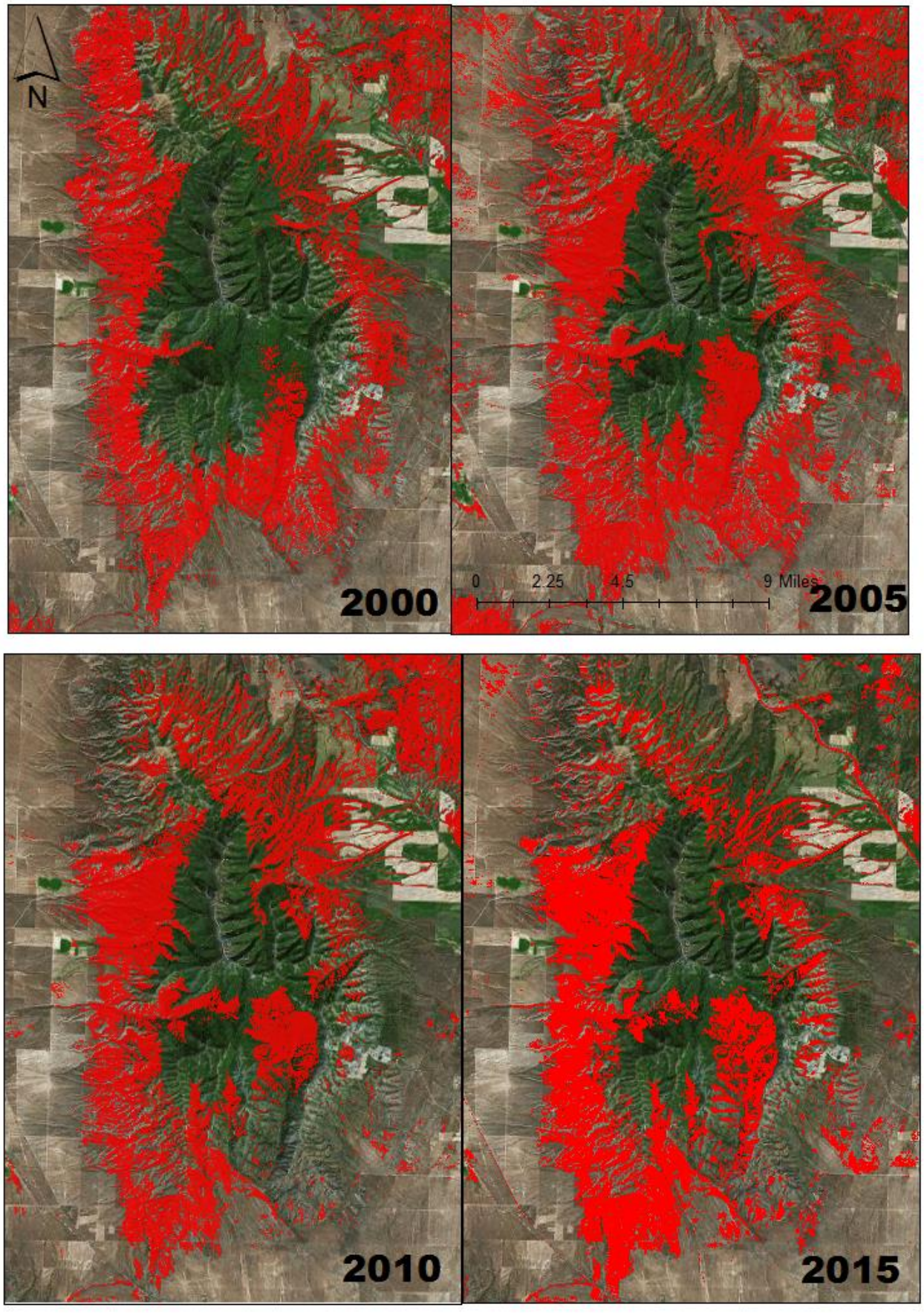
Vegetation Classification of 2015



JUNIPER CLASSIFICATION EXTRACTED FROM CTA'S BY YEAR

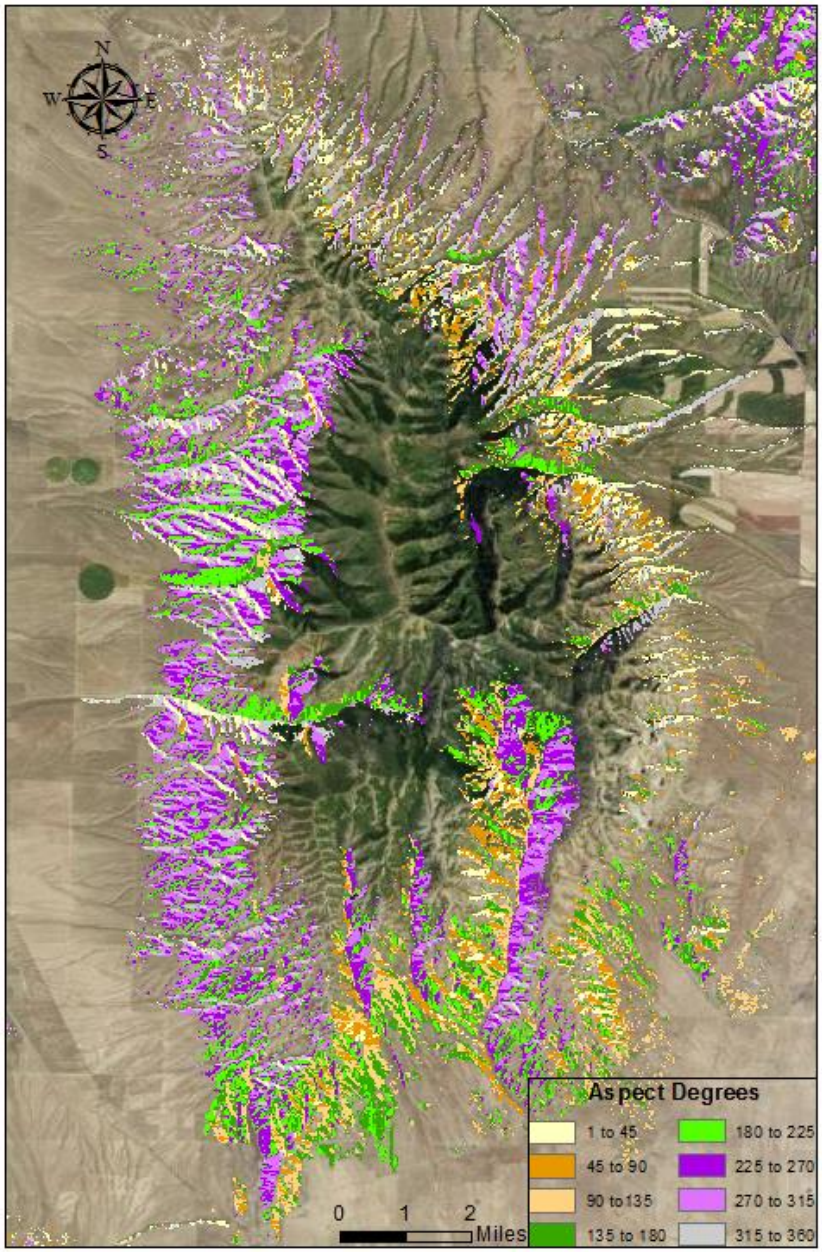


JUNIPER CLASSIFICATION EXTRACTED FROM CTA'S BY YEAR



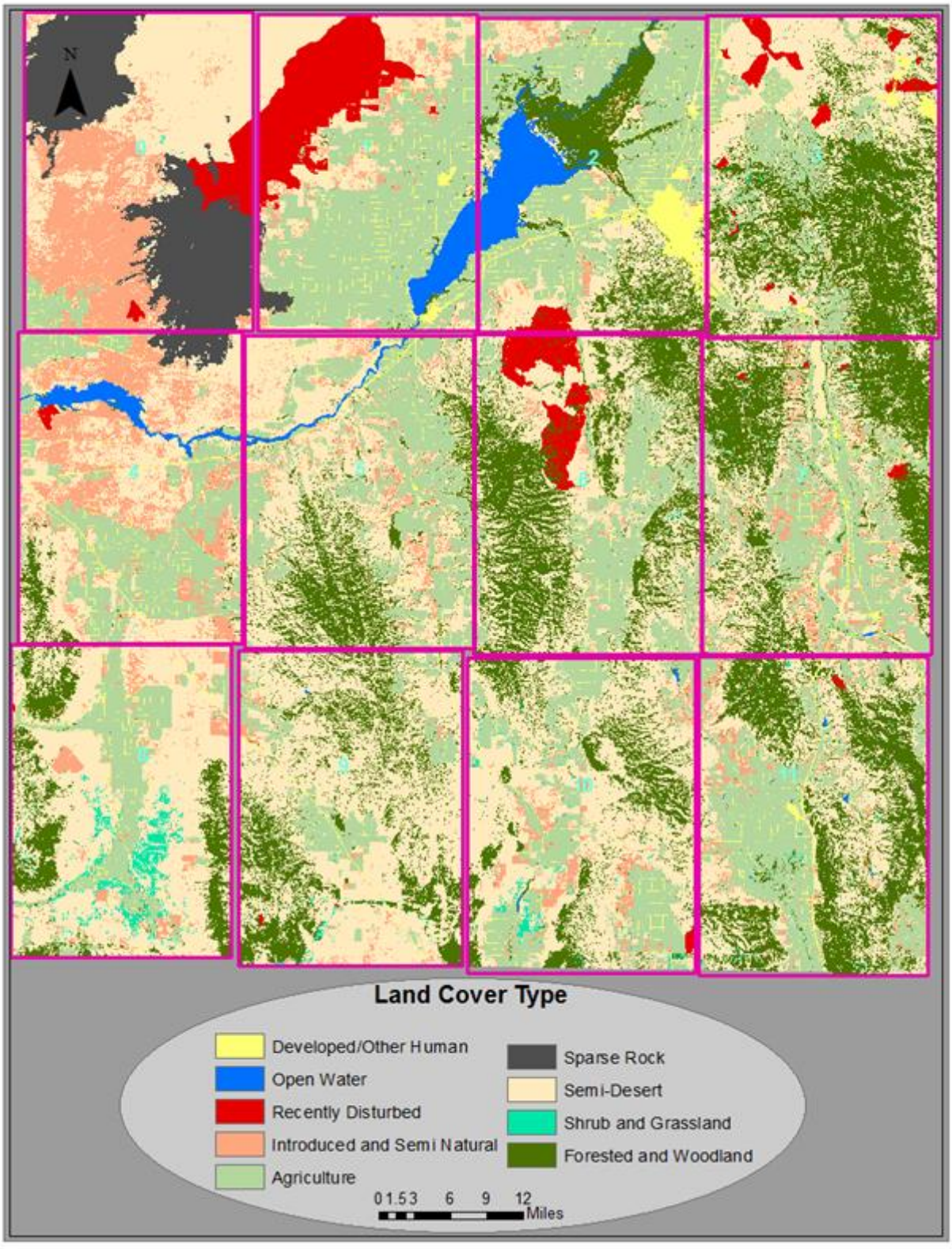
CLASSIFEID JUNIPER

These zoomed in images compare combined juniper classified using CTA with aspect. Although juniper can and does grow on all aspects, this species seems to prefer south western slopes.



LAND COVER MAP BASED ON NATIONAL GAP ANALYSIS LAND COVER DATA

The below map displays the 12 SMAP pixels and the GAP land cover type that encompass our study region. Zonal Statistics was performed on these data to see how soil moisture act based on different vegetation classes. (See pages 9 and 10



LAND COVER PERCENTAGES BY PIXEL BASED ON GAP NORTHWEST LAND COVER DATASET

Graphic Number	Majority Vegetation	% Forest Woodland	% Shrub and Grass	% Semi-Desert	% Sparce Rock	% Agriculture	% Introduced & Semi-Natural	% Recently Disturbed	% Open Water	% Developed/ Other Human	Variance b/t next highest class	
0	Nonvascular and Sparse Vascular Rock Vegetation	0.013	0.045	31.731	35.026	2.976	25.416	4.419	0.000	0.373	3.200	
1	Agricultural Vegetation	0.661	0.010	19.582	1.177	46.270	4.981	19.059	4.472	3.789	26.688	
2	Agricultural Vegetation	18.130	0.082	18.252	0.009	39.830	3.139	1.377	9.607	9.575	21.578	
3	Semi-Desert Shrub and Grassland	35.920	0.447	41.019	0.066	14.472	1.093	3.636	0.002	3.344	5.099	
4	Semi-Desert Shrub and Grassland	3.019	0.101	33.734	3.035	28.127	24.708	0.407	3.520	3.348	5.607	The GAP Zonal statistics says that the majority of this pixel is acturally Ag.
5	Semi-Desert Shrub and Grassland	15.678	0.197	45.173	0.016	28.884	6.551	0.000	0.940	2.560	17.000	The GAP Zonal statistics says that the majority of this pixel is acturally Ag.
6	Semi-Desert Shrub and Grassland	33.102	0.233	37.642	0.045	19.227	1.668	6.840	0.000	1.243	4.540	
7	Forest Woodland	32.093	0.293	30.606	0.129	26.089	7.279	0.421	0.078	3.013	1.487	The GAP Zonal statistics says that the majority of this pixel is acturally Ag.
8	Semi-Desert Shrub and Grassland	14.469	4.782	56.649	0.019	16.528	5.591	0.047	0.004	1.910	40.121	
9	Semi-Desert Shrub and Grassland	23.030	0.564	63.278	0.059	9.790	2.091	0.077	0.022	1.089	40.248	
10	Semi-Desert Shrub and Grassland	15.289	1.298	53.355	0.059	22.042	6.027	0.286	0.106	1.538	31.313	
11	Semi-Desert Shrub and Grassland	31.689	0.555	33.216	0.326	26.879	4.689	0.145	0.146	2.355	1.527	The GAP Zonal statistics says that the majority of this pixel is acturally Ag.

PIXELS THAT HAD AT LEAST A 20% DIFFERENCE BETWEEN THE MAJORITY LAND COVER AND THE NEXT DOMINANT CLASS WERE THEN ANALYZED TO SEE IF MOISTURE MEASUREMENTS ACT DIFFERENTLY BASED ON LAND COVER TYPE.

Agriculture Pixels – 1 and 2 Semi-Desert Shrub and Grassland Pixels – 8, 9, 10