

Harnessing NASA Satellite Remote Sensing in Support of Large-Scale Conservation Management on BLM Lands

UCLA: Greg Okin (PI)

USGS: Michael Duniway

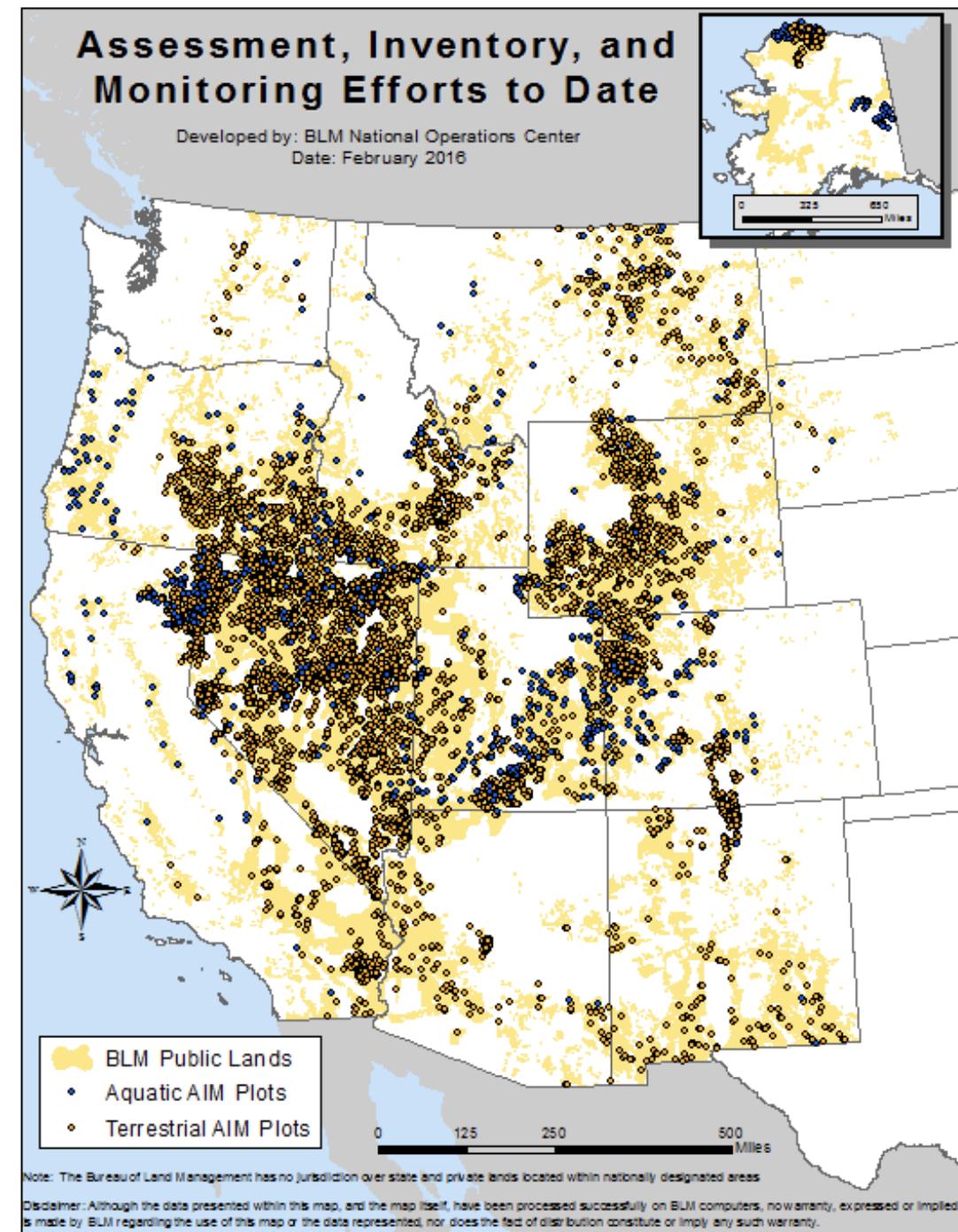
BLM NOC: Kevin Miller, Chris Cole, others

Bureau of Land Management Assessment, Inventory and Monitoring (AIM)

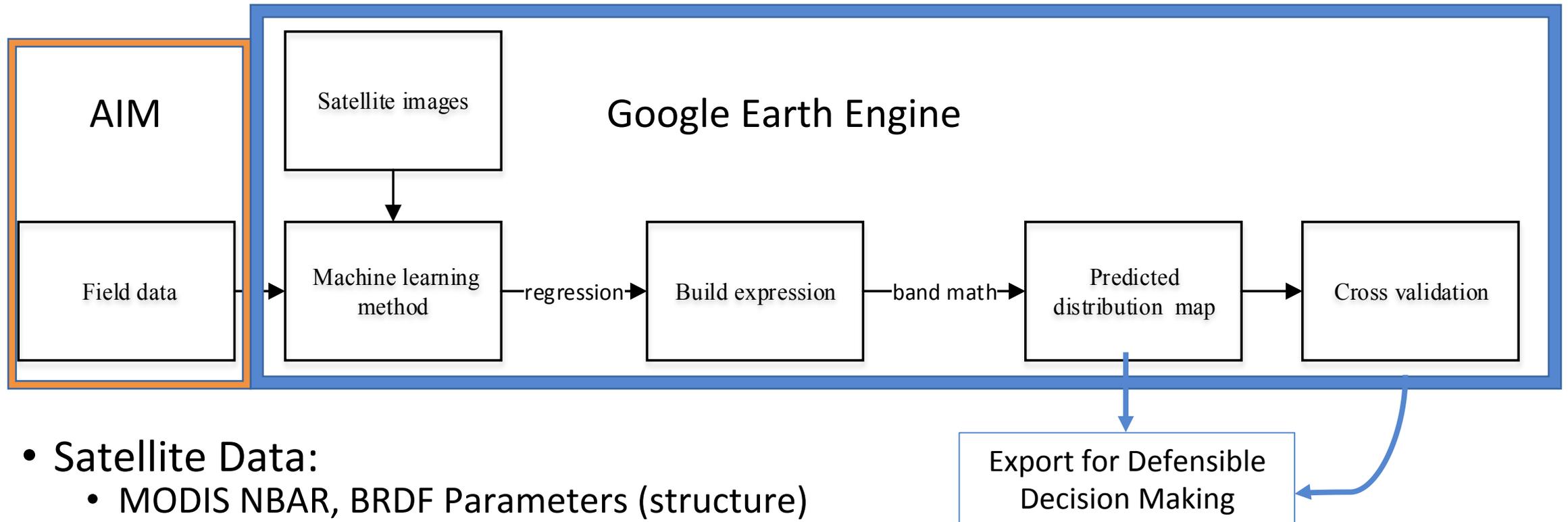
- AIM was developed to allow land managers to gather data in a consistent and efficient manner, to be used at the field office, regional and national level
- Goals
 - (1) the development and **application of a consistent set of core methods for measuring ecosystem indicators**;
 - (2) development and implementation of a statistically valid—and defensible—sampling framework;
 - (3) application and integration of **remote sensing technologies**;
 - (4) electronic data capture and management; an
 - (5) structured implementation based on the particular management objectives and local ecosystems relevant to a project.
- **Problems: spatially/temporally sparse: point data, rare repeat measurements**

AIM Indicators

- Currently, thousands of points across BLM land; 4,000 additional points/year going forward
- Cover: Bare ground, foliar cover, vegetation composition, invasive plant species, species of management concern (sagebrush)
- Structure: Vegetation height, proportion of soil surface in intercanopy gaps



Planned Approach



- **Satellite Data:**
 - MODIS NBAR, BRDF Parameters (structure)
 - Landsat OLI reflectance
- **Auxilliary Data**
 - DEM (inc. slope, aspect), Soil Texture (%sand/silt/clay), Climate (Max/Min Temp, MAP)

Planned 1st Generation Product for Managers (not just BLM: NPS, USFS, Reclamation)

Approach designed in collaboration with BLM in first meeting



Theoretically, this tool isn't limited to just AIM data

Draw/import polygon

Enough AIM Points?

Choose geographical data

Machine Learning Approach

Produce Map

Produce Uncertainty Map
(both through time)

Export: Maps, input data,
Info required to reproduce
analysis

Gravy

- Reduce continuous fields to ecosystem states
 - Ecosystem states are used by rangeland ecologists and land managers to understand and model
- Produce landscape metrics
 - Patch fragmentation/isolation/proximity
 - Patch size distribution/density
 - Patch shape complexity
 - Structural connectivity