

LANDFIRE Webinar

LANDFIRE Remap for the North Central United States



Great Plains, Great Lakes, and Tallgrass Prairie/Oak Savanna Fire Science Networks

Randy Swaty and Jim Smith – The Nature Conservancy’s LANDFIRE Team

May 27, 2020

AGENDA

The Foundation

The Present

The Future

North Central
Results

Learning More



What is LANDFIRE?

An interagency/multi-partner program designed to create and periodically update comprehensive **vegetation**, **fire**, and **fuel** characteristics data using a consistent process for the entire U.S.

The primary partners in the LANDFIRE Program are:

US Forest Service Fire and Aviation Management
US Department of the Interior Office of Wildland Fire
The Nature Conservancy North America Region
USGS EROS Data Center



Past: The LANDFIRE Foundation

LANDFIRE Charter establishes 4-C's:

- **Comprehensive**
- **Compatible**
- **Current**
- **Consistent**

.... which are our design criteria/design constraints for

20+ current and historic vegetation/fuels/condition 30m, spatial data layers and 800+ quantitative state-and-transition BpS models and descriptions.

Delivered versions circa 2000/1 (LF National/Improved), updates in 2008, 2010, 2012 and 2014, and now **LF Remap**



Past: The LANDFIRE Foundation

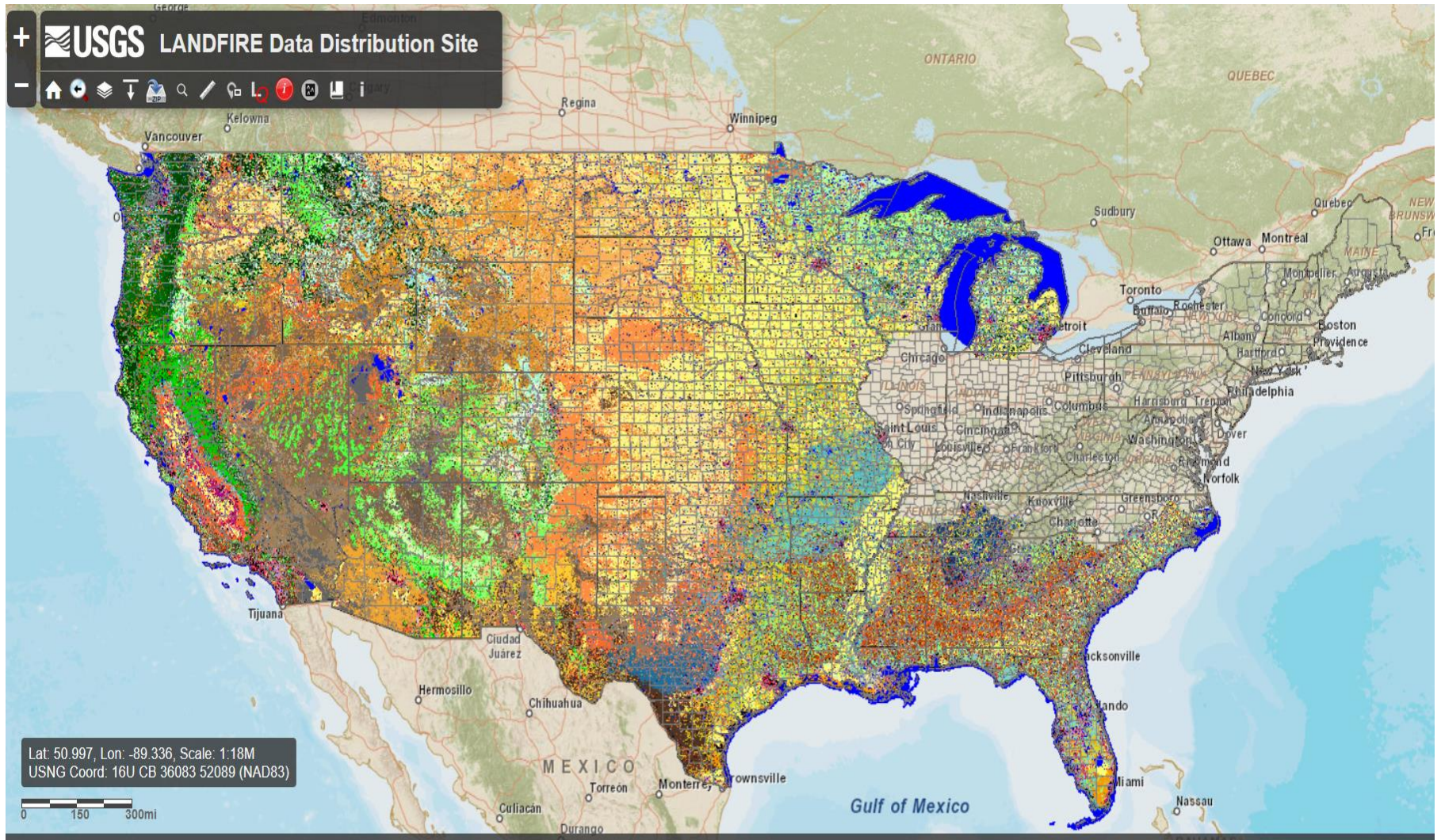
[LF Version Descriptions](#)

Under each column, links are provided to download full extent mosaics or databases. Please note that mosaics are not available until the full extent is complete. Data availability is shown on LF's [Data Distribution Site \(DDS\)](#), which offers data downloads at selected extents.

Product Name	Abbrev	Theme	DDS	LF 2001 LF 1.0.5	LF 2008 LF 1.1.0	LF 2010 LF 1.2.0	LF 2012 LF 1.3.0	LF 2014 LF 1.4.0	LF Remap LF 2.0.0
LF Reference Database	LFRDB	Reference	--	US AK HI	n/c	n/c	n/c	n/c	o
Public Events Geodatabase_1999_YEAR	Events	Reference	x	--	US AK HI	US AK HI	US AK HI	US AK HI	o
Forest Vegetation Simulator Ready Database	FVSRDB	Reference	--	--	--	--	US AK HI	--	--
Disturbance	DistYear	Disturbance	x	--	US AK	US AK	US AK HI	US AK HI	o
Vegetation Disturbance	VDistYear	Disturbance	x	--	US AK HI	US AK HI	US AK HI	US AK HI	--
Historical Disturbance	HDist	Disturbance	--	--	--	--	--	--	--
Vegetation Transition Magnitude	VTMYear	Disturbance	x	--	--	US AK	US AK HI	US AK HI	--
Forest Vegetation Transitions Database	FVTDB	Disturbance	--	--	--	--	US AK HI	n/c	--
Non-forest Vegetation Transitions Database	NFVTDB	Disturbance	--	--	--	--	US AK HI	n/c	--
Fuel Disturbance	FDistYear	Disturbance	x	--	US AK HI	US AK HI	US AK HI	US AK HI	o
Forest Vegetation Simulator Disturbance Database	FVSDDB	Disturbance	--	--	--	--	US AK HI	n/c	--
Biophysical Settings	BPS	Vegetation	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Environmental Site Potential	ESP	Vegetation	x	US AK HI *	n/c	US AK HI	n/c	n/c	--
Existing Vegetation Cover	EVC	Vegetation	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Existing Vegetation Height	EVH	Vegetation	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Existing Vegetation Type	EVT	Vegetation	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
National Vegetation Classification	NVC	Vegetation	--	--	--	--	--	--	o
Biophysical Settings Models and Descriptions	BpS	Vegetation	--	BPS Models	n/c	n/c	n/c	n/c	--
13 Anderson Fire Behavior Fuel Models	FBFM13	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
40 Scott and Burgan Fire Behavior Fuel Models	FBFM40	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Canadian Forest Fire Danger Rating System	CFDRS	Fuel	x	--	--	AK	AK	AK	o
Forest Canopy Bulk Density	CBD	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Forest Canopy Base Height	CBH	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Forest Canopy Cover	CC	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Forest Canopy Height	CH	Fuel	x	US AK HI	US AK HI	US AK HI IA	US AK HI	US AK HI	o
Fuel Characteristic Classification System Fuelbeds	FCCS	Fuel	x	US AK HI	US AK HI	--	--	US AK HI	o
Fuel Loading Models	FLM	Fuel	x	US AK	US AK	--	--	--	--
Fuel Vegetation Cover	FVC	Fuel	--	--	--	--	--	--	o
Fuel Vegetation Height	FVH	Fuel	--	--	--	--	--	--	o
Fuel Vegetation Type	FVT	Fuel	--	--	--	--	--	--	o
Fuel Rulesets Database	--	Fuel	--	--	--	US AK HI	US AK HI	US AK HI	o
Fire Regime Groups	FRG	Fire Regime	x	US AK HI	n/c	US AK HI	n/c	n/c	o
Mean Fire Return Interval	MFR1	Fire Regime	x	US AK HI	n/c	US AK HI	n/c	n/c	--
Percent Low-severity Fire	PLS	Fire Regime	x	US AK HI	n/c	US AK HI	n/c	n/c	--
Percent Mixed-severity Fire	PMS	Fire Regime	x	US AK HI	n/c	US AK HI	n/c	n/c	--
Percent Replacement-severity Fire	PRS	Fire Regime	x	US AK HI	n/c	US AK HI	n/c	n/c	--
Succession Classes	SClass	Fire Regime	x	US AK HI	US AK HI	US AK HI	n/c	n/c	o
Vegetation Condition Class**	VCC	Fire Regime	x	US AK HI	US AK HI	--	US AK HI	US AK HI	o
Vegetation Departure Index**	VDEP	Fire Regime	x	US AK HI	US AK HI	--	US AK HI	US AK HI	o
Aspect ***	ASP	Topographic	x	n/c	n/c	US AK HI IA	n/c	n/c	US AK HI IA
Elevation ***	DEM	Topographic	x	n/c	n/c	US AK HI IA	n/c	n/c	US AK HI IA
Slope ***	SLP	Topographic	x	n/c	n/c	US AK HI IA	n/c	n/c	US AK HI IA



Present: LF Remap



LF Remap – What Remains the Same?

LANDFIRE Program has the **same design criteria/constraints**: comprehensive, compatible, consistent and current.

The **basic product suite is the same**, but there are changes to mapping processes and thematic content intended to improve product usability.

Should still be considered a large landscape, regional, national data set as delivered out-of-the-box.



LF Remap – What’s New?

- Mapping footprints based on **Omernik Level III** ecoregions instead of NLCD Map Zones.
- New **compositing/tiling/masking methods** that provide an improved and more consistent image base.
- New, **improved plot “Auto-Keys”** for assigning vegetation type to field plots.
- Landsat 8 imagery and Landsat Analysis Ready Data Sets (**image stacks**).
- Included **external review** of the Existing Vegetation Type legend and draft products.
- Independently mapped **NVC Group**.

LF Remap – What's New?

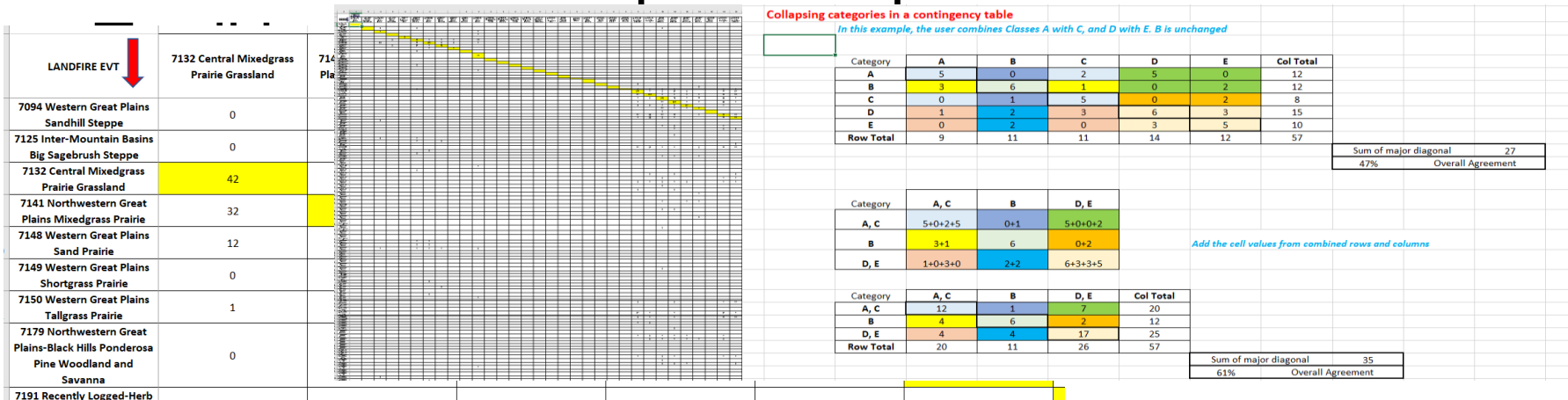
- Many more **field-plots** and more diverse field-plots to support mapping.
- Incorporation of **lidar** data sets to improve the thematic resolution of structure products.
- Incorporation of **NLCD** Continuous Shrub Cover mapping project processes/products.
- Review of **Biophysical Settings** models and descriptions.
- **New products**: Historic disturbance, Year-Capable Fuels Products.
- New, **backwardly compatible** Fire Regime Group schema.

New Fire Regime Group Schema

Original Fire Regime Group	New Group Designation	All Fire Fire Return Interval	% Replacement Fire
I	I-A	0 - 5 years	Less than 66.7%
	I-B	6 - 15 years	
	I-C	16 - 35 years	
II	II-A	0 - 5 years	66.7% or greater
	II-B	6 - 15 years	
	II-C	16 - 35 years	
III	III-A	36 - 100 years	Less than 80%
	III-B	101- 200 years	Less than 66.7%
IV	IV-A	36 - 100 years	80% or greater
	IV-B	101- 200 years	66.7% or greater
V	V-A	201 to 500 years	Any severity
	V-B	501+ years	

LF Remap Quality

- EVT assessments for Ecological Systems, NVC Group, NVC Macrogroup, and SAF/SRM cover type.
- Thousands of independent plots.



- Example of how to collapse categories in the contingency table now included.

LF Remap Quality

- Category Agreement Table

EVT_Name	Row Total (pixels)	Pixels	Row Agreement	Primary Within Row Mismatch	Secondary Within Row Mismatch	Tertiary Within Row Mismatch	Data_Source
Northwestern Great Plains-Black Hills Ponderosa Pine Woodland and Savanna	95	1.33%	97.89%	9014 Northwestern Great Plains Floodplain Forest and Woodland; 1 Incorrect Pixels	7385 Great Plains Wooded Draw and Ravine Woodland; 1 Incorrect Pixels	9817 Northern & Central Ruderal Meadow; 0 Incorrect Pixels	LANDFIRE LFRDB
Northern Tallgrass Prairie	56	0.78%	78.57%	7132 Central Mixedgrass Prairie Grassland; 7 Incorrect Pixels	7412 North-Central Interior Sand and Gravel Tallgrass Prairie; 3 Incorrect Pixels	9816 Northern & Central Plains Ruderal & Planted Grassland; 1 Incorrect Pixels	LANDFIRE LFRDB
North-Central Interior Shrub Swamp	37	0.52%	78.38%	9182 North-Central Interior Shrub Alkaline Fen; 3 Incorrect Pixels	9180 North-Central Interior Freshwater Marsh; 1 Incorrect Pixels	9178 North-Central Interior and Appalachian Rich Swamp; 1 Incorrect Pixels	LANDFIRE LFRDB
Paleozoic Plateau Bluff and Talus Woodland	91	1.27%	78.02%	7314 North-Central Interior Maple-Basswood Forest; 7 Incorrect Pixels	7311 North-Central Interior Dry Oak Forest and Woodland; 6 Incorrect Pixels	7310 North-Central Interior Dry-Mesic Oak Forest and Woodland; 6 Incorrect Pixels	LANDFIRE LFRDB
North-Central Interior Floodplain Forest	340	4.75%	76.76%	9178 North-Central Interior and Appalachian Rich Swamp; 21 Incorrect Pixels	9180 North-Central Interior Freshwater Marsh; 13 Incorrect Pixels	9183 North-Central Interior Shrub Swamp; 11 Incorrect Pixels	LANDFIRE LFRDB

- We are hoping to perform an assessment of Vegetation Cover (EVC) and Vegetation Height (EVH), and perhaps FBFM.

LANDFIRE Future

- Remap 2016 will wrap up in CONUS during the summer of 2020, and then Alaska, Hawai'i, and the island territories over the following months.
- Because “remapping” is more expensive than “updating,” we may not be able to conduct another remap in the future.
- The goal is to find a way to provide more frequent updates (annually, delivered within a few months) with decreased latency.

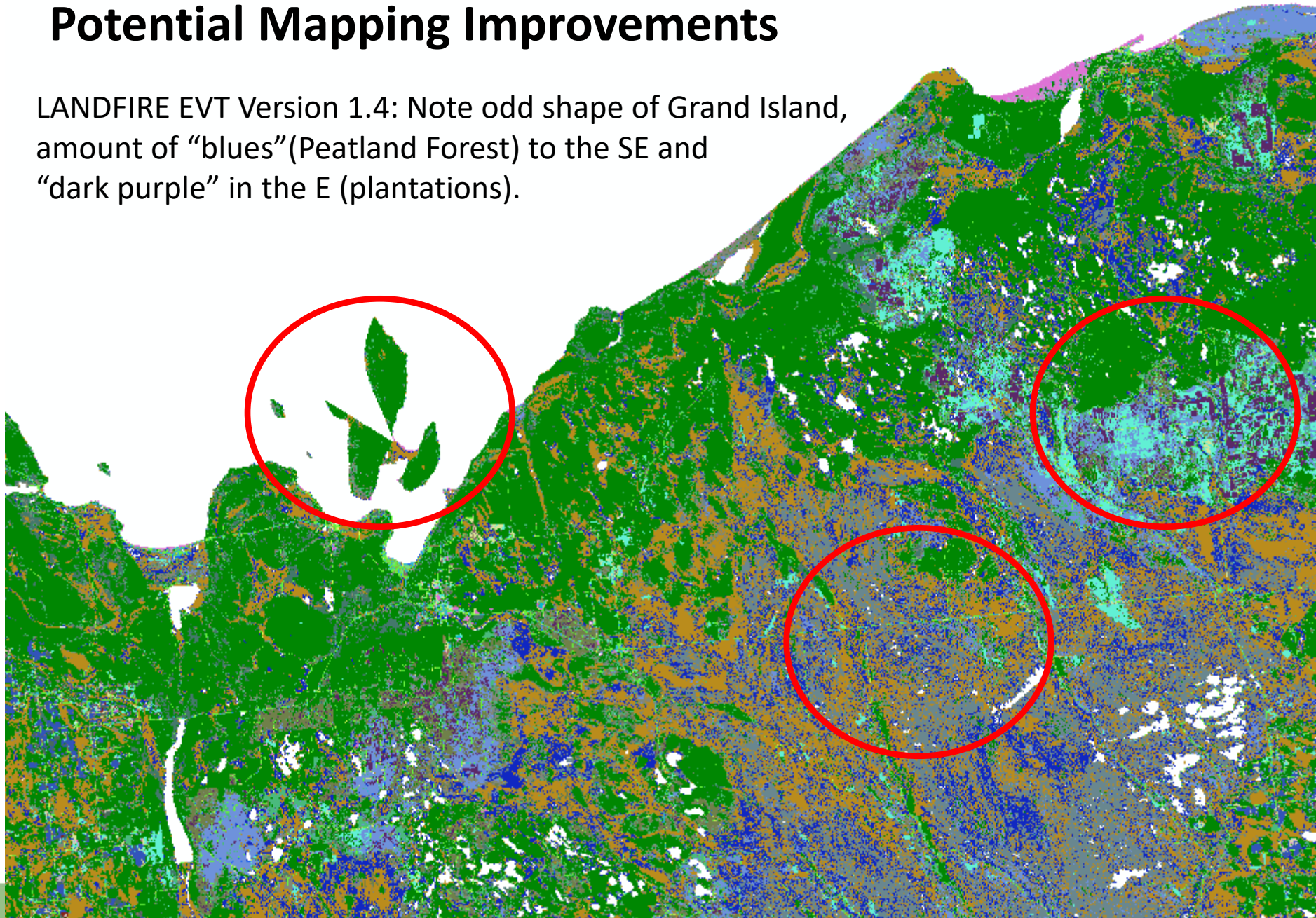


North Central Results

Changes and Improvements

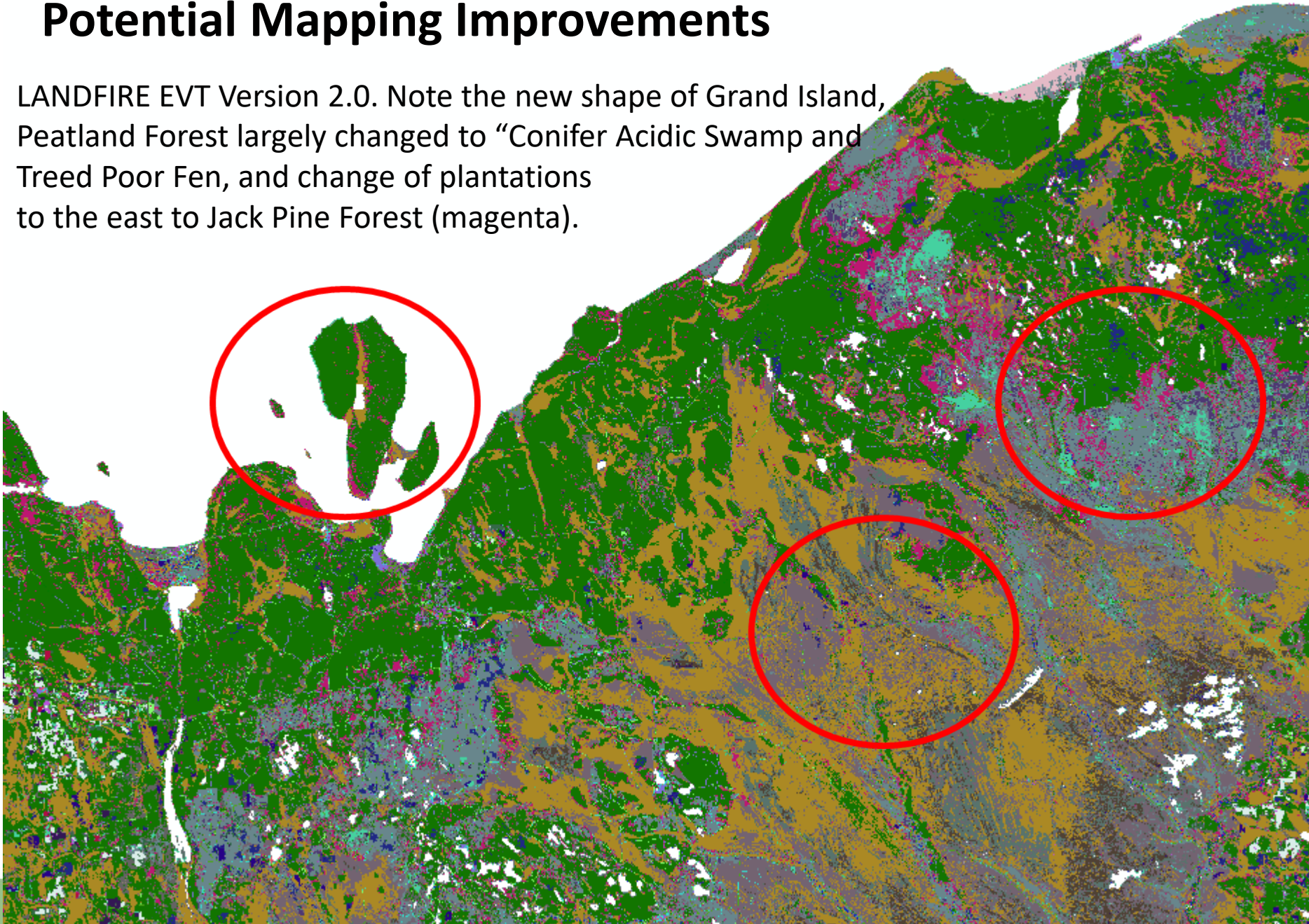
Potential Mapping Improvements

LANDFIRE EVT Version 1.4: Note odd shape of Grand Island, amount of “blues” (Peatland Forest) to the SE and “dark purple” in the E (plantations).

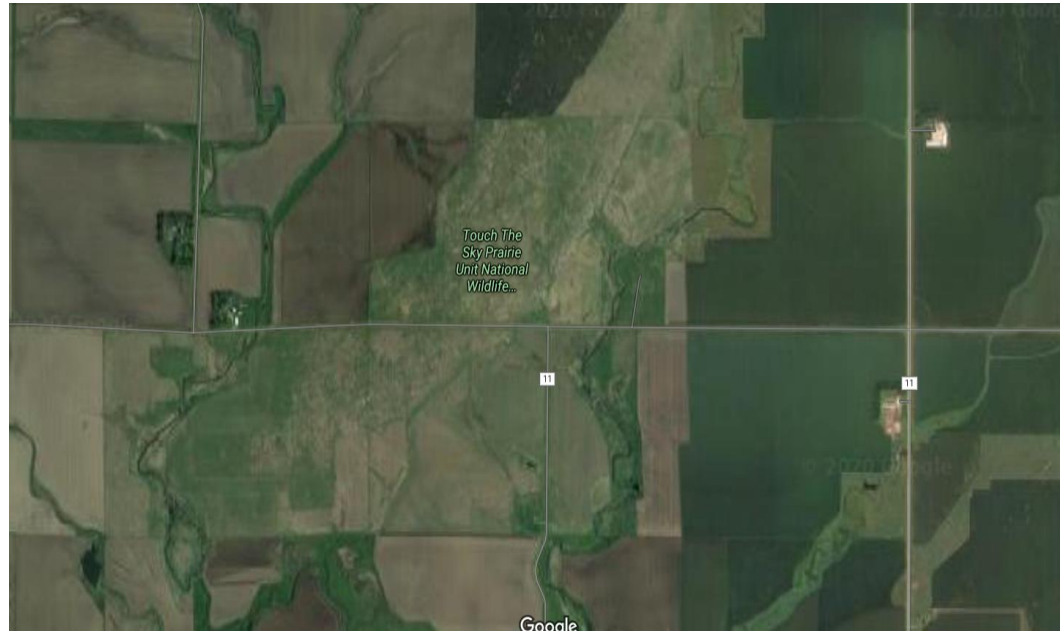


Potential Mapping Improvements

LANDFIRE EVT Version 2.0. Note the new shape of Grand Island, Peatland Forest largely changed to “Conifer Acidic Swamp and Treed Poor Fen, and change of plantations to the east to Jack Pine Forest (magenta).

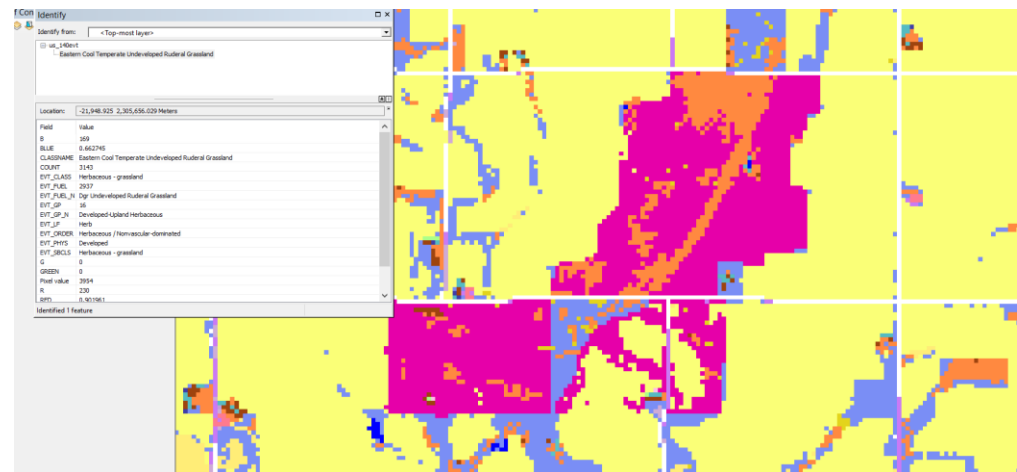
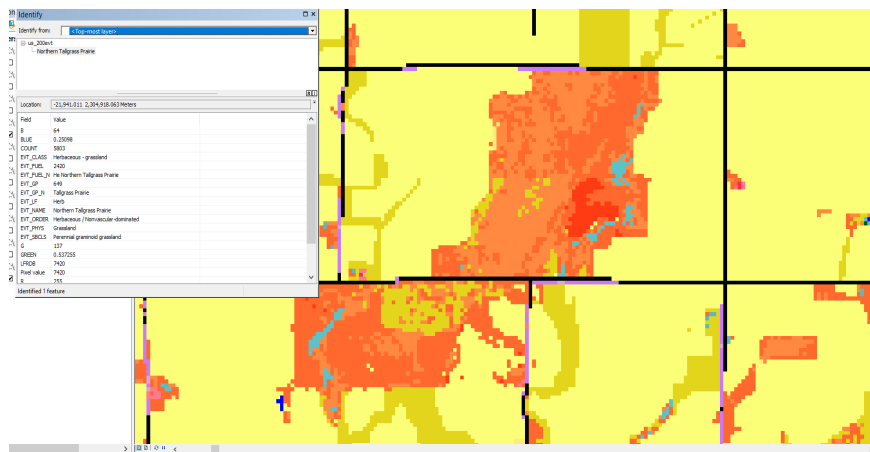


Touch the Sky Prairie, MN



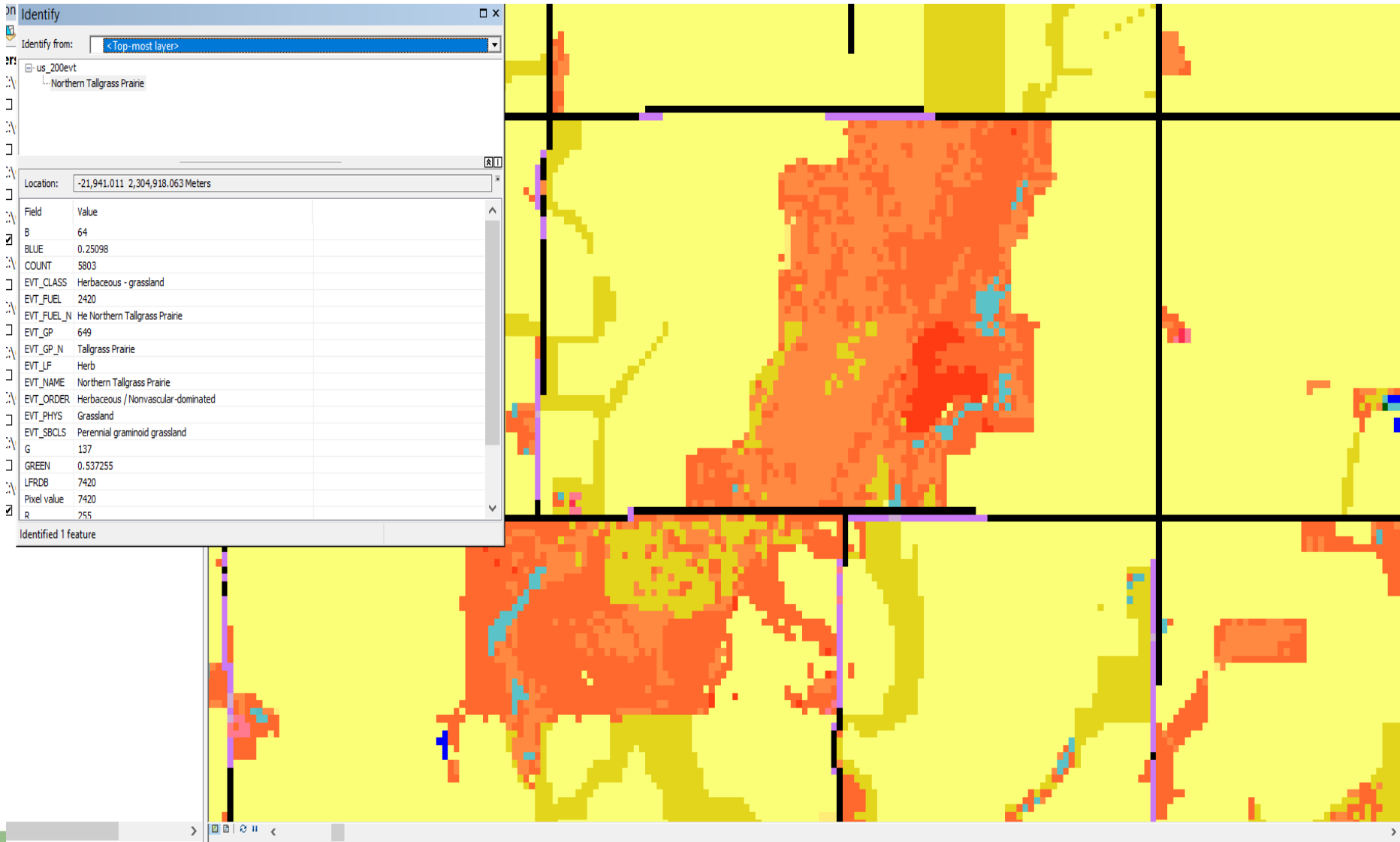
LF Remap
Veg Type

LF 2014
Veg Type



Touch the Sky Prairie, MN

LF Remap Veg Type



Upper Mississippi, MN/WI



LF 2014 Veg Type

Identify

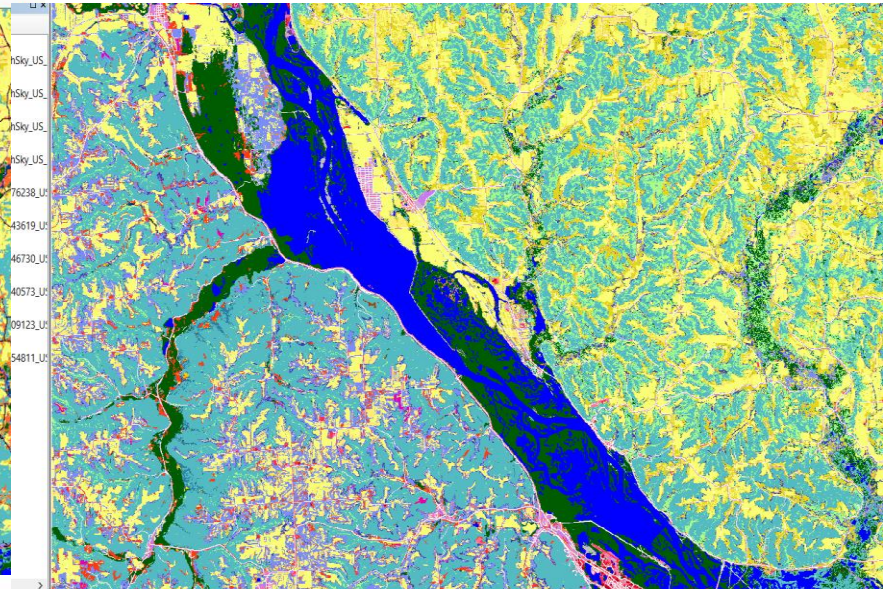
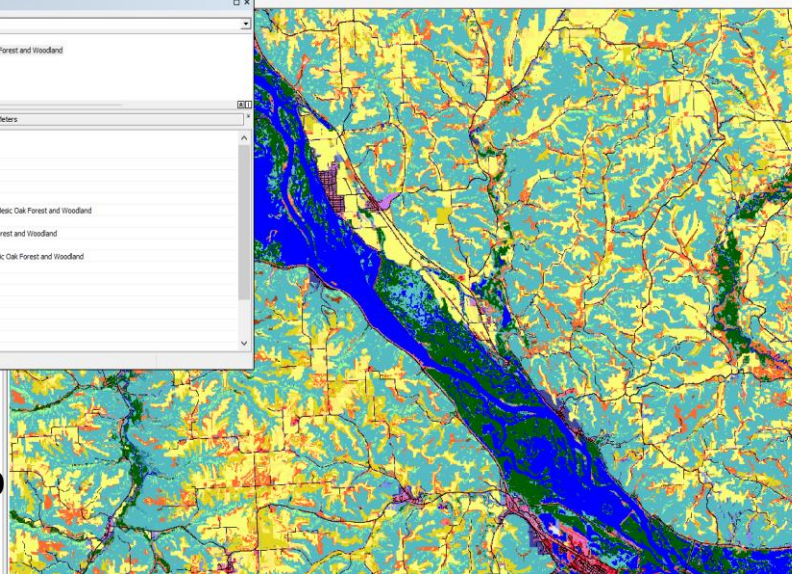
Identify from: <Top-most layer>

- us_200ent
- North-Central Interior Dry-Misc Oak Forest and Woodland

Location: 327,308.100 2,362,685.265 Meters

Field	Value
#	394
BLUE	0.760794
COUNT	8406208
EVT_CLASS	Closed tree canopy
EVT_FSEL	2210
EVT_FSEL_N	1 North-Central Interior Dry-Misc Oak Forest and Woodland
EVT_SP	660
EVT_SP_N	White Oak-Red Oak Hickory Forest and Woodland
EVT_LF	Trees
EVT_NAME	North-Central Interior Dry-Misc Oak Forest and Woodland
EVT_ORDER	Tree-dominated
EVT_PERS	herbaceous
EVT_SRCLS	Deciduous closed tree canopy
g	387
GREEN	0.733333
LPROB	7310
Pixel value	7310
s	85

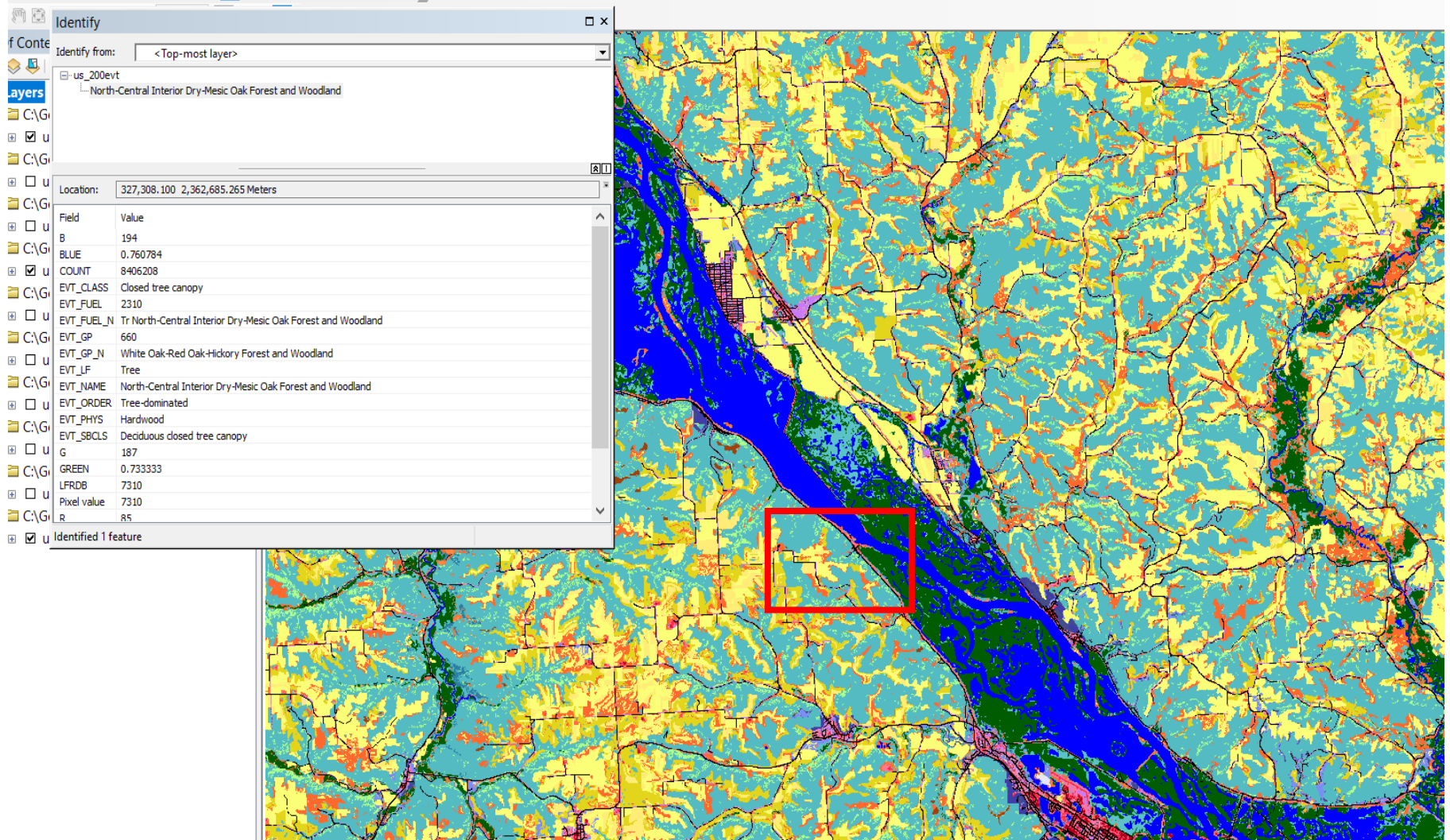
Identified 1 Feature



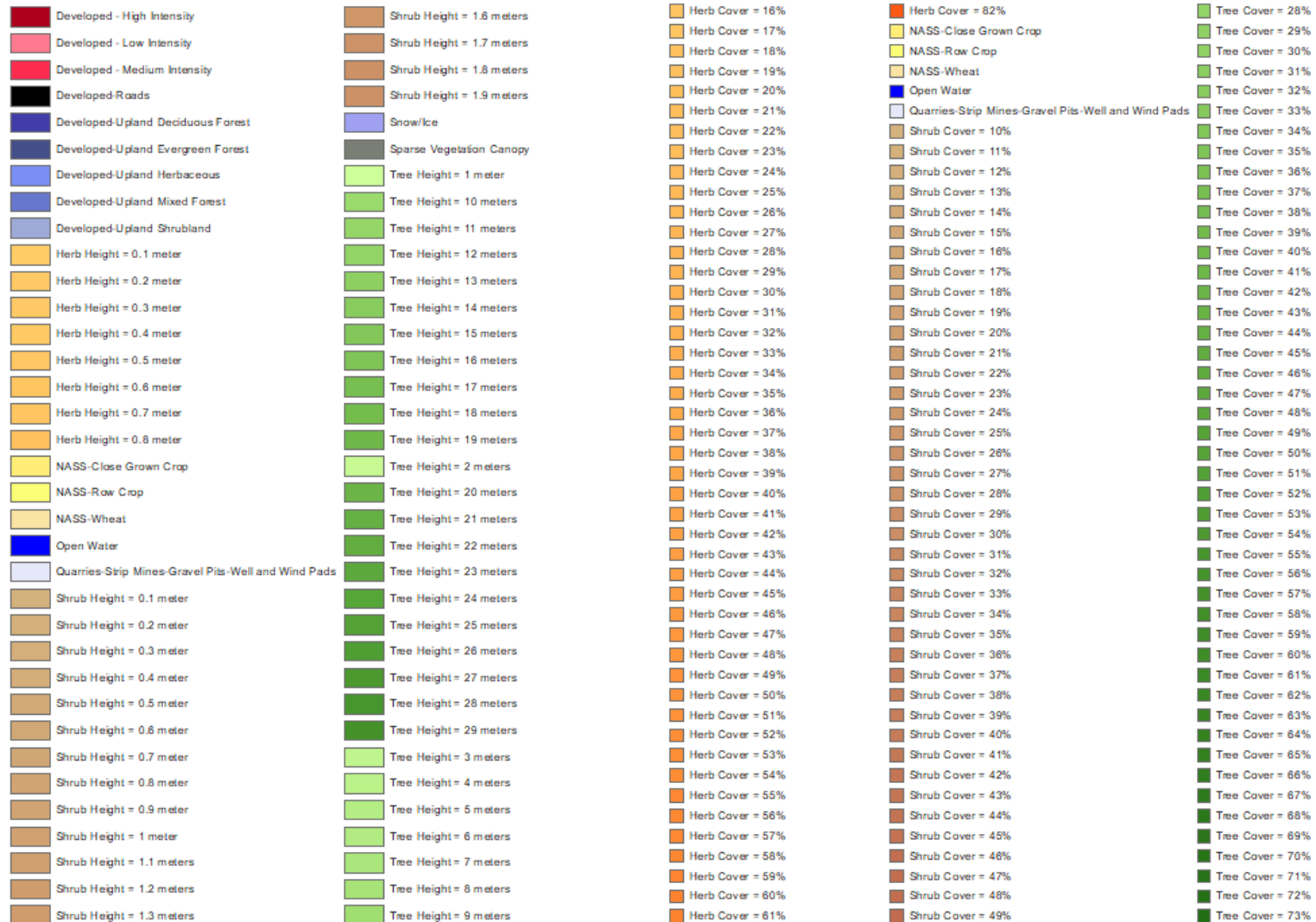
LF Remap
Veg Type

Upper Mississippi, MN/WI

LF Remap Veg Type



Continuous Height & Cover



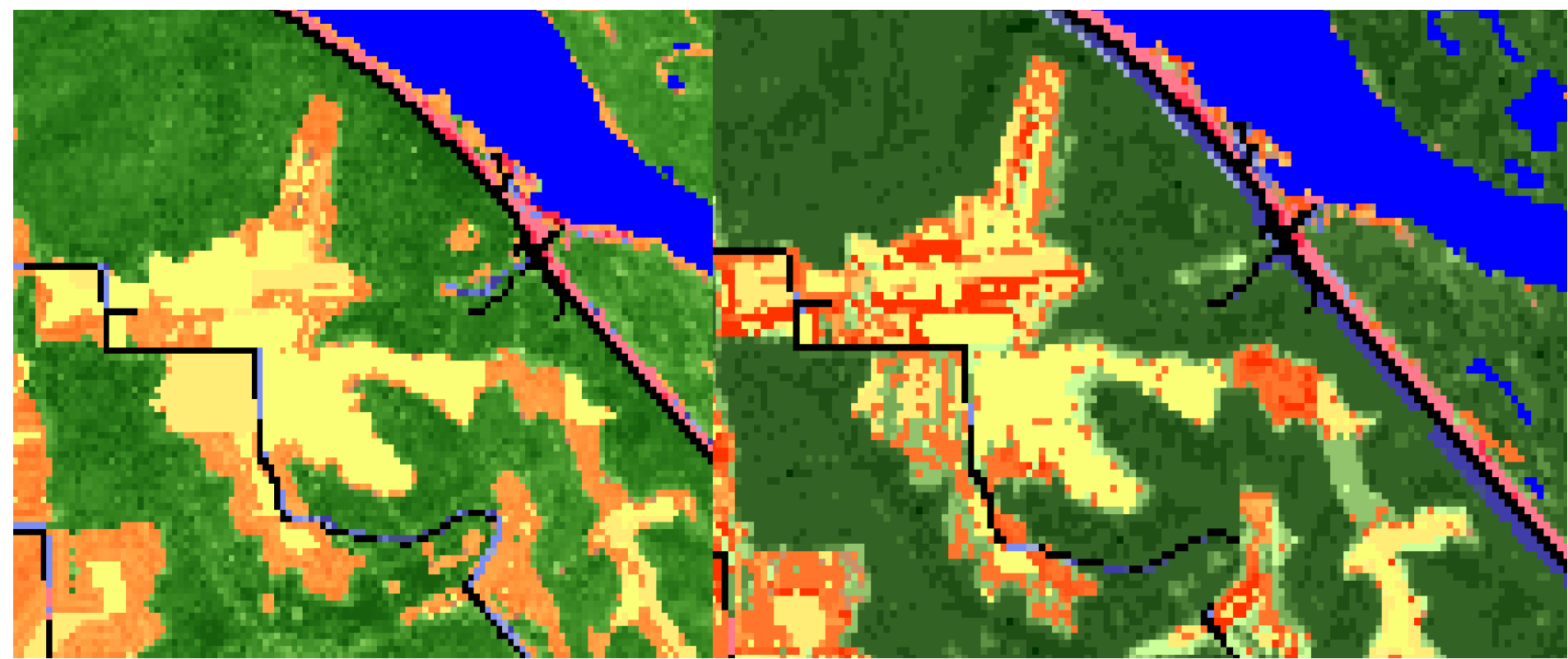
Upper Mississippi, MN/WI



Upper Mississippi, MN/WI

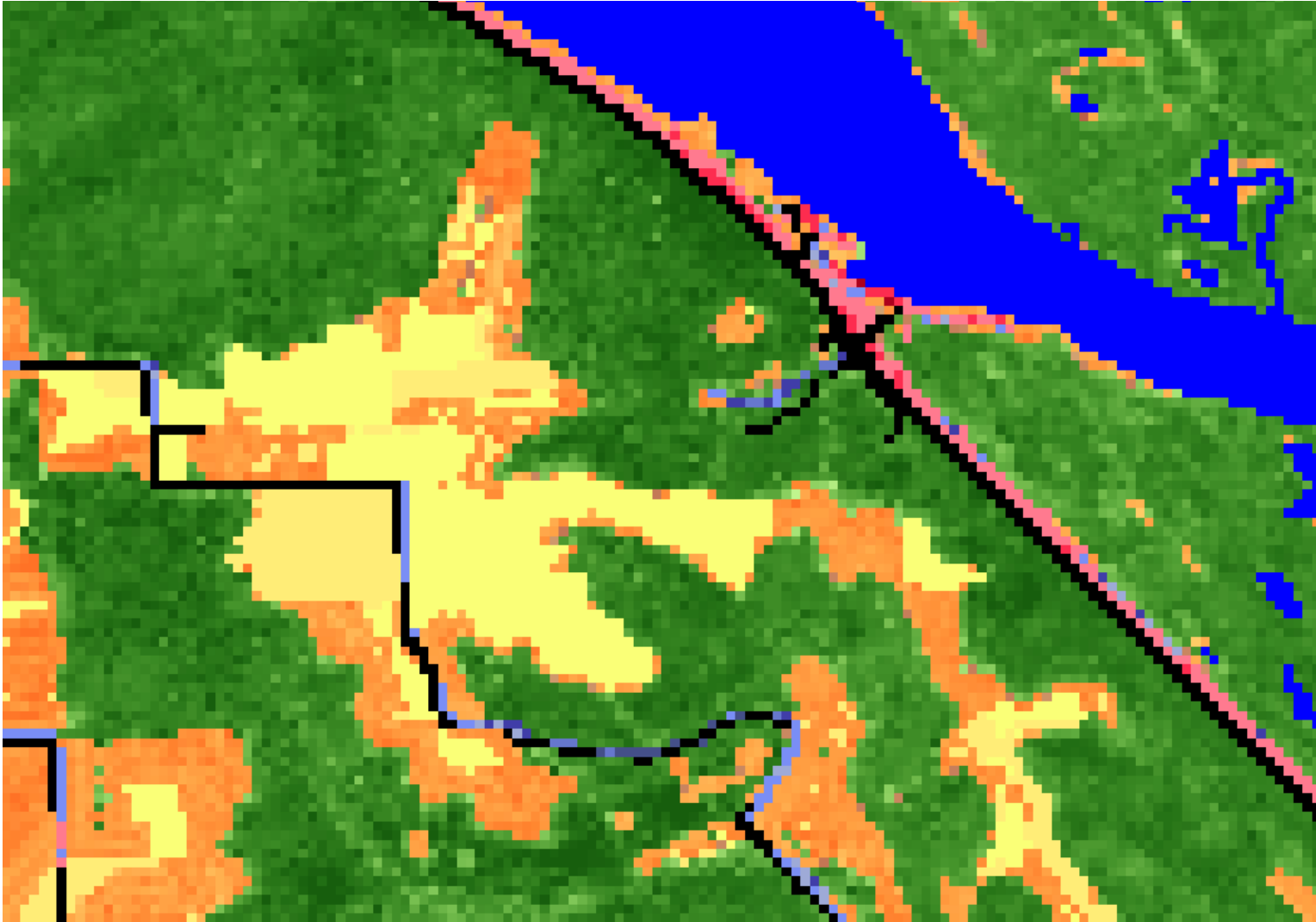
LF Remap Veg Cover

LF 2014 Veg Cover



Upper Mississippi, MN/WI

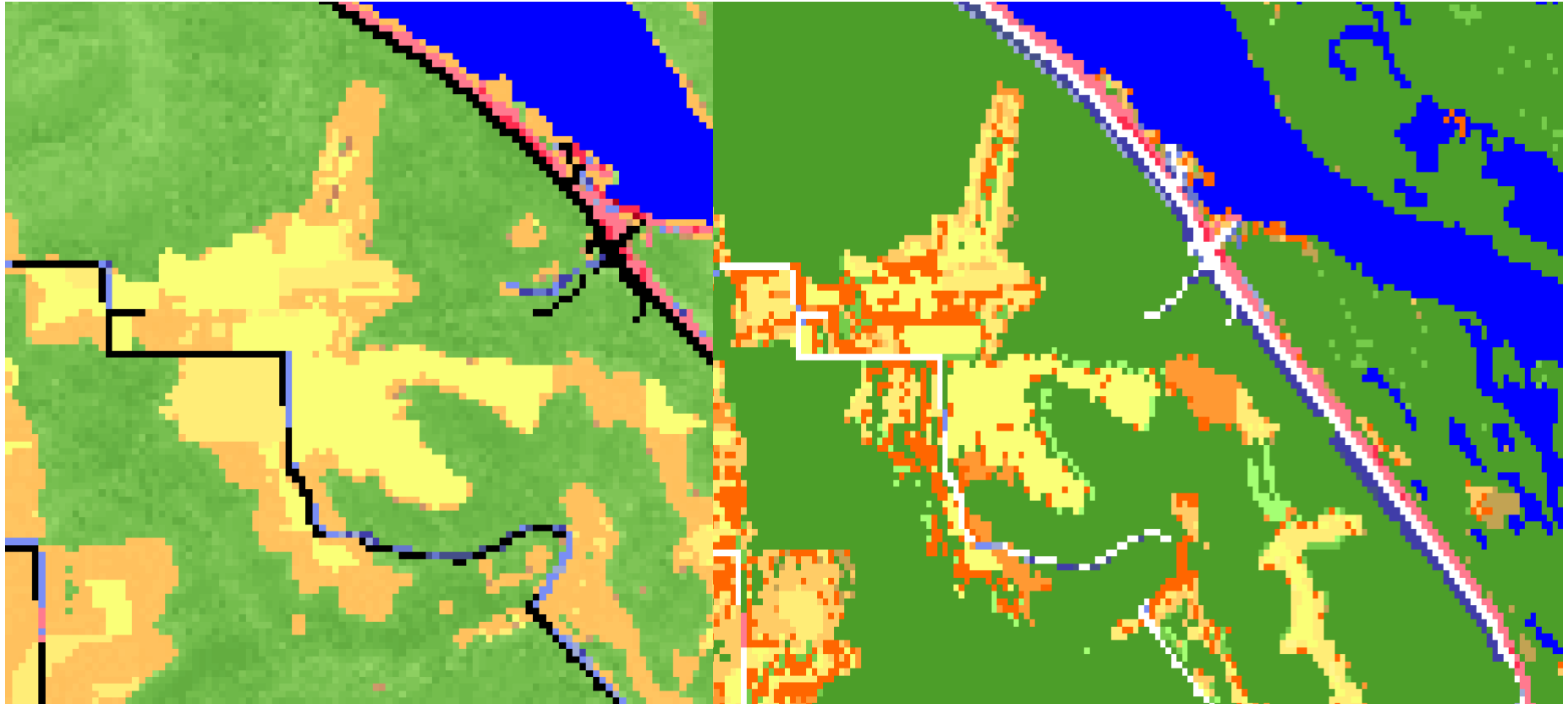
LF Remap Veg Cover



Upper Mississippi, MN/WI

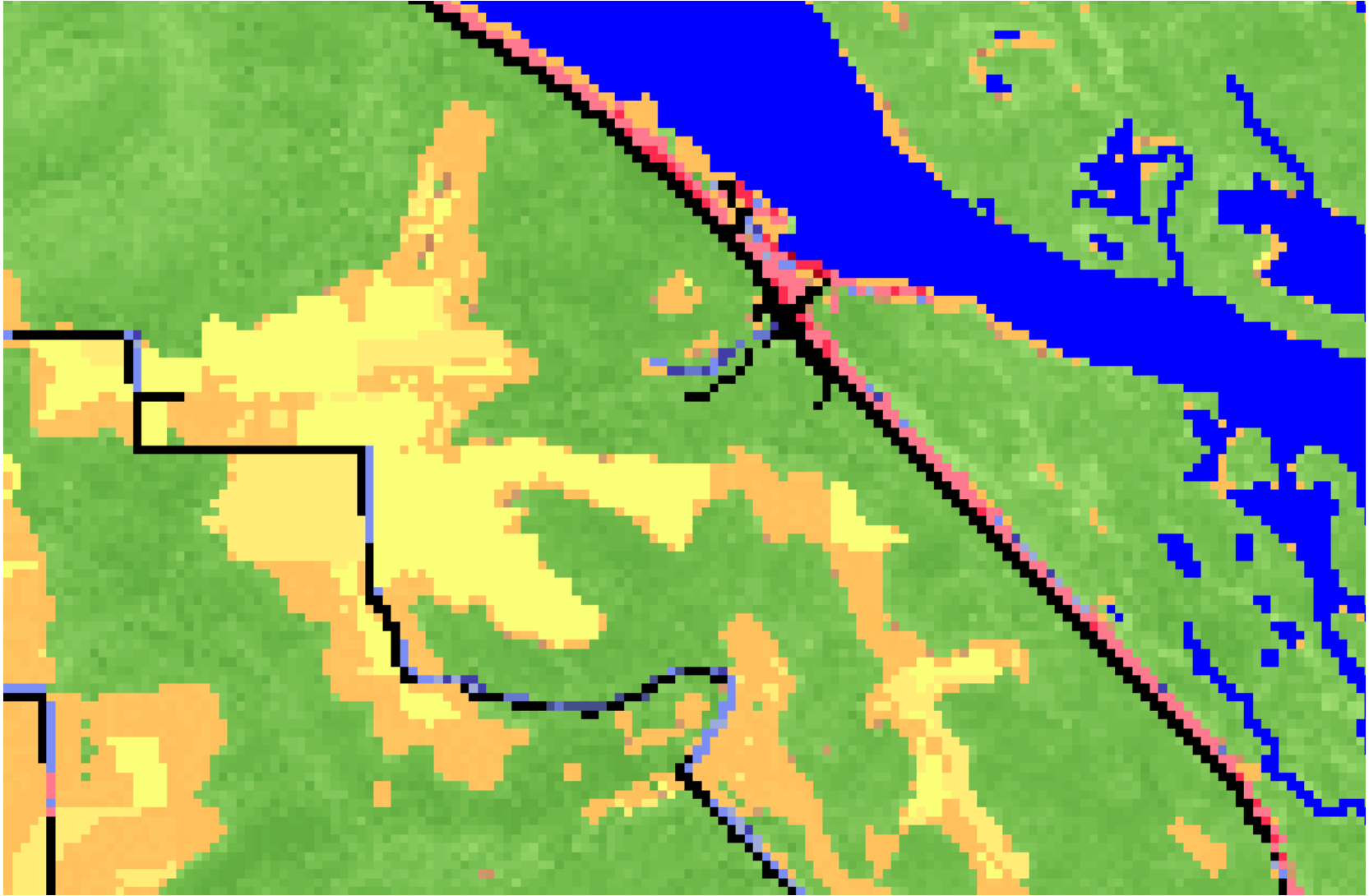
LF Remap Veg Height

LF 2014 Veg Height



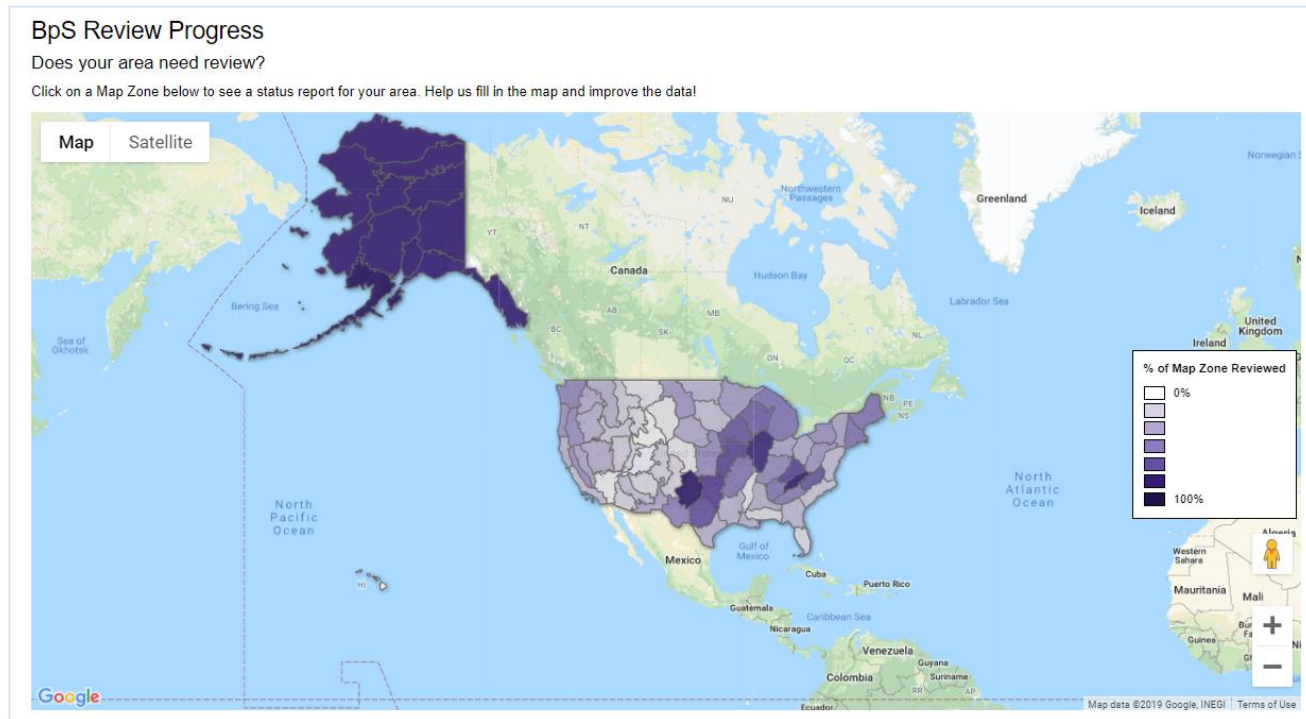
Upper Mississippi, MN/WI

LF Remap Veg Height



BpS Review

- BpS models/descriptions updated with new science
- Succession class mapping rules completed
- New more complete model description document
- User-friendly data access website



BpS Review Example

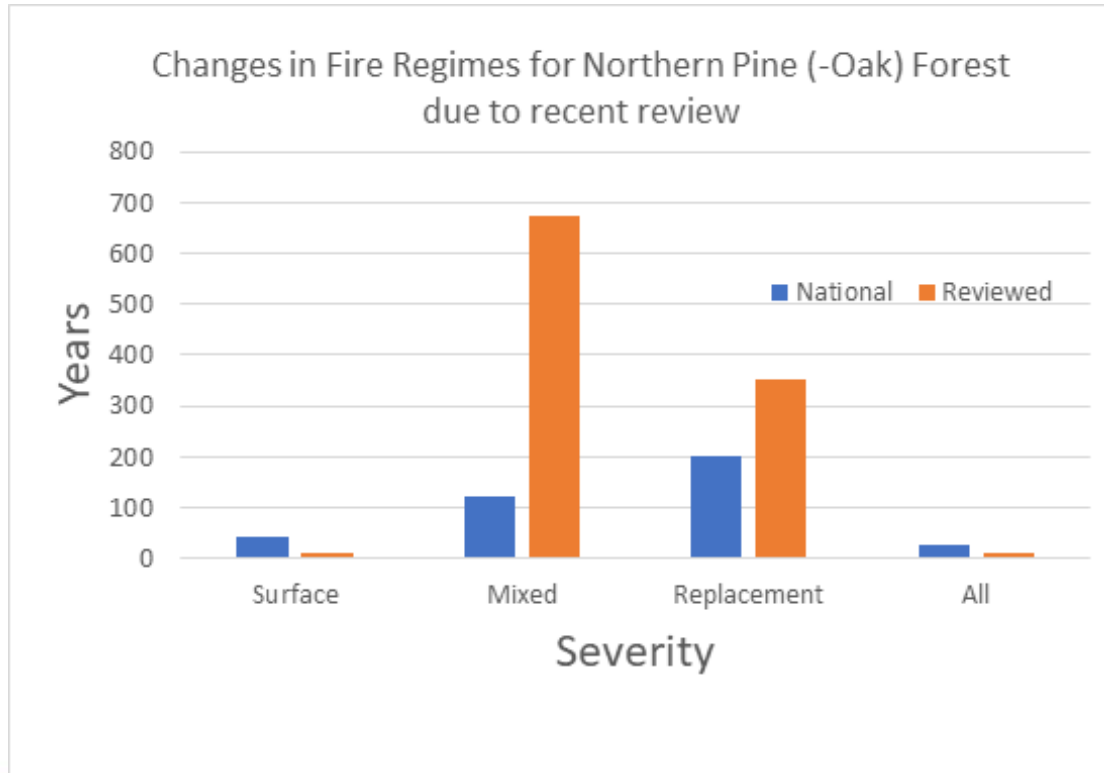
13621

Laurentian-Acadian Northern Pine(-Oak) Forest

BpS Model/Description Version: Oct. 2019

Modelers		Reviewers	
Jeremy Bennett	mte_jeremyb@yahoo.com	Dave Cleland	dcleland@fs.fed.us
Ron Waukau	ronwaukau@yahoo.com	None	None
Randy Swaty	rswaty@tnc.org	None	None

Reviewed by: Mark Farina, Greg Gulan, Dan Hinson, Greg Knight, John Lampereur, Scott Linn, Mary Lucas, Jed Meunier, Linda Parker, Jen Rabuck, Jay Sanders, and Monika Shea.



BpS Review



LANDFIRE

Biophysical Settings Review Site



Home BpS Search About Review Resources Progress Contacts

Vegetation Types

- Forest and Woodland (330)
- Shrubland (139)
- Herbaceous (104)
- Steppe/Savanna (82)
- Woody Wetland (82)
- Mixed Upland and Wetland (56)
- Herbaceous Wetland (26)

Map Zones

- 7 (63)
- 16 (44)
- 25 (44)
- 6 (43)
- 15 (42)
- 1 (40)
- 28 (39)
- 9 (38)
- 23 (37)
- 24 (37)
- 10 (35)
- 19 (35)
- 4 (35)
- 13 (34)
- 17 (34)
- 29 (32)
- 21 (31)
- 27 (31)
- 3 (31)

Search...

[View map of LANDFIRE Map Zones](#)

819 results found in 2ms

- Hawai'i Subalpine Mesic Shrubland**
Model Number: 18280 Map Zone(s): 79
Vegetation Type: Shrubland
- Hawai'i Wet-Mesic Coastal Strand**
Model Number: 18270 Map Zone(s): 79
Vegetation Type: Shrubland
- Hawai'i Dry Coastal Strand**
Model Number: 18260 Map Zone(s): 79
Vegetation Type: Shrubland
- Hawai'i Dry Cliff**
Model Number: 18250 Map Zone(s): 79
Vegetation Type: Shrubland

Documents selected for download:
No documents selected for download.

[Download All Search Results Documents](#)



Example Applications

Terrestrial Ecosystems

Draft Assessment Supplemental Report Wayne National Forest



Ecological Landtypes

Three ecological Landtypes were used for finer-level data analyses, which include Dry Oak Forest, Dry-Mesic Mixed Oak Forest, and Rolling Bottomland Mixed Hardwood Forest. These ecological units were delineated and described for the 17-county study area by Iverson et al. (2019a). **LANDFIRE** (Landscape Fire and Resource Management Planning Tools) was used to document current land use, vegetation trends across time, and historical fire regimes. **LANDFIRE** is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. This multi-partner program produces consistent, comprehensive, geospatial data and databases that describe vegetation, wildland fuel, and fire regimes across the United States and insular areas. **LANDFIRE** is a cornerstone of a fully integrated national data information framework developing and improving vegetation and fuels data products based on the best available authoritative data and science in an all lands landscape conservation approach based on inter-organizational collaboration and cooperation.



Example Applications

Rapid Assessment of the Forested Ecosystems of Michigan by Randy Swaty and Laura Slavsky

**THIS DASHBOARD IS FOR PROOF OF CONCEPT. MAPS HAVE NOT BEEN QA/QC'd, legends may not match. PATTERNS ARE INDICATIVE THOUGH.

MI Forest Ecosystem Assessment Background | Historic Ecosystems Map | Chart of Historic Ecosystems | Current Ecosystems Map | Chart of Current Ecosystems | Change

The Nature Conservancy's Shared Conservation Agenda is guiding conservation change

internationally, leading to substantial amounts of planning Michigan Chapter is developing Narratives, One-Page Plans priorities including "Conserving Resilient Lands and Waters"

Rapid Assessment of the Forested Ecosystems of Michigan by Randy Swaty and Laura Slavsky

**THIS DASHBOARD IS FOR PROOF OF CONCEPT. MAPS HAVE NOT BEEN QA/QC'd, legends may not match. PATTERNS ARE INDICATIVE THOUGH.

Within these priorities forests are foundational, and mention Some example actions include:

- "We will identify additional protection opportunities to
 - Restoration and improved management of existing
 - Improved health of the 16M-acre forest ecosystem resilience and pest/disease resistance

From: CRLW Conserving Resilient Lands and Waters - MI Narrative

Within the Conserving Resilient Lands and Waters strategy (Michigan Chapter of The Nature Conservancy has a draft general forest ecosystem by increasing biodiversity, climate resilience. Additionally, there are forest-focused goals within the Narrative Fire strategies. The hope here is to conduct a general rapid specific strategies and/or future planning questions.

This regional map represents LANDFIRE's Vegetation Designation <https://fdoh.maps.arcgis.com/apps/opsdashboard/index.html#/8d0de33f26>

For this "rapid assessment" the main goals (in addition to the overarching ones above)

Current Ecosystems Map | Chart of Current Ecosystems | Change | More Change | Michigamme Highlands

Forested Ecosystems of Michigan-Current Amounts

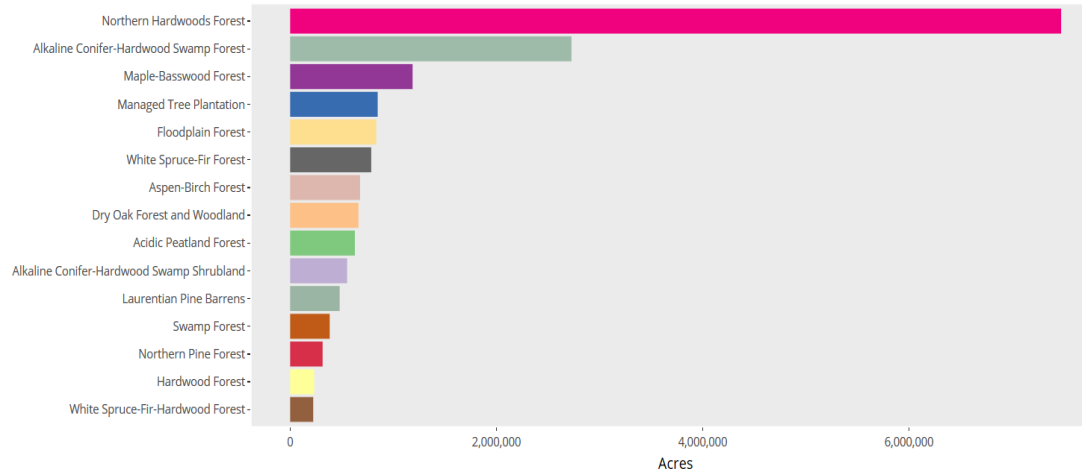
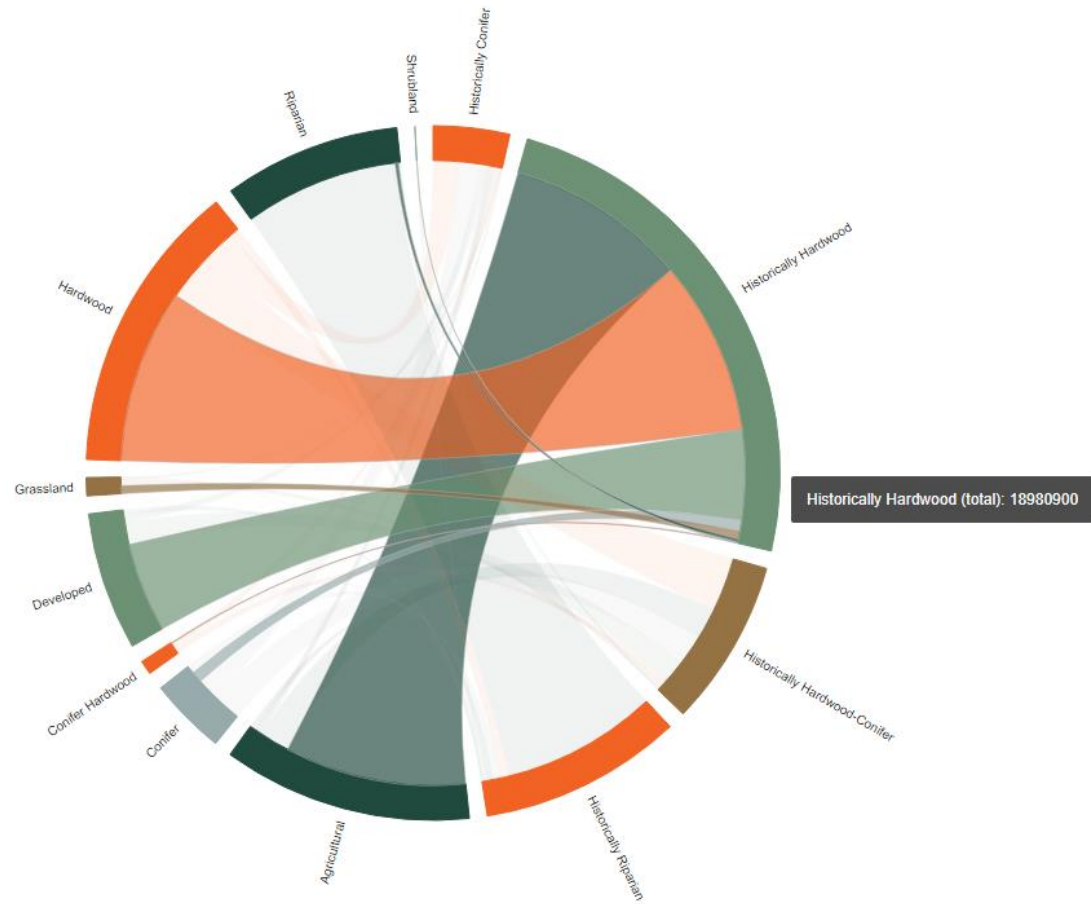


Chart made by taking the top 15 Forest (as defined in the attribute table) "natural" (i.e., not converted to agricultural or urban land uses) Existing Vegetation Types. This was done to "filter out" noise, i.e. EVT's with limited representation.



Example Applications



Take-home Messages

LANDFIRE products

- are comprehensive, compatible, *current* and *consistent*. (4 C's)
- are designed for use at regional and national scales.
- can be modified for local use.

LF Remap incorporated new processes and data sets to improve usability of the products, and represents conditions in 2016.

Users can help improve LANDFIRE products by providing plots and data + feedback.



Feedback



E-mail: helpdesk@landfire.gov

Website:
<https://landfire.gov/contactus.php>

A screenshot of the LANDFIRE website's contact form. The page has a green header with the 'LANDFIRE' logo and navigation links: Home, About, Data Products, Contribute Data, Methods & Applications, Improvements, and Search. Below the header is a navigation bar with icons for Data, Wetlands, Wetlands, Vegetation, Fuel, Fire Regime, and Topography. The main content area is titled 'Contact Us' and contains a form with the following fields: First Name, Last Name, Email, Subject, and a large text area for Feedback/Concerns. A note below the form states: 'NOTE: You should receive a confirmation email from the helpdesk within one business day, if you do not, please resend your question or feedback.' At the bottom of the form is a 'Submit' button and a small logo for 'powered by usCAPTION'.

Our Contact Information



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rswaty@tnc.org

LANDFIRE ONLINE



<https://www.landfire.gov>



<http://bit.ly/Tvz2yl>



http://twitter.com/nature_LANDFIRE



LANDFIREvideo



LANDFIRE Monthly Postcard-must opt-in



LANDFIRE@tnc.org

