A Comparison of LANDFIRE's Existing Vegetation Type Classifications and the USFWS National Wetland Inventory Classifications Within the McCormick Wilderness Area

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Introduction

Wetlands provide a multitude of ecosystem services, including water purification, conservation of soil and water, and carbon sequestration (Rampi et al. 2014). Naturally heterogenous conditions and remote locations make mapping wetland boundaries and wetland vegetation cover inherently difficult. To understand the differences and similarities between two nationally mapped datasets, we used a GIS to compare LANDFIRE's Existing Vegetation Type (EVT) classification and the U.S. Fish and Wildlife Service's National Wetland Inventory (USFWS-NWI) classification system within the McCormick Wilderness Area, a tract of the Ottawa National Forest..

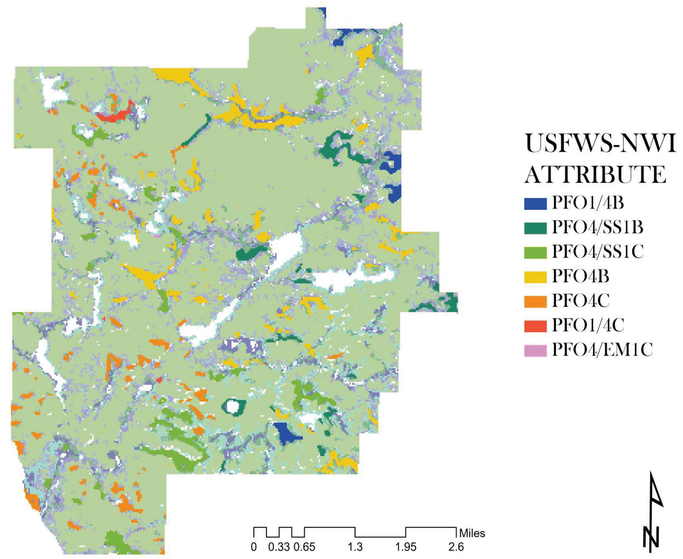

Figure 1. Unique values symbology map (EVT Name, NWI Attribute) as well as two graphs which show NWI wetland attributes PFO4B/C & their EVT "make-ups".

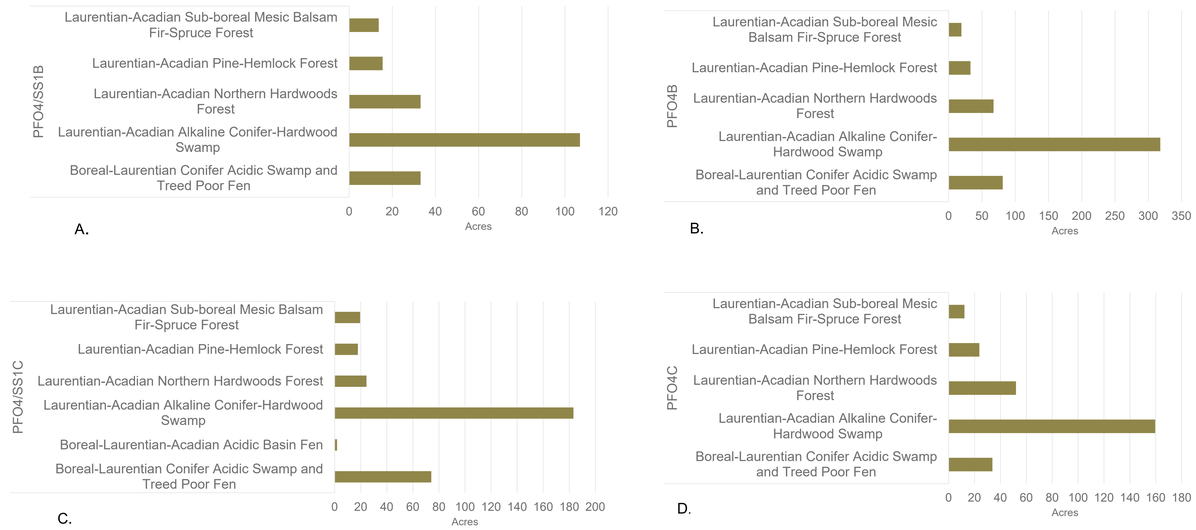

Figure 3 (A-D). Areal extent distribution of PFO4/SS1B (A), PFO4B (B), PFO4/SS1C (C), and PFO4C (D) USFWS-NWI wetland codes among select LANDFIRE Existing Vegetation Types.

Methods

The McCormick Wilderness Area is a 18,650-acre tract of the Ottawa National Forest, situated approximately 35 miles east of the main body in Baraga County, Michigan, USA (Leatherberry and Meunier 1997).

This research is a non-experimental case study. The LANDFIRE-EVT raster dataset was accessed via the LANDFIRE portal, and the USFWS-NWI Michigan data was accessed through the Wetland Mapper portal.

Geoprocessing tools in ArcGIS Pro were applied to the LANDFIRE EVT and USFWS-NWI datasets in order to create a new raster dataset through the "Combine" tool. The Combine tool works by assigning values to each pixel type within each input raster. This was used to further investigate the relationships between the two datasets, specifically the relationship between NWI wetland types and LANDFIRE Existing Vegetation Types.

Table 1. Summary data table showing the 6 NWI wetland types and their respective EVT classifications as well as the area in which they "overlap".

NWI Attribute Code	Existing Vegetation Type [Name]	Acres
PFO1/4B	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	14.9
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	67.3
	Laurentian-Acadian Northern Hardwoods Forest	4.4
	Laurentian-Acadian Pine-Hemlock Forest	4.0
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	3.1
PFO1/4C	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	5.1
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	17.1
	Laurentian-Acadian Northern Hardwoods Forest	4.6
	Laurentian-Acadian Pine-Hemlock Forest	1.5
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	0.2
PFO4/SS1B	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	33.1
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	107
	Laurentian-Acadian Northern Hardwoods Forest	33.1
	Laurentian-Acadian Pine-Hemlock Forest	15.5
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	13.7
PFO4/SS1C	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	74.1
	Boreal-Laurentian-Acadian Acidic Basin Fen	1.8
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	183.2
	Laurentian-Acadian Northern Hardwoods Forest	24.4
	Laurentian-Acadian Pine-Hemlock Forest	17.8
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	19.5
PFO4B	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	81.2
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	318
	Laurentian-Acadian Northern Hardwoods Forest	67.4
	Laurentian-Acadian Pine-Hemlock Forest	32.7
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	19.1
PFO4C	Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	33.8
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	159.6
	Laurentian-Acadian Northern Hardwoods Forest	52
	Laurentian-Acadian Pine-Hemlock Forest	23.7
	Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest	12.2

Results

The majority (33.52%) of Laurentian-Acadian Alkaline Conifer Hardwood Swamp (LAAACHS) & Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen (BLCAS-TPF) classified cells were found to also be classified as Palustrine Forested Needle-Leaved Evergreen Seasonally Saturated (PFO4B; Table 1B).

Similarly, 30.60% of LAAACHS and BLCAS-TPF cells were associated with PFO4/SS1B (Palustrine Scrub-Shrub Broad-Leaved Deciduous Seasonally Saturated).

Only 2.11% of cells assigned as PFO1/4C, 6.15% of cells for PFO1/4B, 13.70% of cells for PFO4/SS1B, and 14.00% of cells for PFO4C where Subclass 1 is Broad-Leaved Deciduous Modifier C is Seasonally Flooded (See NWI Attribute Codes).

Discussion

This non-experimental research was designed to investigate alternative sources of landcover data to enhance support and enhance existing U.S. Fish and Wildlife Service NWI data. Limitations of this study include the geospatial accuracy of the shapefile (provided by University of Montana's Wilderness Connect) used to clip the EVT and NWI data, as well as the inherent limitations of the remotely sensed data.

Future work will incorporate an "agreement" field to systematically and quantitatively assess areal extent comparisons for all USFWS-NWI classifications within a designated study among all LANDFIRE Existing Vegetation Types.