



The Surface Waters and Wetlands Inventory

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Surface Waters and Wetlands Inventory

- What is SWI
- Examples of Data Creation
- Why SWI
- Examples of Analysis
- When
- SWI Mapper



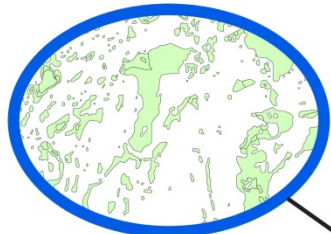


Surface Waters and Wetlands Inventory

- What is SWI
 - Often referred to as version 2.0 of the National Wetlands Inventory (NWI)
 - Provides more inclusive geospatial data of all wetlands and surface water features.
 - SWI is a derived dataset that depicts all surface water and wetland features in a single feature class
 - Retains the wetland and deepwater polygons from NWI
 - Reintroduces linear wetland features orphaned from original NWI hardcopy maps by converting them to narrow polygonal features
 - Supplements the dataset with buffered hydrographic linear data that were missed by NWI mapping or to complete segmented connections
 - Applies the Cowardin et al. (1979) system to provide consistent ecological descriptors
 - E.g. PEM1C, PFO2/4Bg, PUBHx, E2EM1P



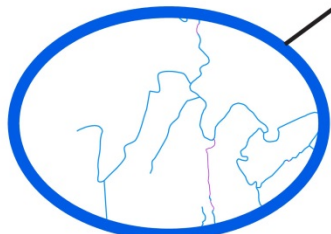
Surface Waters and Wetlands Inventory



National Wetlands Inventory polygon features



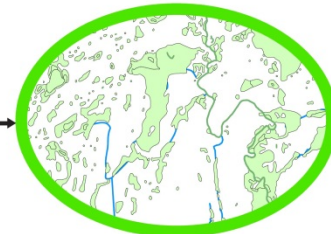
National Wetlands Inventory linear features



Hydrography linear features

A geoprocessing model was developed using ESRI Model Builder to standardize the over 425 geoprocessing and logic processes required for Surface Waters and Wetlands Inventory (SWI) data creation. The general logic is outlined below:

- 1) Selection of appropriate linear hydrography features for inclusion in SWI.
- 2) Linear hydrography features are translated to Cowardin¹ Habitat classification.
Example
Intermittent stream = R4SBC (Intermittent Riverine Stream Bed, Seasonally flooded)
Canal = RSUBFX (Unknown Perennial, Unconsolidated Bottom, Semipermanently flooded and excavated)
- 3) All linear features are buffered based on habitat classification to create polygons.
Examples
Intermittent streams = 4 meter width
Palustrine wetlands = 6 meter width
Perennial streams = 8 meter width
- 4) The resulting three polygon layers are integrated by implementing spatial logic to prioritize hierarchy of overlapping polygons based on data source and habitat type.



Intermediate polygon features

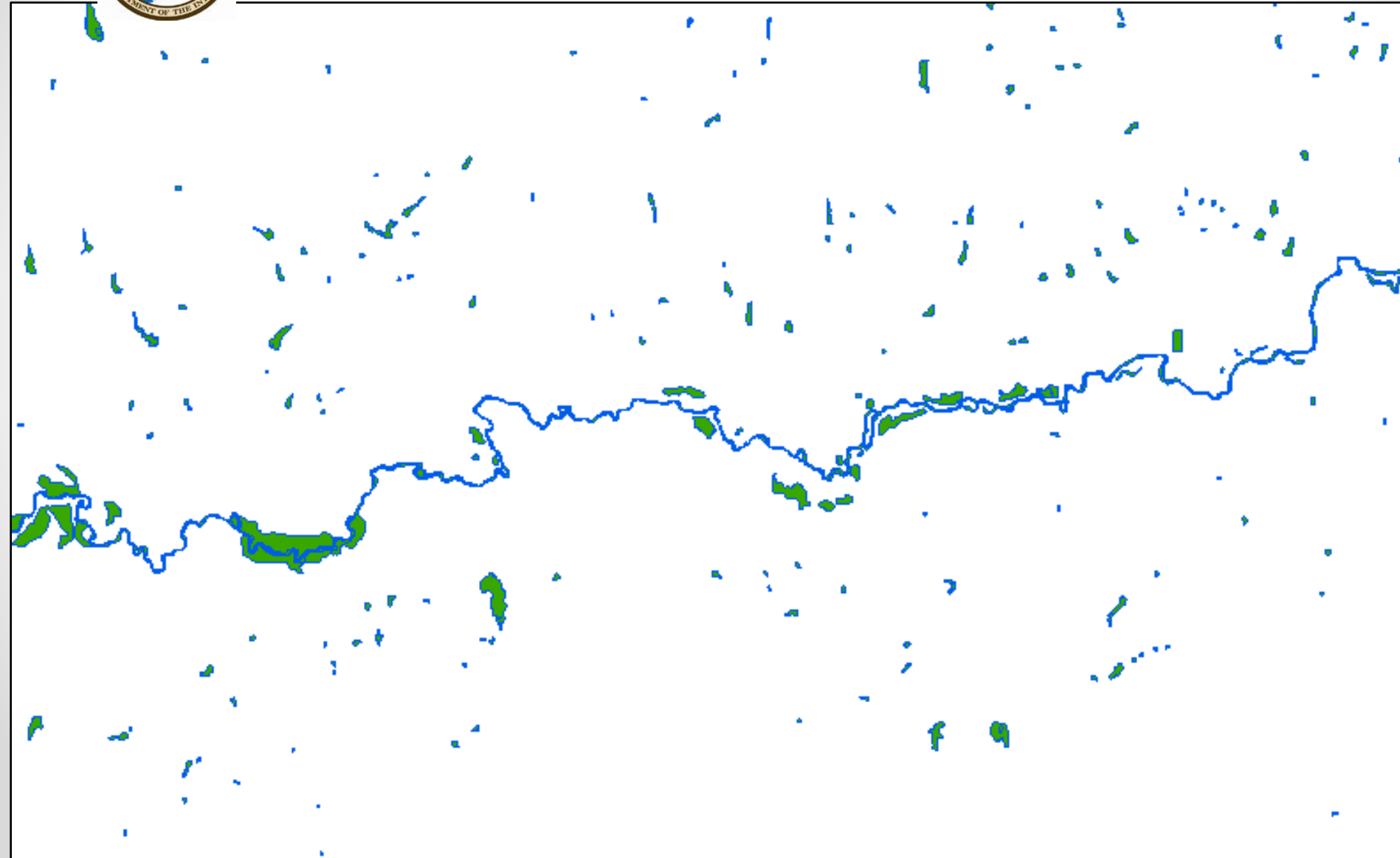


Surface Waters and Wetlands Inventory

- Surface Water
- Wetland

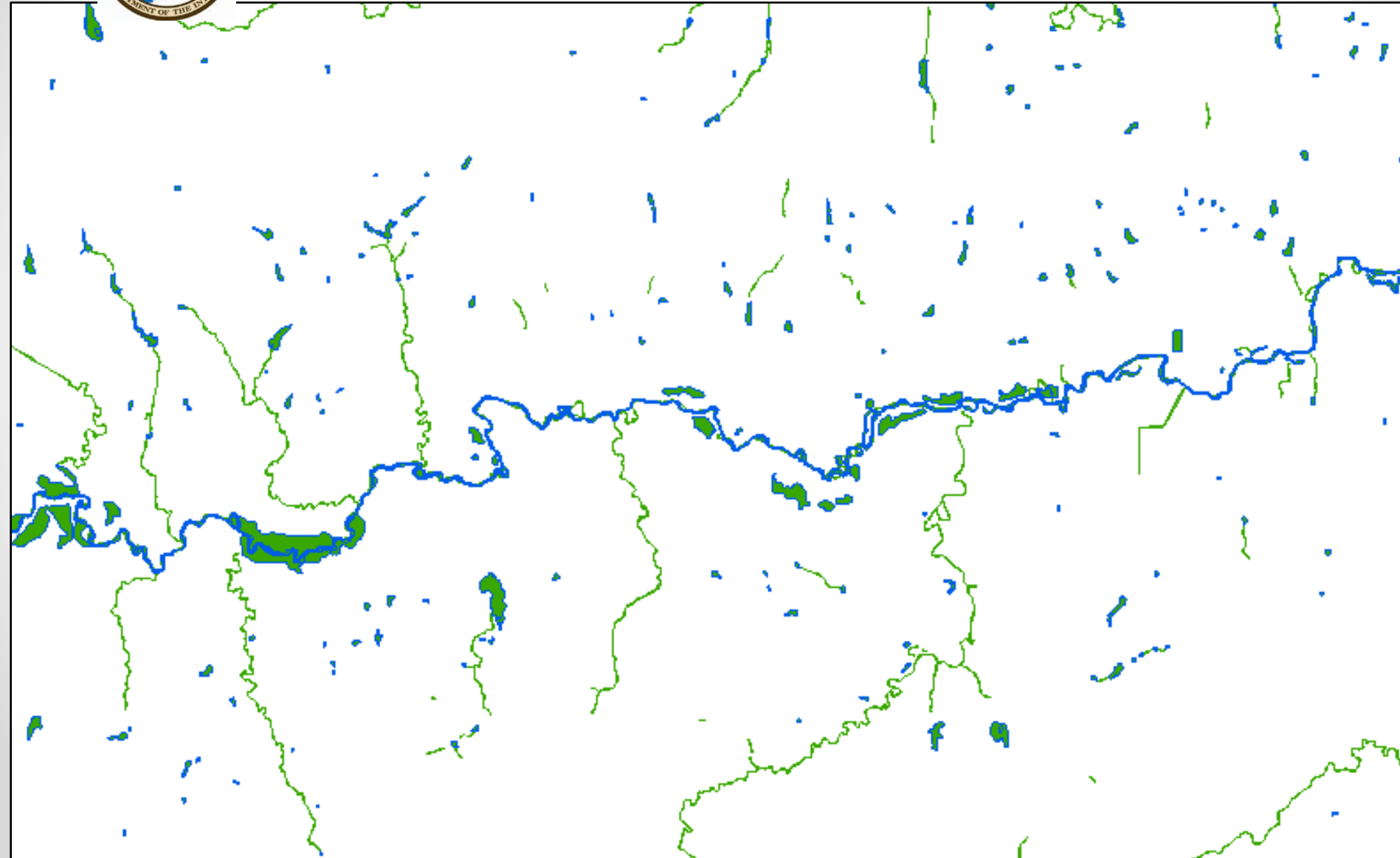


SWI - NWI polygons



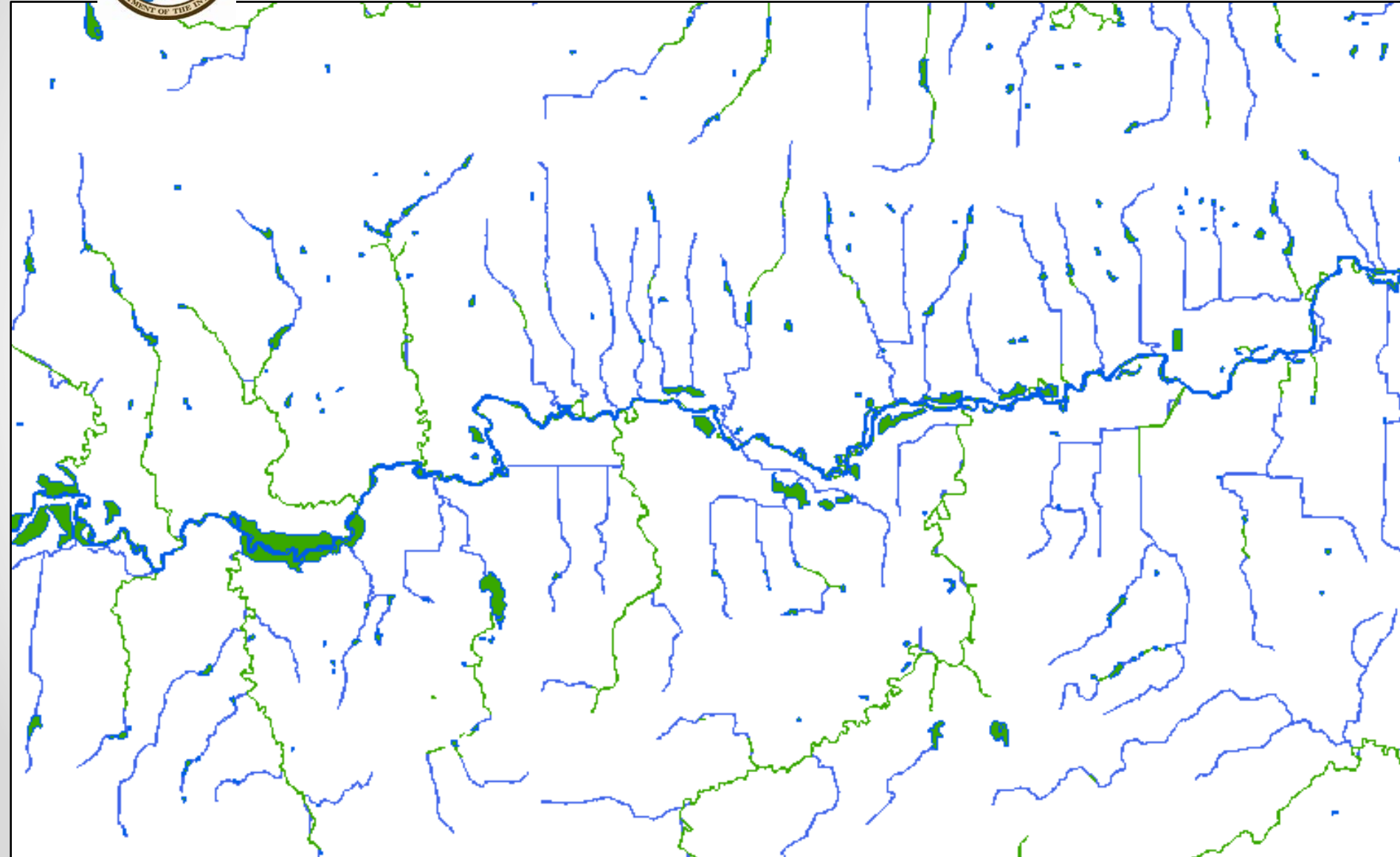


SWI - NWI linears added





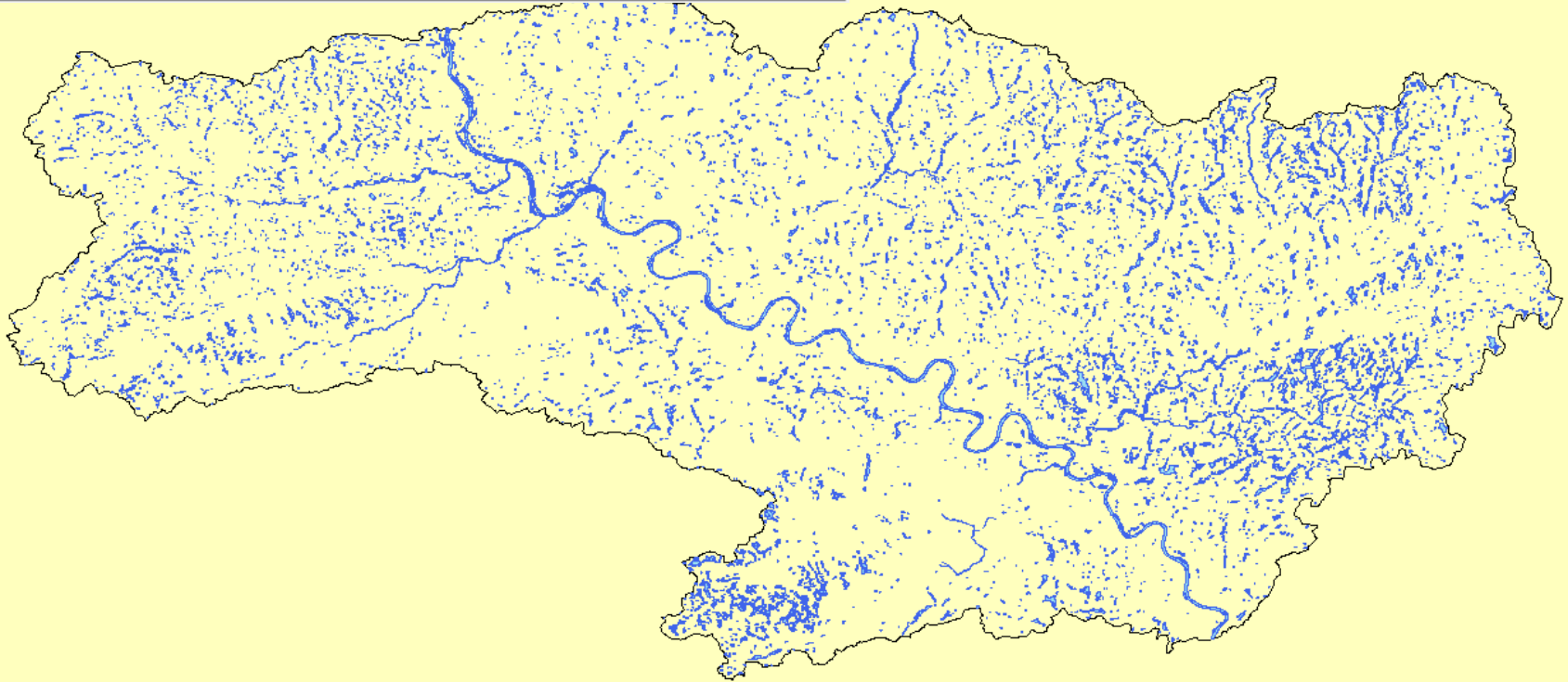
SWI – Hydrography added





NWI polygons

Wetland Type	Wetland Type Frequency	Sum of Acres
Freshwater Emergent Wetland	2953	7399.97
Freshwater Forested/Shrub Wetland	5097	21563.54
Freshwater Pond	5418	5928.65
Lake	167	5113.14
Riverine	283	8560.6



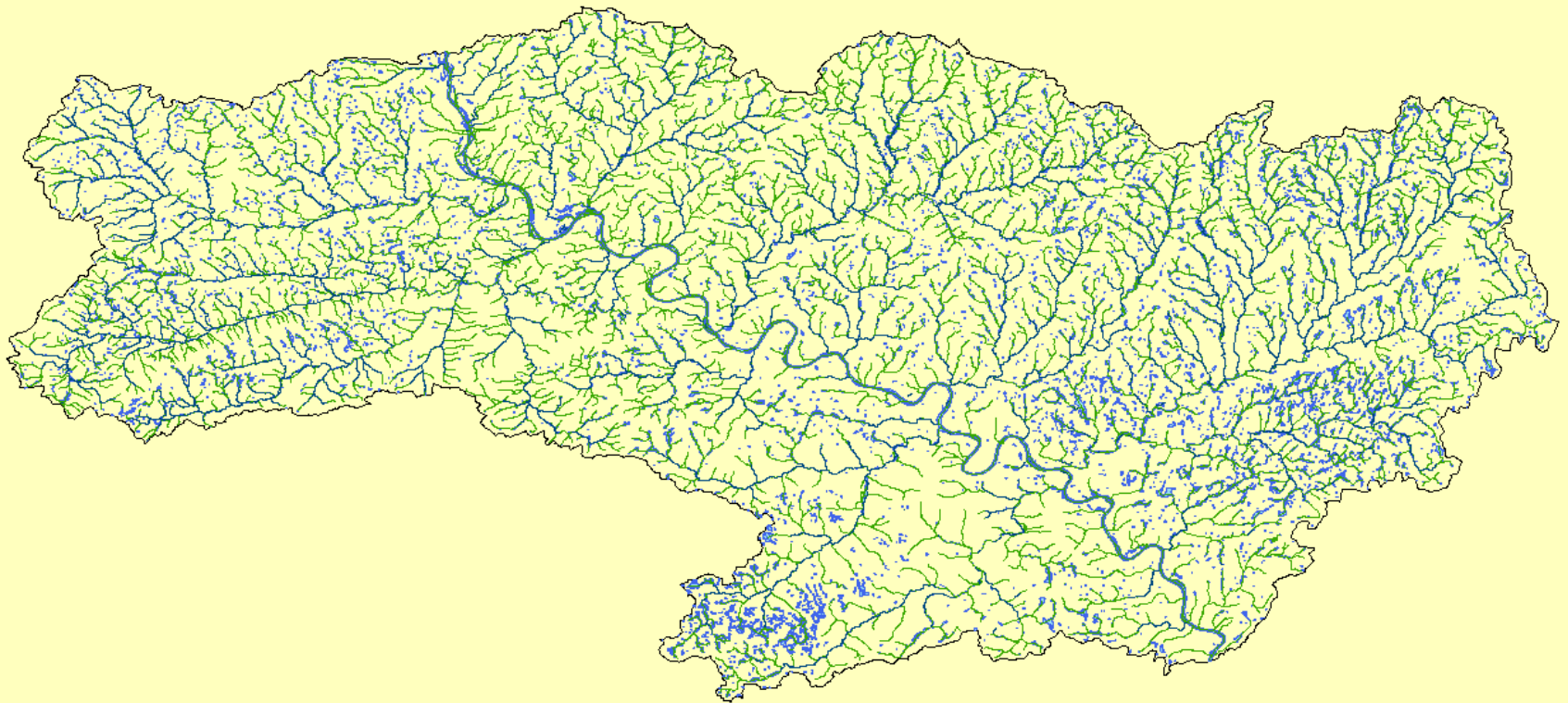


NWI polygons and linears





SWI – Hydrography added





SWI polygons

Wetland Type	Wetland Type Frequency	Sum of Acres
Freshwater Emergent Wetland	2953	7399.97
Freshwater Forested/Shrub Wetland	5097	21563.54
Freshwater Pond	5418	5928.65
Lake	167	5113.14
Riverine	283	8560.6



Wetland Type	Wetland Type Frequency	Sum of Acres
▶ Freshwater Emergent Wetland	3155	7414.86
Freshwater Forested/Shrub Wetland	5331	21491.97
Freshwater Pond	5531	5943.28
Lake	165	5111.61
Riverine	7035	16743.33

*SWI includes 207 freshwater emergent, 173 forested/shrub, 122 freshwater pond and 1,039 riverine linear segments from original NWI mapping efforts. Some of these segments have been merged with hydrography segments to create a uniform wetland network.

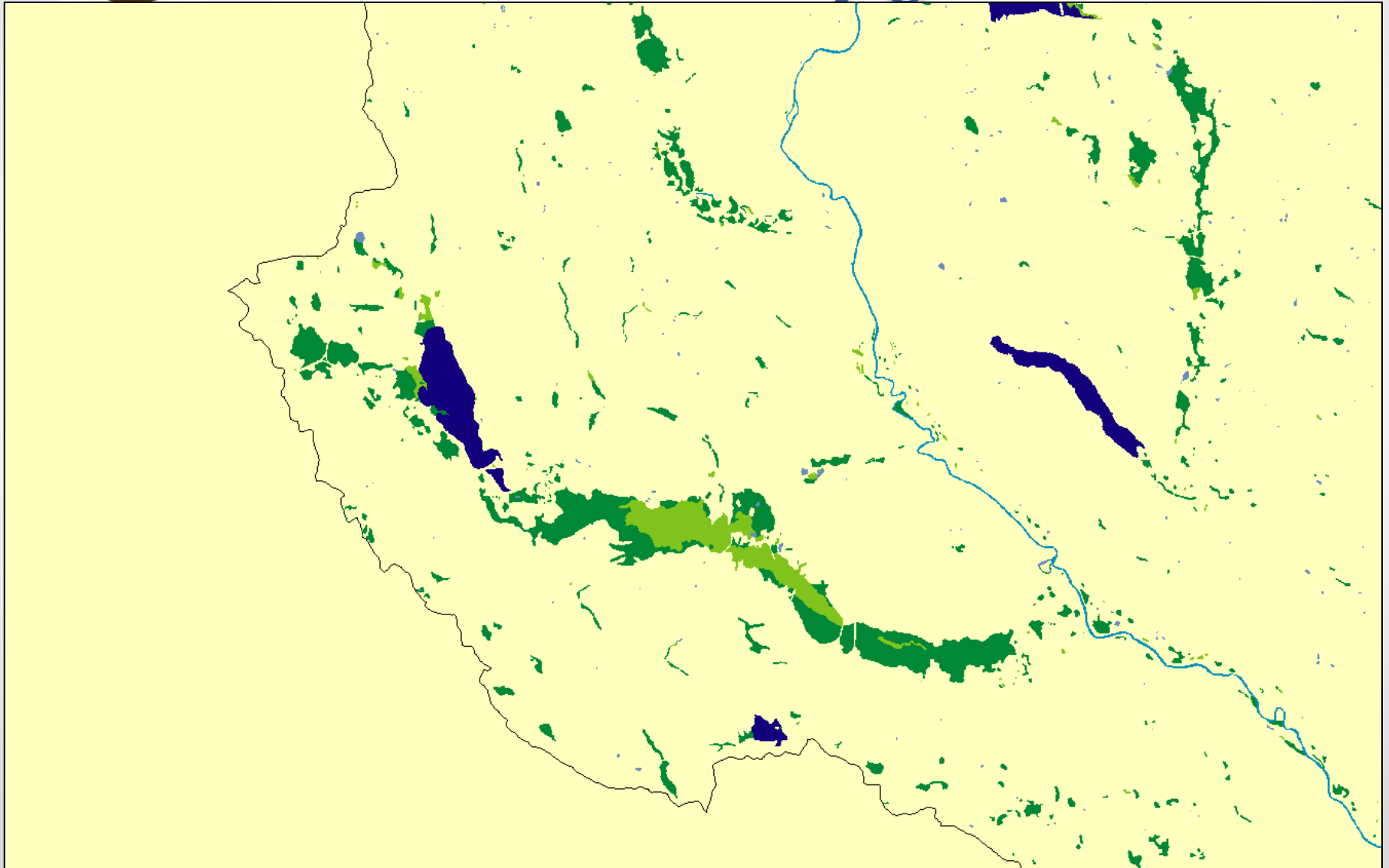


Surface Waters and Wetlands Inventory

- Why SWI
 - It stems from the need to represent all surface waters and wetlands as polygons in a geospatial dataset to facilitate accurate area calculations and provide consistent, standardized ecological classification to allow for adaptive management, geospatial summaries, and modeling.
 - Tracing contaminant pathways through aquatic systems
 - Quantifying water retention capabilities upstream
 - Identifying and prioritizing habitat restoration opportunities
 - Examining continuity or dissection of habitat corridors
 - Quantifying aquatic and wetland resource types
 - Facilitating ecological modeling
 - Environmental Protection Agency's Science Advisory Board (SAB) DRAFT report titled Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence
 - The report examines the effects that headwater and ephemeral streams and wetlands have on larger downstream waters.



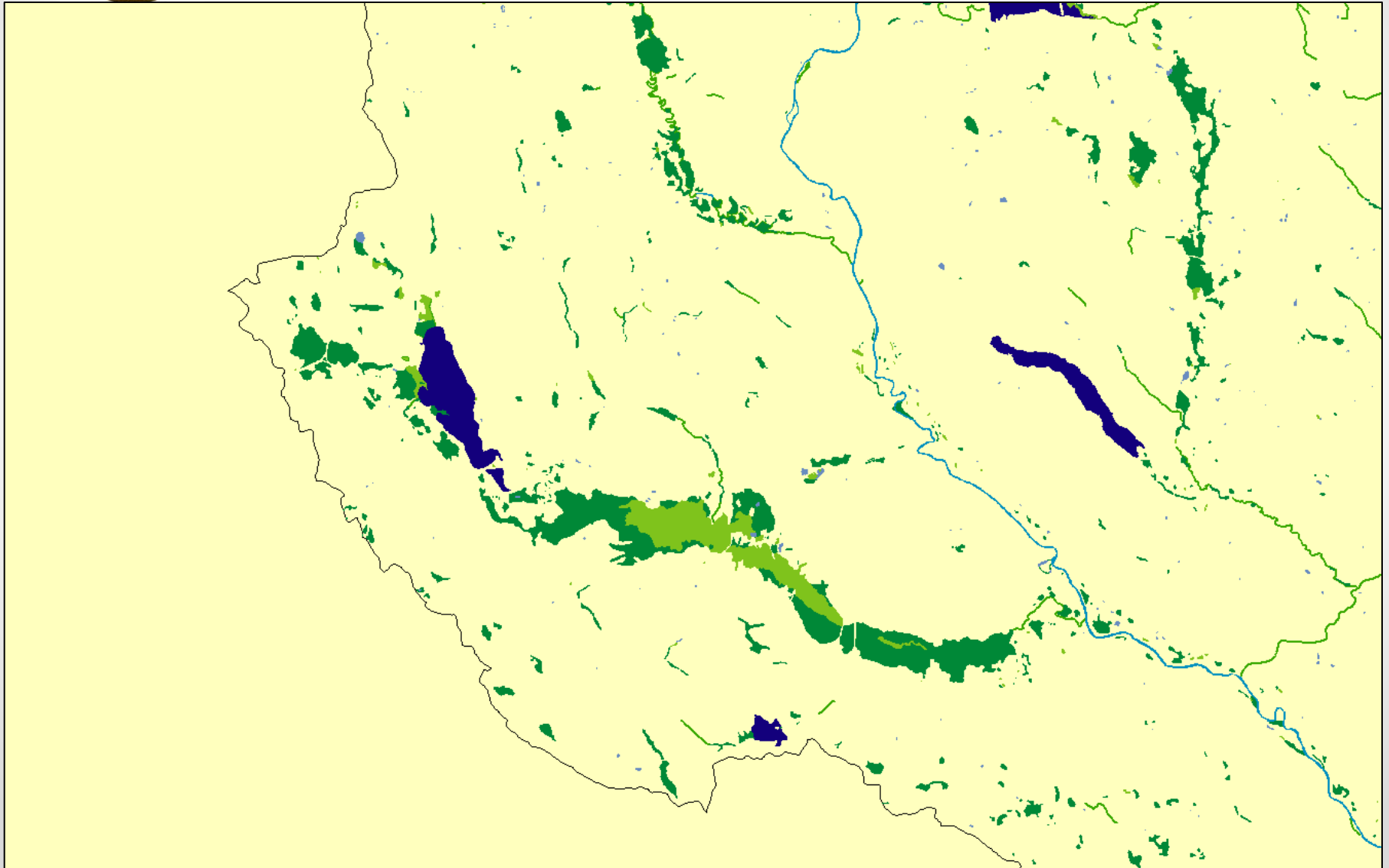
SWI – Analysis NWI Polygons





SWI – Analysis

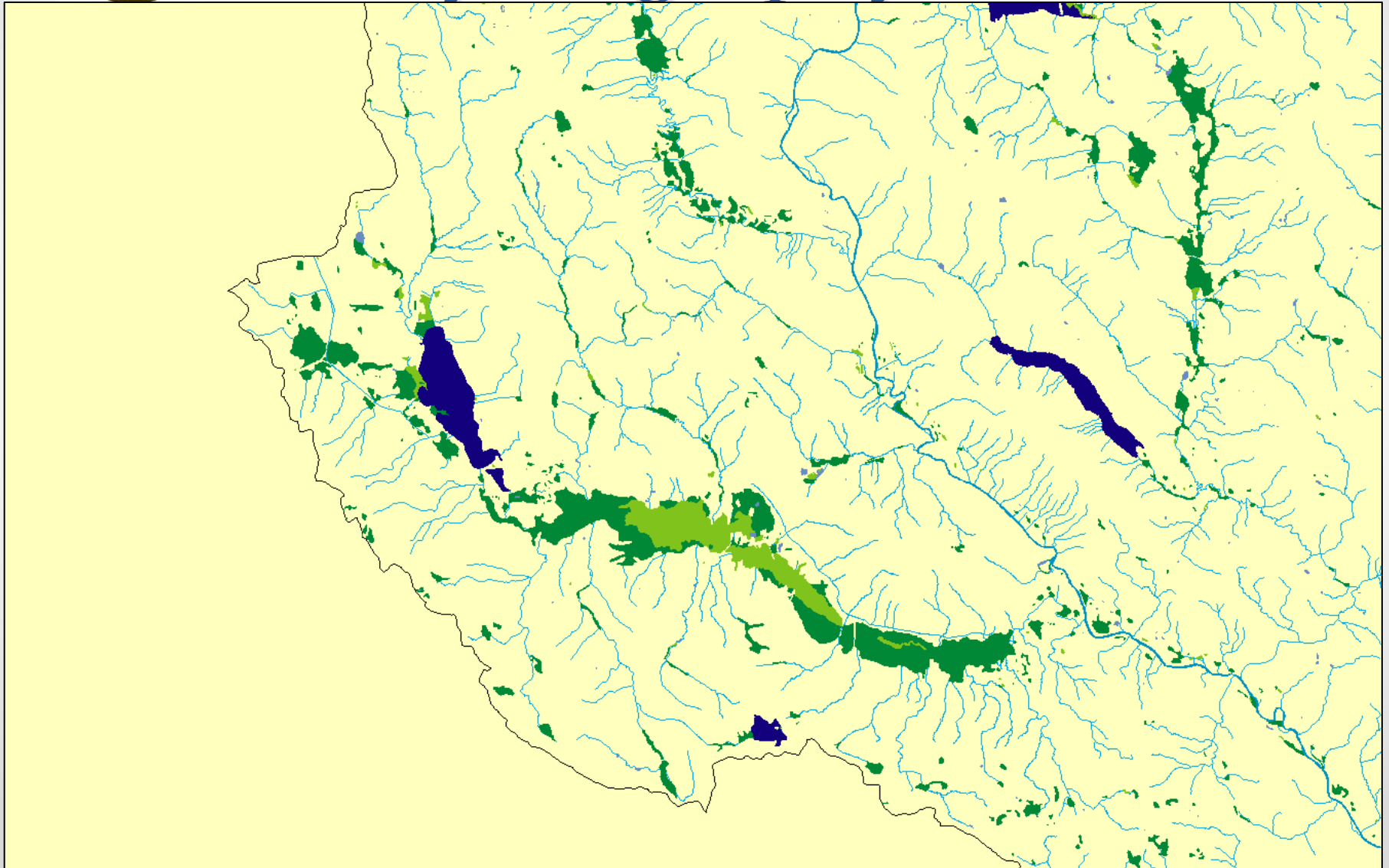
NWI Linears added





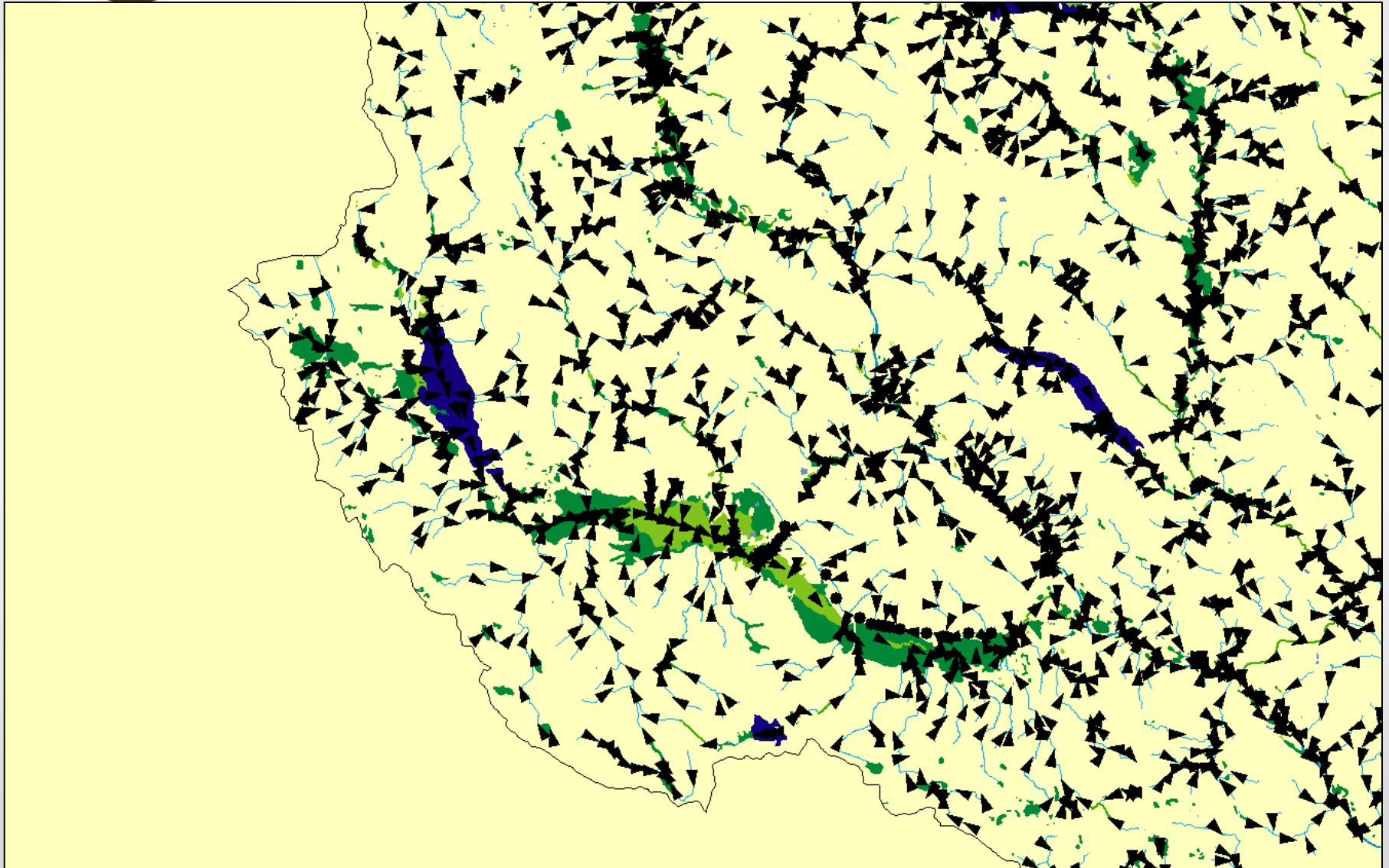
SWI – Analysis

Hydrography added



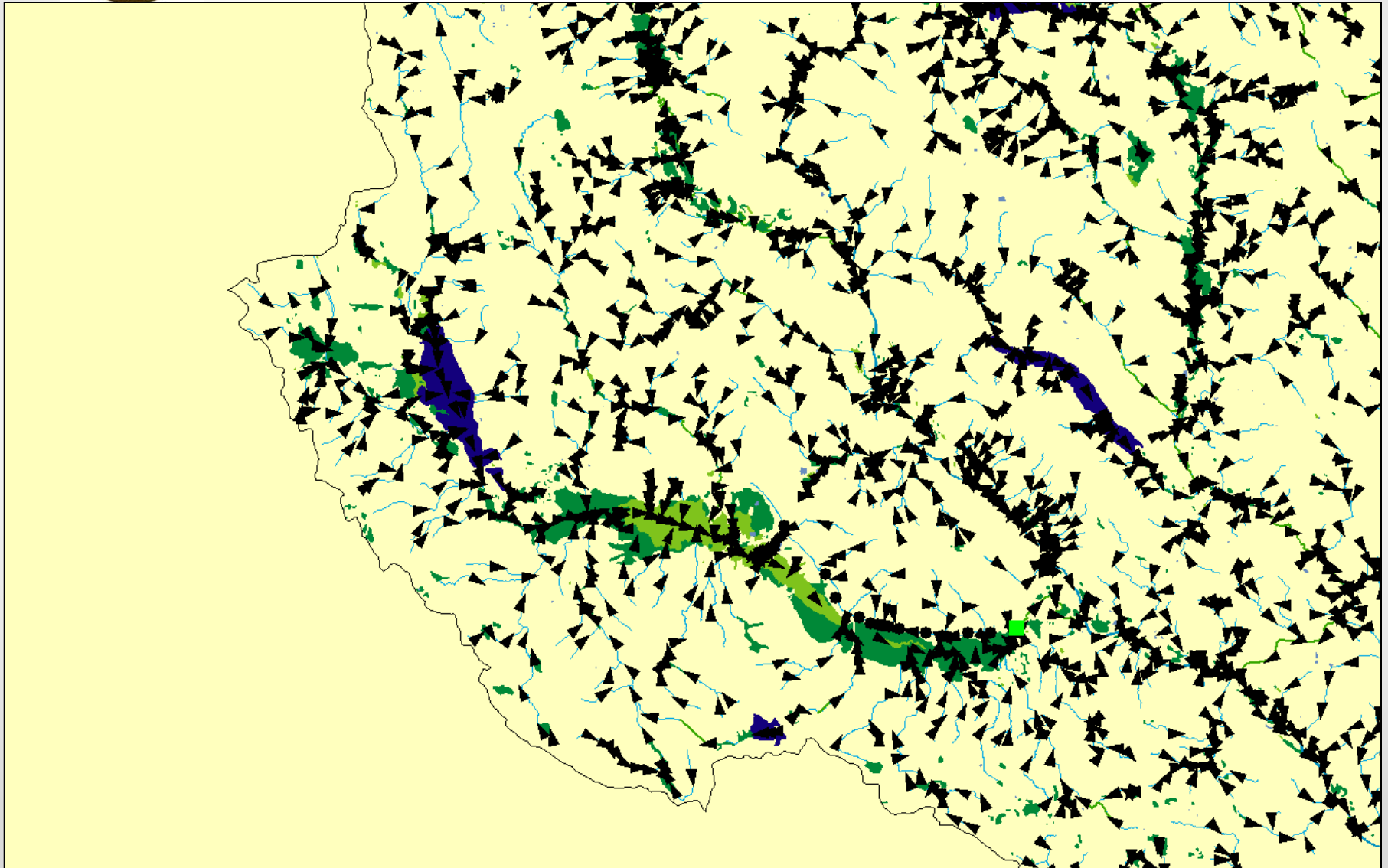


SWI – Analysis



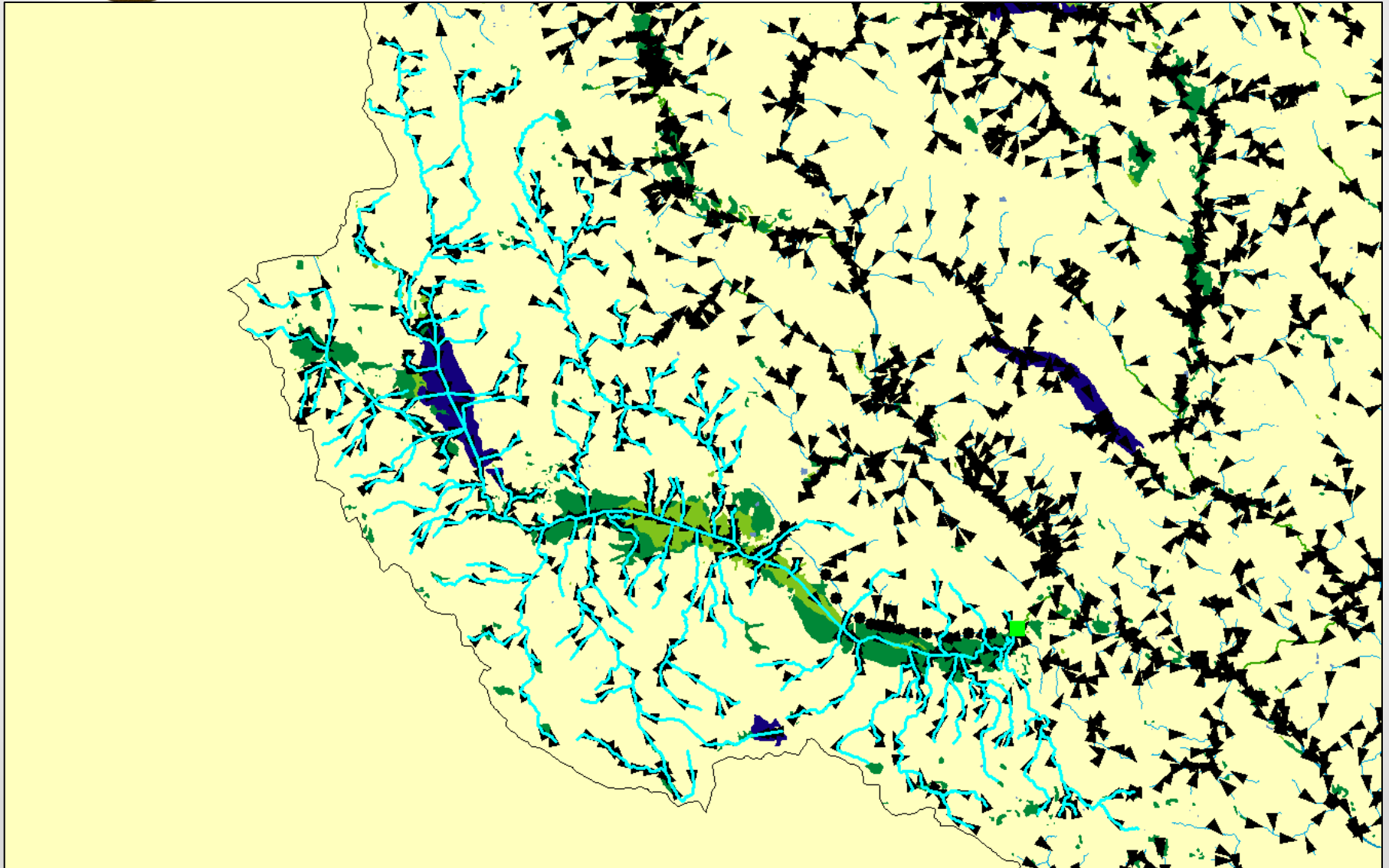


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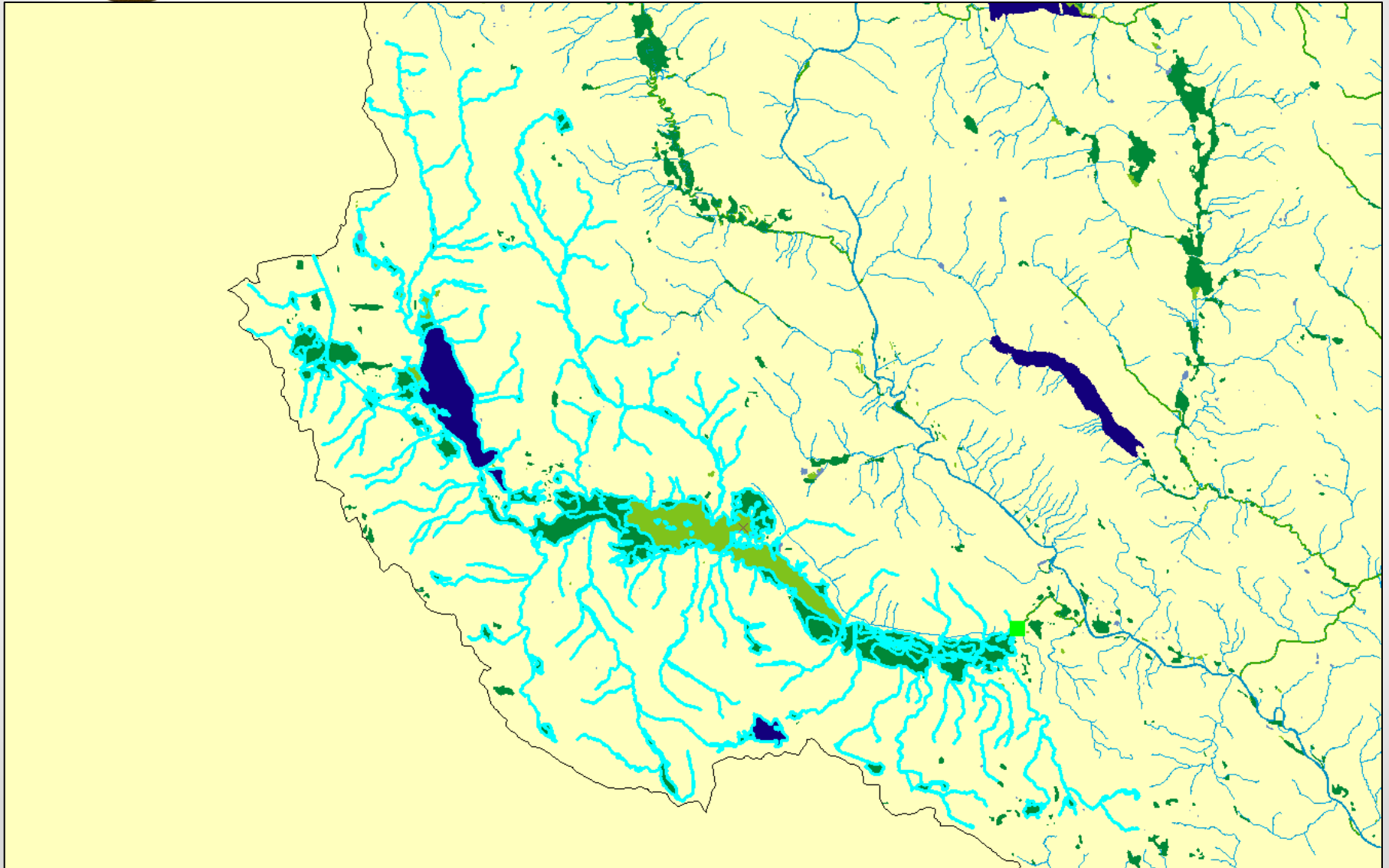


SWI – Analysis





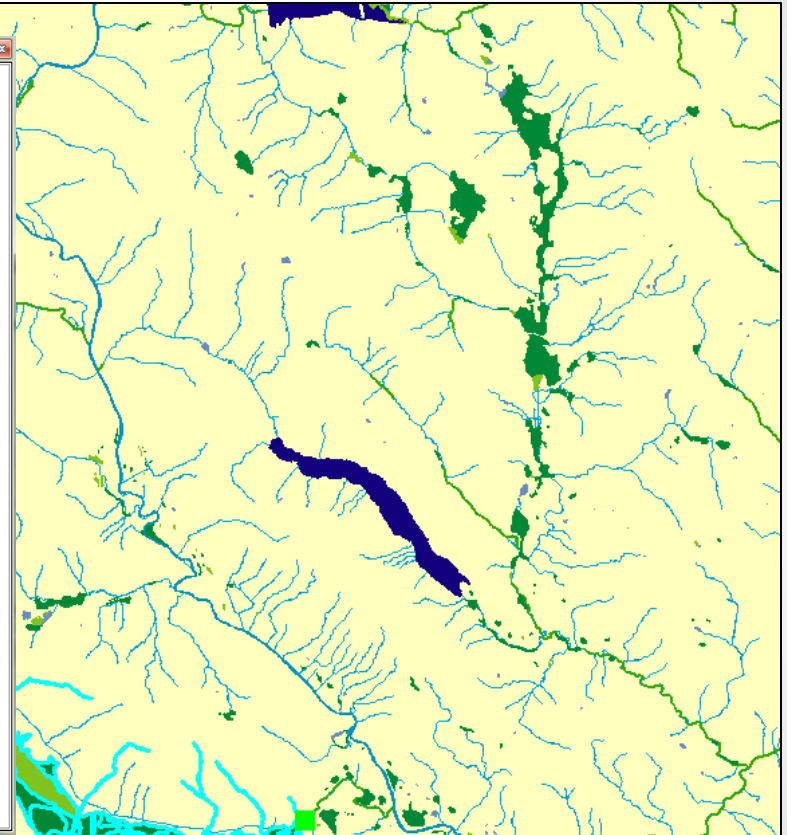
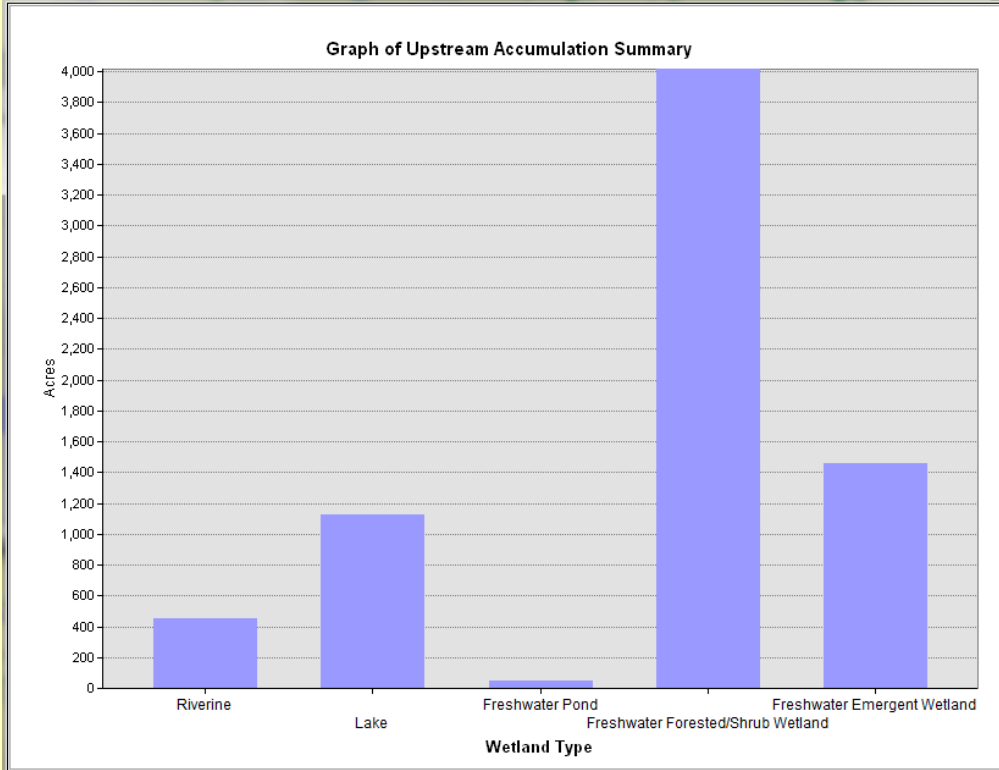
SWI – Analysis





SWI – Analysis

Graph of Upstream Accumulation Summary

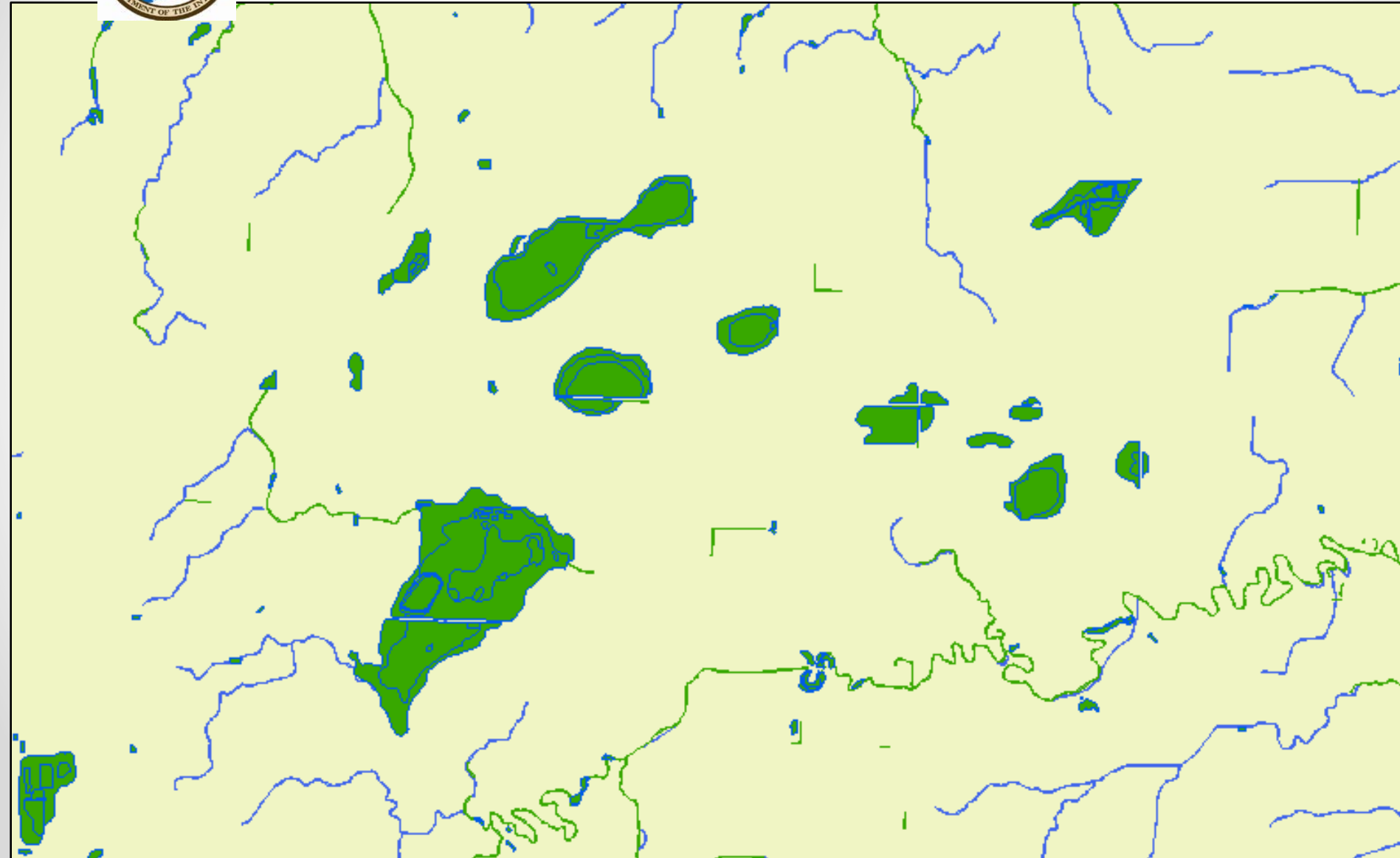


Upstream_Accumulation_Summary_Table

OBJECTID *	WETLAND_TYPE	Count_WETLAND_TYPE	Sum_ACRES
1	Freshwater Emergent Wetland	23	1455.85
2	Freshwater Forested/Shrub Wetland	146	4017.52
3	Freshwater Pond	24	45.25
4	Lake	3	1125.19
5	Riverine	251	451.05

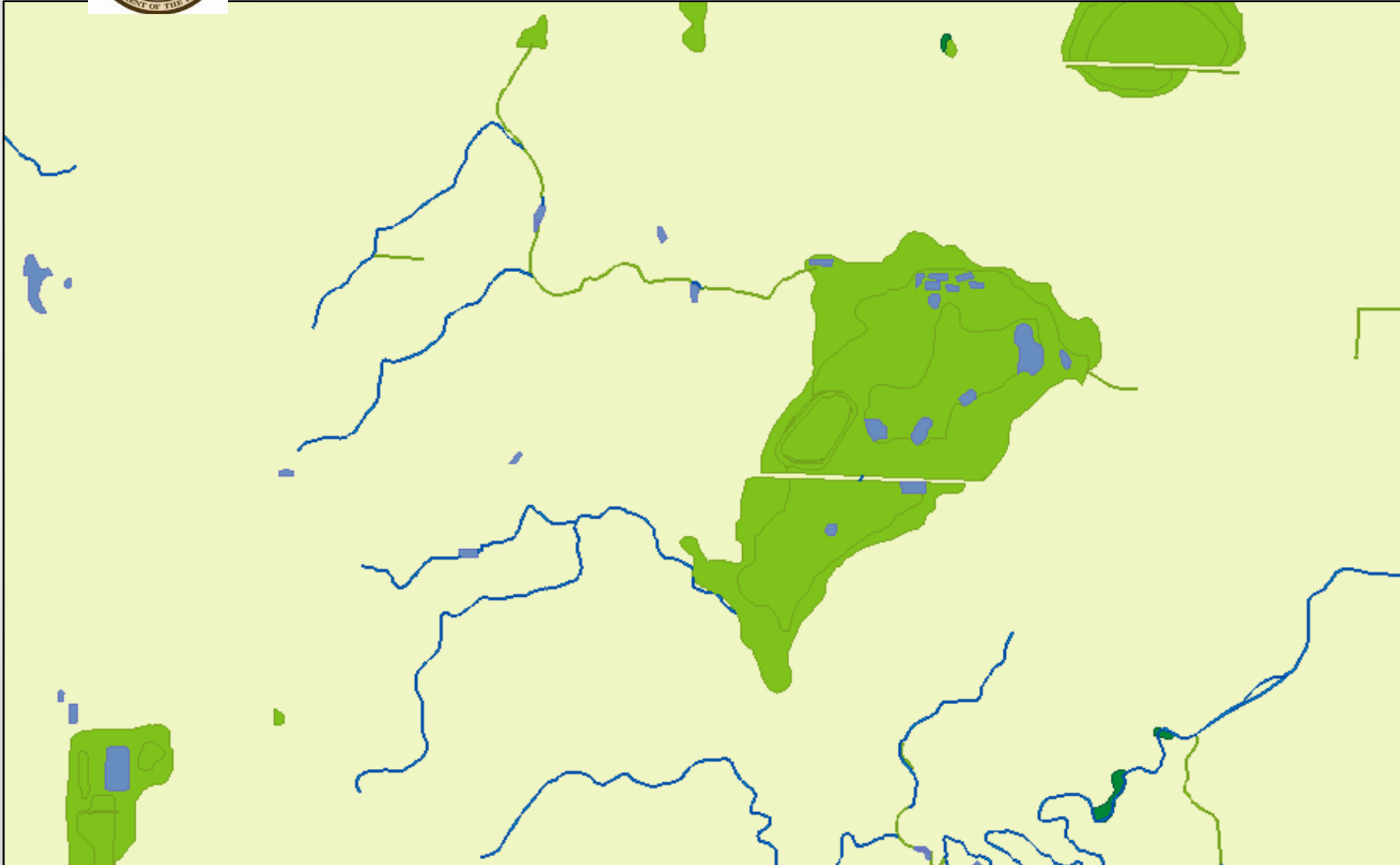


SWI – Analysis



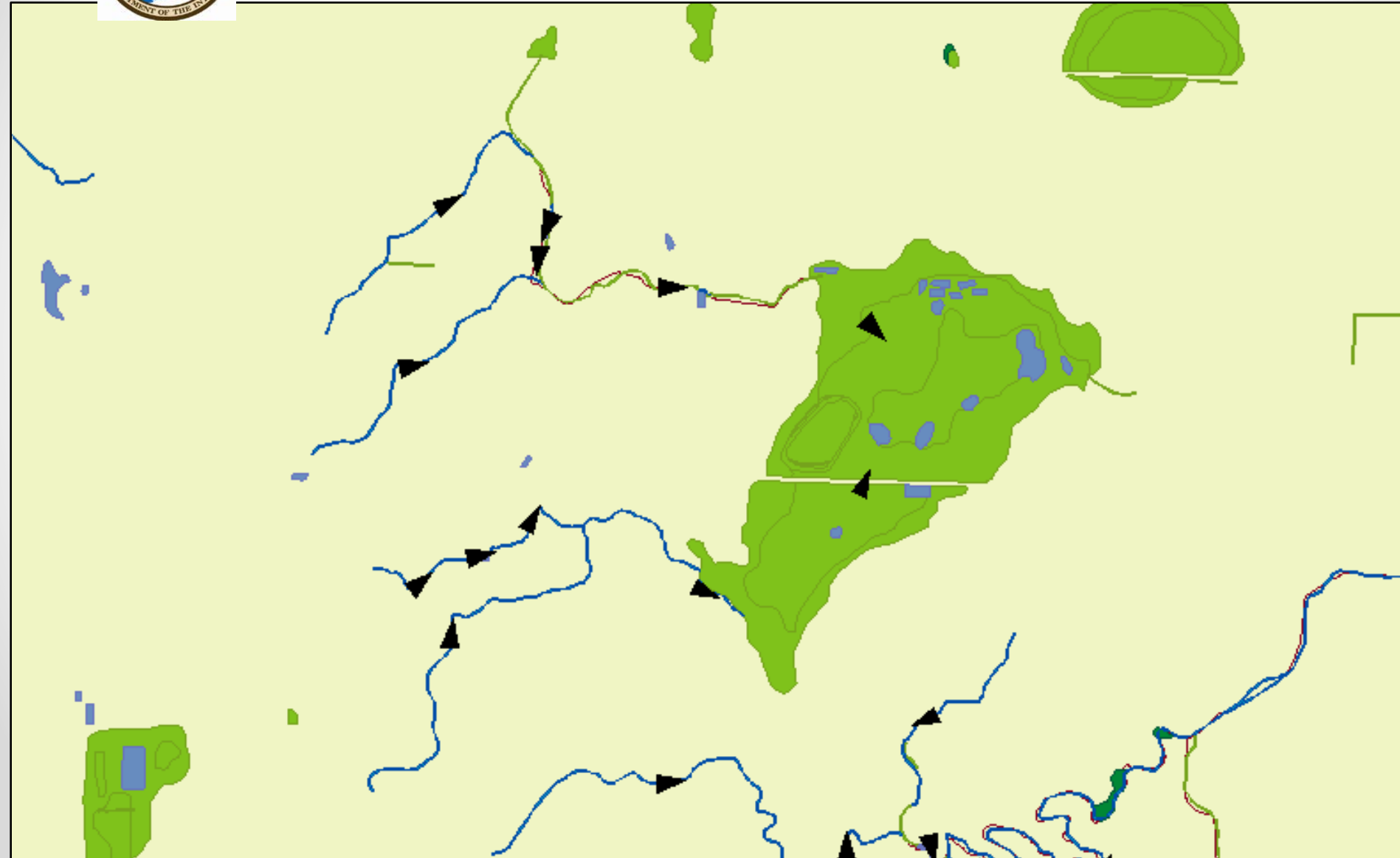


SWI – Analysis



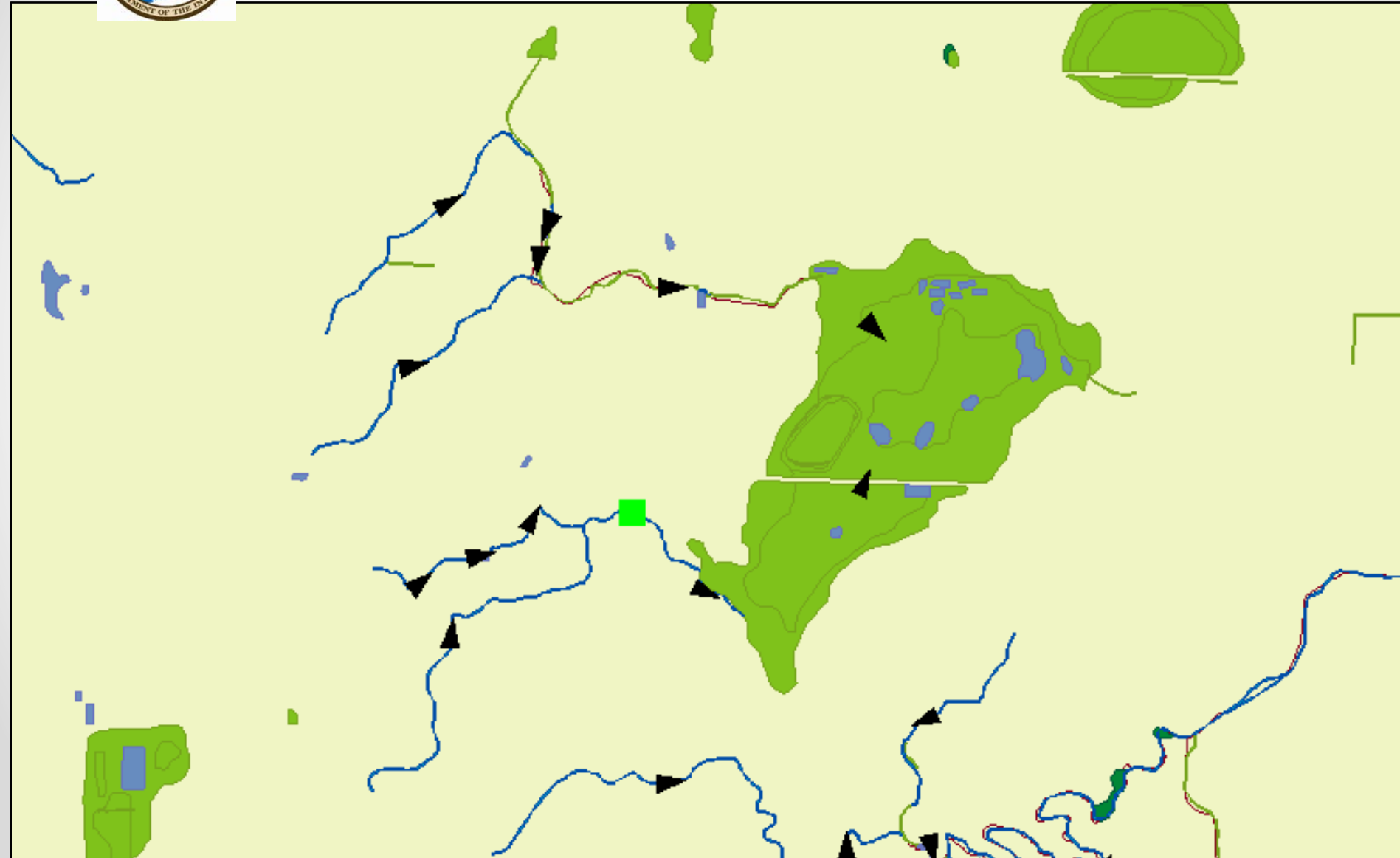


SWI – Analysis



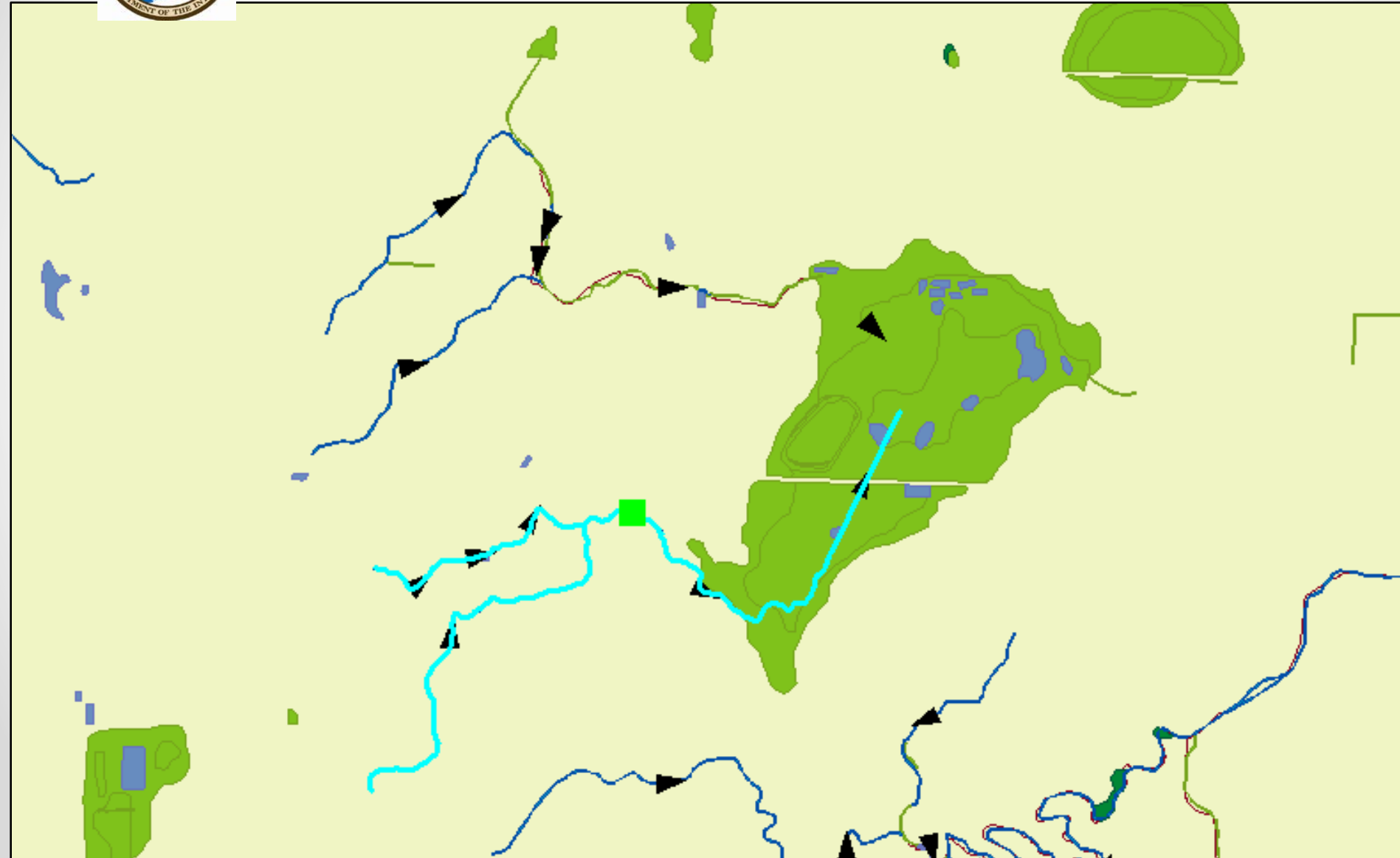


SWI – Analysis



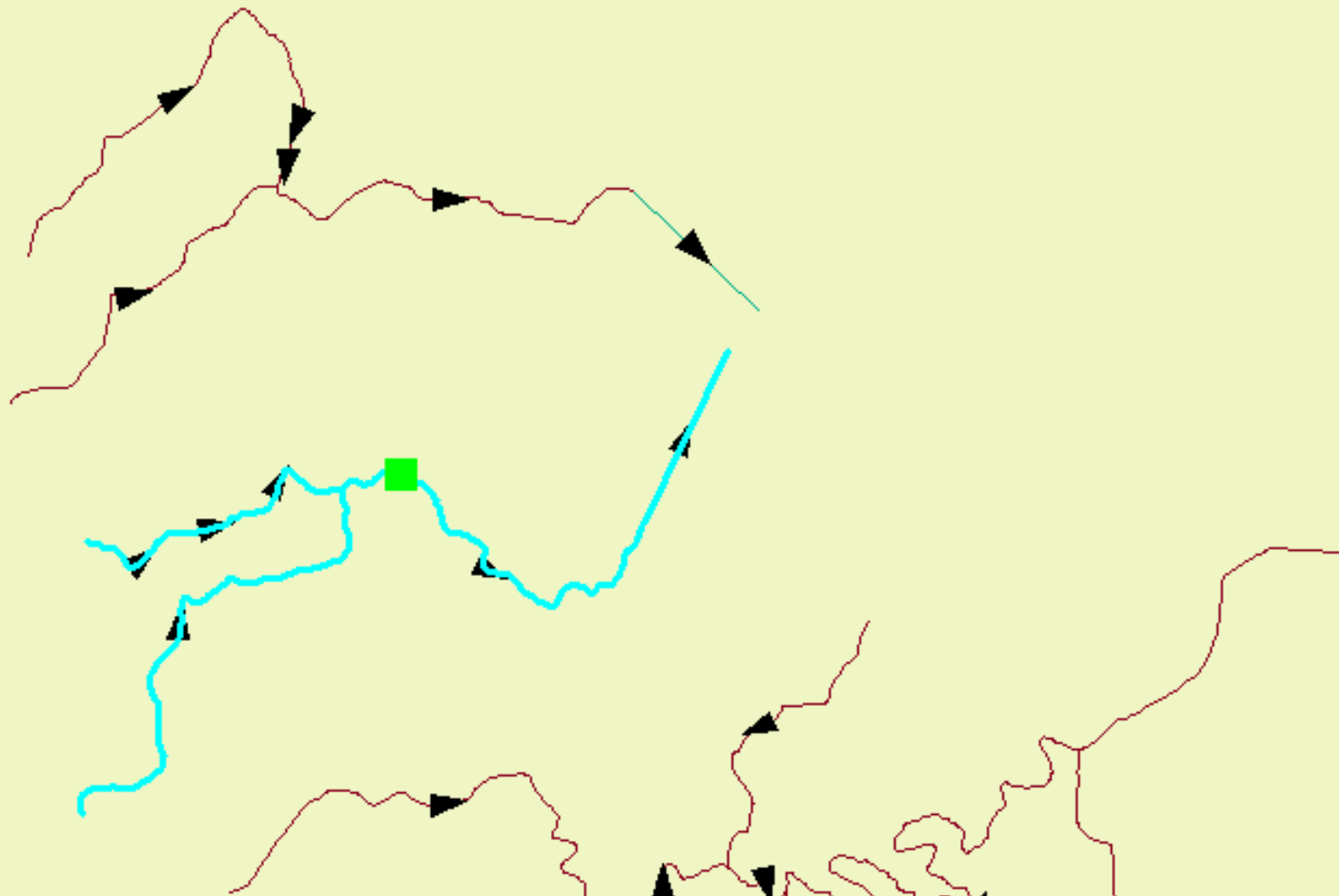


SWI – Analysis





SWI – Analysis





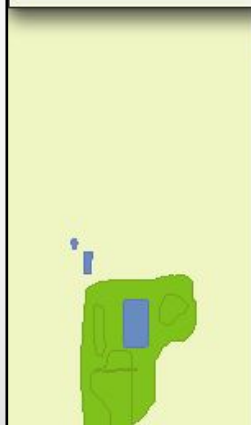
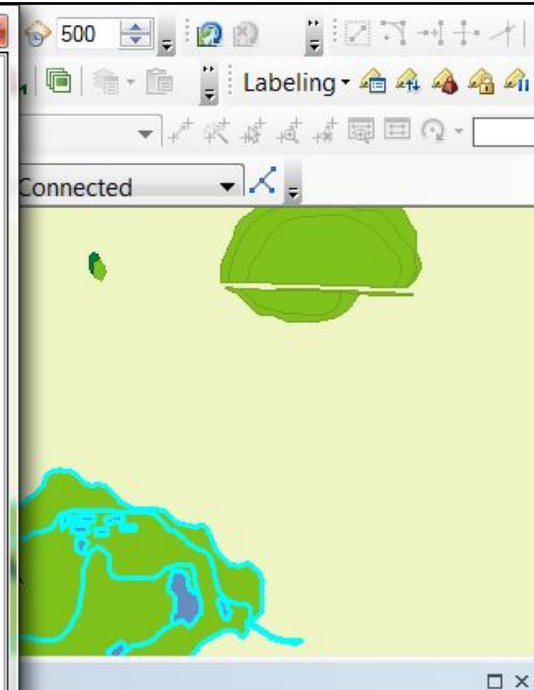
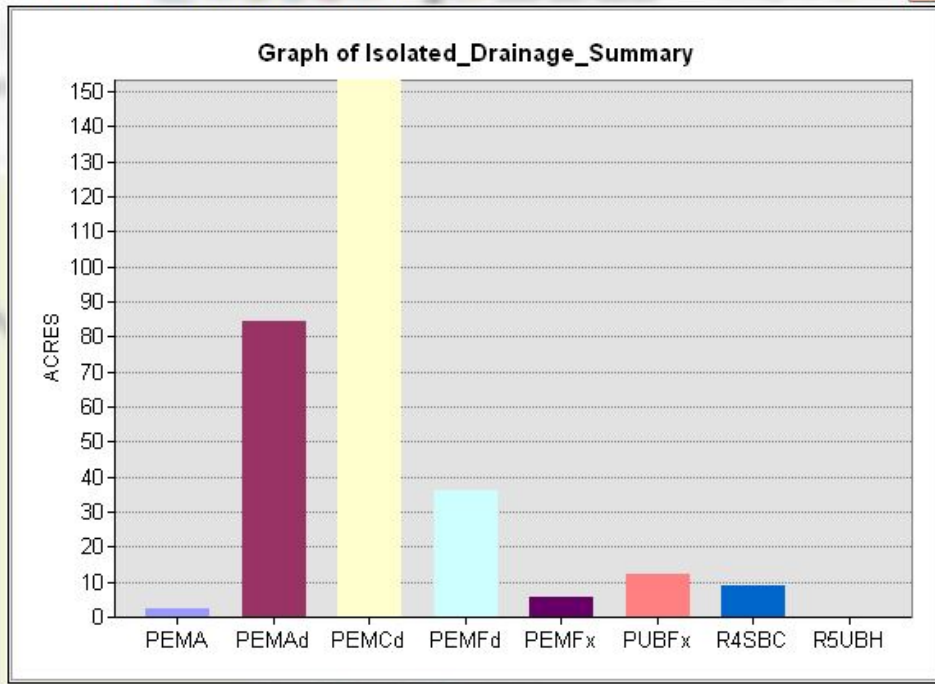
SWI – Analysis





SWI – Analysis

Graph of Isolated_Drainage_Summary



Isolated_Drainage_Summary

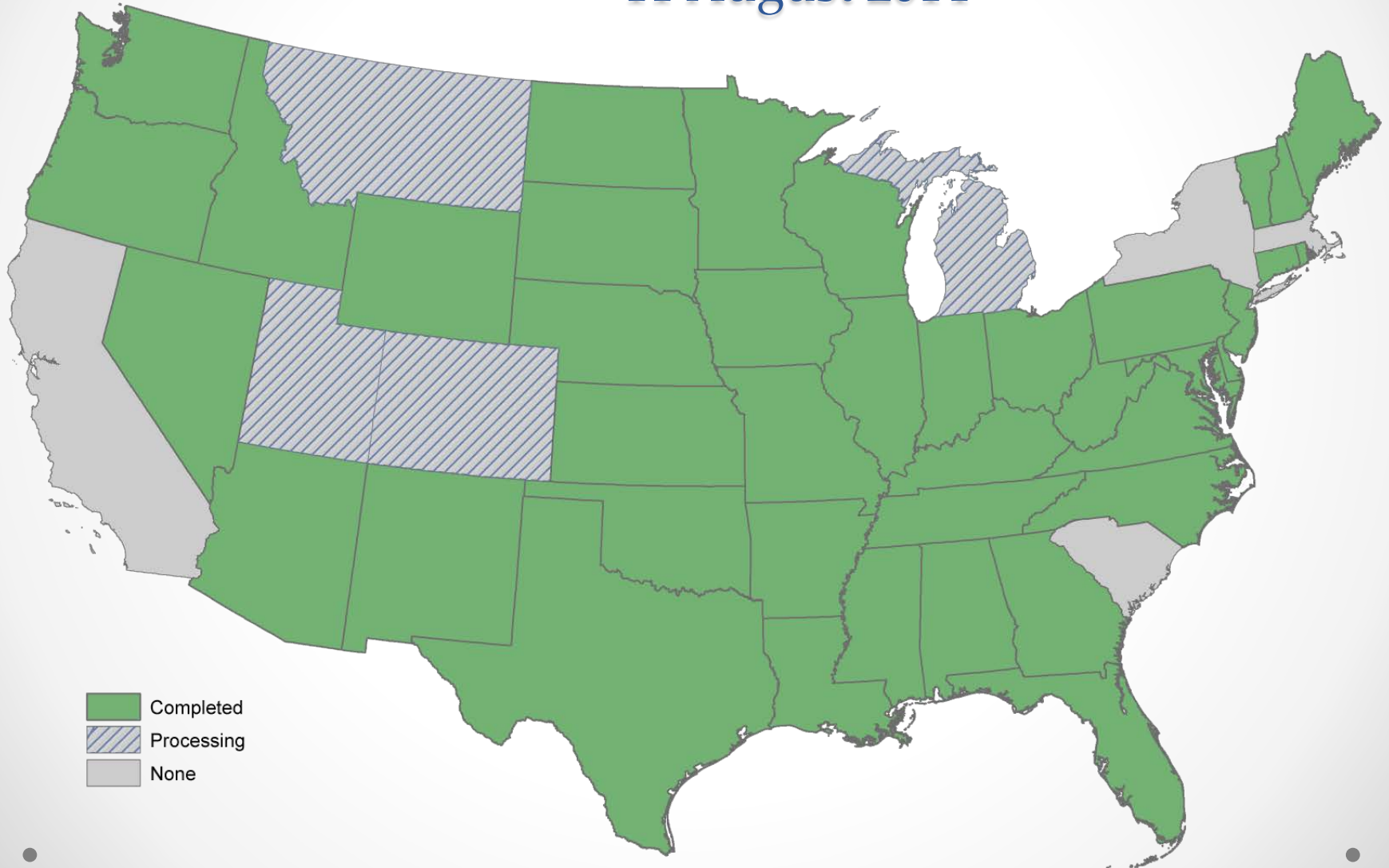
OBJECTID *	ATTRIBUTE	Count_ATTRIBUTE	First_WETLAND_TYPE	Sum_ACRES
1	PEMA	2	Freshwater Emergent Wetland	2.42375
2	PEMAd	4	Freshwater Emergent Wetland	84.552348
3	PEMCd	7	Freshwater Emergent Wetland	153.319953
4	PEMFd	1	Freshwater Emergent Wetland	35.951896
5	PEMFx	4	Freshwater Emergent Wetland	5.709311
6	PUBFx	17	Freshwater Pond	12.278523
7	R4SBC	8	Riverine	8.961775
8	R5UBH	3	Riverine	0.071774

Isolated_Drainage_Summary (0 out of 8 Selected)



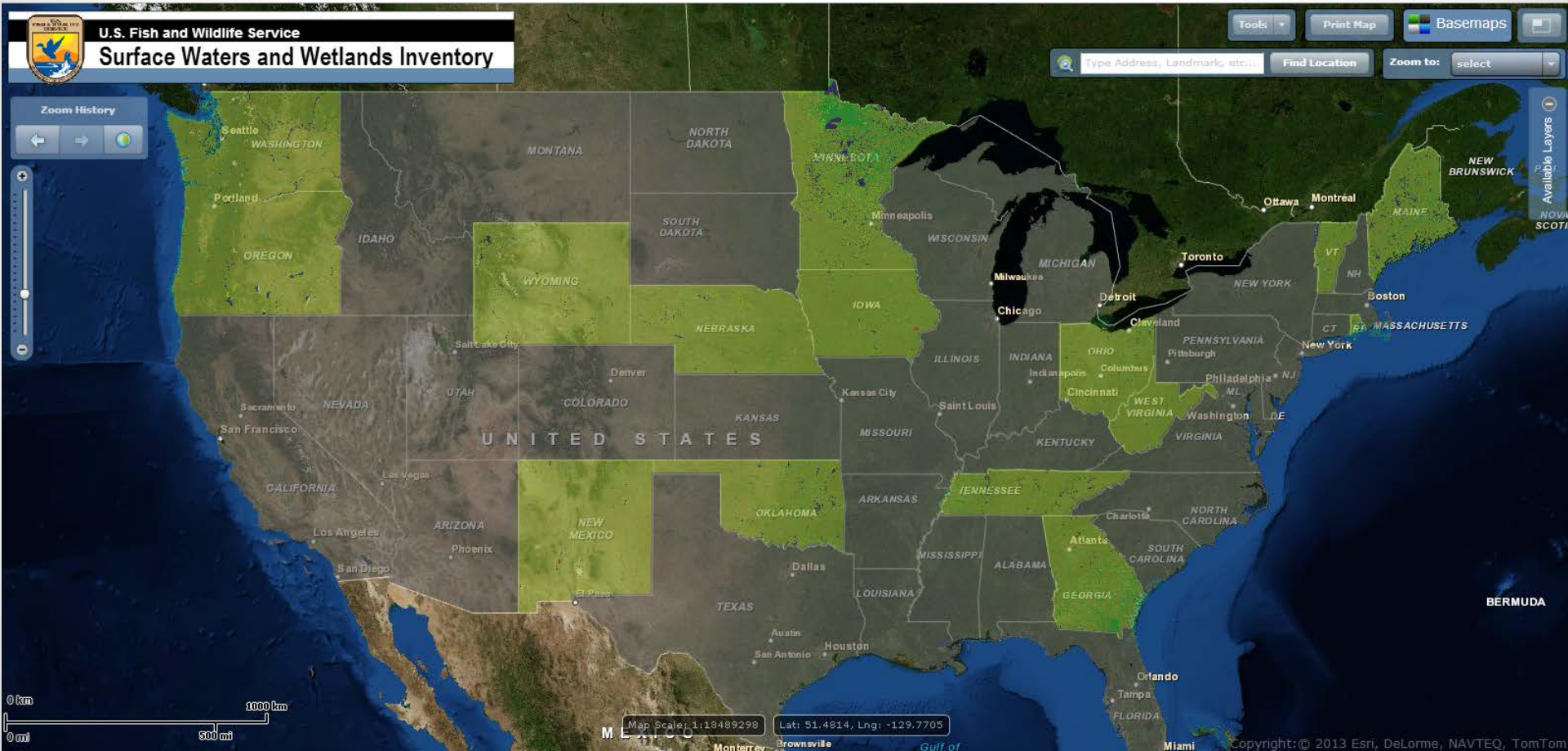
SWI – Status

11 August 2014





Surface Waters and Wetlands Inventory - Mapper



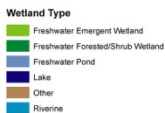
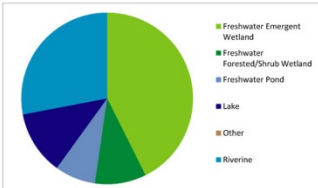
<http://www.fws.gov/wetlands/Data/SWI-Product-Summary.html>



The SWI dataset is a more comprehensive characterization of all surface water features on the landscape. It stems from the need to represent all surface waters and wetlands as polygons in a geospatial dataset to facilitate accurate area calculations and provide consistent, standardized ecological classification to allow for adaptive management, geospatial summaries, and modeling. The SWI has been created by reclassifying the wetland and deepwater polygons that comprise the NWI digital wetlands spatial data layer. The water bodies, already contained within the NWI data and classified as deepwater habitats using the Cowardin et al. (1979) nomenclature, are retained as they provided ecological descriptors of habitat types. These wetland and deepwater features have been supplemented by reclassifying any linear wetland or surface water features that were obtained from the original NWI hard copy maps and converting them to narrow polygonal features. The NWI wetland classification attribute is retained for these narrow features. Additionally, the data are supplemented with hydrography data as a secondary source for any single-line streams. Features not mapped by the NWI and by separate segmented connections. These features are reclassified to Cowardin classification to conform to National Wetland Inventory standards and formatted to become polygonal features as described above. A geospatial modeling approach addresses geospatial dominance issues, such as water bodies traversing through wetlands, and the translation of converting NWI classifier features with unclassified hydrography data. It also updates all existing NWI classifications to current standards. The resulting dataset is a more complete depiction of surface waters and wetlands. Due in part to how wetlands were mapped in the past, coupled with improved geospatial processing techniques, the SWI dataset is a departure from the legacy NWI data in several ways. The SWI depicts all surface water and wetland features in a single database, it applies the Cowardin et al. (1979) system to provide consistent ecological descriptors intended to address wetlands and water bodies, and it imparts new and improved information about wetland extent and hydrologic connectivity. The ramifications of generating the SWI data are substantial in terms of providing a more comprehensive inventory of wetland and associated water bodies. Recognizing the difference between these two datasets has implications for past wetland data summaries and modeling that has been generated using the legacy NWI map data.

QUESTIONS?

Wetland Type	Acres	Percent of wetland area	Percent of state area
Freshwater Emergent Wetland	576,844	42.6	1.2
Freshwater Forested/Shrub Wetland	130,964	9.7	0.3
Freshwater Pond	103,773	7.7	0.2
Lake	162,499	12.0	0.3
Other	291	0.0	0.0
Riverine	377,527	28.0	0.8
Total	1,351,158		2.7



Coordinate System: NAD 1983 Albers
 Spheroid: GRS80
 Datum: GRS80
 Contour: 100000



<http://www.fws.gov/wetlands/Data/SWI-Product-Summary.html>

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