

New Uses of New Wetland Data in Cache County

Groundwater and Wetlands Program

Pete Goodwin

pgoodwin@utah.gov





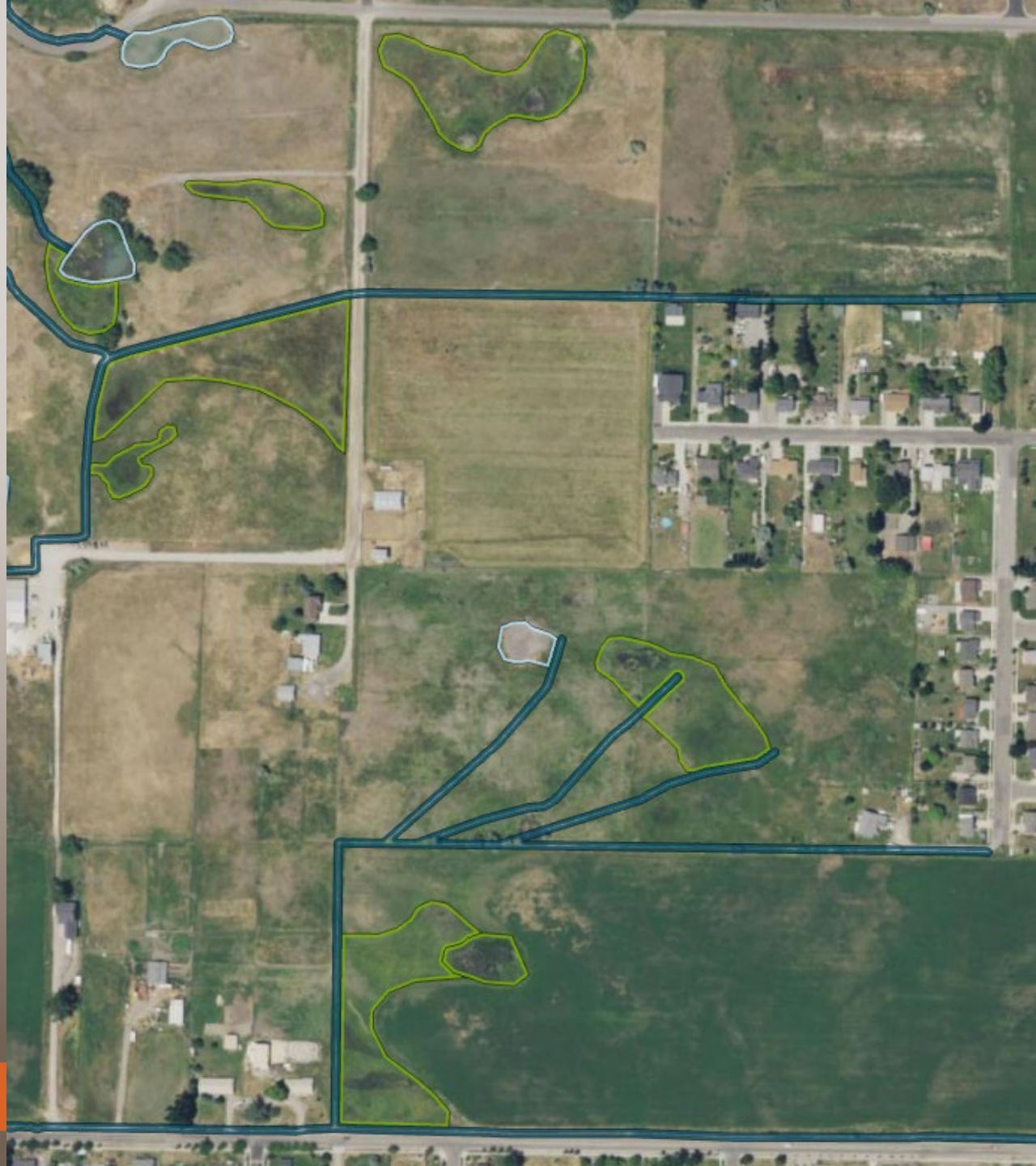
Talk Outline

- Project Overview
- Remapping Efforts
- Enhanced Attribution
- Possible Applications
- Modeled Functions



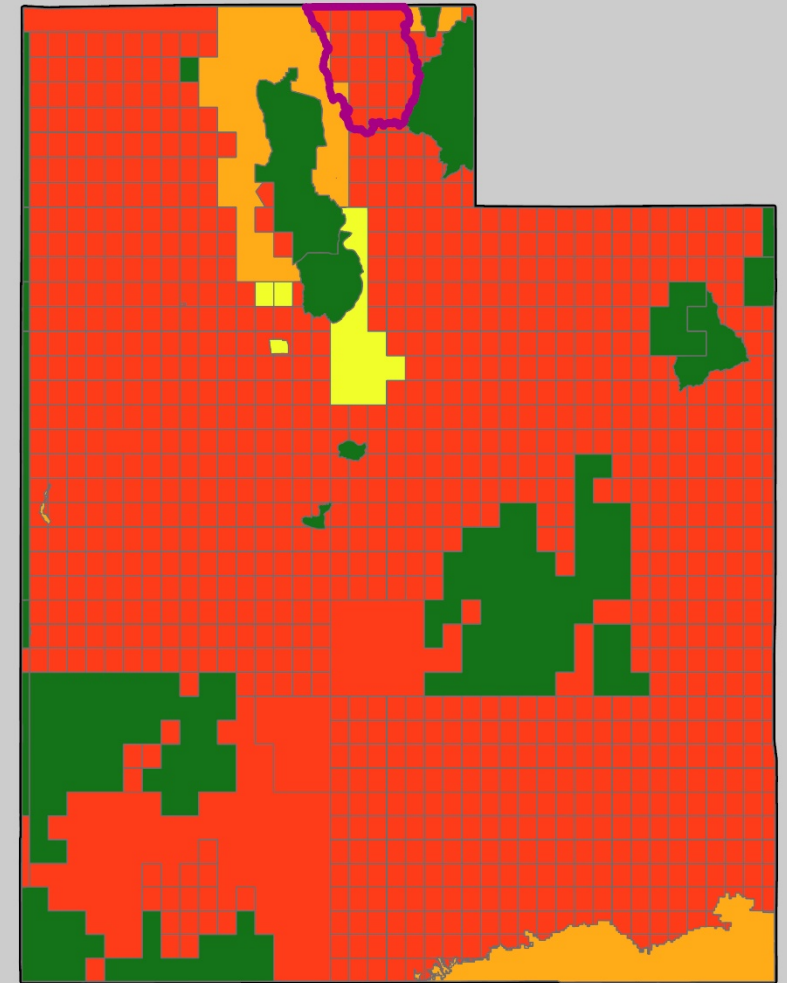
Project Overview – Background

- Need for spatial data describing location and type of wetlands
 - Development, planning, inventory, management
- National Wetland Inventory (NWI)
 - Nationwide, consistent
 - Includes rivers, ponds, lakes
 - NOT FOR DELINEATIONS!

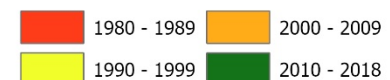


Project Overview – Background

- Need for spatial data describing location and type of wetlands
 - Development, planning, inventory, management
- National Wetland Inventory (NWI)
 - Nationwide, consistent
 - Includes rivers, ponds, lakes
 - Description issues
 - Outdated

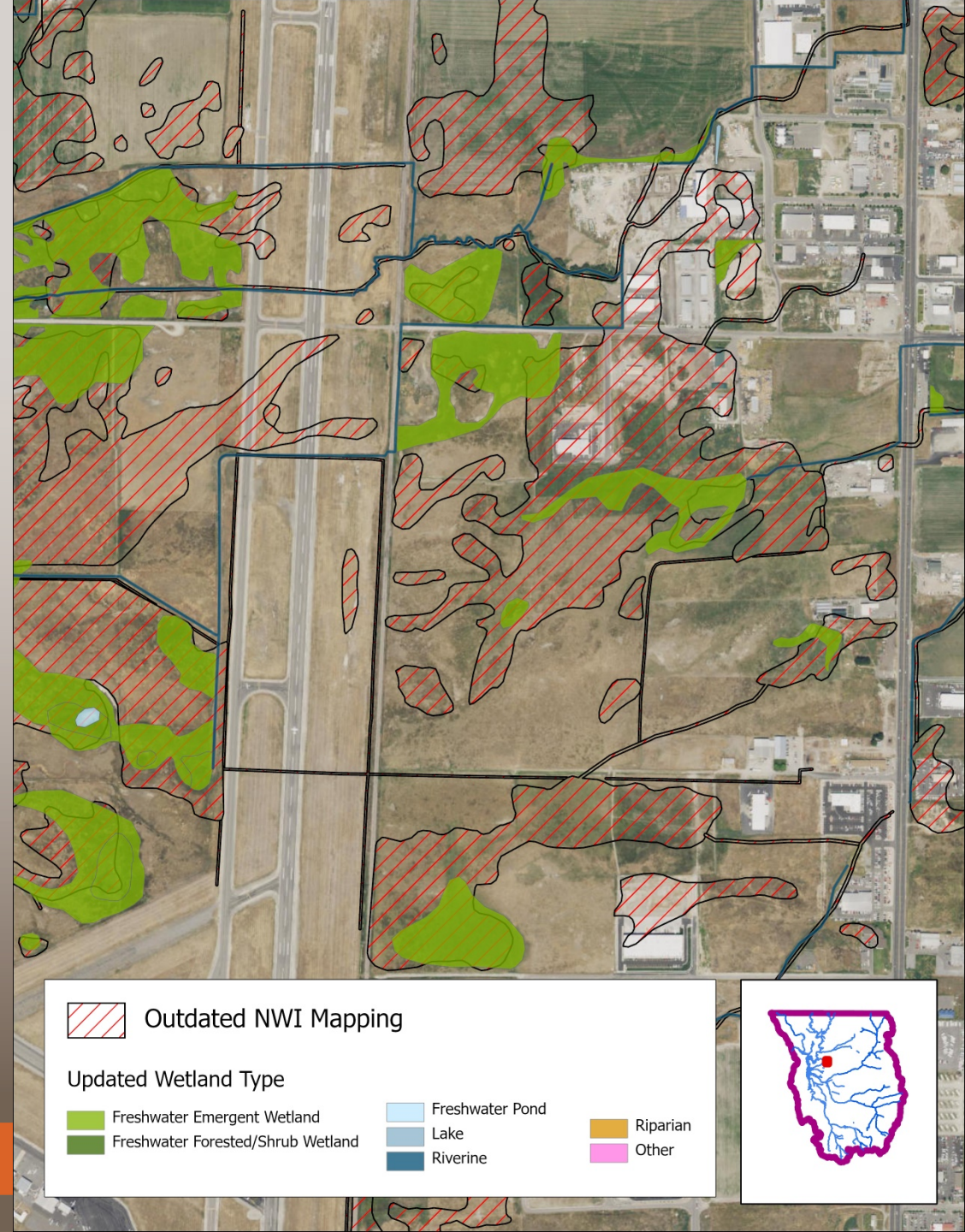


NWI Imagery Year



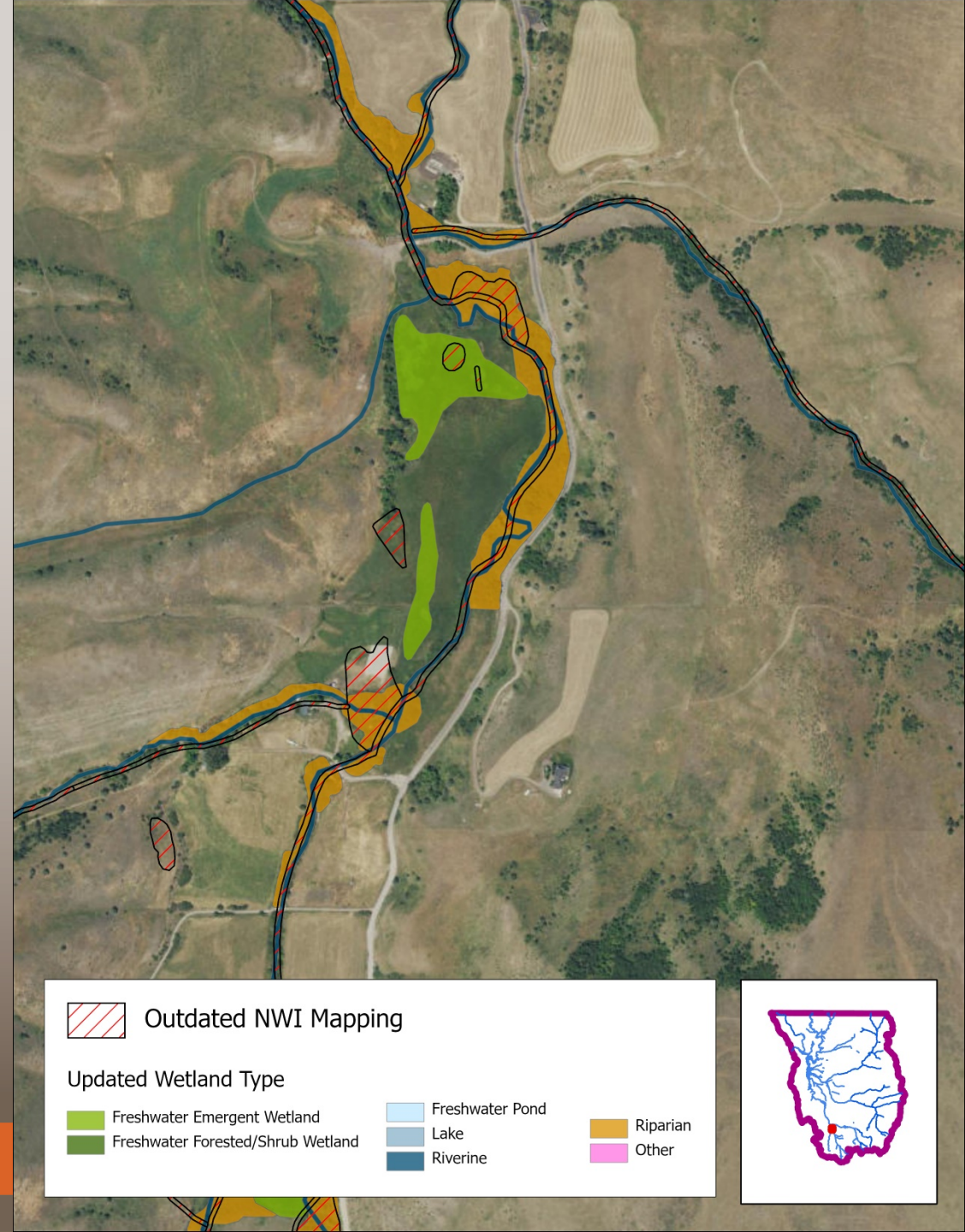
Project Overview— Goals

1. Update NWI mapping to modern imagery and standards
 - Account for development
 - Wetland change or loss
 - Identify and map smaller features



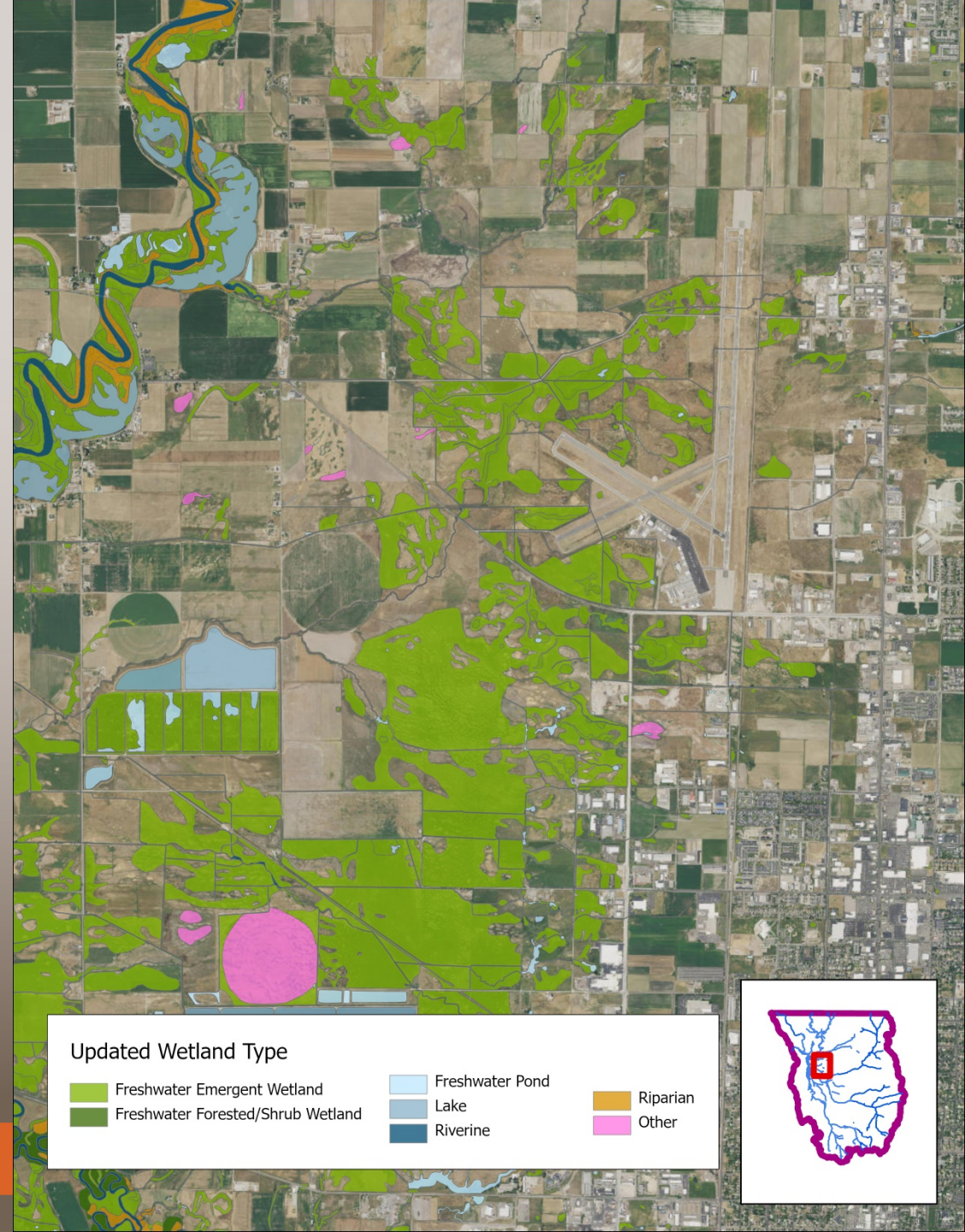
Project Overview— Goals

1. Update NWI mapping to modern imagery and standards
2. Map riparian areas
 - Increasingly important for floodplain management and conservation planning
 - Address data gap
 - Riparian: Areas connected to streams or waterbodies that are distinct from surrounding uplands but not mappable as wetlands



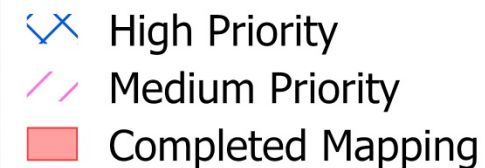
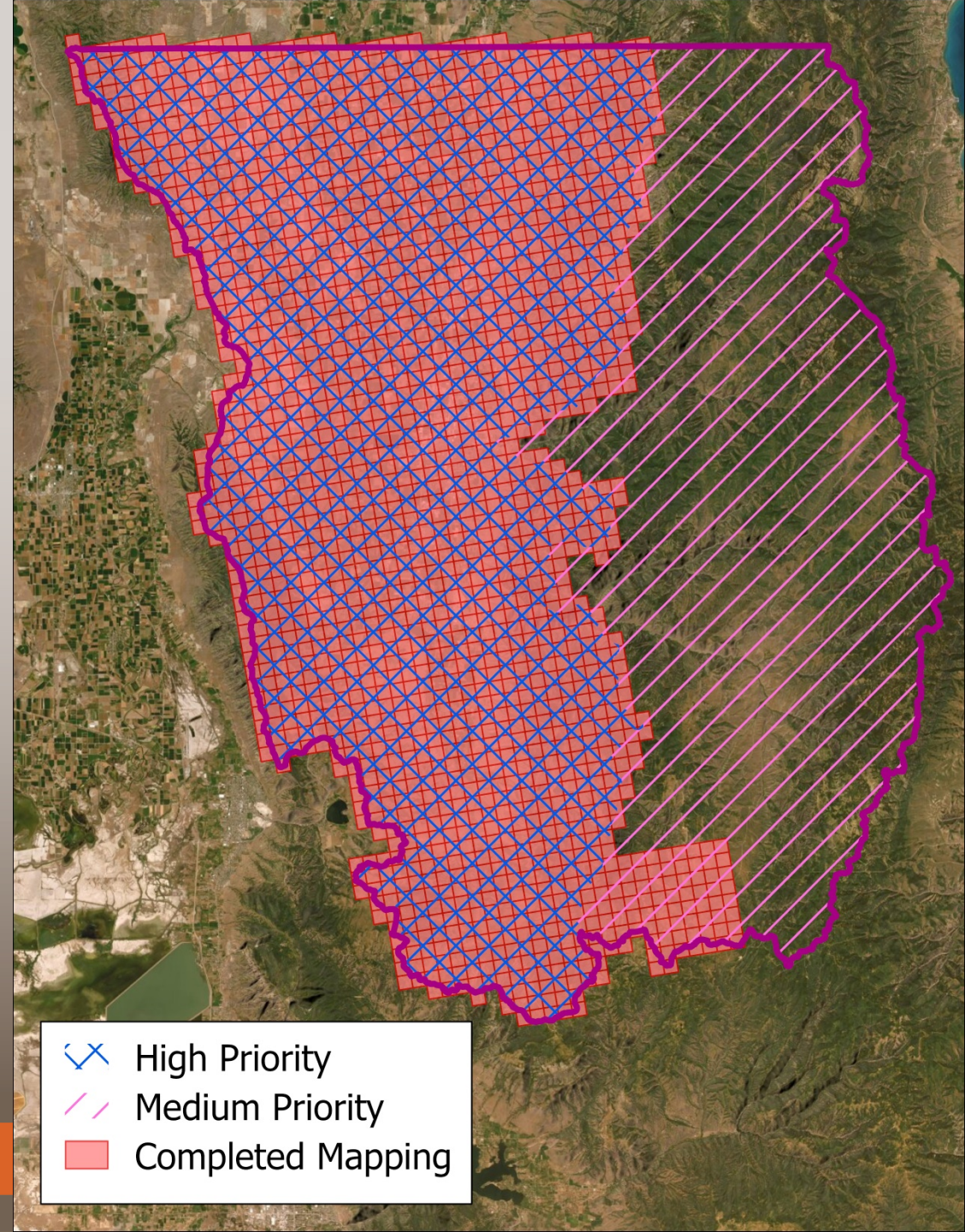
Project Overview— Goals

1. Update NWI mapping to modern imagery and standards
2. Map riparian areas
3. Enhance wetland descriptions
 - NWI broadly describes wetland types
 - Misses distinctions like:
 - Groundwater vs irrigation
 - Slope vs basin
 - Floodplain vs isolated
 - Needed to assess and map wetland functions



Remapping Effort

- Started in 2019
- Split into priority areas based on watersheds
 - High: Valley areas with dense wetland or high conflict
 - Moderate: Montane areas with less wetlands or conflict
- 10,000+ hand drawn polygons
 - Lydia Keenan, Rebecca Lee, Elisabeth Stimmel
- Mapping to be released in Spring 2022
- UGS Utah Wetlands
 - <https://geology.utah.gov/apps/wetlands/index.html>
- USFWS Wetlands Mapper
 - <https://www.fws.gov/wetlands/data/mapper.html>





Remapping Effort

Wetland Type	Outdated NWI		Updated NWI	
	Acres	Features	Acres	Features
Freshwater Emergent Wetland	21,391	3,142	22,115	3,900
Freshwater Forested/Shrub Wetland	2,967	572	774	362
Lake	8,711	95	8,447	44
Freshwater Pond	2,599	1,036	2,394	1,313
Riverine	7,390	2,097	8,964	1,478
Riparian	-	-	8,104	1,873
Other	0	0	671	90
Total	43,057	6,942	51,470	9,060





Remapping Effort

Wetland Type	Outdated NWI		Updated NWI	
	Acres	Features	Acres	Features
Freshwater Emergent Wetland	21,391	3,142	22,115	3,900
Freshwater Forested/Shrub Wetland	2,967	572	774	362
Lake	8,711	95	8,447	44
Freshwater Pond	2,599	1,036	2,394	1,313
Riverine	7,390	2,097	8,964	1,478
Riparian	-	-	8,104	1,873
Other	0	0	671	90
Total	43,057	6,942	51,470	9,060

- Overall- update maps more wetlands



Remapping Effort

Wetland Type	Outdated NWI		Updated NWI	
	Acres	Features	Acres	Features
Freshwater Emergent Wetland	21,391	3,142	22,115	3,900
Freshwater Forested/Shrub Wetland	2,967	572	774	362
Lake	8,711	95	8,447	44
Freshwater Pond	2,599	1,036	2,394	1,313
Riverine	7,390	2,097	8,964	1,478
Riparian	-	-	8,104	1,873
Other	0	0	671	90
Total	43,057	6,942	51,470	9,060

- Overall- update maps more wetlands
- Decrease in Forested/Shrub wetlands
 - Likely due to mapping most of these areas as Riparian features



Remapping Effort

Wetland Type	Outdated NWI		Updated NWI	
	Acres	Features	Acres	Features
Freshwater Emergent Wetland	21,391	3,142	22,115	3,900
Freshwater Forested/Shrub Wetland	2,967	572	774	362
Lake	8,711	95	8,447	44
Freshwater Pond	2,599	1,036	2,394	1,313
Riverine	7,390	2,097	8,964	1,478
Riparian	-	-	8,104	1,873
Other	0	0	671	90
Total	43,057	6,942	51,470	9,060

- Overall- update maps more wetlands
- Decrease in Forested/Shrub wetlands
- Increase in Emergent Wetlands
 - 3% increase in acreage, 24% increase in number of features -- Update identifies smaller, isolated features



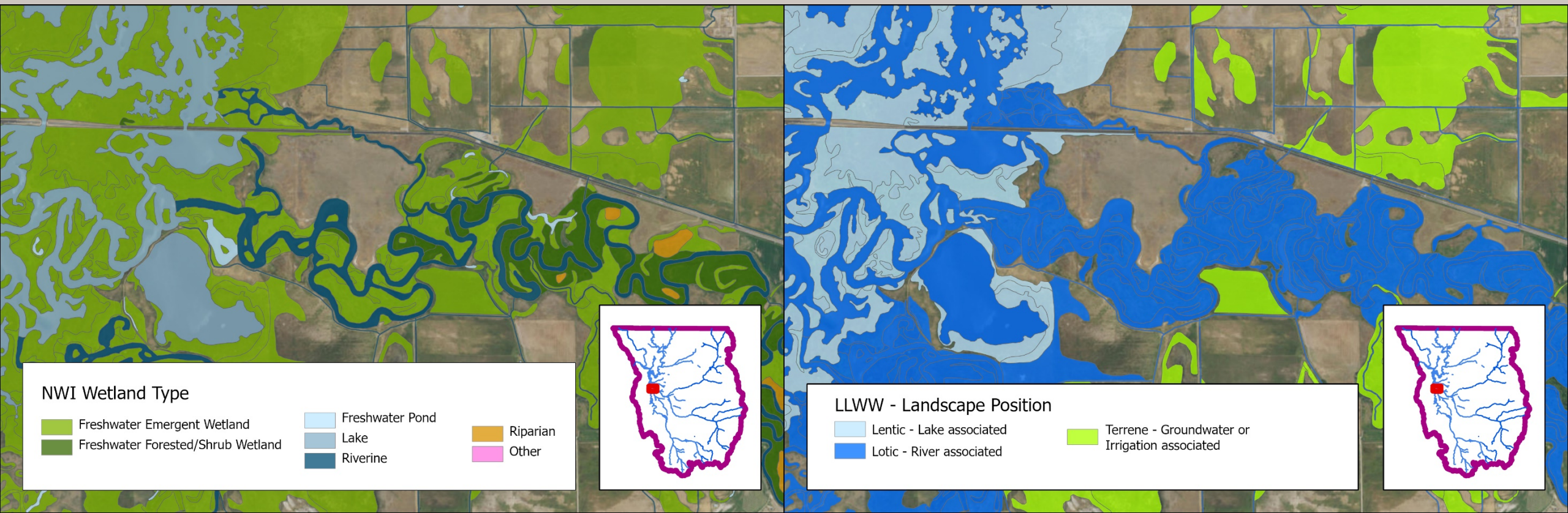


Enhanced Attribution

- NWI describes wetlands with the Cowardin System
 - Evaluates three characteristics
 1. Dominant vegetation
 2. Duration of flooding
 3. Eight modifiers to describe human impacts
 - Accurate mapping from aerial imagery
 - Misses other key characteristics that dictate wetland function
- Applied LLWW attributes to provide additional descriptions
 - LLWW: Landscape Position, Landform, Waterbody, Water Flowpath
 - Developed by Tiner (USFWS 2008) and modified for the Western US by CNHP and others (CNHP 2018)
 - Considers different characteristics
 1. Geomorphic setting
 2. Wetland type and shape
 3. Surface water connection and flow direction
 4. 54 modifiers to further describe hydrology, wetland type, human impacts
 - Same blobs, different codes

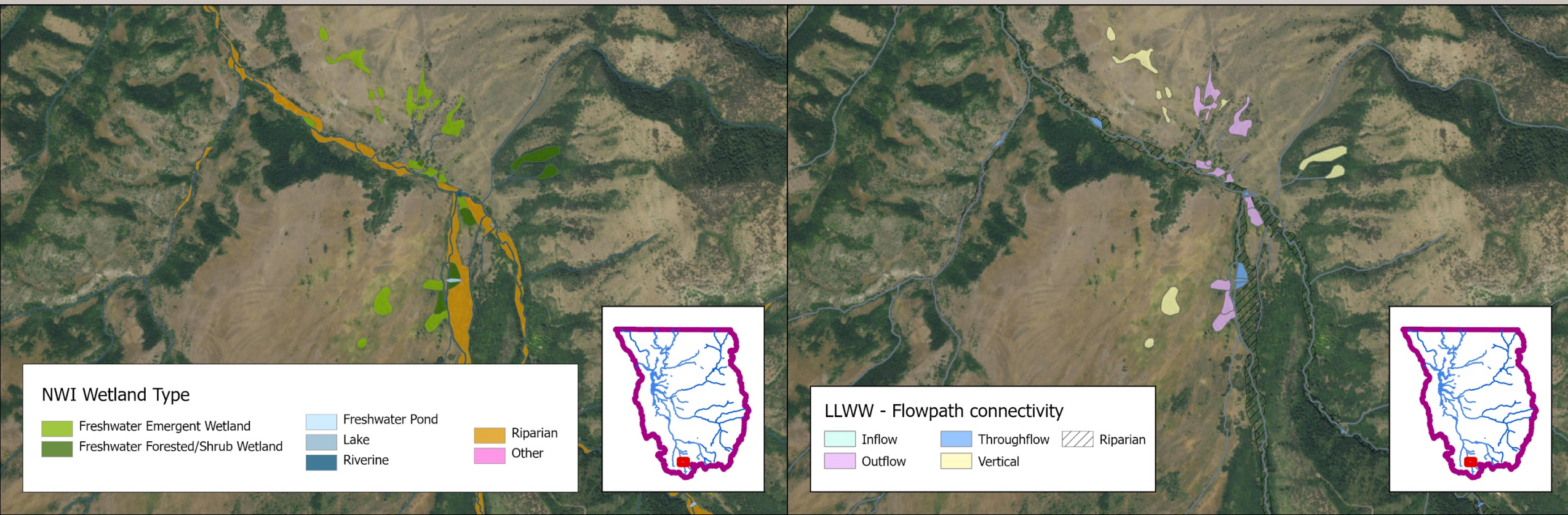
Landscape Position

- Geomorphic setting
- Logan River and Cutler Reservoir Confluence
 - Complicated area with wetlands affected by lake level changes, river flooding, and groundwater and irrigation
 - Easily separated in LLWW
- LLWW quirk considers Cutler Reservoir itself a lotic feature



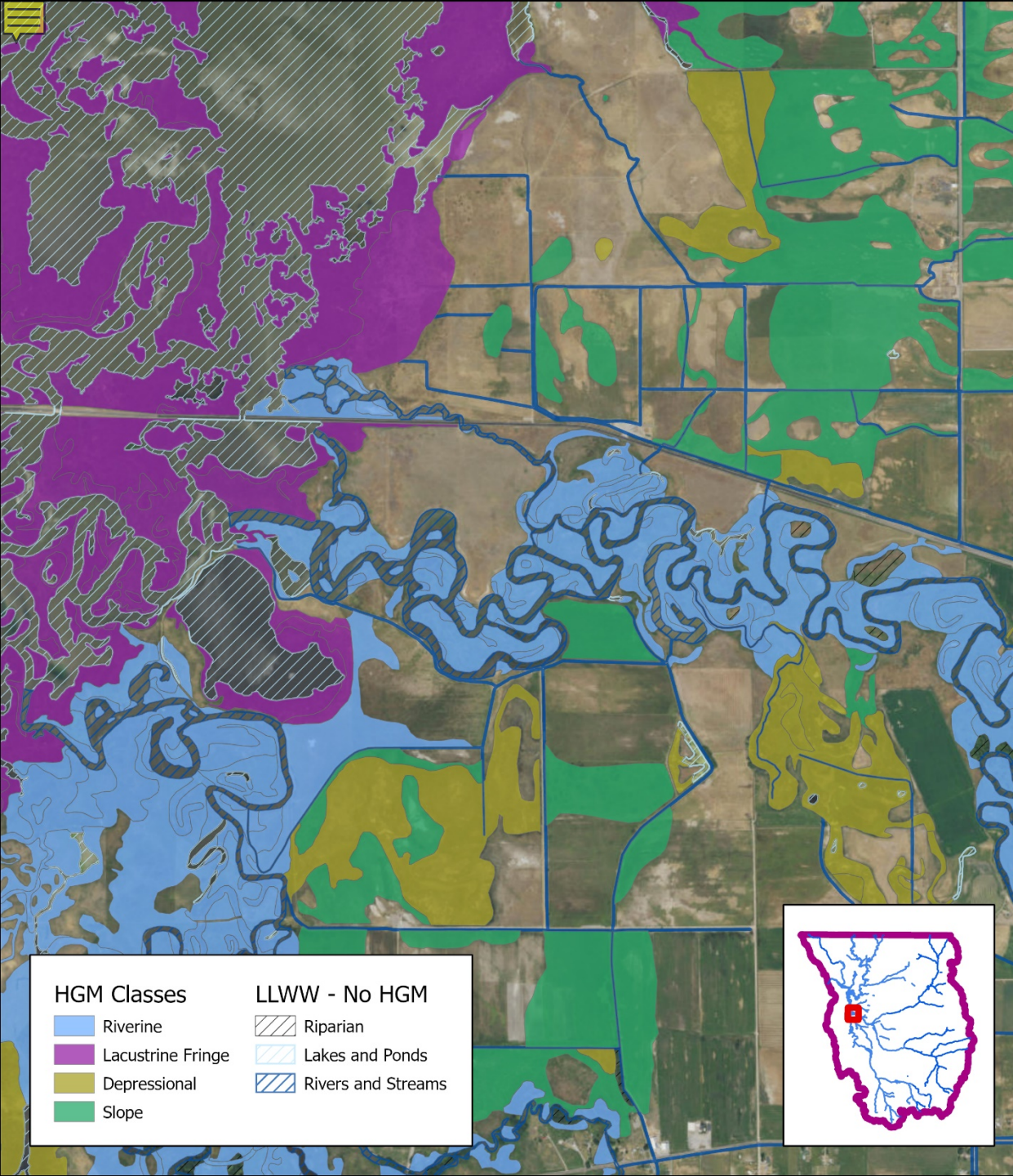
Water Flowpath

- Connection to surface water and flow direction
- Davenport Creek with springs
- Identifies
 - Isolated wetlands
 - Overbank Flooding
 - Discharge areas
- LLWW not applied to riparian areas



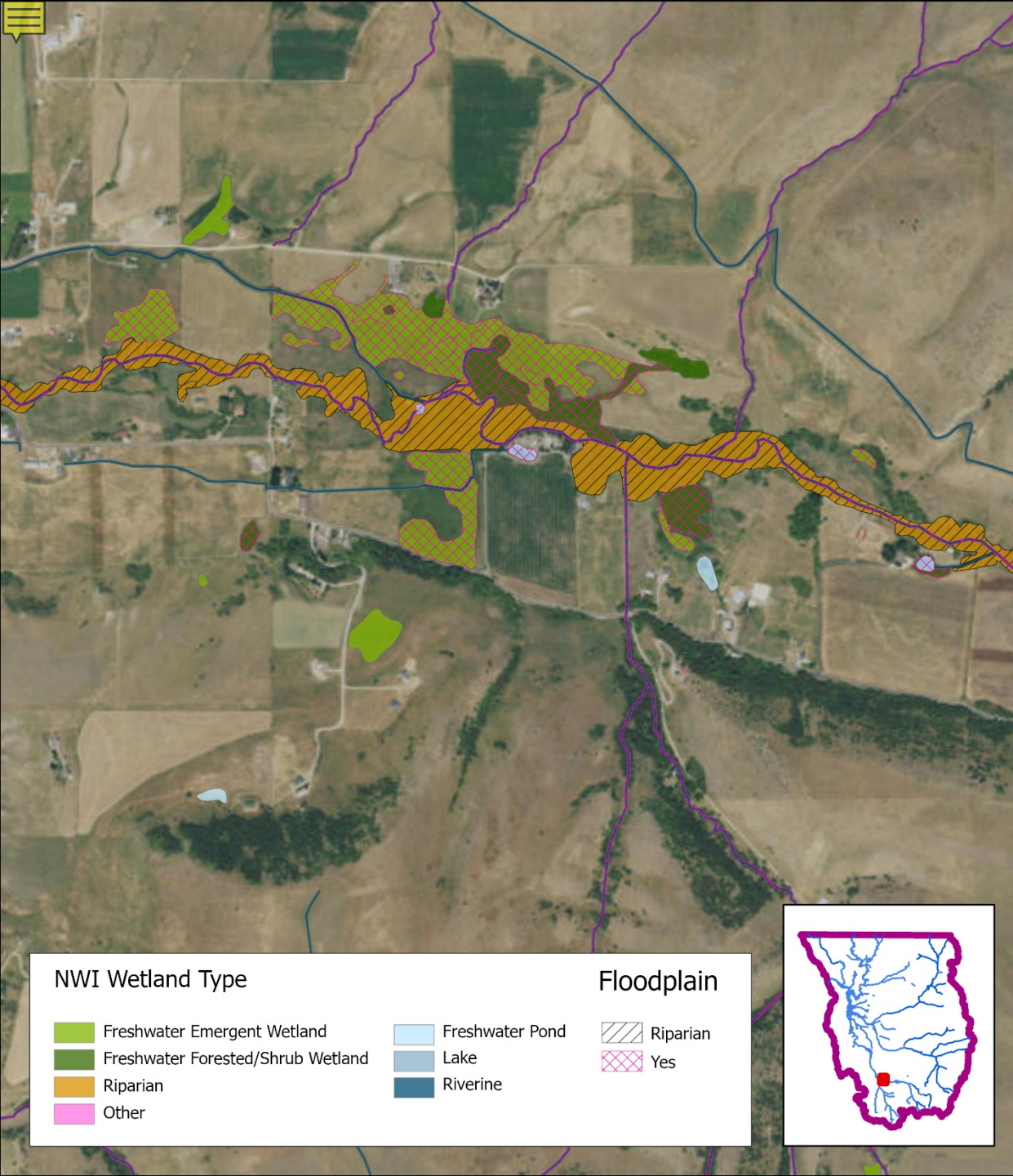
Possible Applications – HGM Classes

- Hydrogeomorphic Classes (HGM)
 - Basis for the functional assessments used by the Army Corps of Engineers for mitigation
 - Riverine
 - Lacustrine Fringe
 - Depressional
 - Slope
 - Mineral Flats
 - Organic Flats
- Directly crosswalked to LLWW attributes



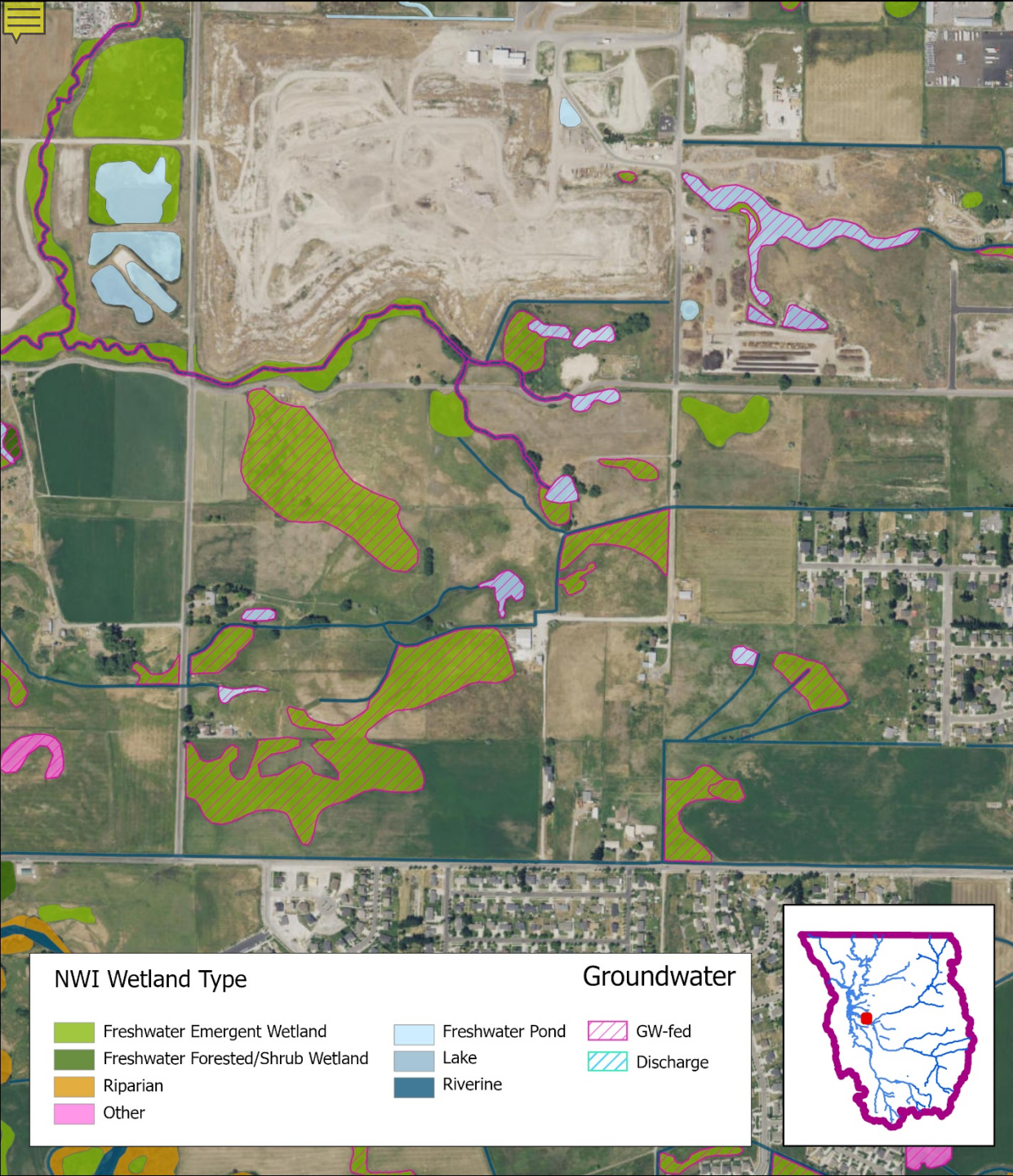
Possible Applications – Floodplain?

- Floodplain wetlands perform several valuable functions
 - Filter sediments
 - Detain floodwaters
 - Provide habitat
- Interest in management and protection
- LLWW attribution evaluates wetland location
- Floodplain identified in the LLWW attributes



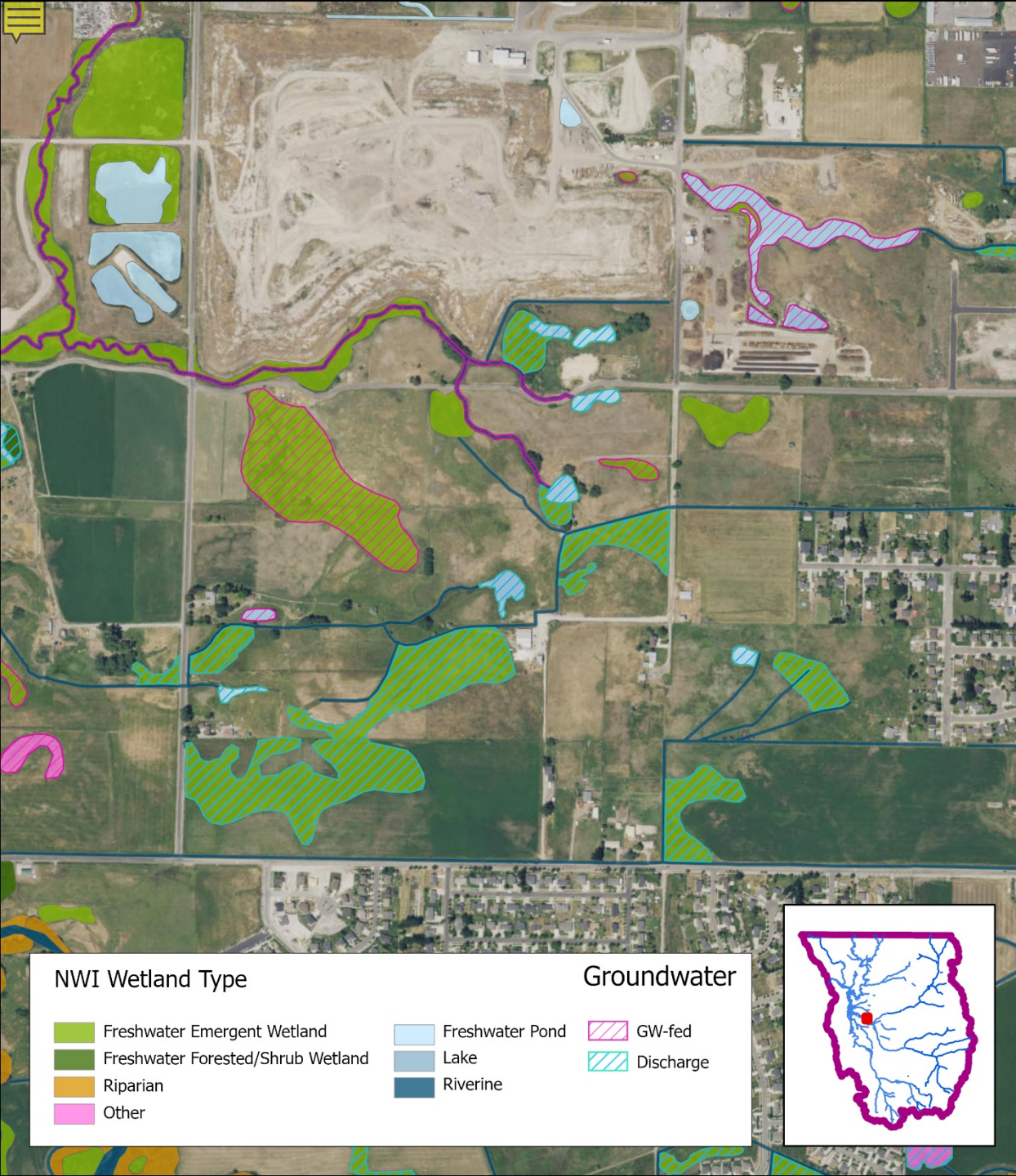
Possible Applications – Groundwater Fed

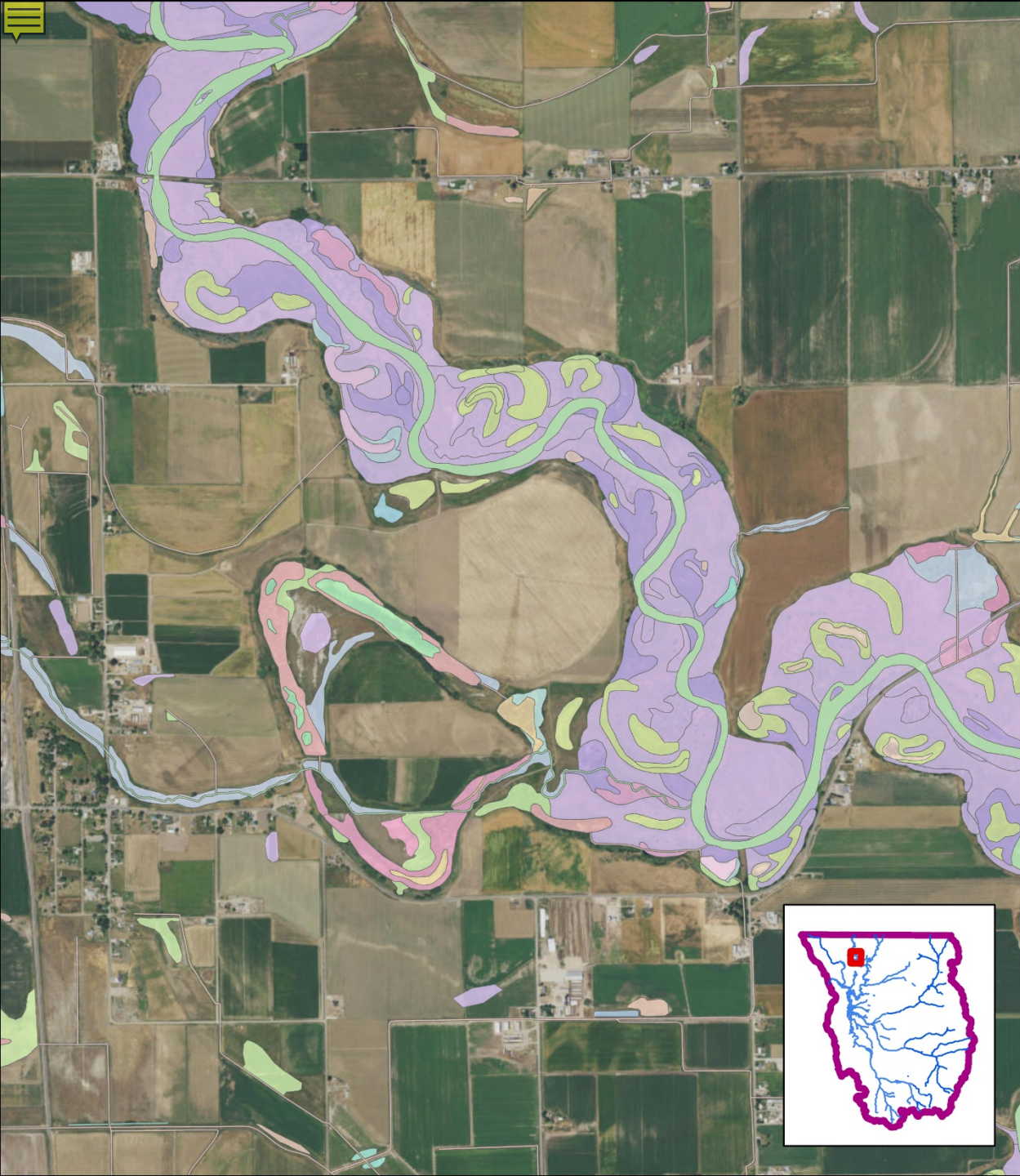
- LLWW attribution involves modifiers to describe the water source
 - Groundwater fed
 - Spring fed
 - Snow and rain
 - Rainfall
 - Irrigation
 - Artificial Flow
- Possible to identify groundwater and spring-fed wetlands



Possible Applications – Groundwater Fed

- LLWW attribution involves modifiers to describe the water source
 - Groundwater fed
 - Spring fed
 - Snow and rain
 - Rainfall
 - Irrigation
 - Artificial Flow
- Possible to identify groundwater and spring-fed wetlands
- Also possible to identify wetlands that discharge to streams or canals



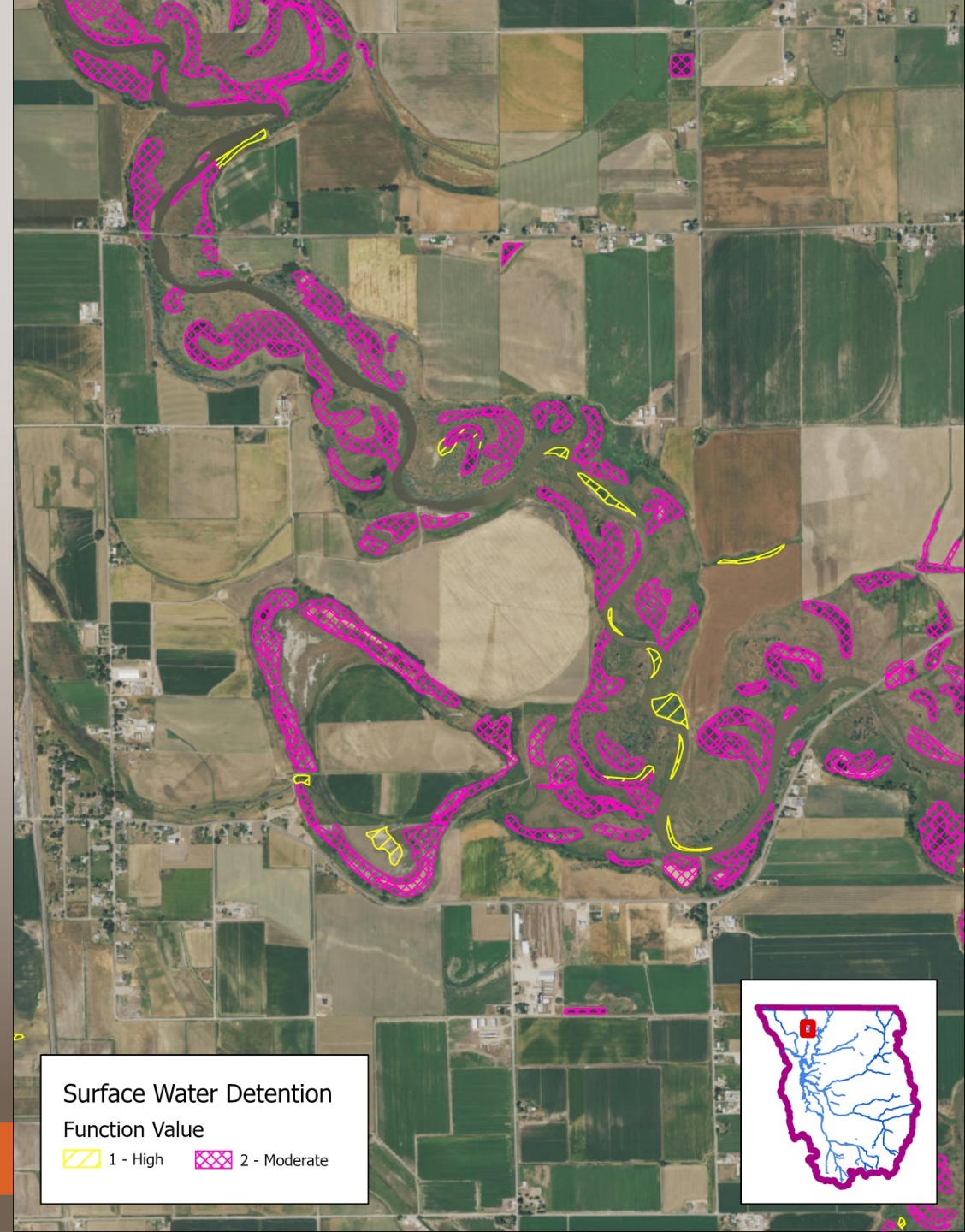


Possible Applications – Others?

- LLWW attribution greatly expands the wetland mapping applications
 - Which wetlands get extra water from irrigation?
 - Which wetlands are regularly grazed?
 - Which wetlands are sewage treatment ponds?
- Reach out for unique applications!

UGS Wetland Function Models

- Wetlands provide valuable functions benefitting humans, wildlife and ecosystems
 - Types and degree of function dictated by
 - Location
 - Shape and type
 - Vegetation
 - Human impacts
 - Connection to other features
 - Characteristics considered by the wetland mapping
- Enhanced attribution allows landscape level modeling and mapping of wetland functions
 - Which wetlands detain surface water from flooding and runoff, and where are they?



Model Approach

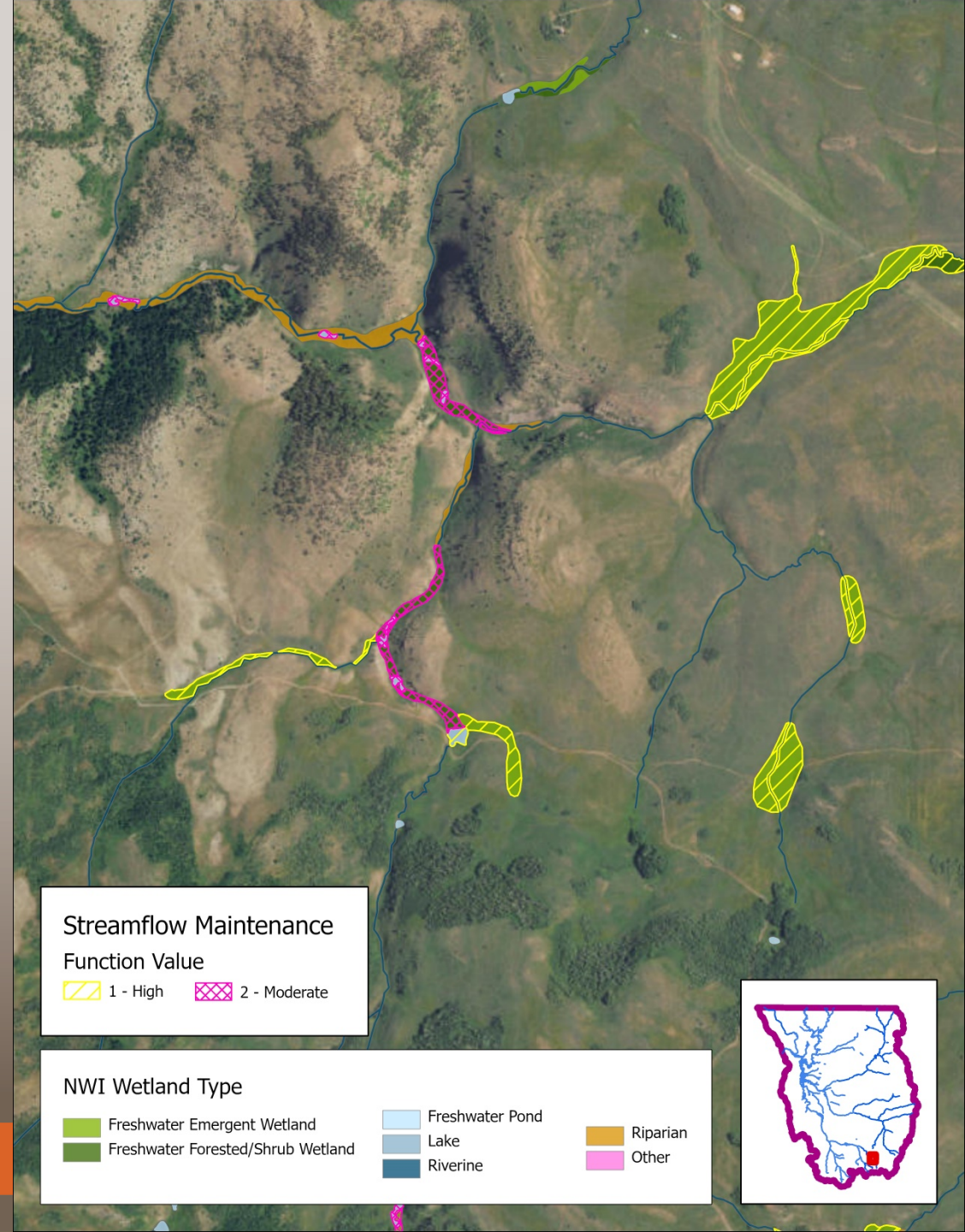
- Approach developed by CNHP 2018
 - Revising based on our mapping
- Attribute and spatial queries
 - Slope, Disturbance, Topographic Wetness, Elevation
- Identifies wetlands likely to provide a particular function
 - High: Optimal conditions or documented through literature review
 - Moderate: Potential to provide function but limited
 - Low: Not applied

Draft completed

Modeled Functions
Bank and Shoreline Stabilization
Carbon Sequestration
Sediment and Particulate Retention
Streamflow Maintenance
Aquatic Invertebrate
Shorebird
Waterfowl and Waterbird
Surface Water Detention
Ute Ladies'-tresses Habitat

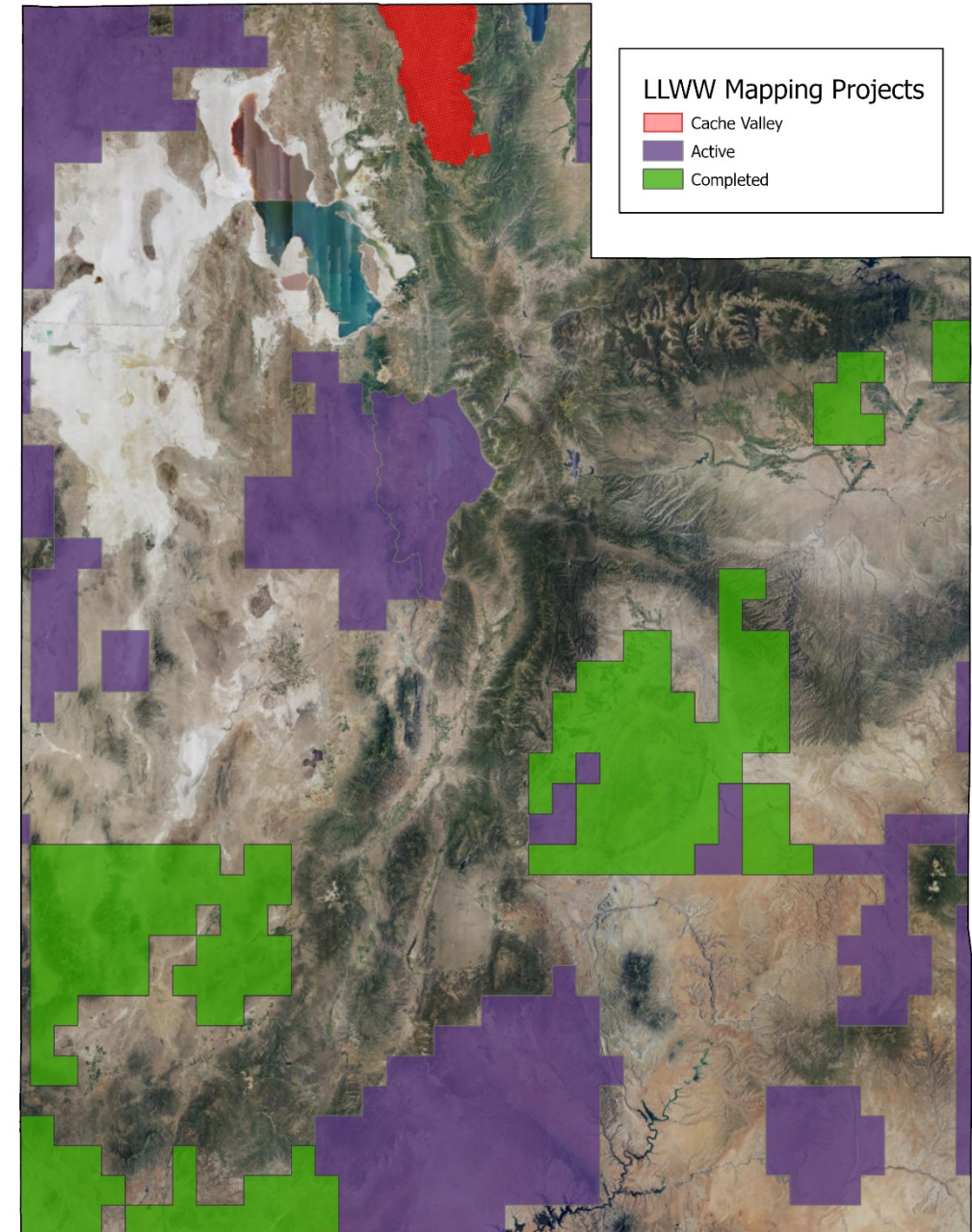
Streamflow Maintenance

- Streamflow Maintenance
 - GW-fed features or catchments that store/release water to streams year-round
- Fish habitat, maintain riparian zones, water supply
- Headwater of the East Fork of the Little Bear



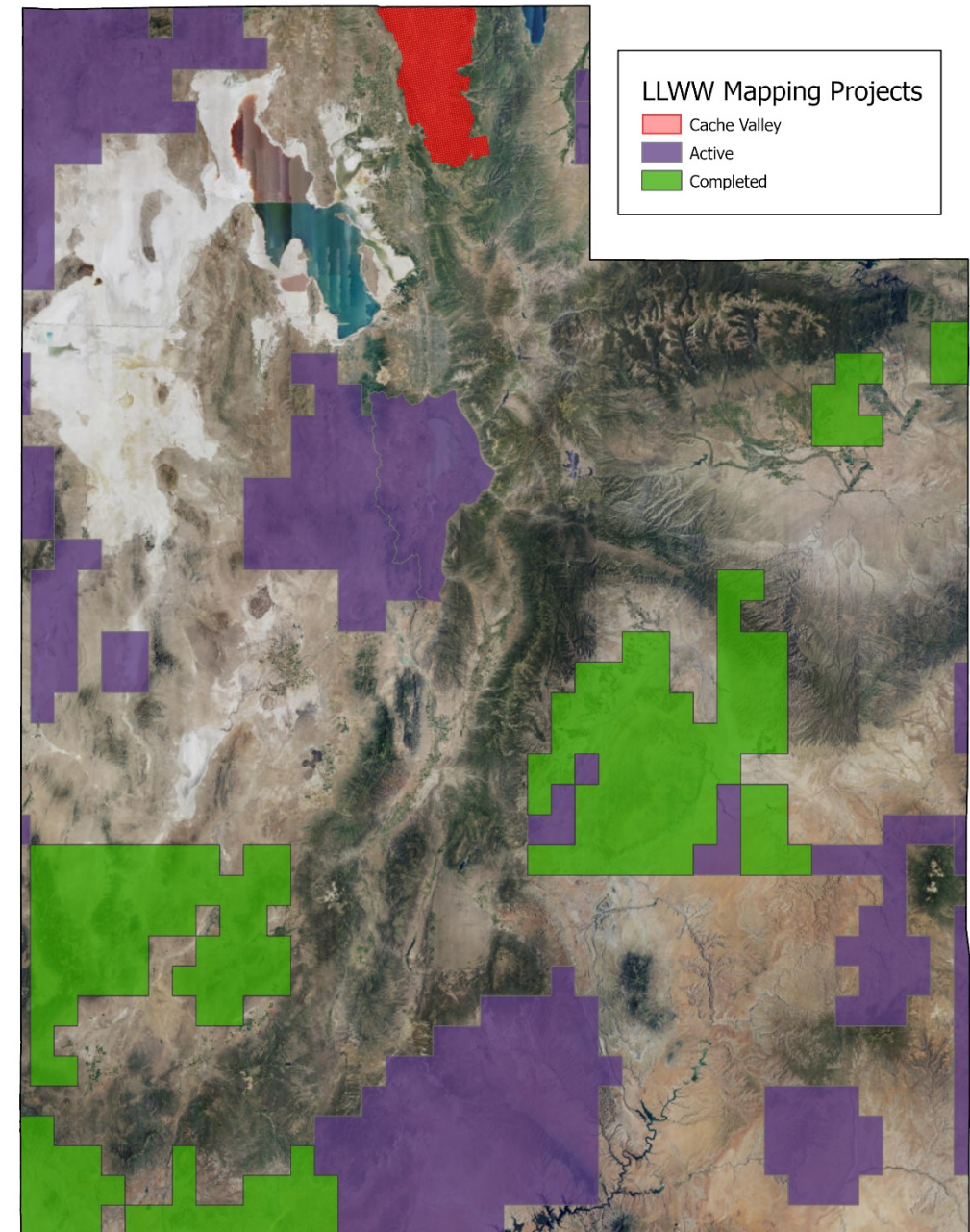
LLWW Availability

- Several LLWW mapping projects
 - BLM mapping contracts
 - University of Montana and St. Mary's University
 - UGS mapping projects
 - Collaboration to apply LLWW consistently and determine functions
- No one location for all Utah LLWW data
 - Contact Diane or I
 - pgoodwin@utah.gov
 - dmenuz@utah.gov



LLWW Availability

- All projects include updated NWI data
 - UGS Wetlands
<https://geology.utah.gov/apps/wetlands/index.html>
 - NWI Wetland Mapper
<https://www.fws.gov/wetlands/data/mapper.html>



Acknowledgments

- EPA Wetland Program Development Grants
- Feedback from several organizations
 - USFWS NWI Program
 - USFWS Utah Field Office
 - Colorado Natural Heritage Program
 - St. Mary's University
 - University of Montana
 - Zac Covington with BRAG
- UGS Mapping and Review
 - Elisabeth Stimmel
 - Rebecca Lee
 - Lydia Keenan
 - Diane Menuz



Questions

