Montana Wetland Council Presents:
Tech Transfer Webinar Series

Montana Wetland and Riparian Mapping
Where to Find It and How to Use It

Presenter: Levia Shoutis
Moderator: Lynda Saul

MONTANA WETLAND COUNCIL

HAVING TROUBLE WITH THE SOFTWARE?

Check your email from yesterday:

1. You were sent a link to instructions for how to use the GoToWebinar software.

2. You were also sent a PDF of today's presentation. This means you can watch the PDF on your own while you listen to the audio portion of the presentation by dialing in on the phone number provided to you in your email.

If you have any technical difficulties during the webinar you can email or call Erin at erin.rykken@erm.com or 406-222-7600 during the webinar.

Agenda

- Welcome and Introductions (5 minutes)
- Wetland and Riparian Mapping: Where to Find It and How to Use It (75 minutes). (Pauses for Q&A)
- Question & Answer (10 minutes)
- Wrap up (1 minute)

Today's Presenter

Levia Shoutis, PWS

Environmental Resources Management (ERM), Inc.
(406) 222-7600 x229
levia.shoutis@erm.com

Montana Wetland and Riparian Mapping Center, MNHP

Karen Newlon

Ecologist/Project Manager
Montana Natural Heritage Program
(406) 444-0915
KNewlon@mt.gov

Moderator

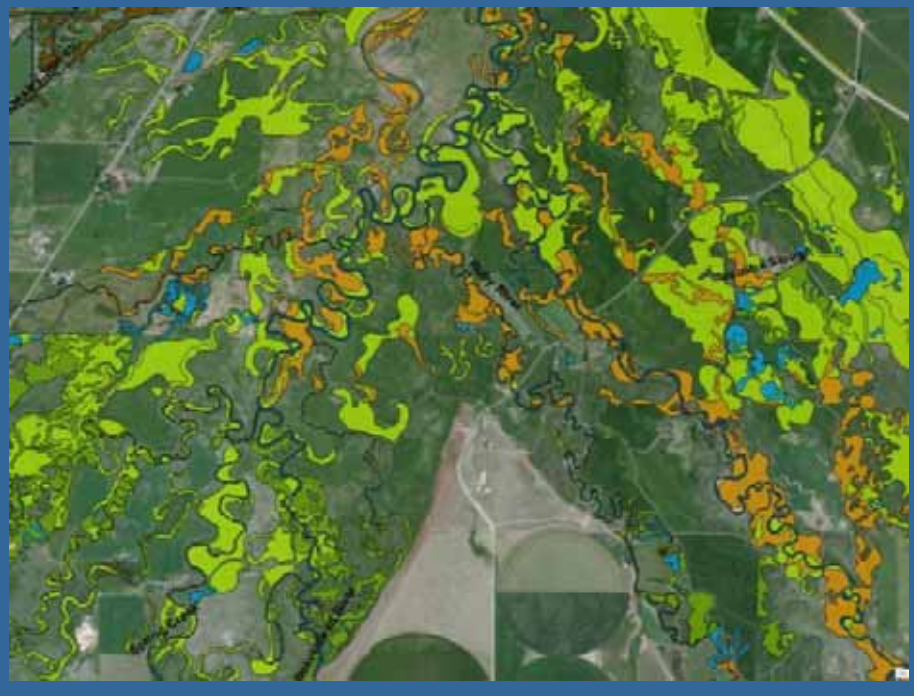
Lynda Saul, PWS, CFM

Wetland Program Coordinator
Montana DEQ
(406) 444-6652
lsaul@mt.gov

Montana Wetland and Riparian Mapping

Where to Find It and How to Use It

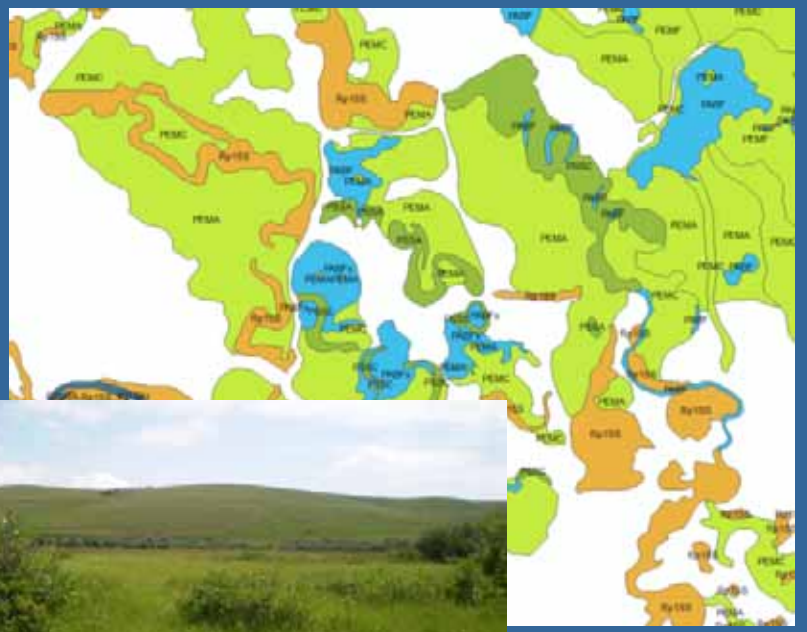
Levia Shoutis, PWS
ERM, Inc.
Livingston, MT



Training Goals

The goal is for participants to understand:

- What wetland and riparian mapping is
- How to access the mapping
- Potential uses and limitations



Training Overview

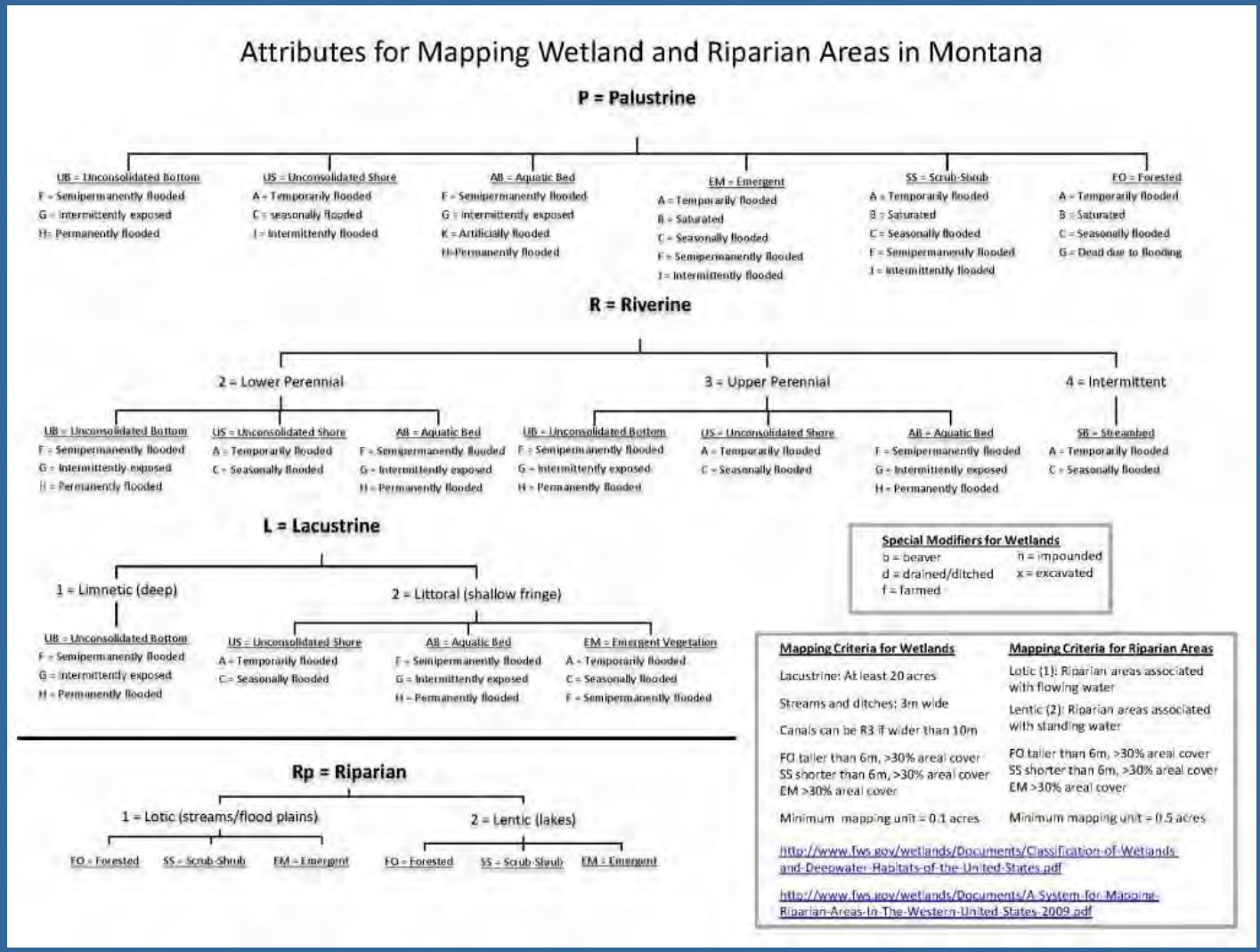
- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- Mapping programs and status
- How mapping is created, limitations
- Classification systems
- Accessing mapping
- Hands-on mapping activity
- Uses and examples

Handouts


MONTANA NATURAL HERITAGE PROGRAM
Natural Heritage Program
WETLAND AND RIPARIAN
MAPPING IN MONTANA
WETLANDS AND RIPARIAN AREAS PROVIDE IMPORTANT FUNCTIONS
Wetlands and riparian areas provide critical biological and economic benefits:
fish & wildlife habitat
flood attenuation
groundwater recharge
sediment retention
water quality improvement
maintain stream flows
shoreline stabilization
recreation
WETLAND AND RIPARIAN MAPPING
Wetland and riparian mapping provides information on the type, size, and location of wetland and riparian resources. Digital wetland and riparian mapping is a necessary first step towards effectively and efficiently identifying and protecting Montana's aquatic resources.
WETLAND AND RIPARIAN MAPPING CENTER
The Wetland and Riparian Mapping Center (WRMC) of the Montana Natural Heritage Program (MTNHP) is creating digital wetland and riparian maps with the support of multiple project partners. Our goal is to create a statewide digital wetland and riparian layer as a resource for management, planning, conservation, and restoration efforts. The WRMC completes mapping according to the national wetland mapping standard. Mapped wetlands are classified using the Cowardin classification system of the National Wetlands Inventory (NWI). Riparian mapping follows the U.S. Fish and Wildlife Service's System for Mapping Riparian Areas. Mapping is ultimately incorporated into the NWI.
Mapping is completed through photointerpretation of 1-meter resolution color infrared aerial imagery. Ancillary data layers such as topographic maps, digital elevation models, soils data, and other aerial imagery sources are also used to improve mapping accuracy.
LIMITATIONS OF WETLAND AND RIPARIAN MAPPING
Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands differently than the NWI. Mapped wetlands do not represent precise wetland boundaries, and digital wetland data cannot substitute for an on-site determination of jurisdictional wetlands.
How to access wetland and riparian mapping.


ACCESSING WETLAND AND RIPARIAN MAPPING
WETLAND AND RIPARIAN MAPPING CENTER WEBPAGE
View in the MTNHP Map Viewer
View & Download Mapping
Other useful links:
Wetland and Riparian Mapping Center
mtnhp.org/nwi/
Guide to Wetland and Riparian Classification in Montana
mtnhp.org/nwi/Wetland_Riparian_Classification.pdf
National Wetlands Inventory
http://www.fws.gov/wetlands/
For more information, contact:
Karen Newlon
Ecologist/Project Manager
MTNHP
knewlon@mt.gov
406 444 0915
Levia Shoutis, PWS
EHM, Inc.
Livingston, MT
levia.shoutis@ehm.com
406 222 7600 x229
MTNHP MAP VIEWER
Summarize mapping by an area of interest.
Turn mapping layers on and off.
View different base layers.
Search for specific location.
View mapping summary and printable report.
Download Wetland and Riparian Mapping:
ftp://ftp.geoinfo.msl.mt.gov/Data/Spatial/MSDI/Wetlands
Or view as a Wetland and Riparian Map Service:
http://gisservice.mt.gov/ArcGIS/rest/services/MSDI_Framework/Wetlands/Riparian/MapServer
Geographic Information
State Library
Wetlands

Handouts


Attributes for Mapping Wetland and Riparian Areas in Montana
P = Palustrine
UB = Unconsolidated Bottom
F = Semipermanently flooded
G = Intermittently exposed
H= Permanently flooded
US = Unconsolidated Shore
A = Temporarily flooded
C = seasonally flooded
J = Intermittently flooded
AB = Aquatic Bed
F = Semipermanently flooded
G = Intermittently exposed
K = Artificially flooded
H=Permanently flooded
EM = Emergent
A = Temporarily flooded
B = Saturated
C = Seasonally flooded
F = Semipermanently flooded
J = Intermittently flooded
SS = Scrub-Shrub
A = Temporarily flooded
B = Saturated
C = Seasonally flooded
F = Semipermanently flooded
J = Intermittently flooded
FO = Forested
A = Temporarily flooded
B = Saturated
C = Seasonally flooded
G = Dead due to flooding
R = Riverine
2 = Lower Perennial
UB = Unconsolidated Bottom
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
US = Unconsolidated Shore
A = Temporarily flooded
C = Seasonally flooded
AB = Aquatic Bed
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
3 = Upper Perennial
UB = Unconsolidated Bottom
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
US = Unconsolidated Shore
A = Temporarily flooded
C = Seasonally flooded
AB = Aquatic Bed
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
4 = Intermittent
SB = Streambed
A = Temporarily flooded
C = Seasonally flooded
L = Lacustrine
1 = Limnetic (deep)
UB = Unconsolidated Bottom
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
2 = Littoral (shallow fringe)
US = Unconsolidated Shore
A = Temporarily flooded
C = Seasonally flooded
AB = Aquatic Bed
F = Semipermanently flooded
G = Intermittently exposed
H = Permanently flooded
EM = Emergent Vegetation
A = Temporarily flooded
C = Seasonally flooded
F = Semipermanently flooded
Special Modifiers for Wetlands
b = beaver
d = drained/ditched
f = farmed
n = impounded
x = excavated
Rp = Riparian
1 = Lotic (streams/flood plains)
FO = Forested
SS = Scrub-Shrub
EM = Emergent
2 = Lentic (lakes)
FO = Forested
SS = Scrub-Shrub
EM = Emergent
Mapping Criteria for Wetlands
Lacustrine: At least 20 acres
Streams and ditches: 3m wide
Canals can be R3 if wider than 10m
FO taller than 6m, >30% areal cover
SS shorter than 6m, >30% areal cover
EM >30% areal cover
Minimum mapping unit = 0.1 acres
Mapping Criteria for Riparian Areas
Lotic (1): Riparian areas associated with flowing water
Lentic (2): Riparian areas associated with standing water
FO taller than 6m, >30% areal cover
SS shorter than 6m, >30% areal cover
EM >30% areal cover
Minimum mapping unit = 0.5 acres
http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf
http://www.fws.gov/wetlands/Documents/A-System-for-Mapping-Riparian-Areas-In-The-Western-United-States-2009.pdf

Wetland definition:

From: USFWS National Wetlands Inventory (Cowardin et al. 1979)

Lands transitional between upland and aquatic systems where the water table is usually at or near the surface or inundated by shallow water.

A wetland must have ***one or more*** of the following attributes:

1. Dominated by wetland plants
2. Substrate is predominantly hydric soil
3. Substrate is saturated or covered by shallow water at some time during the growing season annually.

Definition is non-regulatory

Riparian definition:

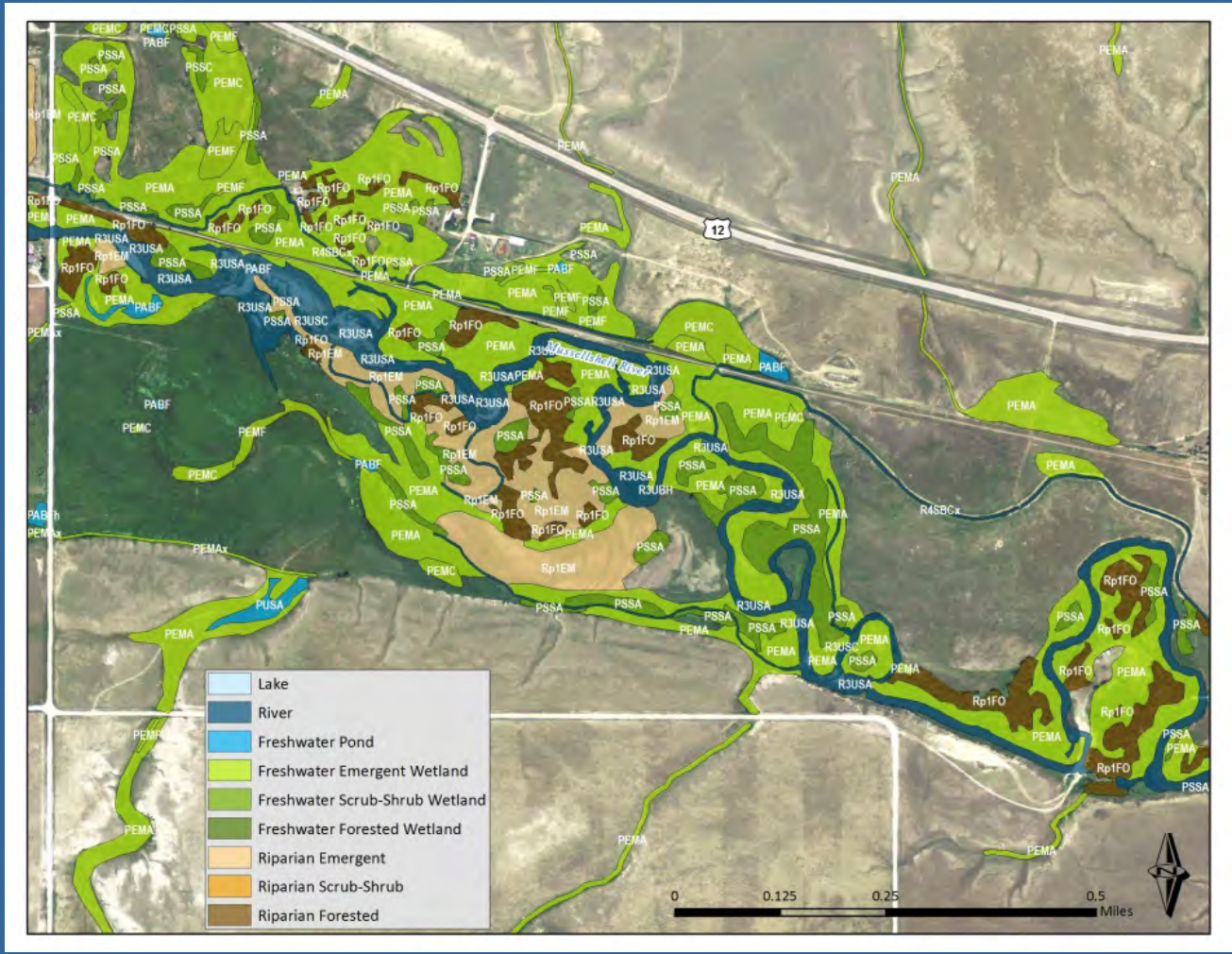
From: USFWS (2009)

Plant communities contiguous to and affected by surface and subsurface hydrologic features; usually transitional between wetland and upland.

Mapped as riparian where soils, plants, and hydrology do not display wetland characteristics.

What is Wetland and Riparian Mapping?

- Digital maps of potential wetland and riparian areas
- Maps are developed using aerial imagery interpretation



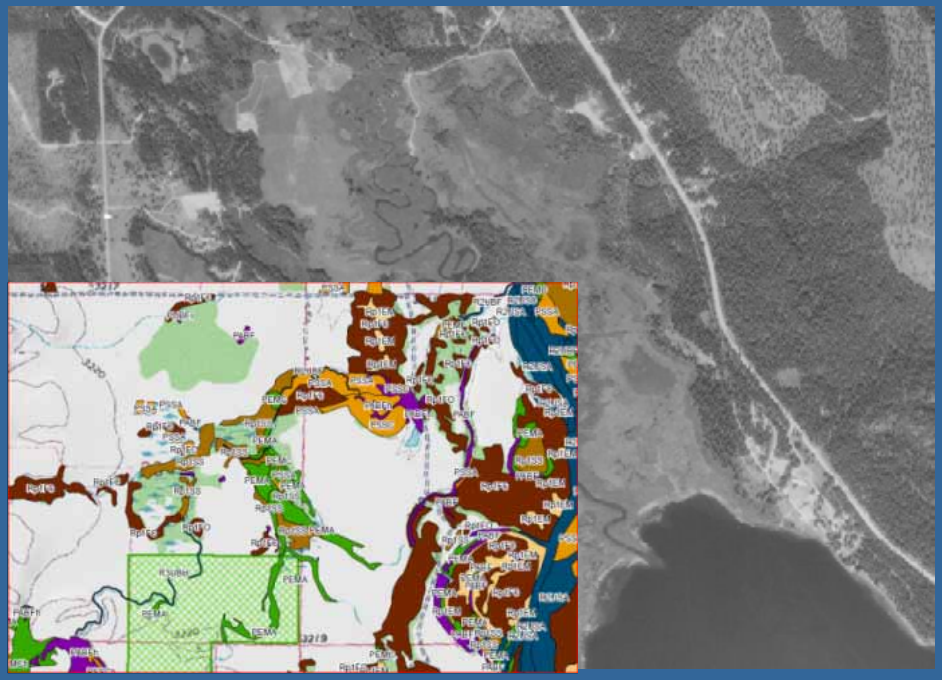
Training Overview

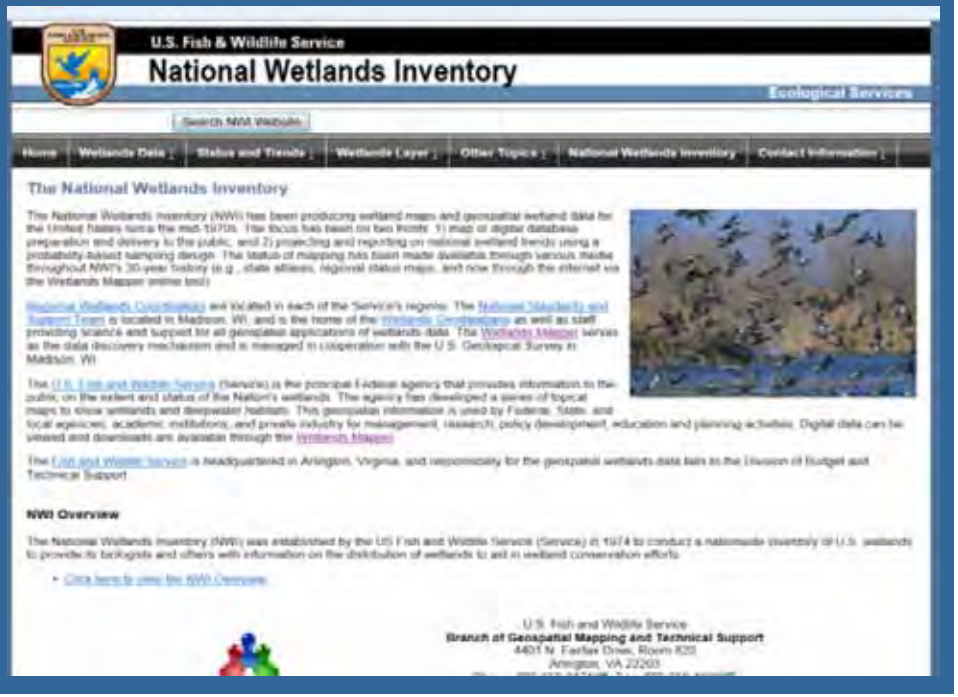
- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- **Mapping programs and status**
- How mapping is created, limitations
- Classification systems
- Accessing mapping
- Hands-on mapping activity
- Uses and examples

USFWS National Wetlands Inventory

www.fws.gov/wetlands

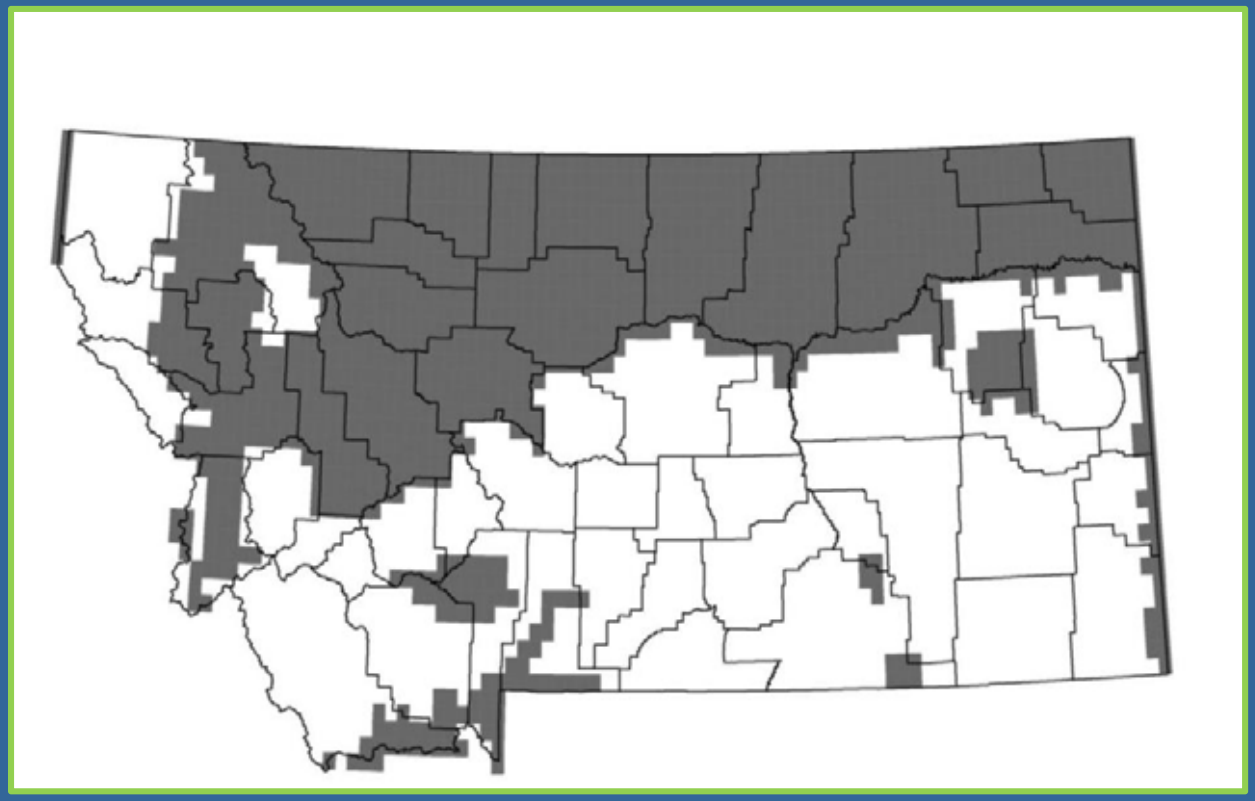
- Goal: conduct a nationwide inventory of wetlands in the U.S.
- Maps and classifies wetland, riparian, and deepwater habitats
- Preliminary tool-**non-regulatory**





Status of NWI Mapping in Montana circa 2006

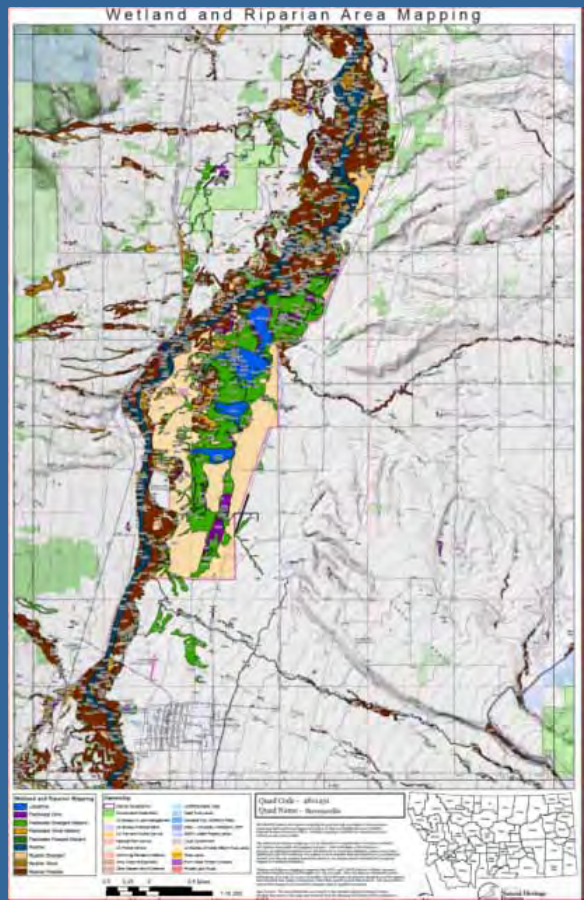
- Completed in 1980's, wetlands only, no riparian
- Considered "historic" mapping to be updated
- *Not always representative of "historic" conditions*



Montana Natural Heritage Program
Wetland and Riparian Mapping Center

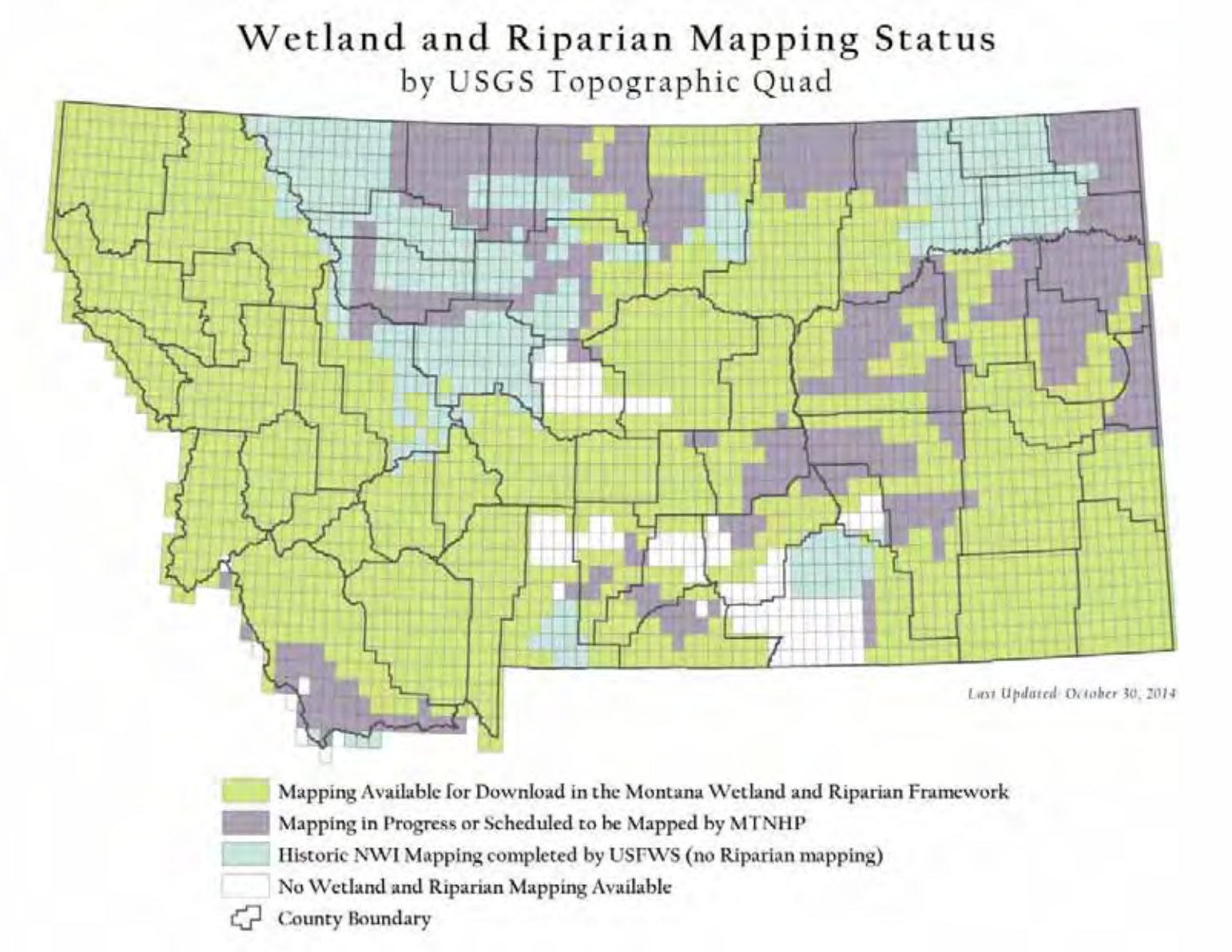
www.mtnhp.org/nwi

- Started in 2006
- Five full time GIS specialists
- Maps and classifies wetland, riparian, and deepwater habitats to NWI standards
- Provides mapping to NWI



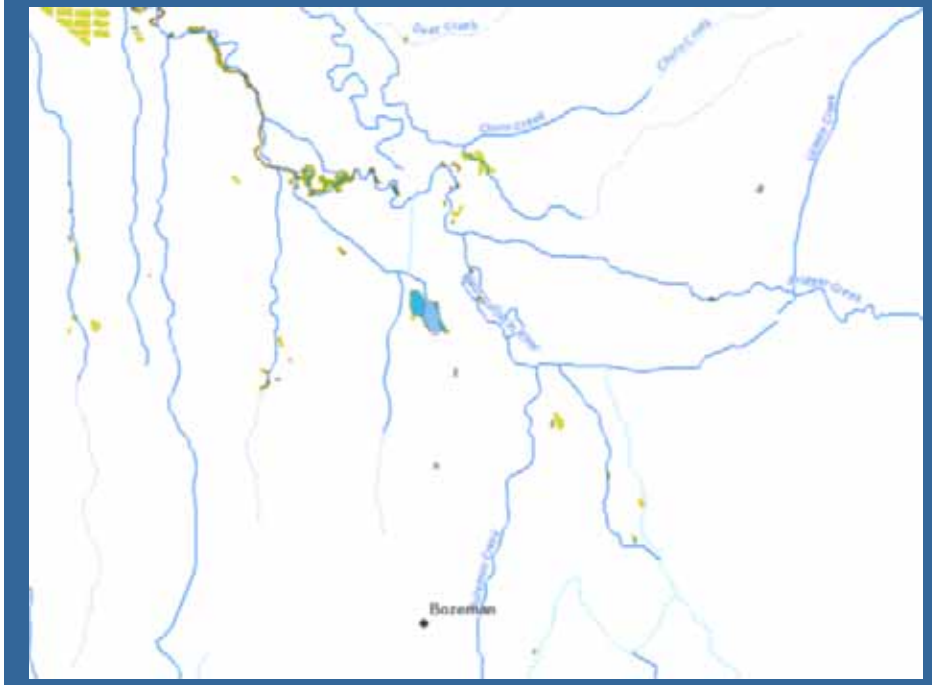
New mapping is available from MTNHP before NWI

Status of Mapping as of October 2014

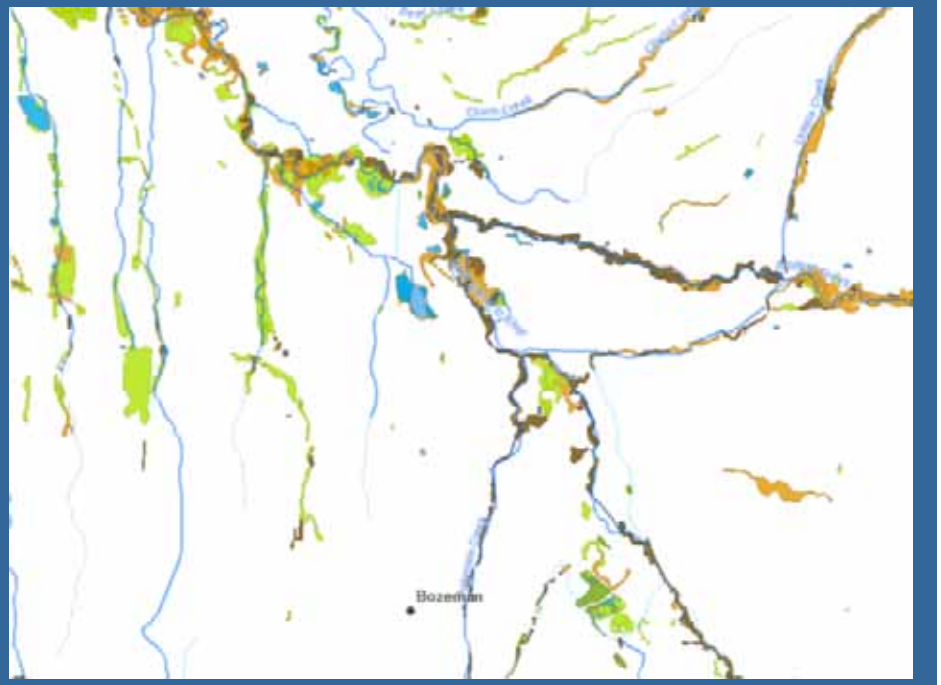


Historic Versus New Mapping

Lower Gallatin River Watershed

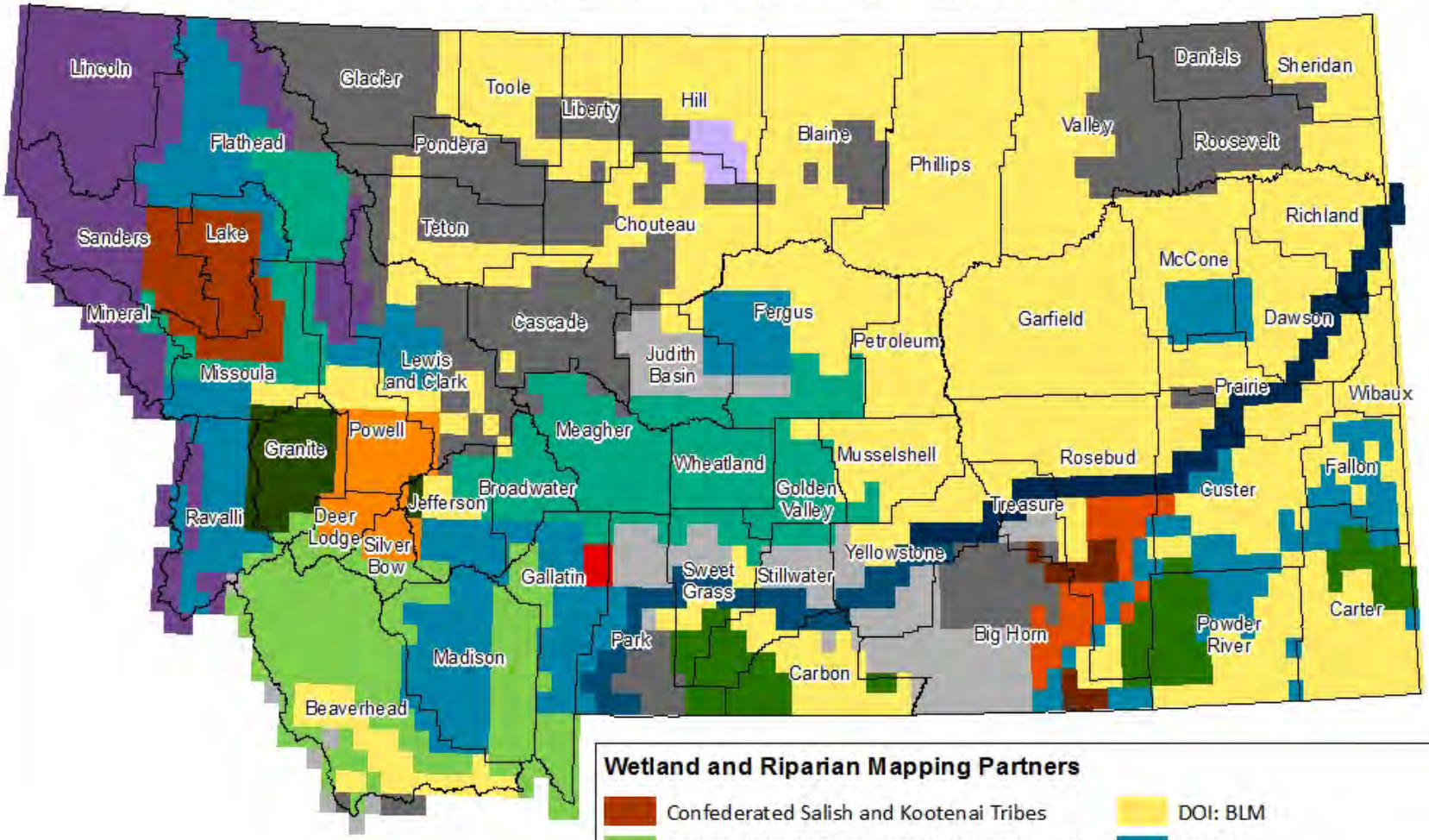


Historic Mapping



New Mapping

Wetland and Riparian Mapping Project Partners



Wetland and Riparian Mapping Partners

- Confederated Salish and Kootenai Tribes
- SWMT - (MT DEQ, PPL, MLIA, USFS Region1)
- MT DOJ: Natural Resource Damage Program
- MT DEQ Mines
- US Army Corps of Engineers
- MLIA/Yellowstone River ConservationDistrict
- Chippewa Cree Tribe
- MT Land Information Act
- DOI: BLM
- US EPA
- USFS - Custer National Forest
- Great Northern LCC
- MT DEQ
- Northern Cheyenne Tribe
- US Forest Service - Region 1

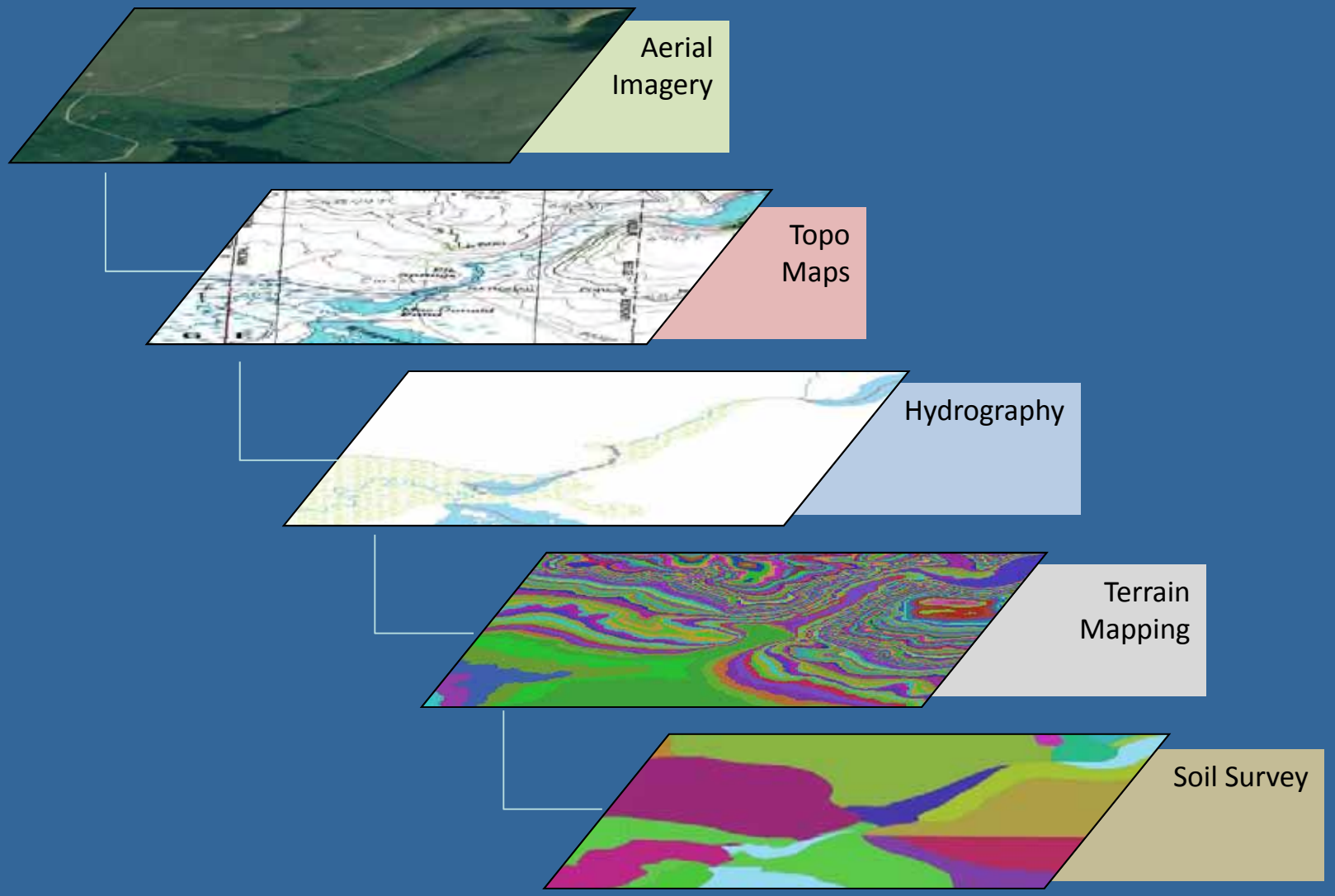
- Mapped from 1980s Imagery (USFWS)
- No Mapping Available

Last Updated: August 26, 2014

Training Overview

- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- Mapping programs and status
- **How mapping is created, limitations**
- Classification systems
- Accessing mapping
- Hands-on mapping activity
- Uses and examples

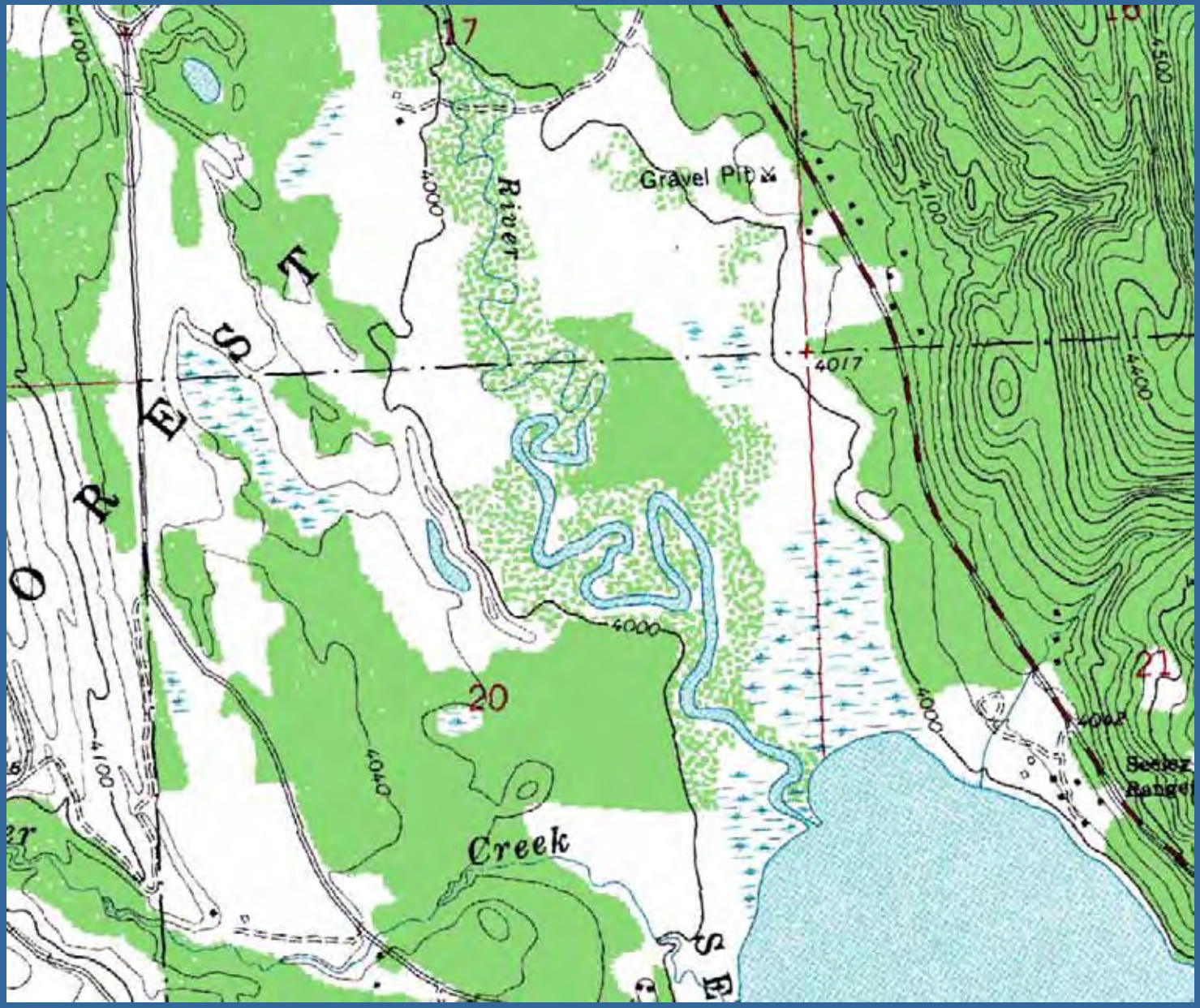
How is Mapping Created?



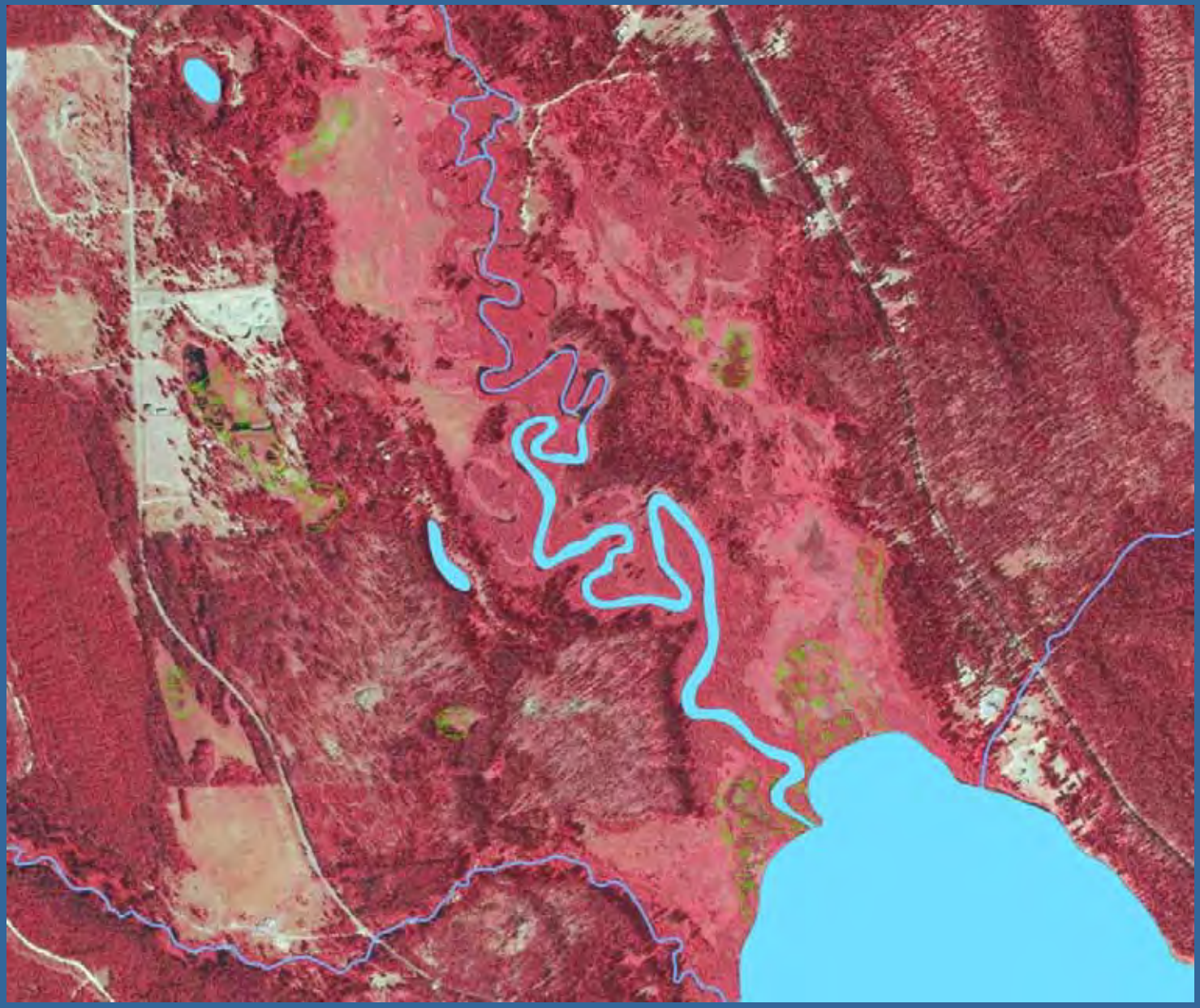
Color Infrared Imagery

Natural Color Imagery

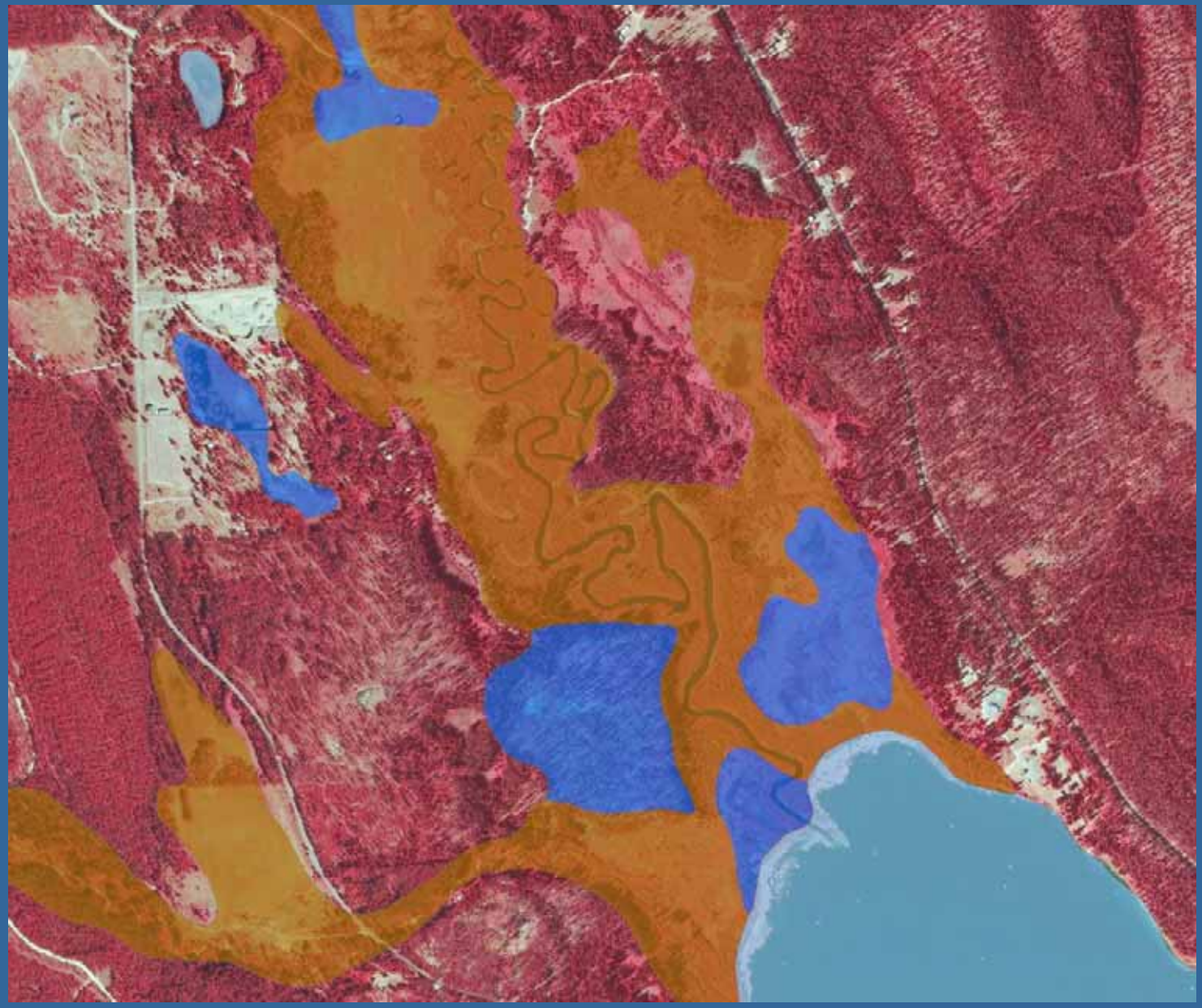
Topographic Maps



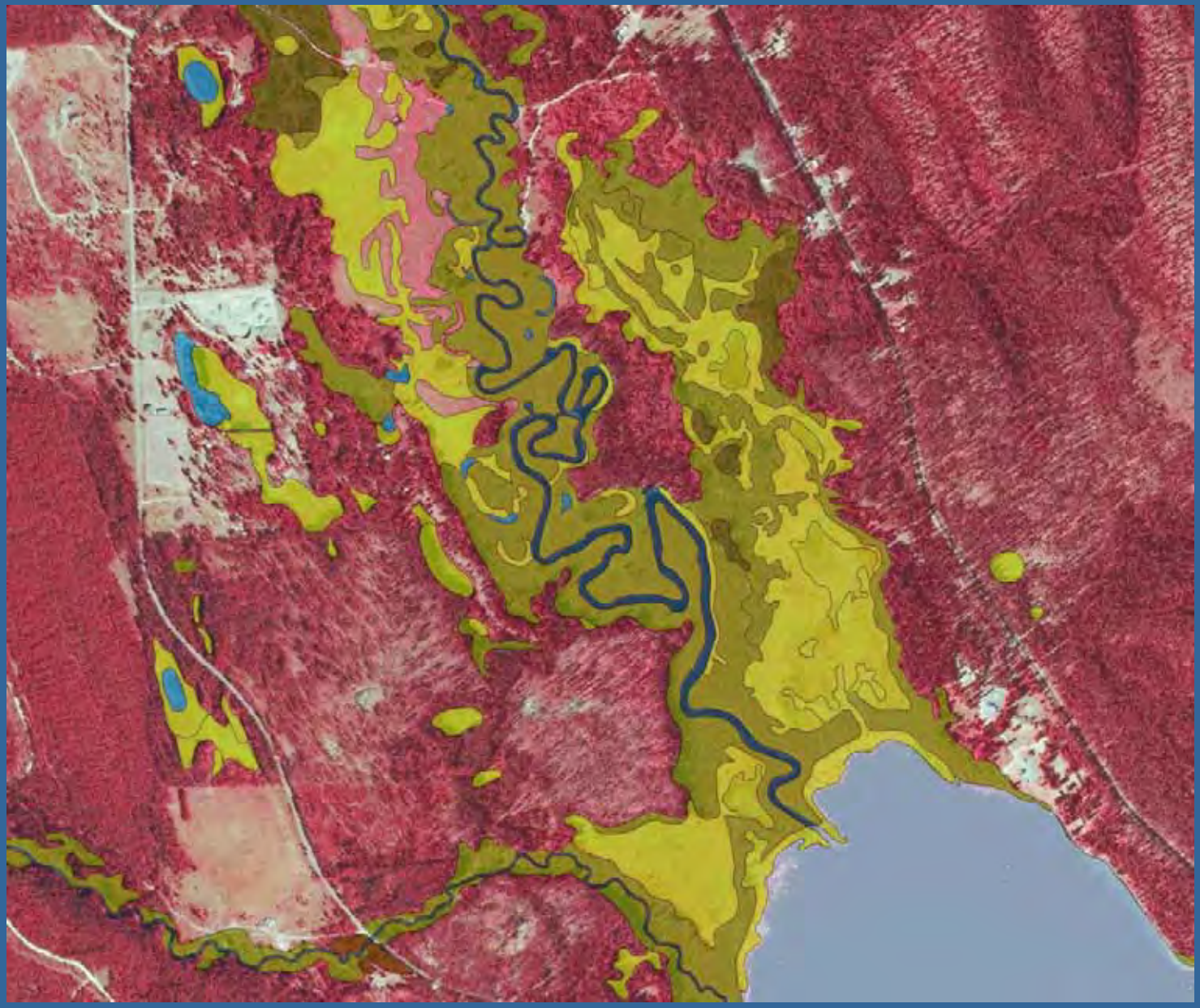
Hydrography



Potential Wetland Soils



Result: Wetland and Riparian Mapping

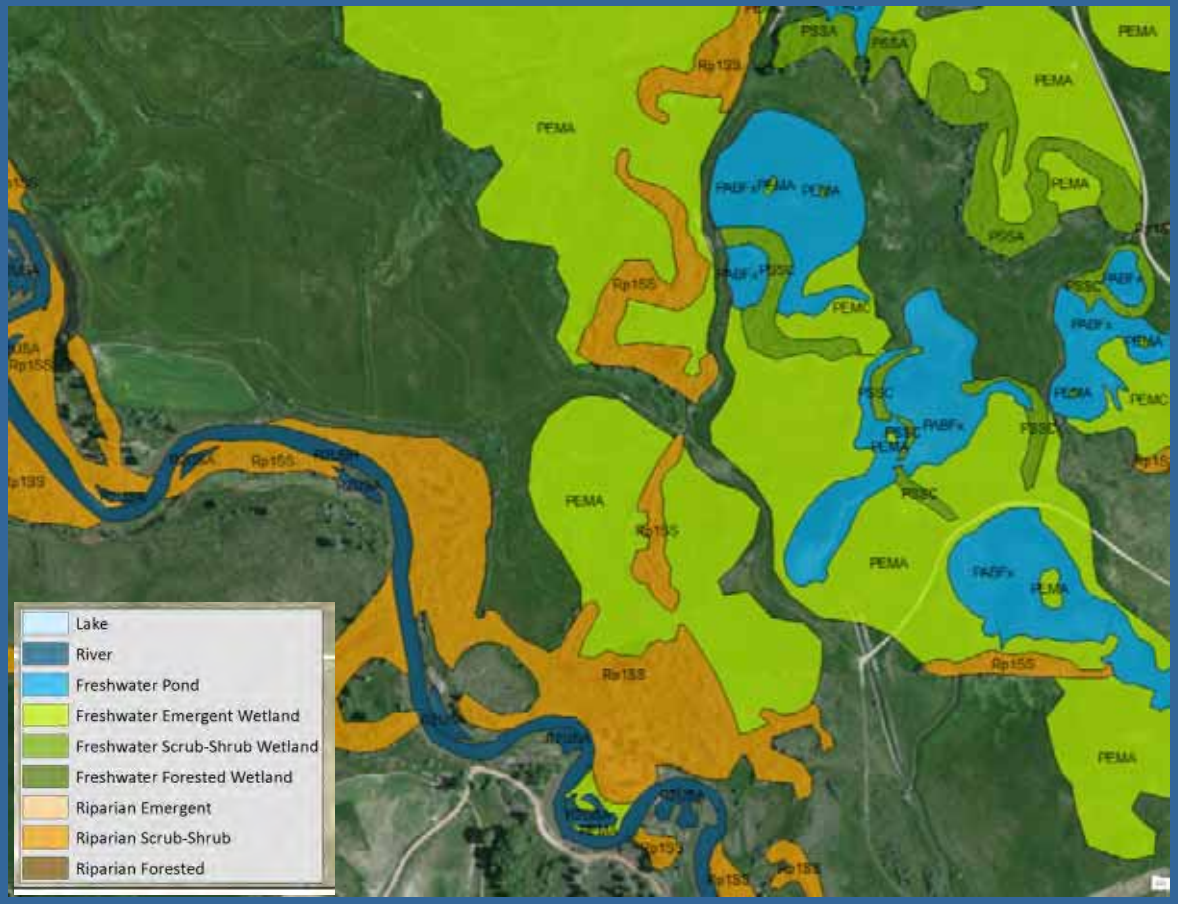


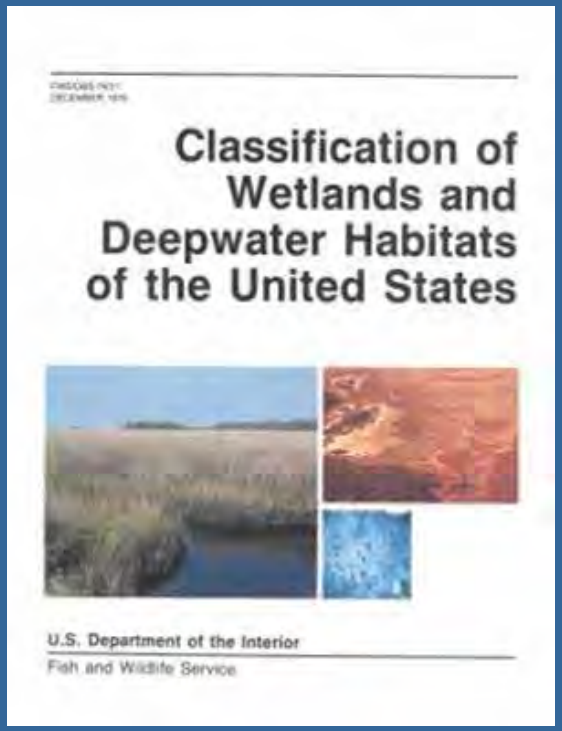
Limitations?

- Landscape level, reconnaissance information
- Accuracy depends upon image quality, image date, and image analyst experience
- Function information is limited (easily added to database)
- No condition information (easily added to database)
- Scale limitations
  - Minimum mapping unit: wetlands, 0.1 ac; riparian, 0.5 ac
  - Publication scale: 1:12,000 or “smaller”
- No CWA jurisdictional information
- Requires groundtruthing for site use

Classification Systems

- Use codes to describe vegetation, water regime, and any alterations
- Wetlands classification: USFWS NWI Cowardin et al. (1979)
- Riparian classification: USFWS (2009)





Palustrine Wetlands

Freshwater Wetlands

- Greater than 30% vegetation cover, *OR*
- Unvegetated, or vegetation covers less than 30% of area, but less than 20 acres, and less than 6.6 ft deep

Palustrine emergent

Palustrine unconsolidated bottom or aquatic bed

Riverine Wetlands

- Located *within* a stream or river channel with less than 30% vegetation cover

Unconsolidated bottom or
Unconsolidated shore
(upper or lower perennial)

Riparian Areas

- Vegetated areas contiguous to rivers, streams, lakes, or drainage ways that are influenced by both surface and below surface hydrology.

Riparian forest

Riparian forest

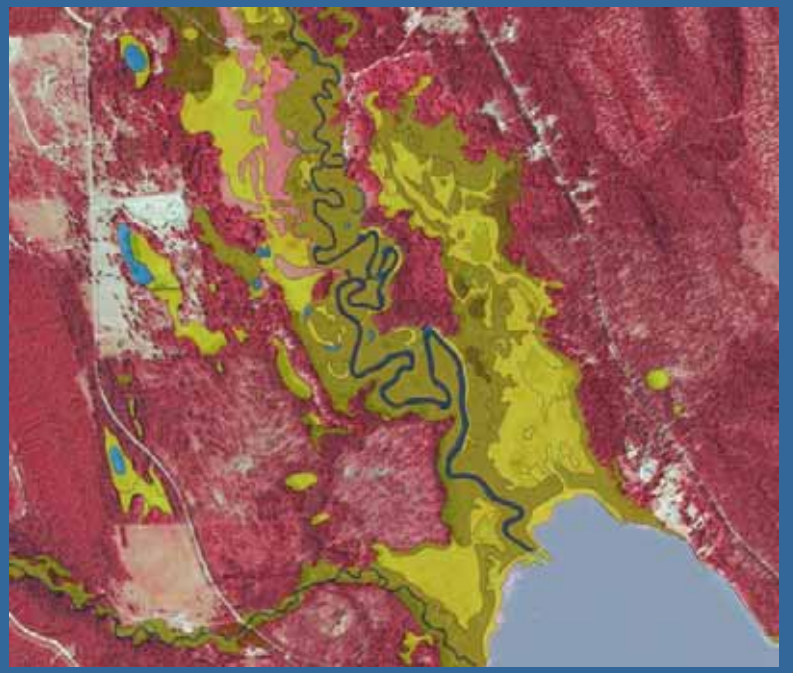
Questions?

Training Overview

- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- Mapping programs and status
- How mapping is created, limitations
- Classification systems
- **Accessing mapping**
- Hands-on mapping activity
- Uses and examples

Accessing Mapping

1. MTNHP Map Viewer: mapping status and mapping
2. GIS
   a. View mapping as a Map Service layer in GIS
   b. Download mapping for use in GIS



Accessing Mapping

Comparison of Access Methods

Application	MapViewer	GIS MapService	GIS Download
GIS skill level required	None	Low	Moderate
Preliminary review	X	X	X
View data attributes using identify tool	X	X	X
Data summary	X	X	X
Overlay ancillary data layers	X	X	X
Overlay project infrastructure layers		X	X
View data in attribute table			X
Data analysis			X
Edit data (shapes or attributes)			X

Accessing Mapping

MT Natural Heritage Program
Wetland and Riparian Mapping Center
http://mtnhp.org/NWI

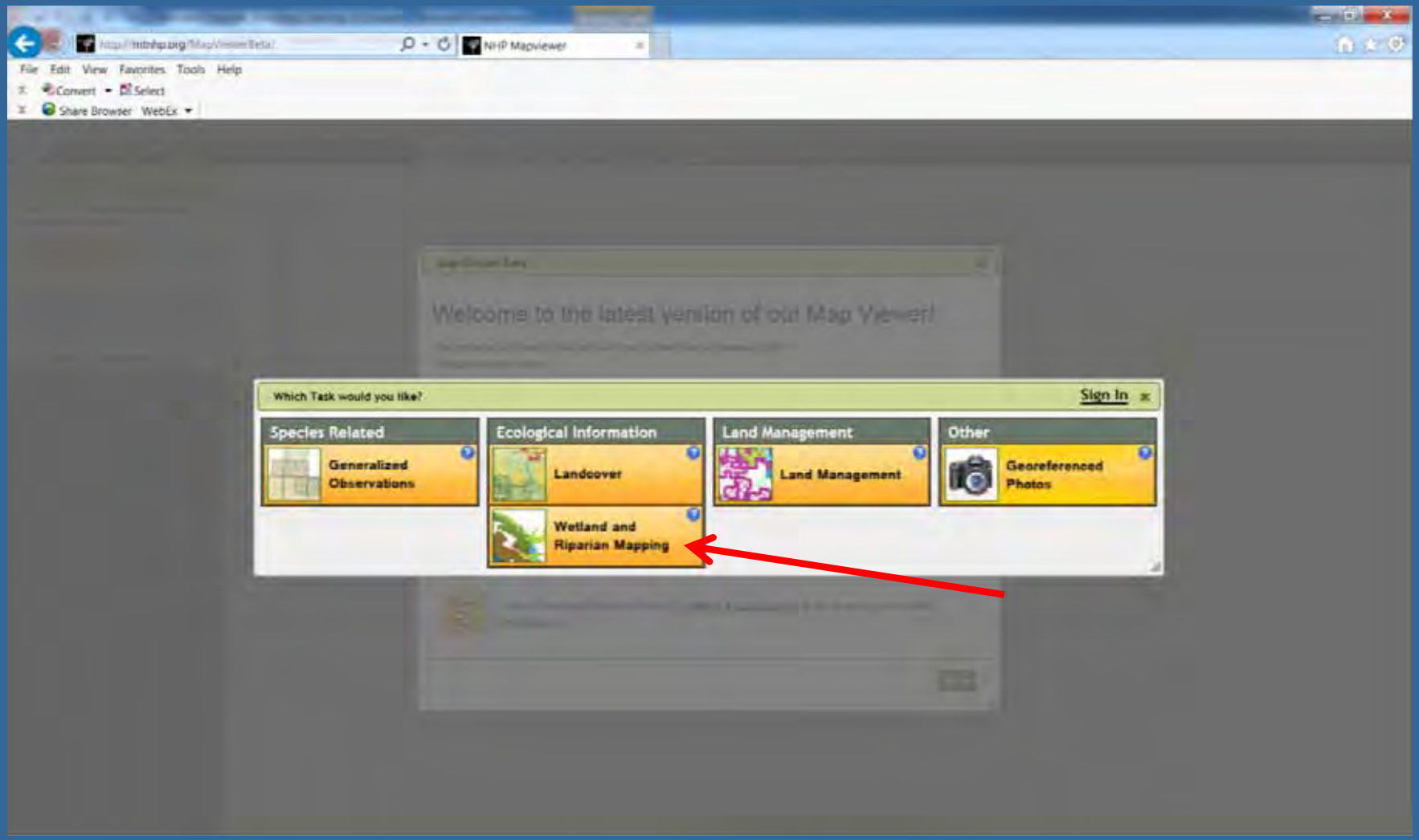
View mapping and other data layers in Map Viewer

GIS Options: Map Service or Download

View status of mapping in MT (new, historic)

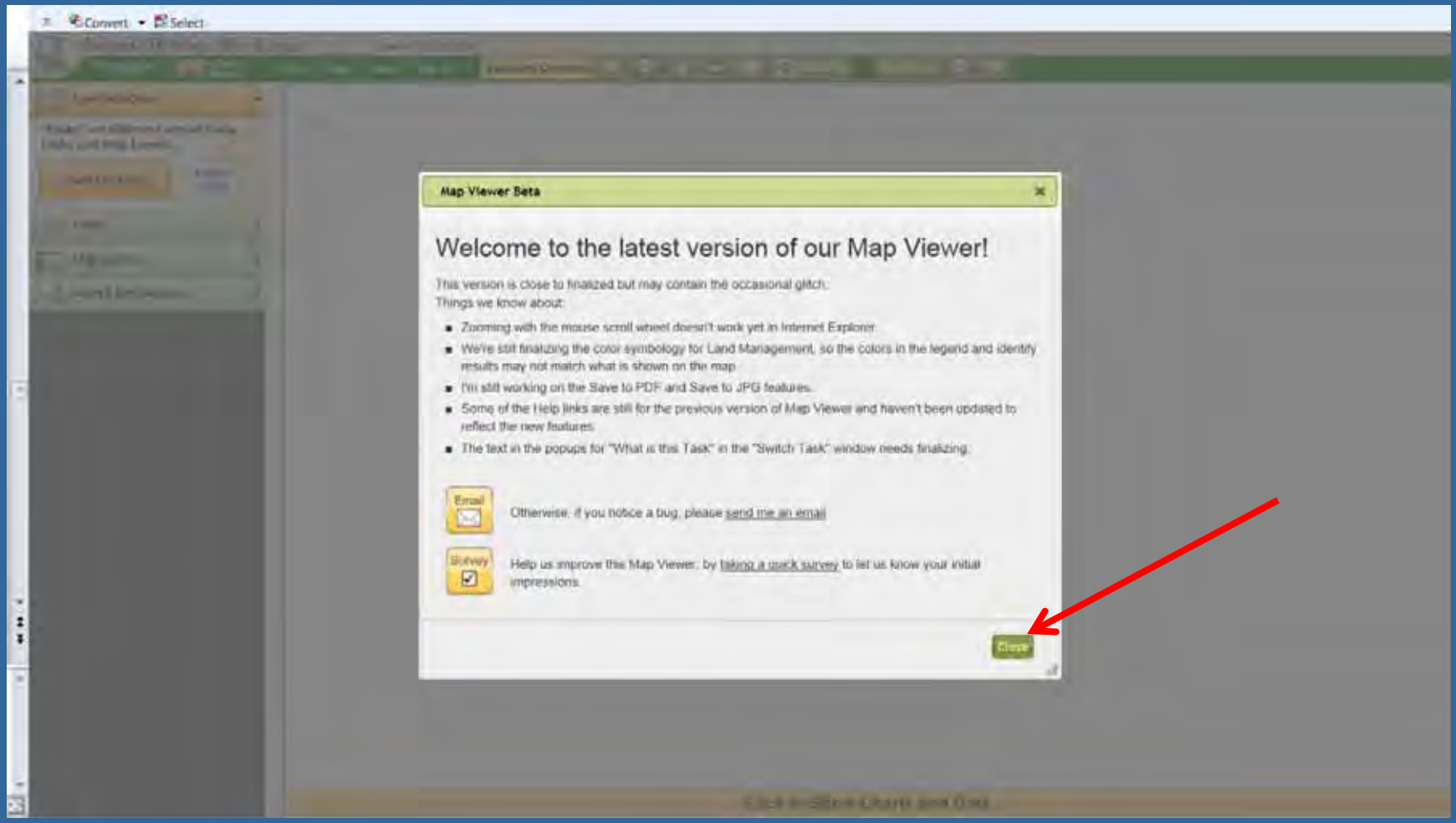
Map Viewer

mtnhp.org/mapviewer/

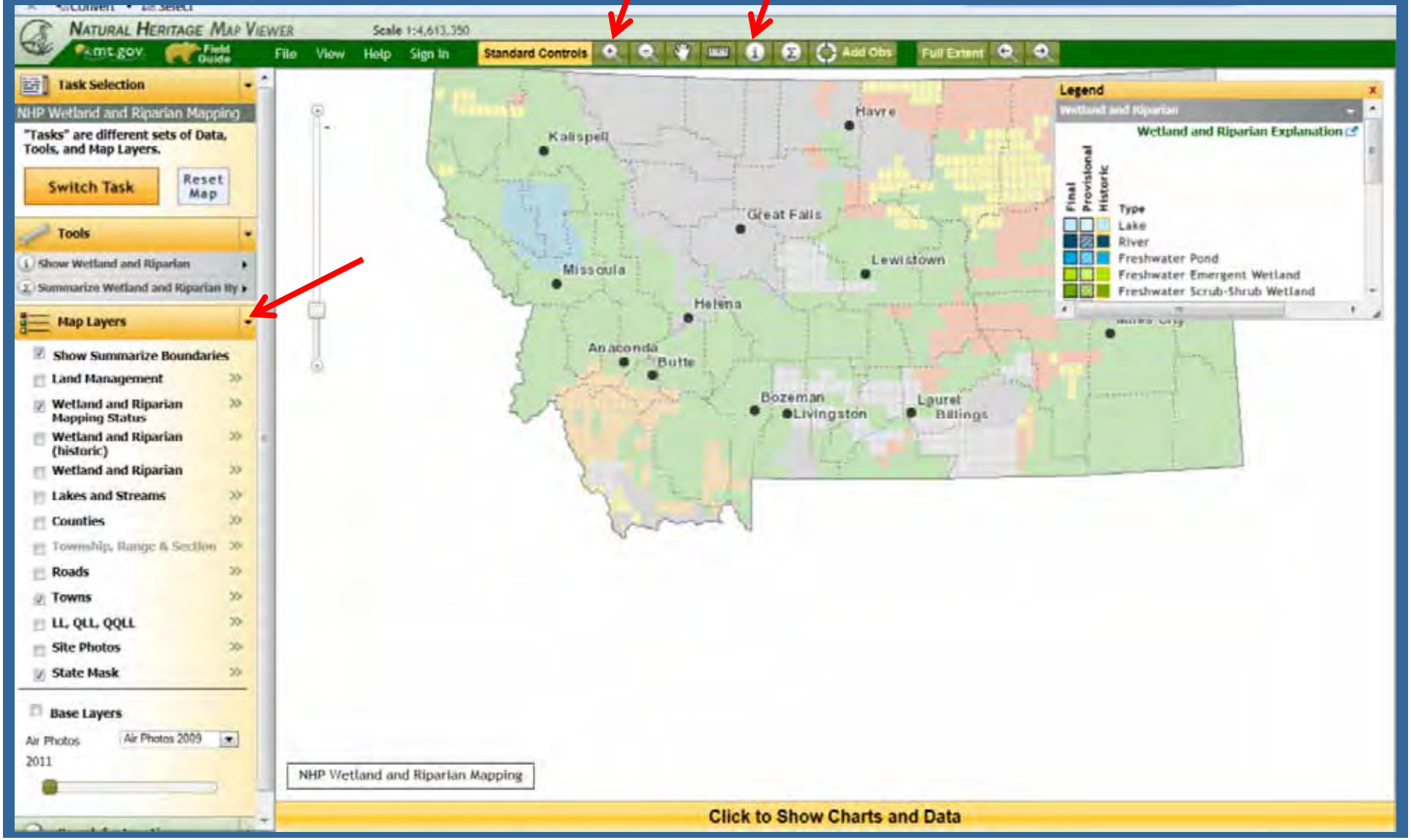


Map Viewer

Review known bugs, click **“Close”**



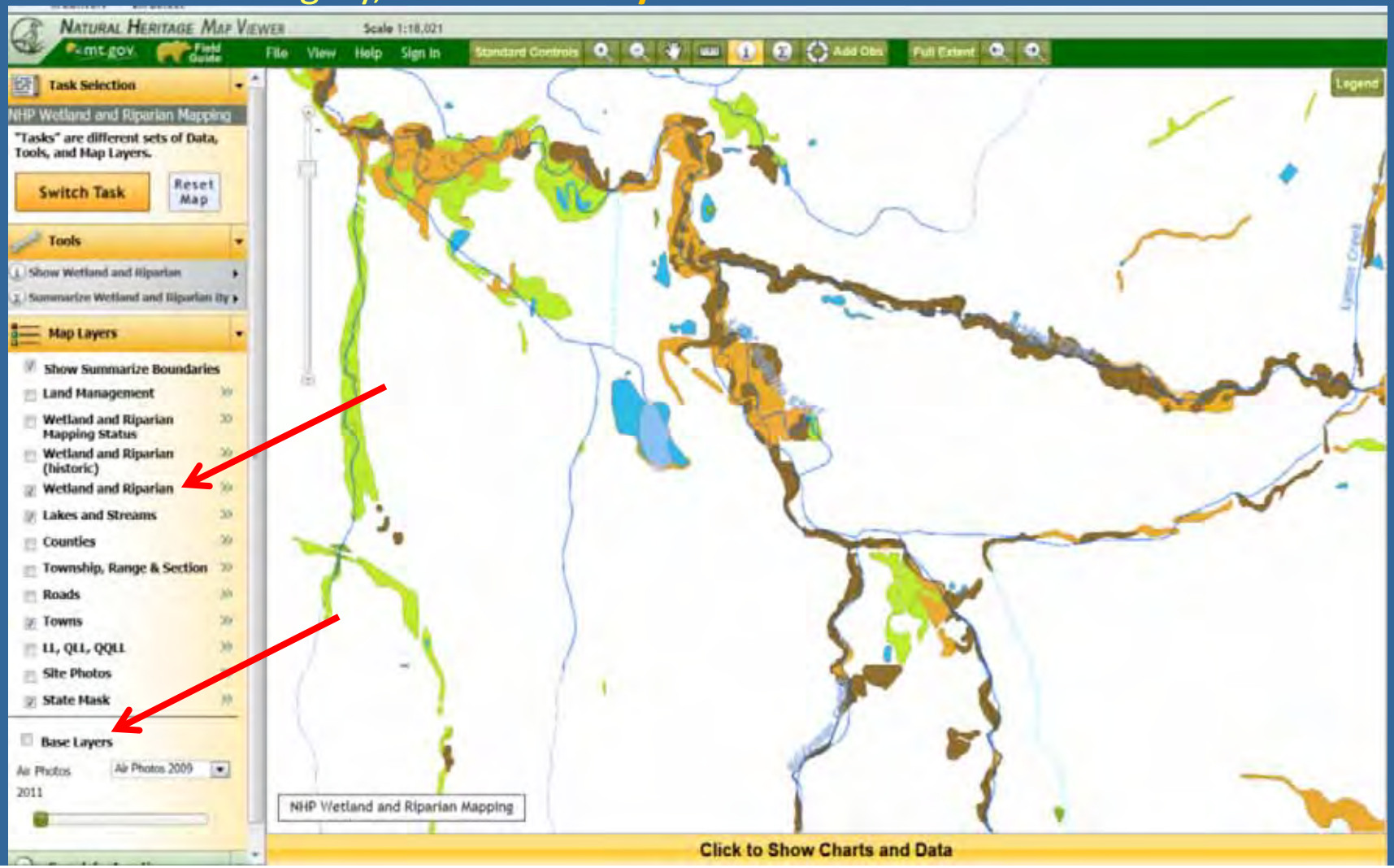
Map Viewer


Natural Heritage Map Viewer
Scale 1:4,613,390
mt.gov
Field Guide
File
View
Help
Sign In
Standard Controls
Add Obs
Full Extent
Task Selection
NHP Wetland and Riparian Mapping
"Tasks" are different sets of Data, Tools, and Map Layers.
Switch Task
Reset Map
Tools
Show Wetland and Riparian
Summarize Wetland and Riparian By
Map Layers
Show Summarize Boundaries
Land Management
Wetland and Riparian Mapping Status
Wetland and Riparian (historic)
Wetland and Riparian
Lakes and Streams
Counties
Township, Range & Section
Roads
Towns
LL, QLL, QQLL
Site Photos
State Mask
Base Layers
Air Photos
Air Photos 2009
2011
Legend
Wetland and Riparian
Wetland and Riparian Explanation
Final
Provisional
Historic
Type
Lake
River
Freshwater Pond
Freshwater Emergent Wetland
Freshwater Scrub-Shrub Wetland
Havre
Kalispell
Great Falls
Lewistown
Missoula
Helena
Anaconda
Butte
Bozeman
Livingston
Laurel
Billings
NHP Wetland and Riparian Mapping
Click to Show Charts and Data

Map Viewer

In Map Layers, click on **"Wetland and Riparian"**

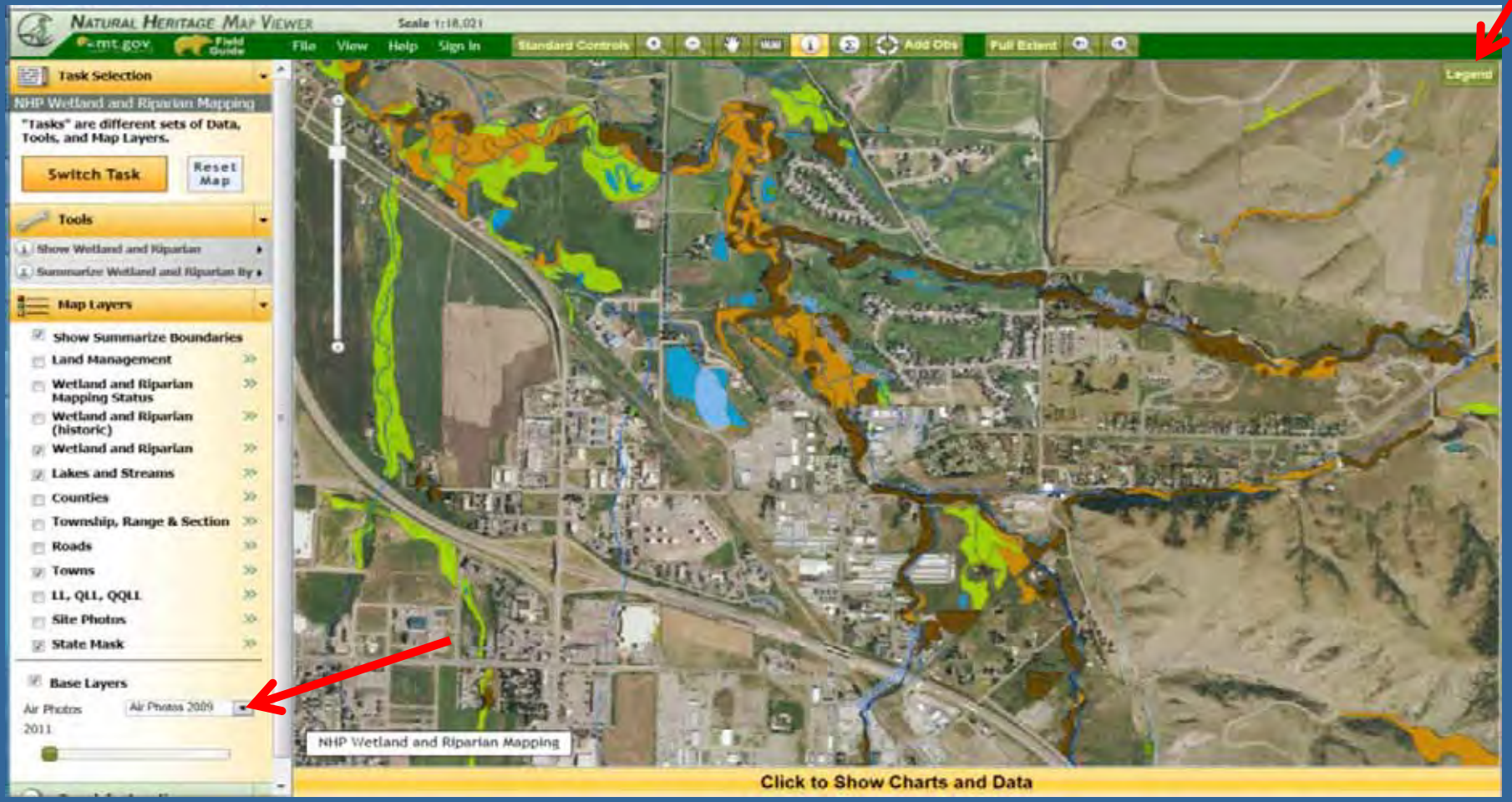
To add aerial imagery, click **"Base Layers"**



Map Viewer

Base Layers

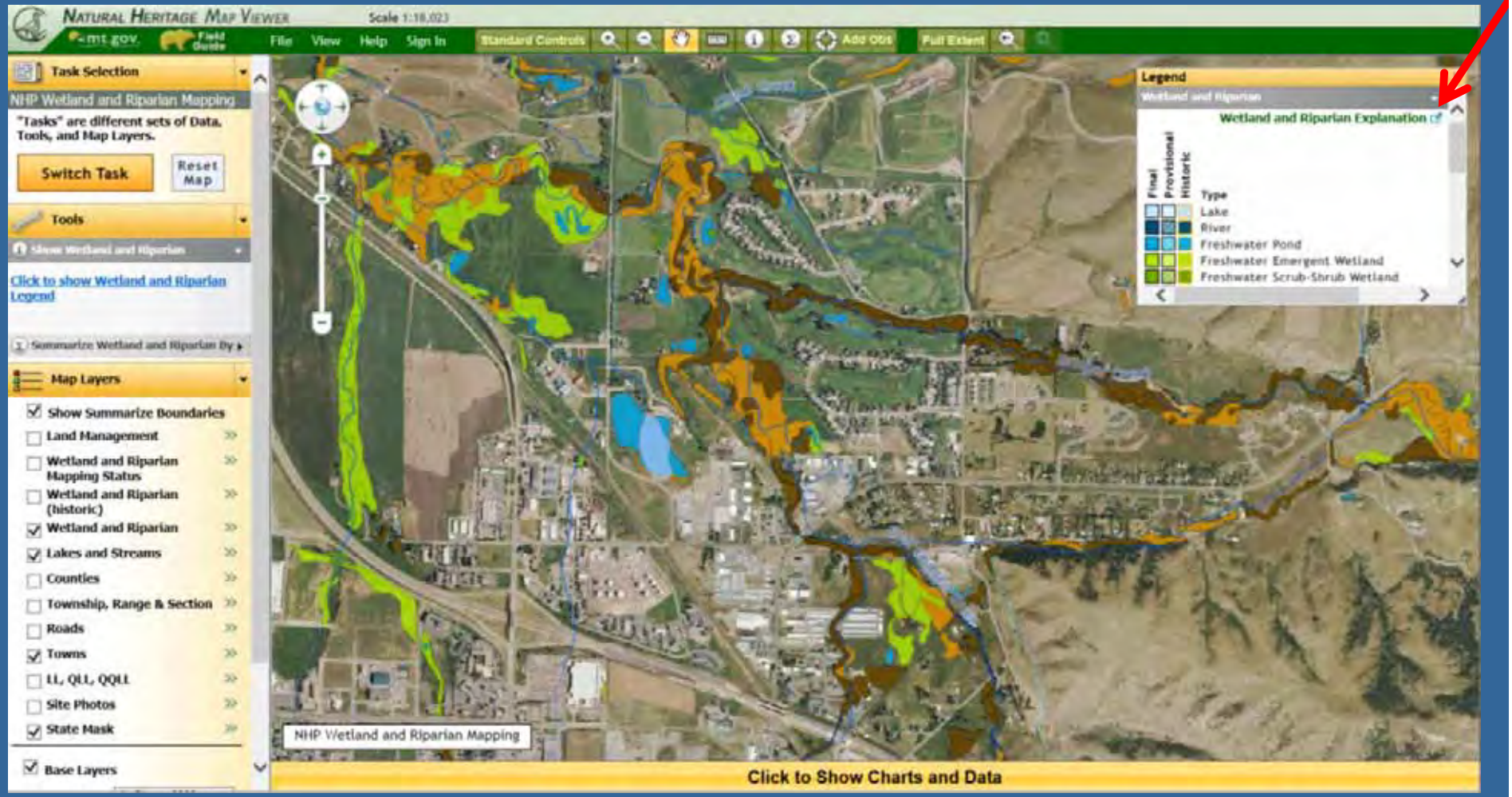
- Aerial imagery, hillshade (terrain), color IR imagery, topographic map, landcover



Map Viewer

Legend

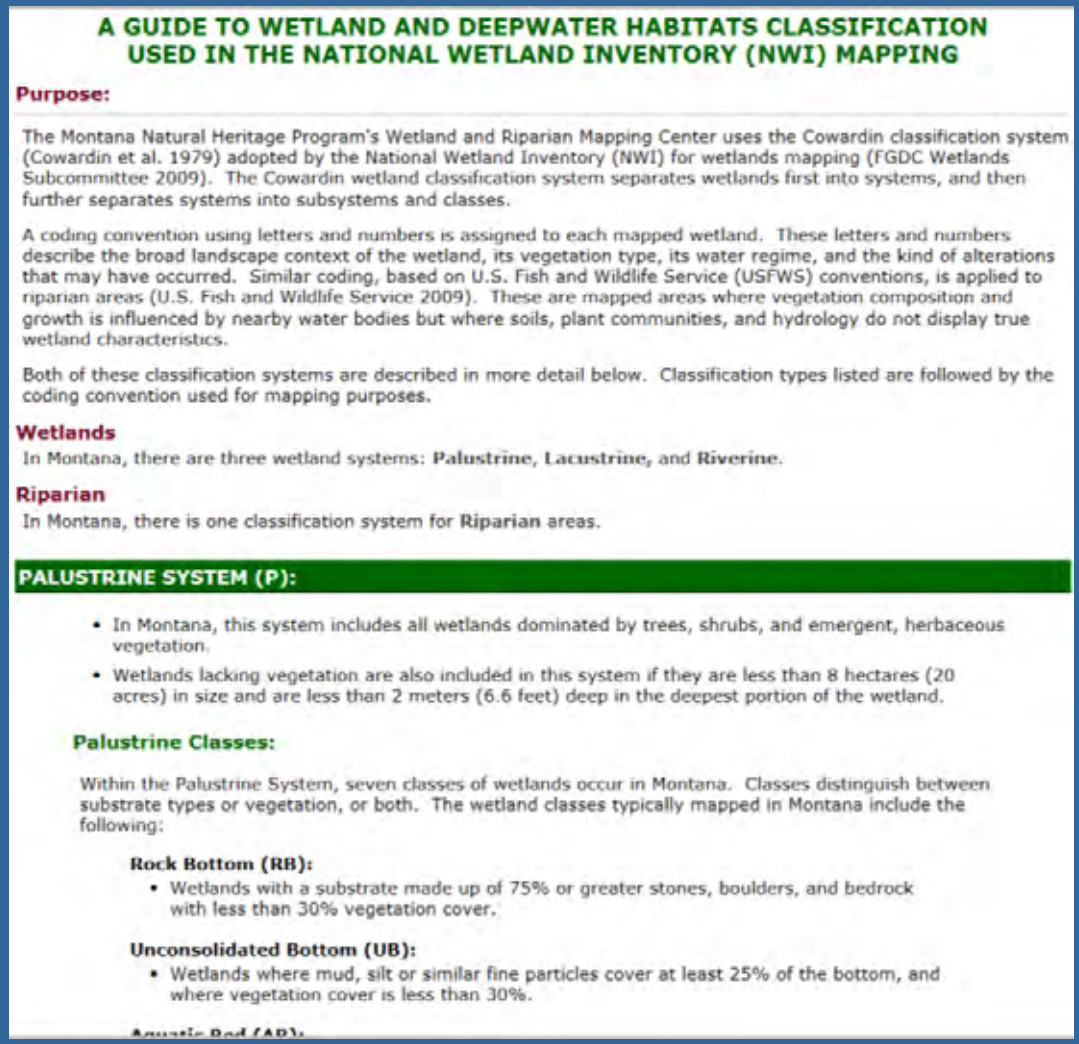
- Click **"Wetland and Riparian Explanations"** to view classification details



Map Viewer

Legend

- Links to wetland and riparian classification document



A GUIDE TO WETLAND AND DEEPWATER HABITATS CLASSIFICATION USED IN THE NATIONAL WETLAND INVENTORY (NWI) MAPPING

Purpose:

The Montana Natural Heritage Program's Wetland and Riparian Mapping Center uses the Cowardin classification system (Cowardin et al. 1979) adopted by the National Wetland Inventory (NWI) for wetlands mapping (FGDC Wetlands Subcommittee 2009). The Cowardin wetland classification system separates wetlands first into systems, and then further separates systems into subsystems and classes.

A coding convention using letters and numbers is assigned to each mapped wetland. These letters and numbers describe the broad landscape context of the wetland, its vegetation type, its water regime, and the kind of alterations that may have occurred. Similar coding, based on U.S. Fish and Wildlife Service (USFWS) conventions, is applied to riparian areas (U.S. Fish and Wildlife Service 2009). These are mapped areas where vegetation composition and growth is influenced by nearby water bodies but where soils, plant communities, and hydrology do not display true wetland characteristics.

Both of these classification systems are described in more detail below. Classification types listed are followed by the coding convention used for mapping purposes.

Wetlands

In Montana, there are three wetland systems: **Palustrine**, **Lacustrine**, and **Riverine**.

Riparian

In Montana, there is one classification system for **Riparian** areas.

PALUSTRINE SYSTEM (P):

- In Montana, this system includes all wetlands dominated by trees, shrubs, and emergent, herbaceous vegetation.
- Wetlands lacking vegetation are also included in this system if they are less than 8 hectares (20 acres) in size and are less than 2 meters (6.6 feet) deep in the deepest portion of the wetland.

Palustrine Classes:

Within the Palustrine System, seven classes of wetlands occur in Montana. Classes distinguish between substrate types or vegetation, or both. The wetland classes typically mapped in Montana include the following:

Rock Bottom (RB):

- Wetlands with a substrate made up of 75% or greater stones, boulders, and bedrock with less than 30% vegetation cover.

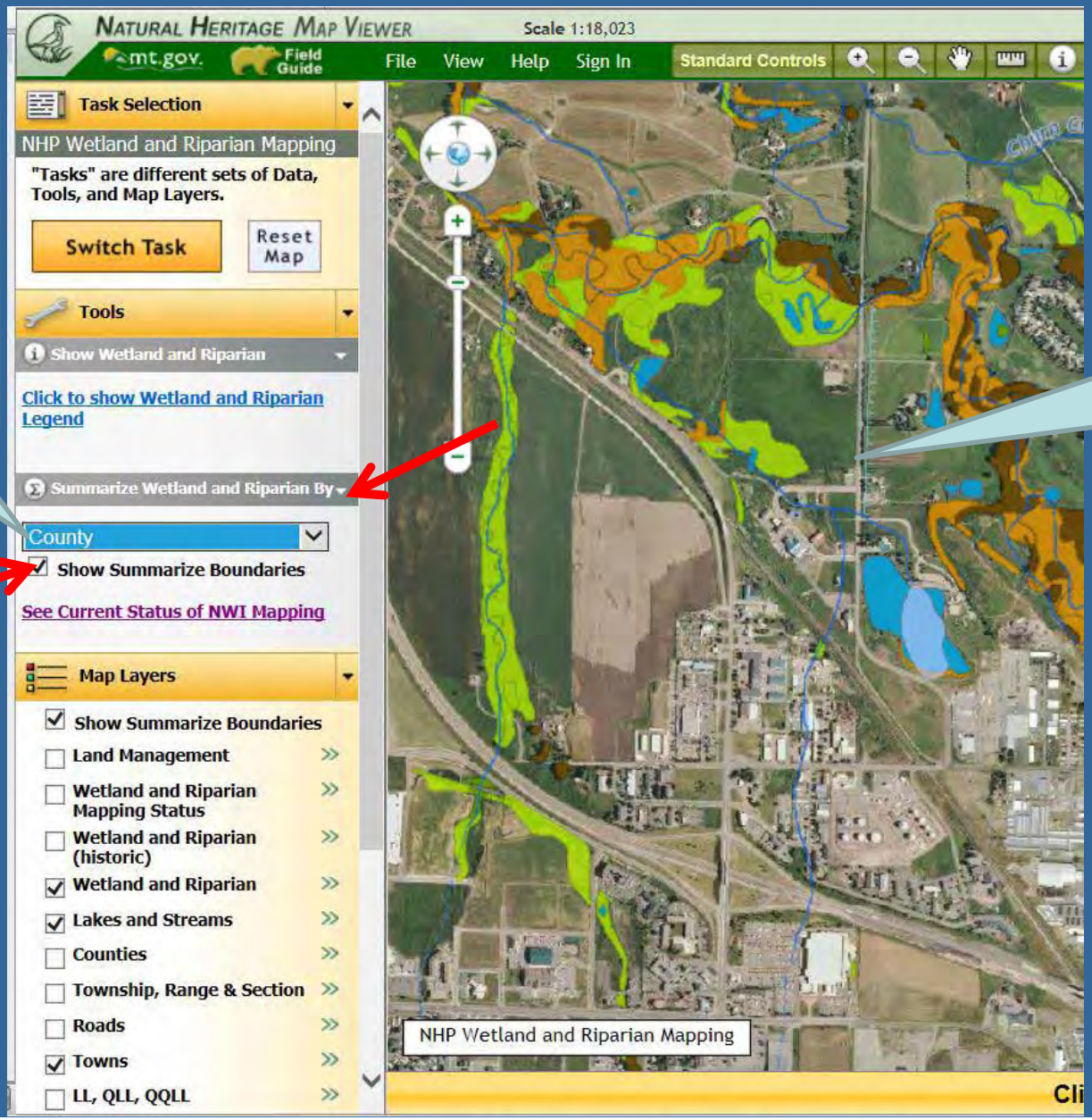
Unconsolidated Bottom (UB):

- Wetlands where mud, silt or similar fine particles cover at least 25% of the bottom, and where vegetation cover is less than 30%.

Aquatic Bed (AB):

Map Viewer Summarize Data

Summarize data by: state, county, quad, watershed, township, section

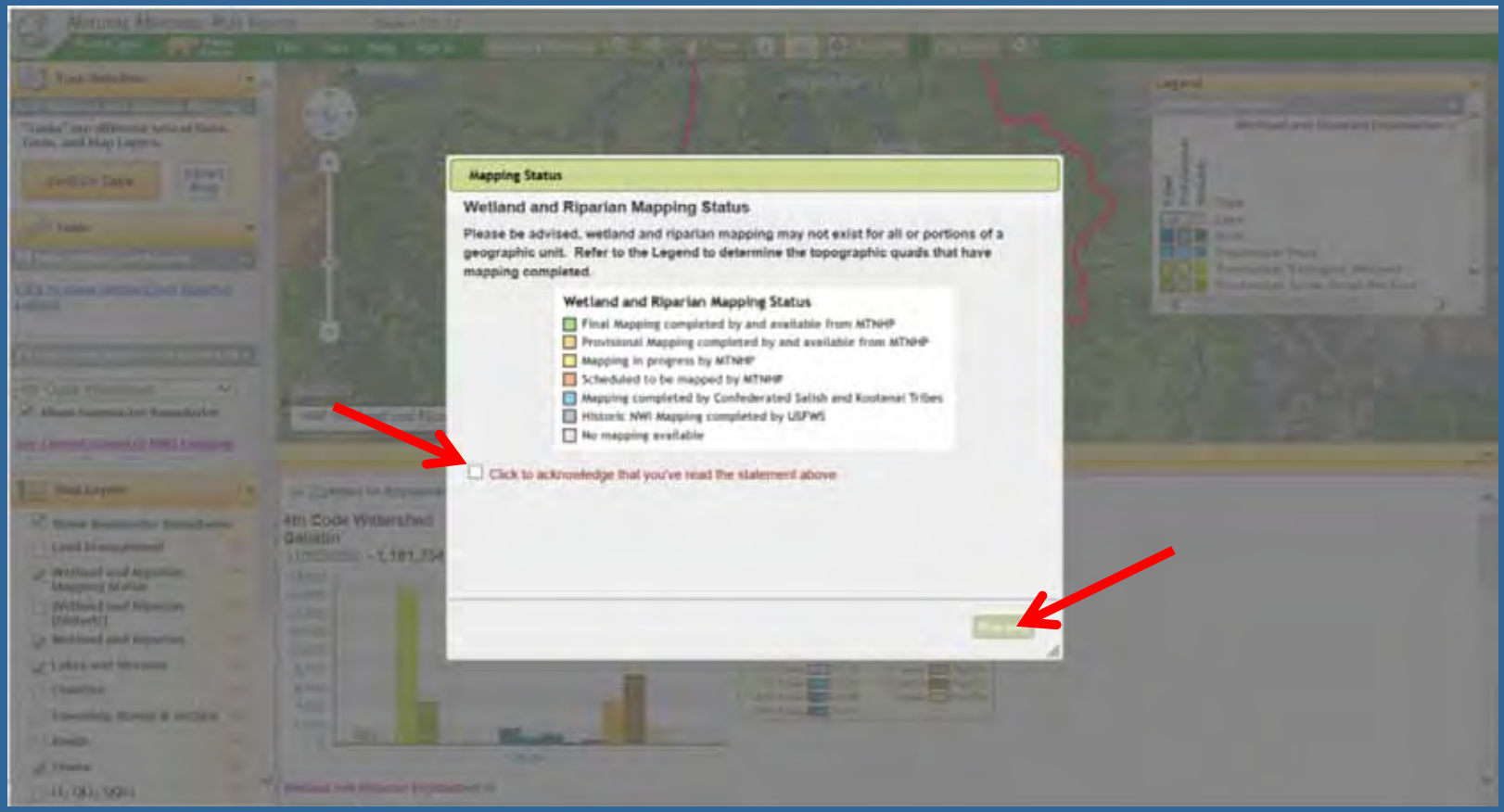


Click on map to summarize

Map Viewer Summarize Data

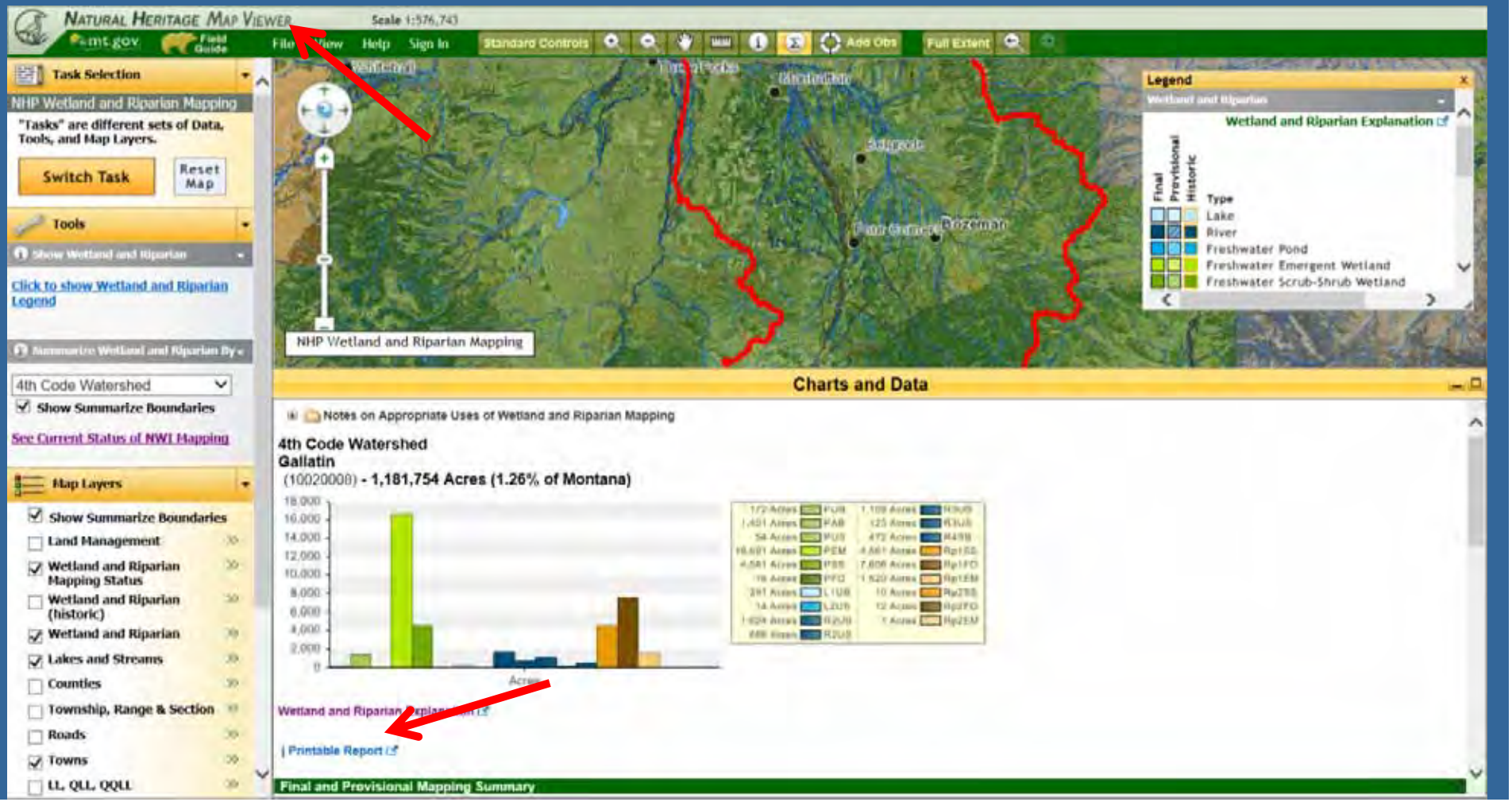
Summarize Data

- Review and acknowledge mapping status statement



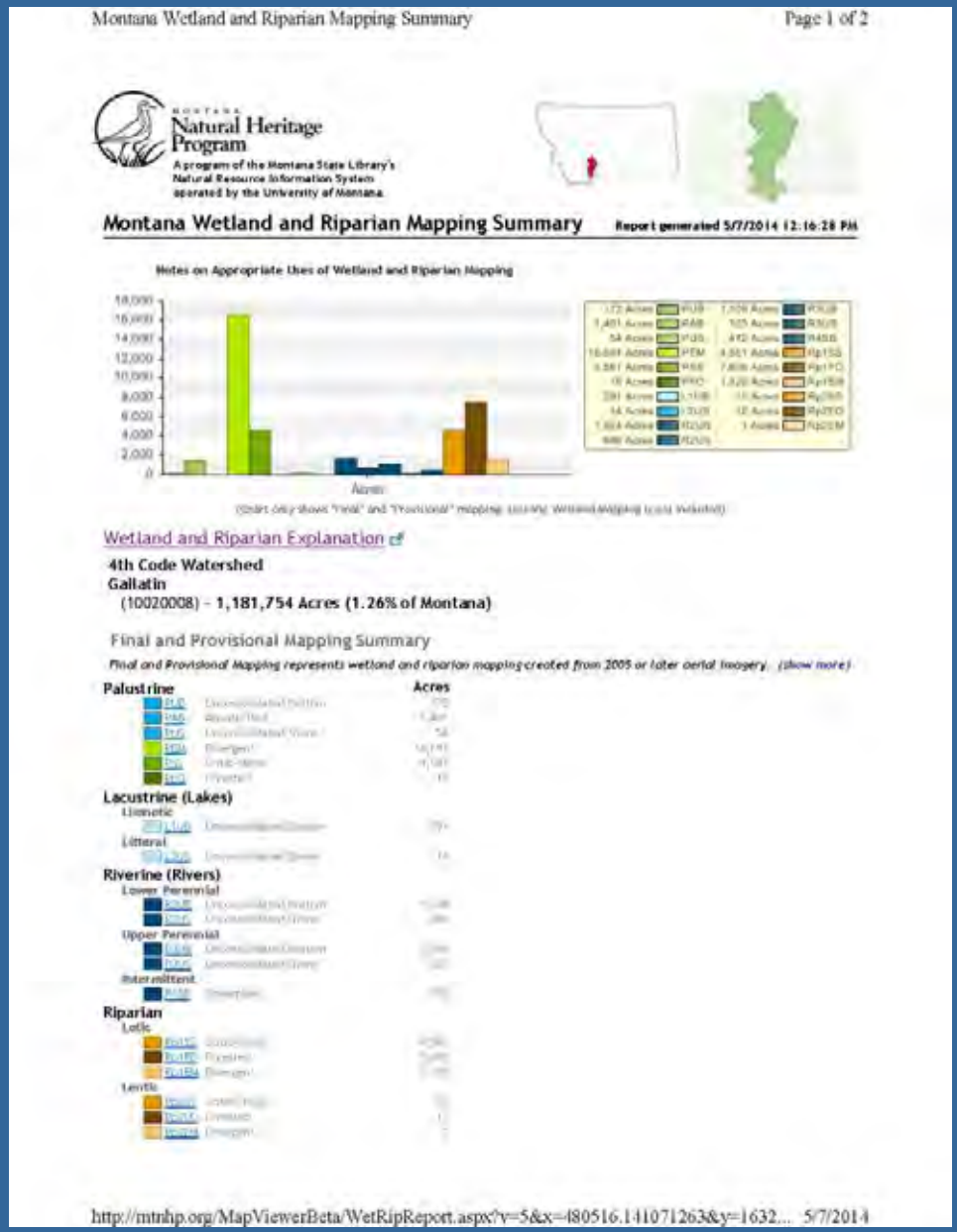
Map Viewer Summarize Data

- Acreage by type and modification
- Export map to jpg or pdf: Click “File, “Export map to jpg/pdf”
- Print report to jpg or pdf



Map Viewer Summarize Data

Print mapping and report to jpg or pdf



Montana Wetland and Riparian Mapping Summary Page 1 of 2

Natural Heritage Program
A program of the Montana State Library's Natural Resource Information System operated by the University of Montana

Montana Wetland and Riparian Mapping Summary

Report generated 5/7/2014 12:16:28 PM

Notes on Appropriate Uses of Wetland and Riparian Mapping

Wetland and Riparian Explanation

4th Code Watershed
Gallatin
(10020008) - **1,181,754 Acres (1.26% of Montana)**

Final and Provisional Mapping Summary

Final and Provisional Mapping represents wetland and riparian mapping created from 2005 or later aerial imagery. (show more)

Palustrine — Acres

Lacustrine (Lakes)
Limnetic
Littoral

Riverine (Rivers)
Lower Perennial
Upper Perennial
Intermittent

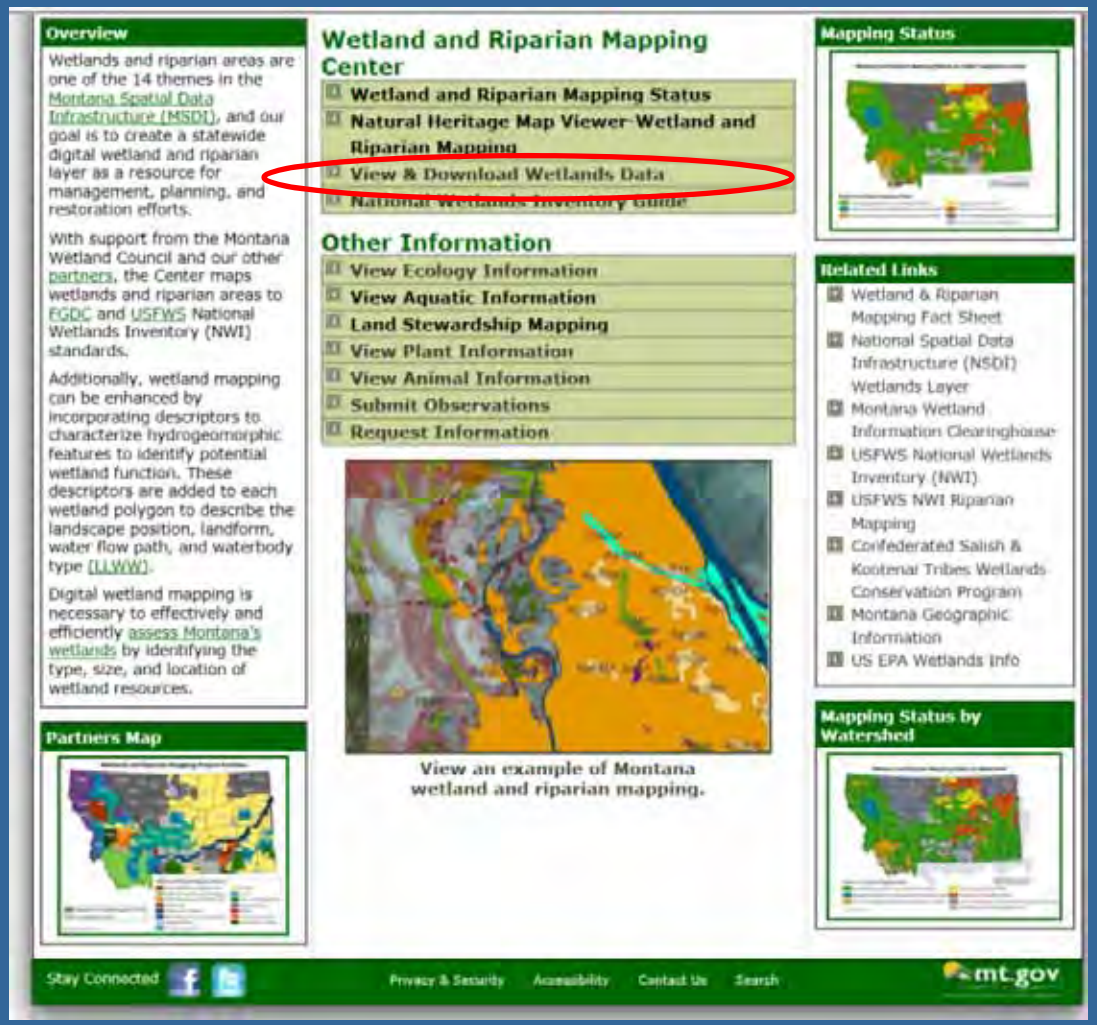
Riparian
Lotic
Lentic

http://mtnhp.org/MapViewerBeta/WetRipReport.aspx?v=5&x=-80516.141071263&y=1632... 5/7/2014

Accessing Mapping

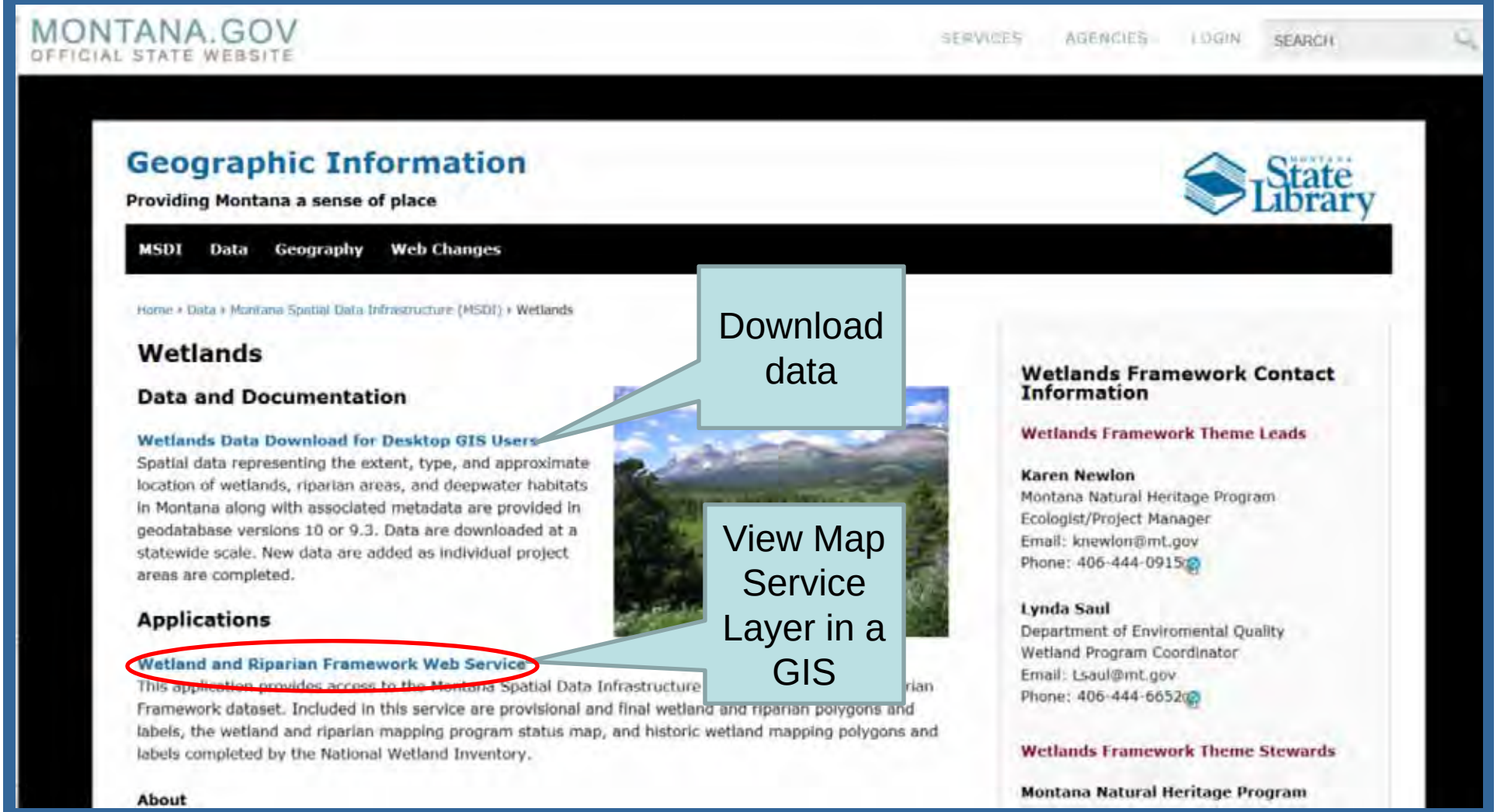
View or Download for GIS

http://mtnhp.org/NWI



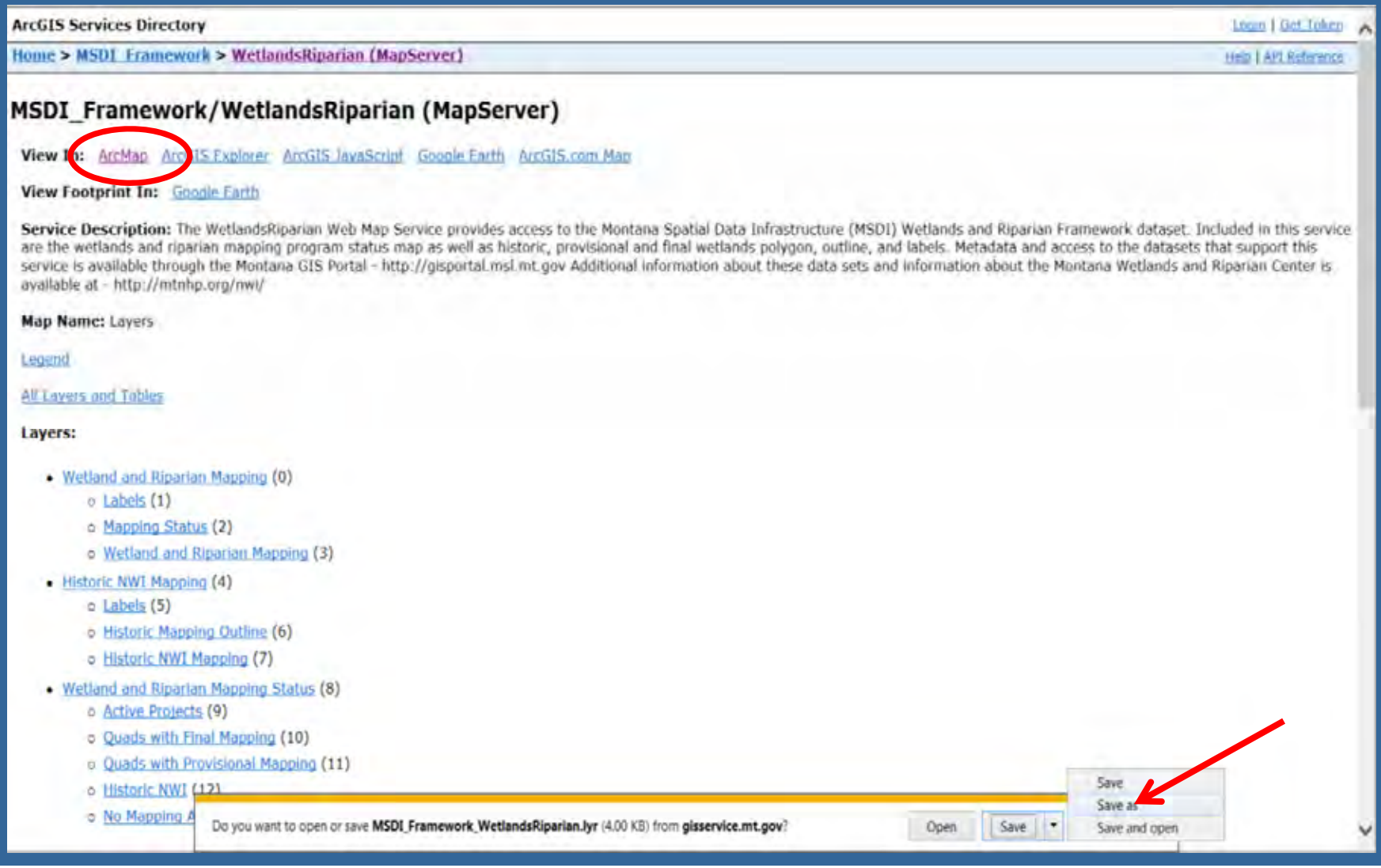
View or Download for GIS

http://geoinfo.montanastatelibrary.org/data/msdi/wetlands/



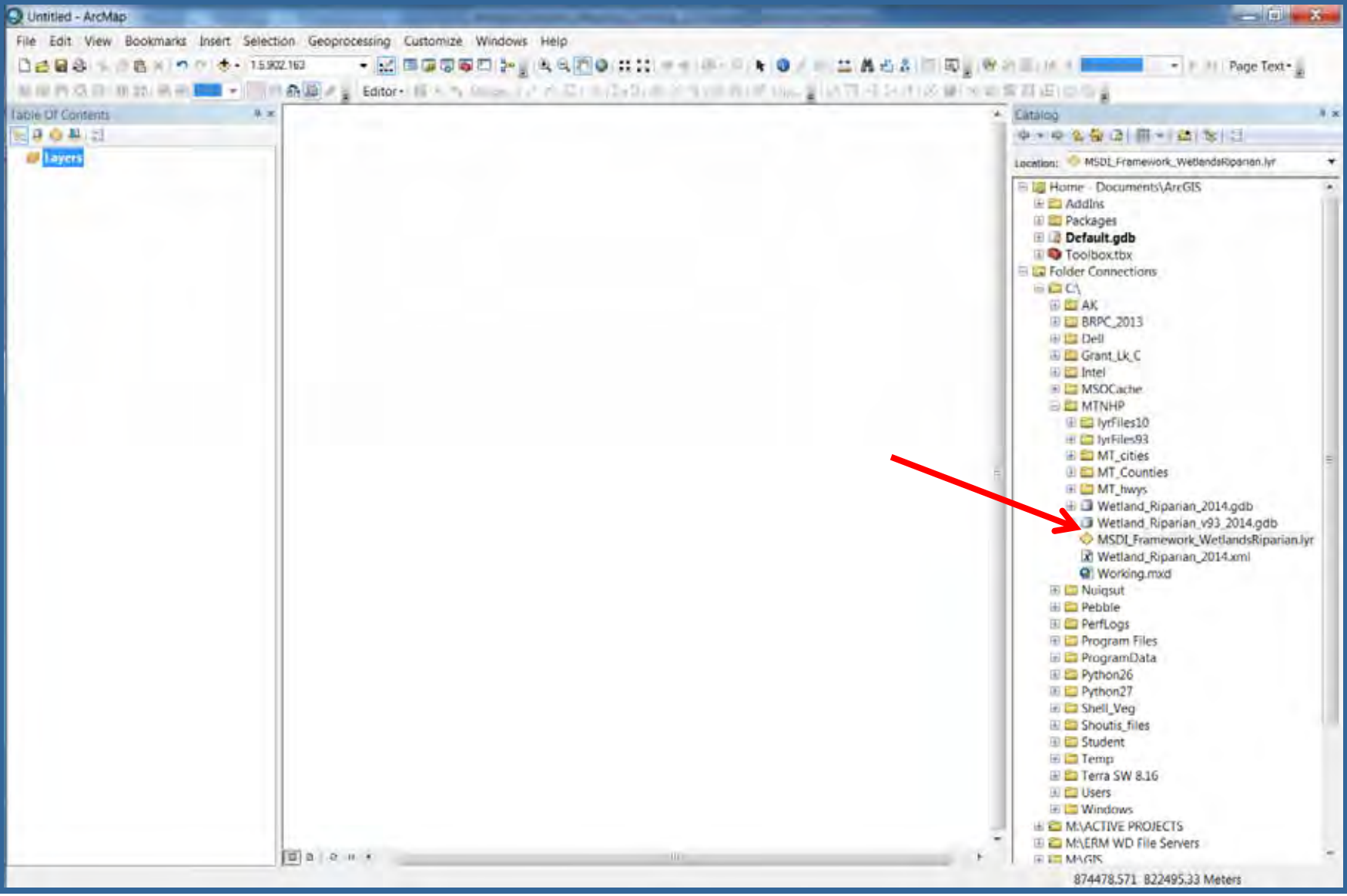
View Using Map Service in GIS

Click Save, use the drop down arrow to **"Save As"**
Save with your ArcMap layers, add layer to your map



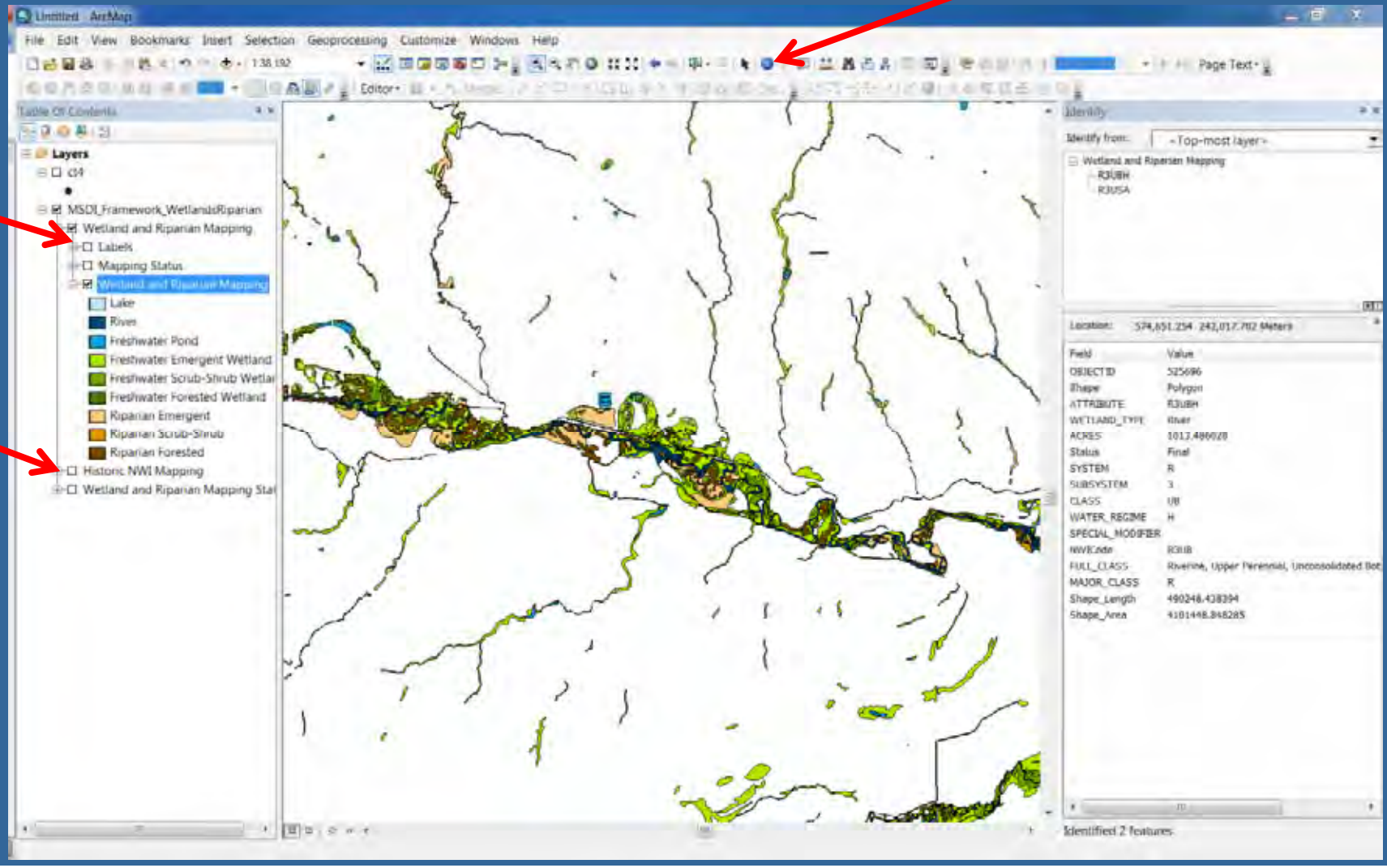
View Using MapService in GIS

Add layer to the map, **"MSDI_Framework_WetlandsRiparian.lyr"**



View Using MapService in GIS

- Zoom to area of interest to view mapping
- Use **"Identify"** tool to explore attributes



Download for GIS

http://geoinfo.montanastatelibrary.org/data/msdi/wetlands/

MONTANA.GOV
OFFICIAL STATE WEBSITE

SERVICES AGENCIES LOGIN SEARCH

Geographic Information

Providing Montana a sense of place

State Library

MSDI Data Geography Web Changes

Home › Data › Montana Spatial Data Infrastructure (MSDI) › Wetlands

Wetlands

Data and Documentation

Wetlands Data Download for Desktop GIS Users

Spatial data representing the extent, type, and approximate location of wetlands, riparian areas, and deepwater habitats in Montana along with associated metadata are provided in geodatabase versions 10 or 9.3. Data are downloaded at a statewide scale. New data are added as individual project areas are completed.

Applications

Wetland and Riparian Framework Web Service

This application provides access to the Montana Spatial Data Infrastructure (MSDI) Wetlands and Riparian Framework dataset. Included in this service are provisional and final wetland and riparian polygons and labels, the wetland and riparian mapping program status map, and historic wetland mapping polygons and labels completed by the National Wetland Inventory.

About

Wetlands Framework Contact Information

Wetlands Framework Theme Leads

Karen Newlon
Montana Natural Heritage Program
Ecologist/Project Manager
Email: knewlon@mt.gov
Phone: 406-444-0915

Lynda Saul
Department of Enviromental Quality
Wetland Program Coordinator
Email: Lsaul@mt.gov
Phone: 406-444-6652

Wetlands Framework Theme Stewards

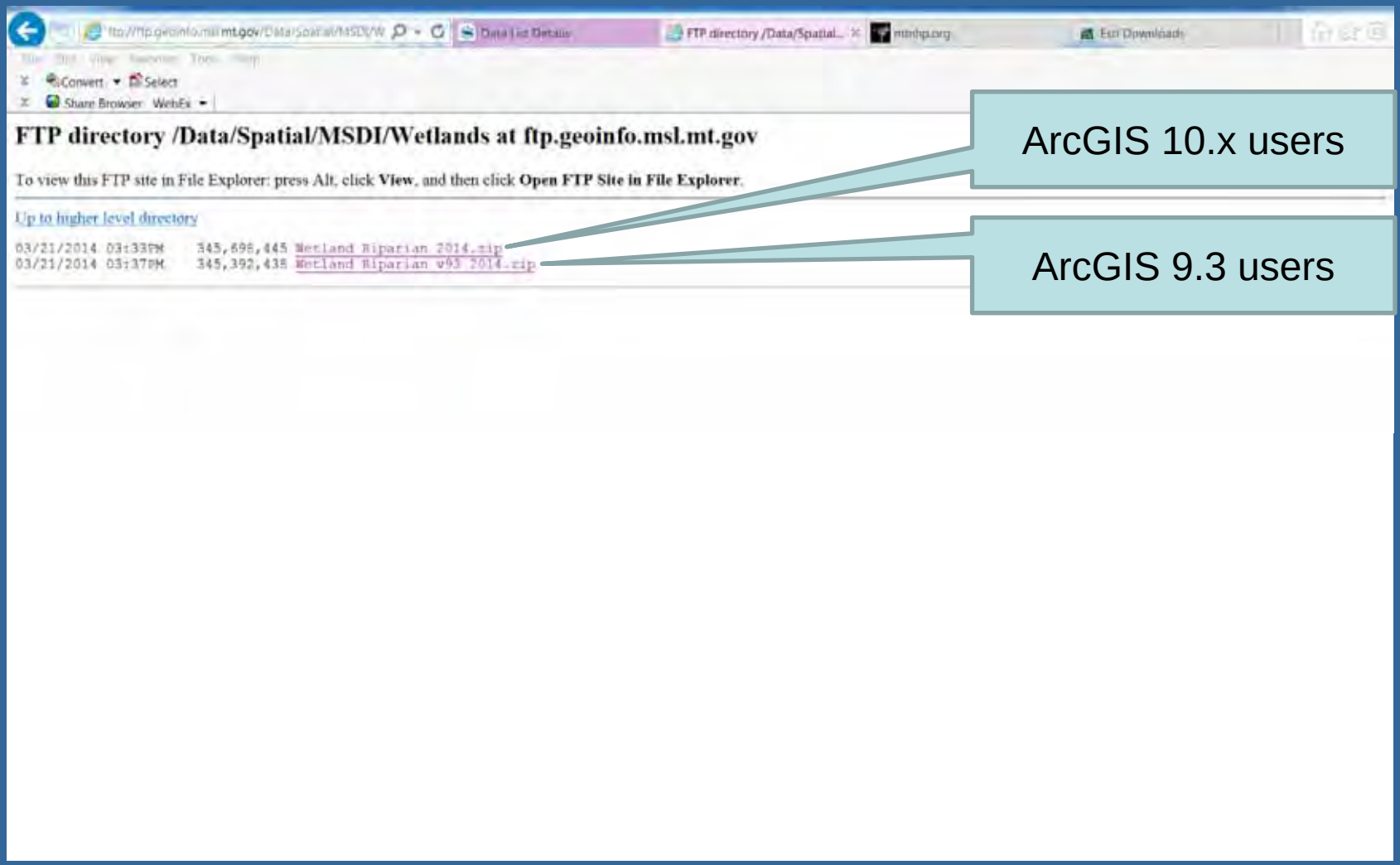
Montana Natural Heritage Program

Download for GIS

Montana State Data Infrastructure (MSDI)

Download for GIS

Download zip file for your version of ArcGIS



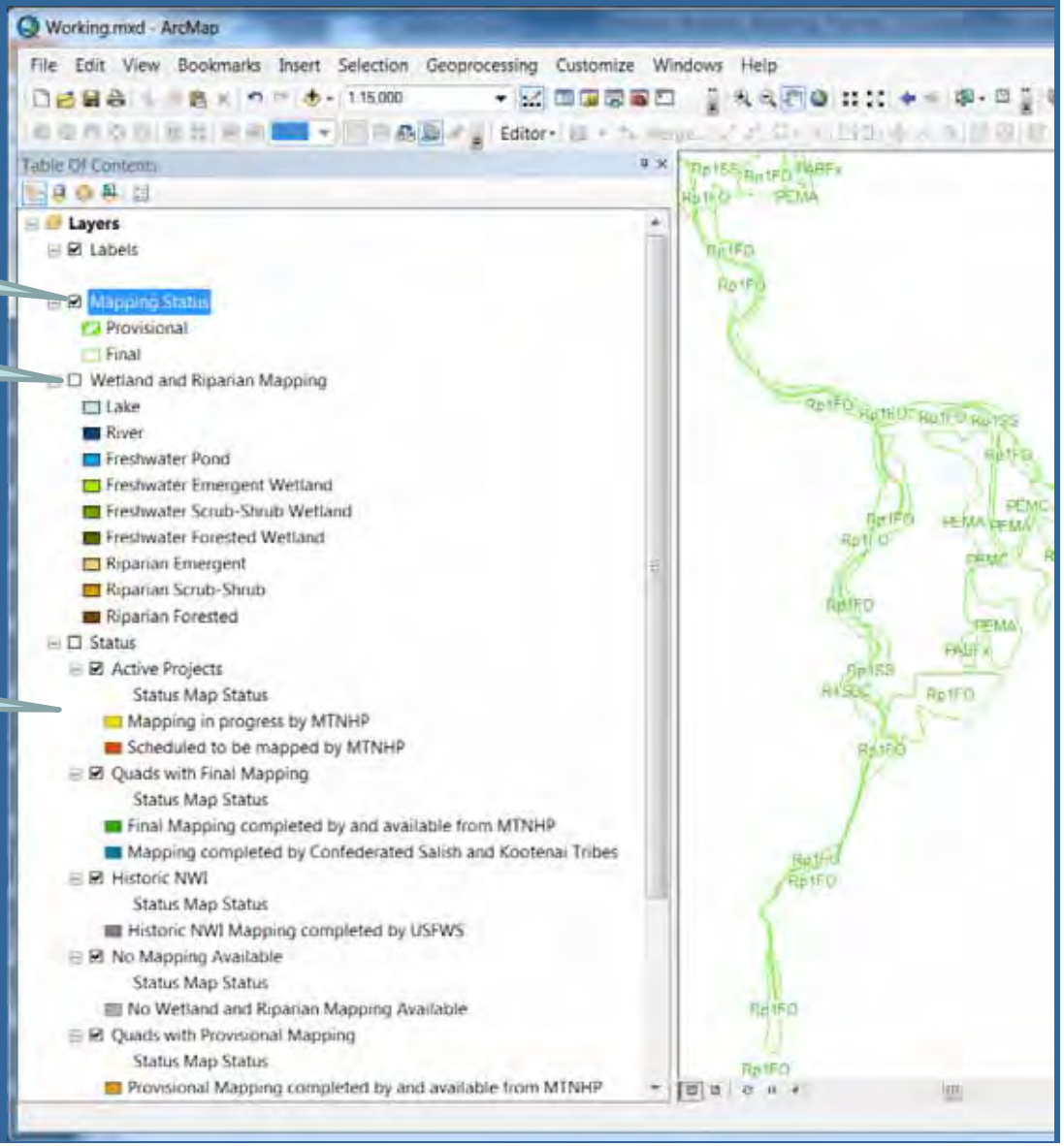
Download for GIS

Using Mapping in ArcGIS

Status by polygon

Mapping by polygon (provisional or final only)

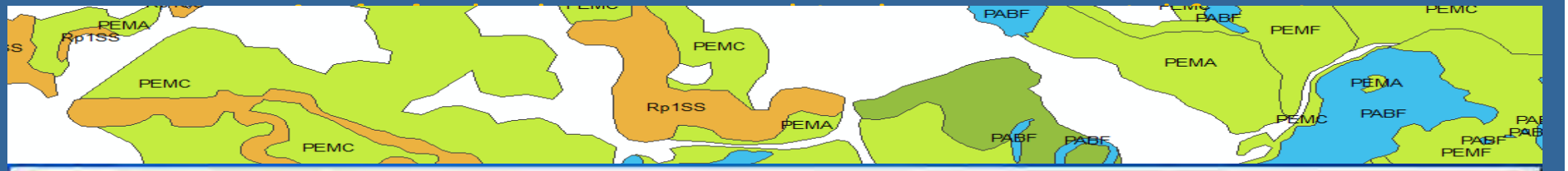
Mapping status by quad



Download for GIS

Attribute table

- Includes NWI coding (vegetation, water regime, alterations)



Table

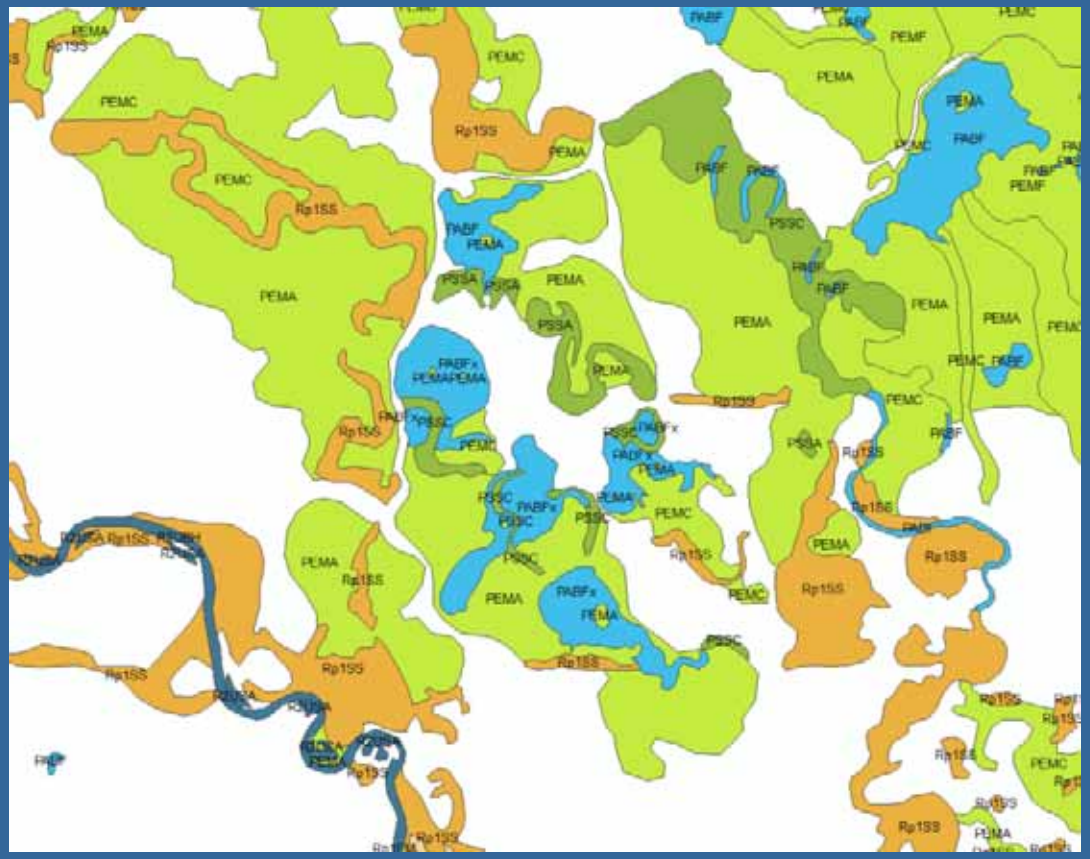
Wetland and Riparian Mapping

WETLAND_TYPE	ATTRIBUTE	ACRES	Status	SYSTEM	SUBSYSTEM	CLASS	WATER_REG	SPECIAL_MODIFIER	NWICode	FULL_CLASS	M
River	R3UBF	28.003481	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMA	2.052434	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
Freshwater Pond	PABFx	0.074808	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R3UBF	18.250269	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMA	0.217019	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
River	R4SBCx	27.438884	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFx	0.333811	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R4SBCx	40.464602	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFx	0.162224	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFh	0.085555	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFx	0.213669	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFx	0.026285	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Emergent Wetland	PEMA	4.03685	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
Freshwater Pond	PABFx	0.062419	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFx	0.028559	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R4SBCx	125.079106	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
River	R4SBCx	26.20464	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFh	0.802709	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.151048	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.797061	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Emergent Wetland	PEMC	0.142154	Final	P		EM	C		PEM	Palustrine, Emergent, Seasonally Flooded	P
Freshwater Pond	PABFh	0.219671	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.293705	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.080464	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
River	R3UBF	9.735145	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMB	0.693596	Final	P		EM	B		PEM	Palustrine, Emergent, Saturated	P
River	R3UBF	4.516137	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Pond	PABFh	0.277586	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	1.116554	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P

2 (0 out of 863373 Selected)

Wetland and Riparian Mapping

Questions?



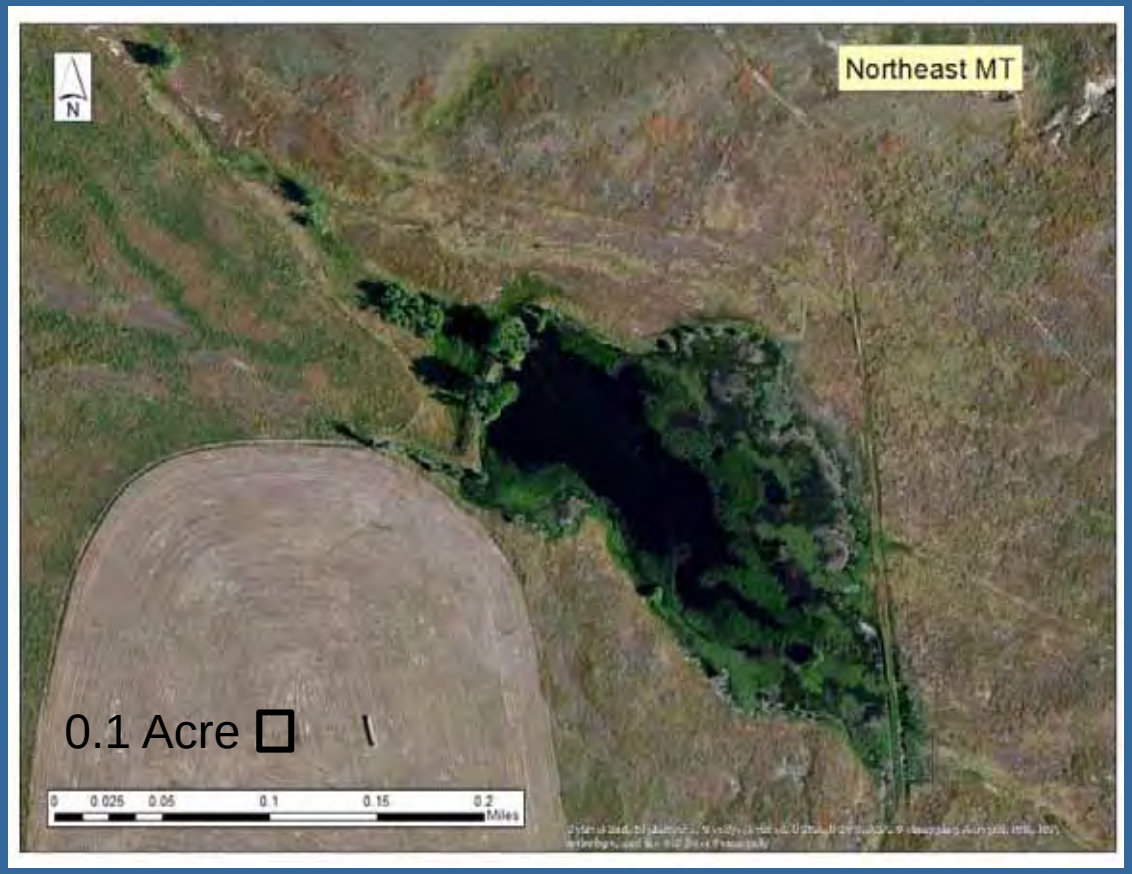
Training Overview

- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- Mapping programs and status
- How mapping is created, limitations
- Classification systems
- Accessing mapping
- **Hands-on mapping activity**
- Uses and examples

Mapping Activity

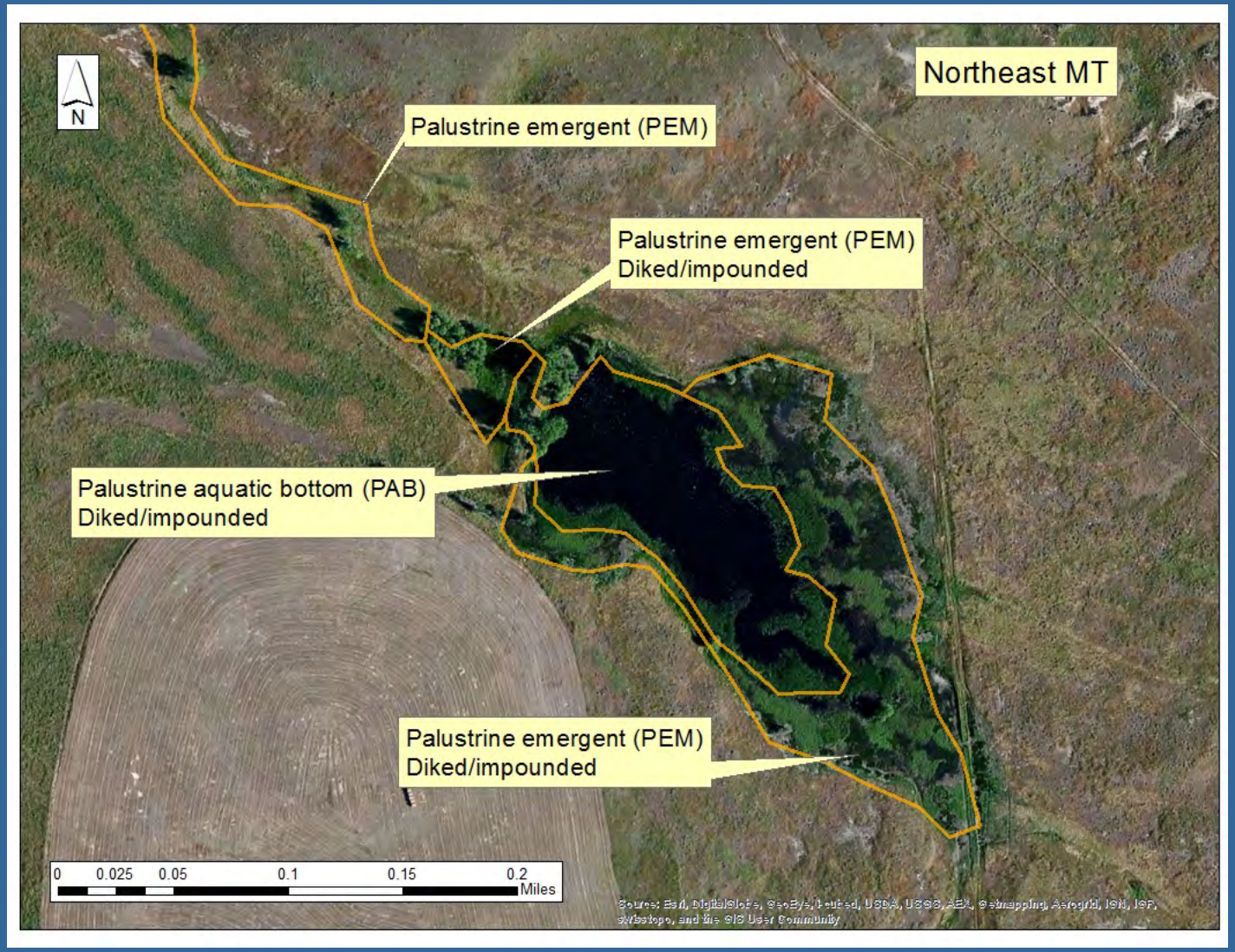
Directions

- Outline potential wetland types
- Add wetland classification



20 minutes

Mapping Activity



Training Overview

- Definition of wetland and riparian areas
- What is wetland and riparian mapping?
- Mapping programs and status
- How mapping is created, limitations
- Classification systems
- Accessing mapping
- Hands-on mapping activity
- **Uses and examples**

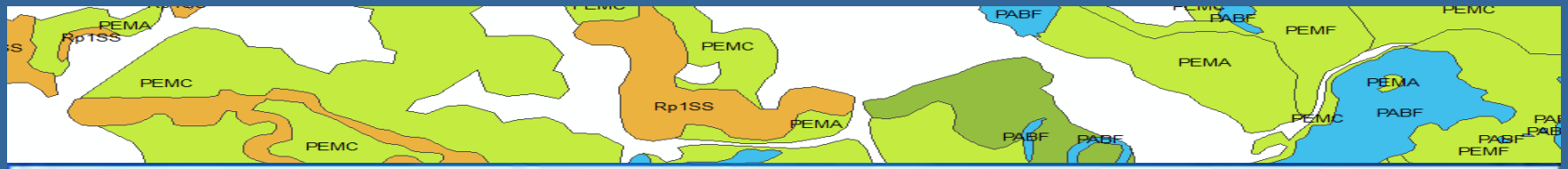
Potential Uses

- Preliminary site assessment
- General data management
- Land use planning
- Floodplain management
- Riparian setbacks
- NEPA process
- Project permitting
- Project facilities siting
- CWA Section 404 Permitting
- Assessing wetland function
- Restoration planning
- Monitoring plan development
- Evaluate watershed-scale wetland losses/gains
- Habitat assessment
- Conservation planning
- Fisheries protection
- Water quality protection

General Use

Data Management

GIS layer can be used as the geodatabase to house any wetland/riparian data set



Table

Wetland and Riparian Mapping

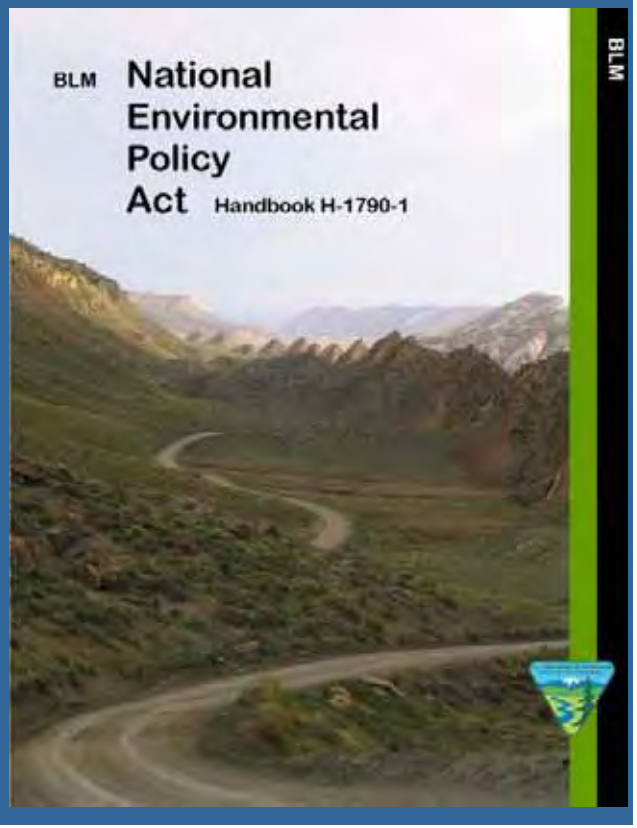
WETLAND_TYPE	ATTRIBUTE	ACRES	Status	SYSTEM	SUBSYSTEM	CLASS	WATER_REG	SPECIAL_MODIFIER	NWICode	FULL_CLASS	M
River	R3UBF	28.003481	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMA	2.052434	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
Freshwater Pond	PABFx	0.074808	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R3UBF	18.250269	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMA	0.217019	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
River	R4SBCx	27.438894	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFx	0.333811	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R4SBCx	40.464602	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFx	0.162224	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFh	0.085555	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFx	0.213669	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFx	0.026285	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Emergent Wetland	PEMA	4.02685	Final	P		EM	A		PEM	Palustrine, Emergent, Temporarily Flooded	P
Freshwater Pond	PABFx	0.082419	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
Freshwater Pond	PABFx	0.028559	Final	P		AB	F	x	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	P
River	R4SBCx	125.079108	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
River	R4SBCx	26.26464	Final	R	4	SB	C	x	R4SB	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated	R
Freshwater Pond	PABFh	0.882709	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.151048	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.797061	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Emergent Wetland	PEMC	0.142154	Final	P		EM	C		PEM	Palustrine, Emergent, Seasonally Flooded	P
Freshwater Pond	PABFh	0.215671	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.293706	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	0.080454	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
River	R3UBF	9.735145	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Emergent Wetland	PEMB	0.893559	Final	P		EM	B		PEM	Palustrine, Emergent, Saturated	P
River	R3UBF	4.516137	Final	R	3	UB	F		R3UB	Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded	R
Freshwater Pond	PABFh	0.277586	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P
Freshwater Pond	PABFh	1.116554	Final	P		AB	F	h	PAB	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	P

2 (0 out of 863373 Selected)

Wetland and Riparian Mapping

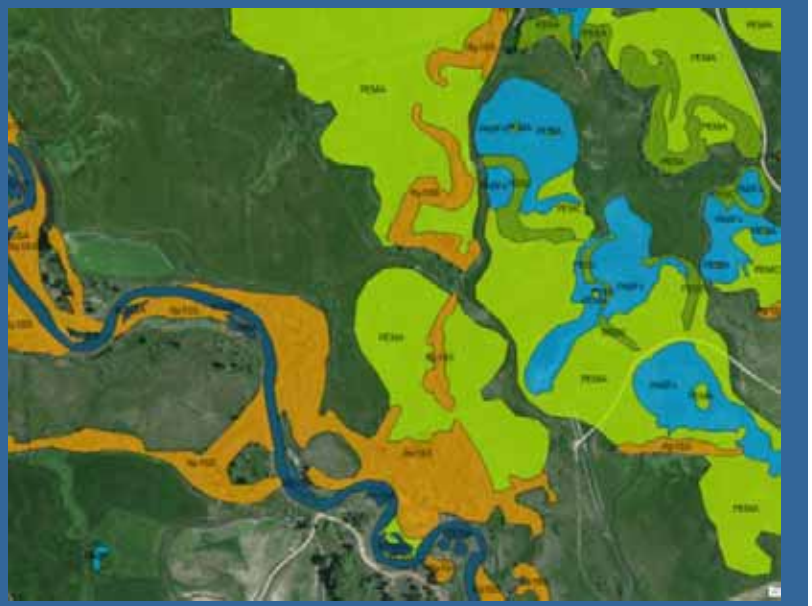
Example Use
NEPA Process

- Characterization of riparian and wetland habitat types and acreage for Affected Environment and Alternatives Analysis Sections
- To house environmental data and ancillary information
- Assessment of restoration and mitigation options



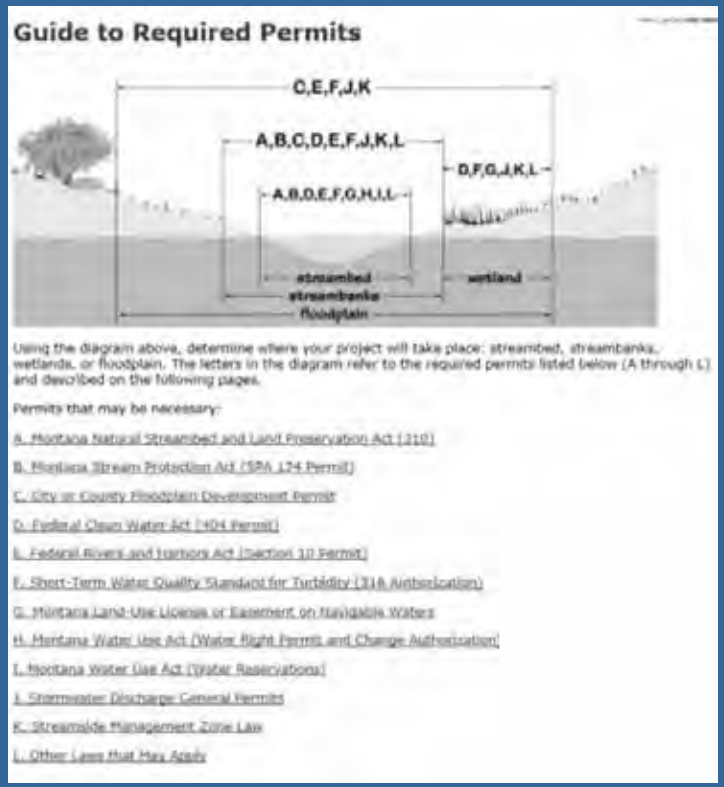
Example Use
Habitat Assessment

- Mapping fish and wildlife habitat
- Mapping T/E species habitat
- Prioritization of habitat conservation areas at local or regional scales
- Modeling/predicting potential suitable habitat for specific species
- USFWS North American Wetlands Conservation Act (NAWCA) Grants



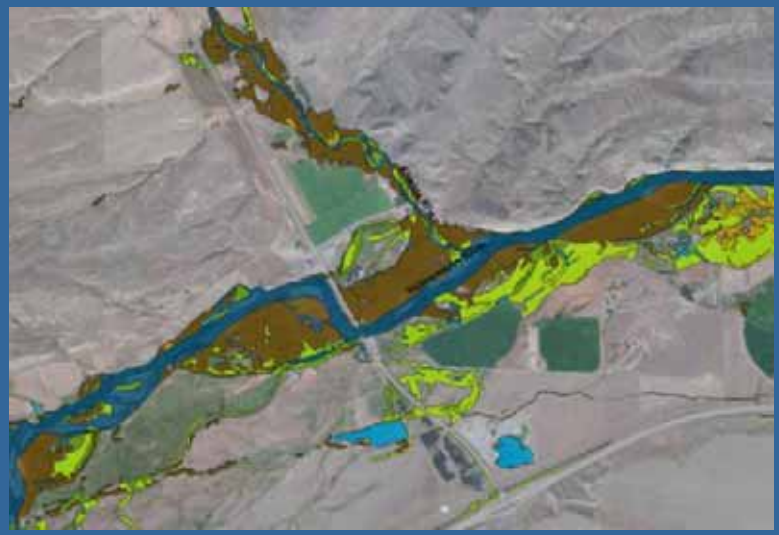
General Use
Project Permitting

- Clean Water Act Section 404 Permit
- Facilities siting
- Stormwater discharge general permits (MPDES, SWPPP)
- Streamside Management Zone Law



General Use
Land Use Planning

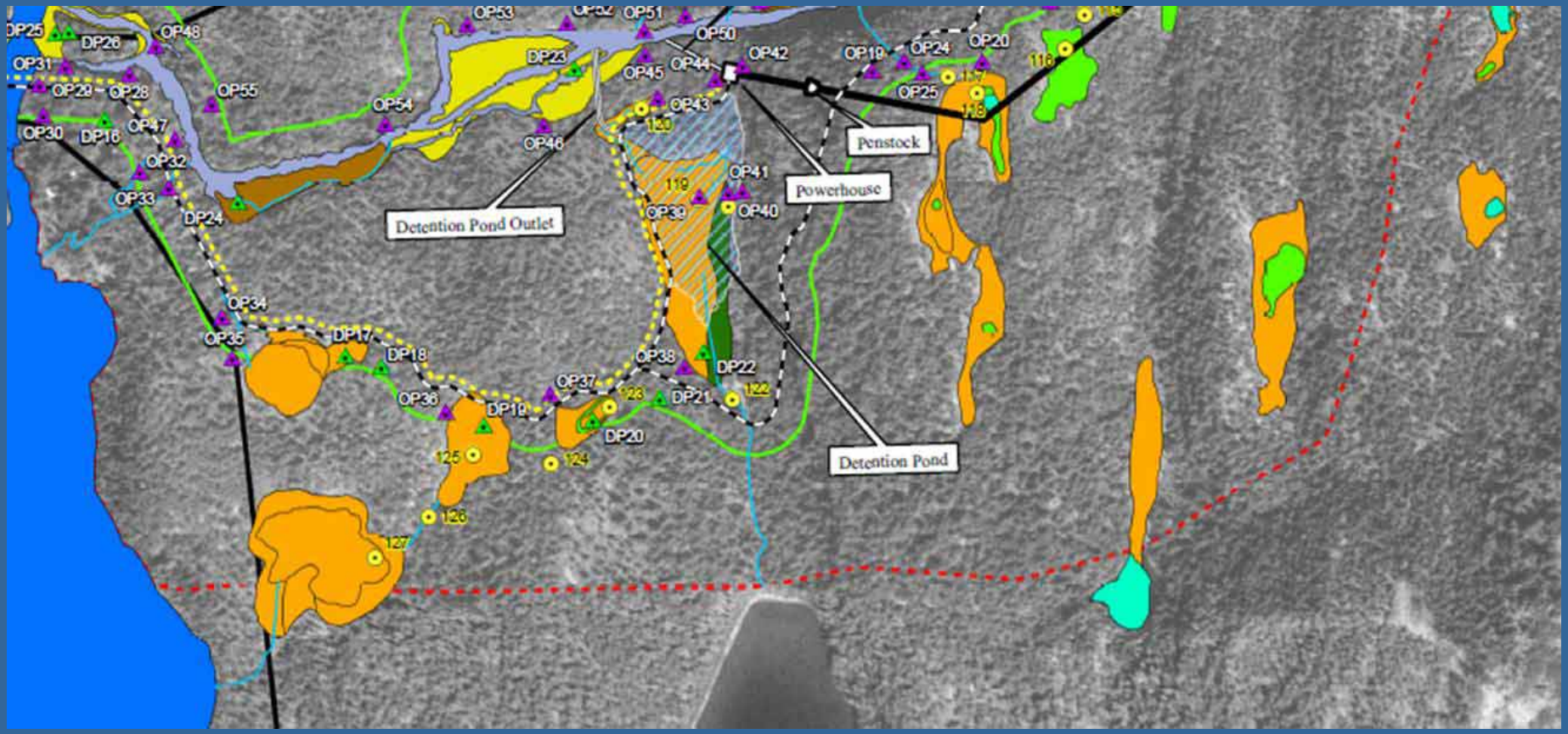
- Identify natural resources, and potential hazards, in a planning area
- Prioritize appropriate zoning types: recreation, residential, commercial, industrial…
- Project facilities siting and permitting
- Assess potential development impacts



Land Use Planning/Permitting Example

Project Facilities Siting

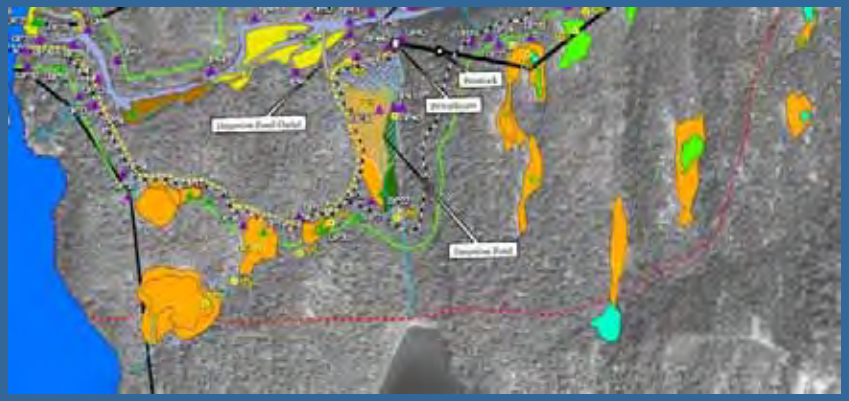
- Assess siting of project infrastructure for permitting
- Example: using wetland mapping to assess best route for proposed road and power transmission line



Example Use
CWA Section 404 Permitting

- Placement of fill in “Waters of the U.S.” requires CWA Section 404 permit
- Delineation of wetlands and waters
  - Pre-field desktop mapping
  - As base layer geodatabase for wetlands/waters data
- Wetland functional assessment for compensatory mitigation
  - As base layer geodatabase for functional data

Final delineation and jurisdictional determination requires field groundtruthing



Example Use

Floodplain Management and Planning

Floodplains are natural assets – keeping floodplains as open lands can:

- Save lives, reduce property damage, and avoid costs associated with building requirements
- Reduce environmental damage

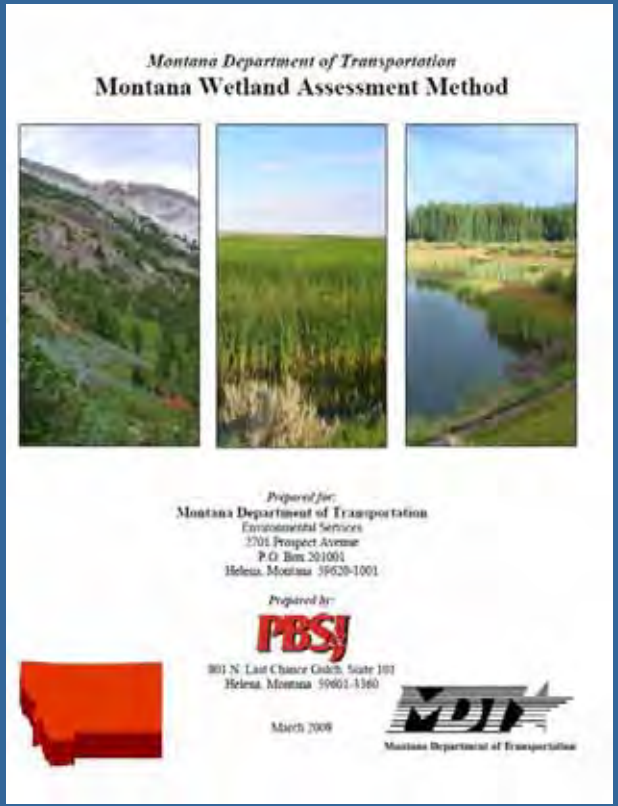
FEMA FIRM maps don't always include all river hazard areas

- NWI mapping can be used to augment the FIRM maps to assess potential channel migration and river hazard areas

Photo credit: Varella 2013

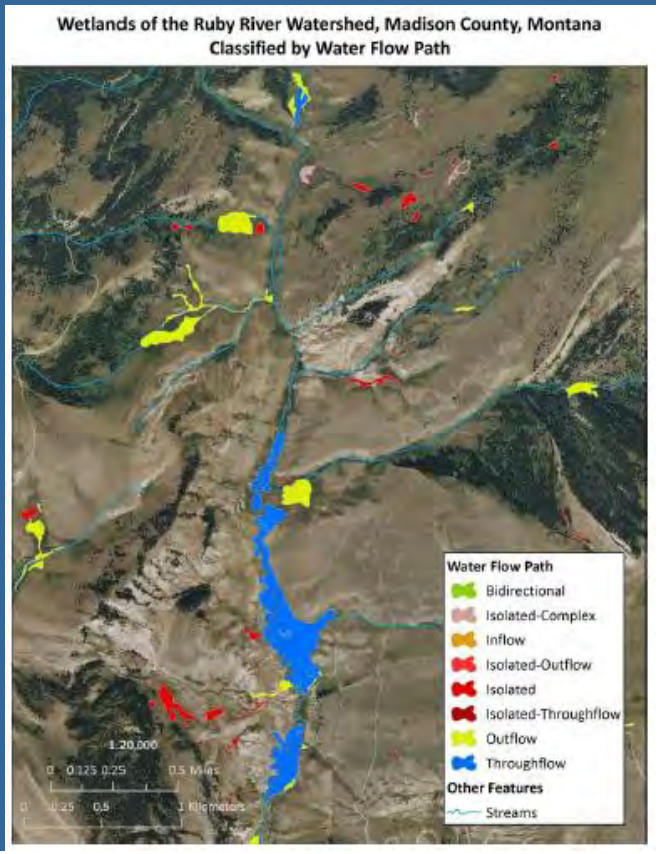
Example Use
Assessing Wetland Function

- Understanding potential wetland functions for mitigation, restoration prioritization, and conservation planning, i.e.:
  - Flood attenuation
  - Bank stabilization
  - Maintenance of flow
  - Sediment/nutrient retention
- Uses:
  - As base layer geodatabase for functional data (field or desktop data)
  - Landscape-scale assessment and modeling of potential functions in GIS



Example Use
Assessing Wetland Function

- Hydrogeomorphic characteristics are often used as surrogates to model potential functions at the landscape scale
- NWI uses LLWW descriptors for HGM information
  - *Landscape position*
  - *Landform*
  - *Water flow path*
  - *Waterbody type*
- ***HGM is not currently part of the NWI mapping for MT,*** but can be added by users
- MTNHP will be adding this data in the next few years



Example Use:
Water Quality Assessment and TMDL Planning

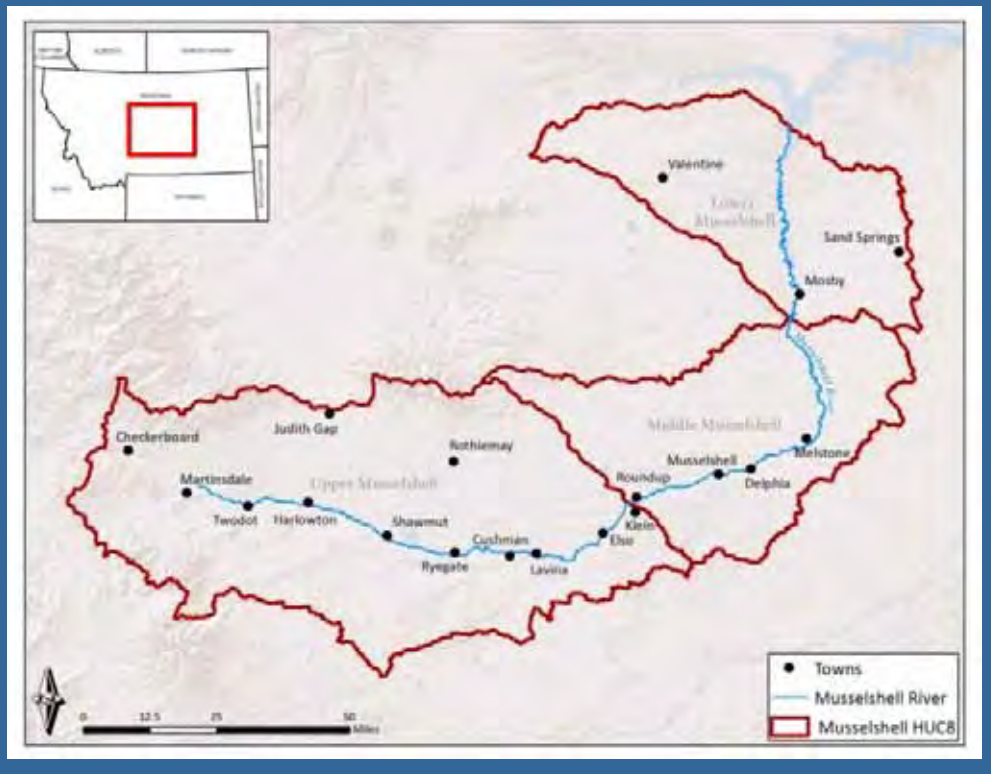
Uses

- Land Use/Land Cover characterization of watershed
- Assessment of natural loading sources
- Identification of source reduction areas (buffering)
- Assist in deriving model inputs for nutrient uptake, sediment retention, and potential shading in riparian areas

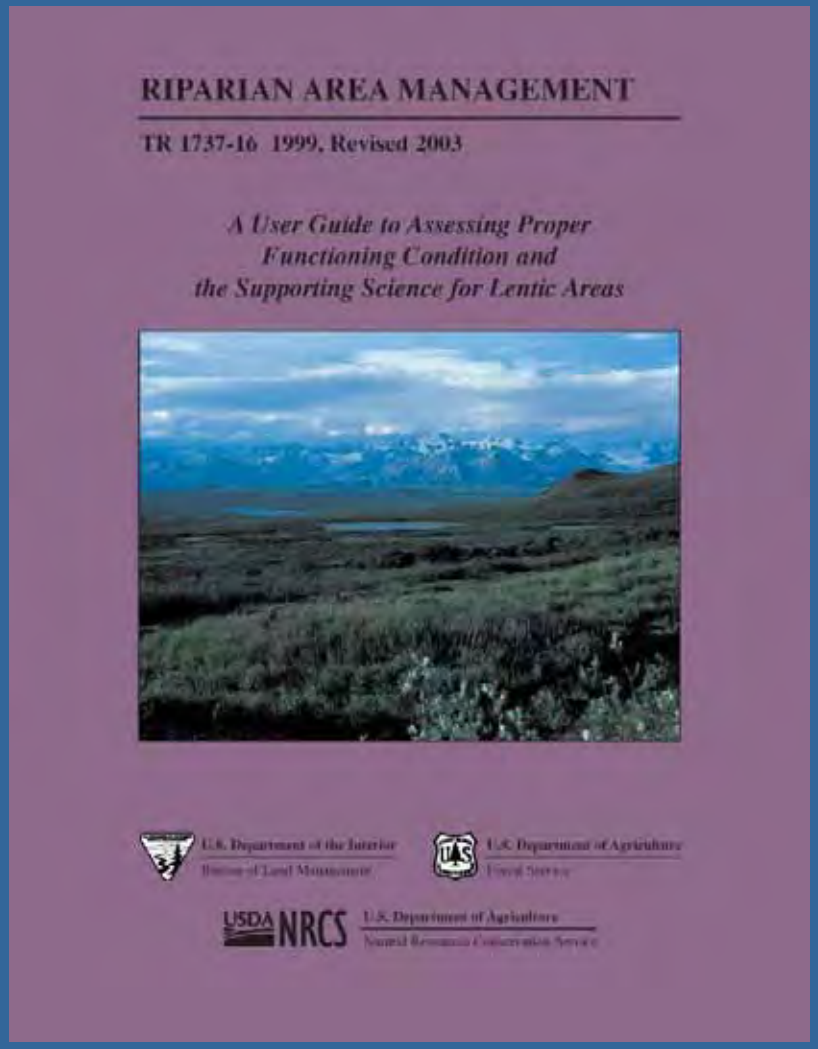
Project Example

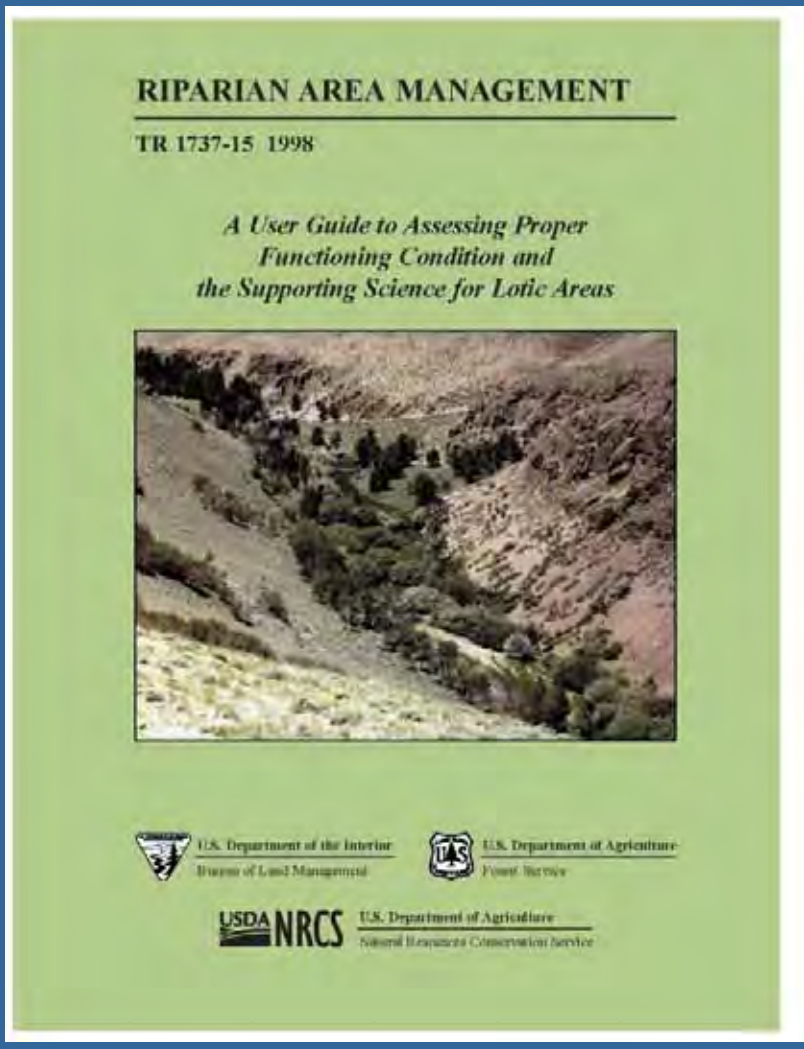
Restoration Planning in the Musselshell Watershed

- DEQ pilot project to incorporate wetlands into watershed restoration planning
- Employ a “risk-based” approach to prioritize wetland restoration sites with the highest potential to mitigate impairments to water quality and quantity



BLM Example Use:
Assessing Proper Functioning Condition (PFC)





BLM Example Use: Assessing Proper Functioning Condition (PFC)

Uses

- Pre-field landscape-level inventory of existing wetland and riparian resources
- GIS attribute table can house all PFC inventory and monitoring data (desktop and field data)
- As the GIS base layer to assess potential function and condition, and edit wetland/riparian boundaries

BLM Example Use: Permitting and Monitoring of Grazing and Minerals Leases

Uses

- Development of BLM permit stipulations and Resource Management Plans (e.g. Land Health Standards and BMP's)
- Water development planning: identify water resources for assessment of livestock distribution
- Initial pre-field work for BLM proper functioning condition assessment

Data Management

BLM Water Resources Inventory Project

Goal: Develop GIS geodatabase/layer to house:

- BLM Water Right data
- Lentic-wetland Proper Functioning Condition inventory and monitoring data

Solution:

- Linked NWI layer with DNRC Water Rights layer
- This layer could be expanded to house lentic PFC data (TBD)

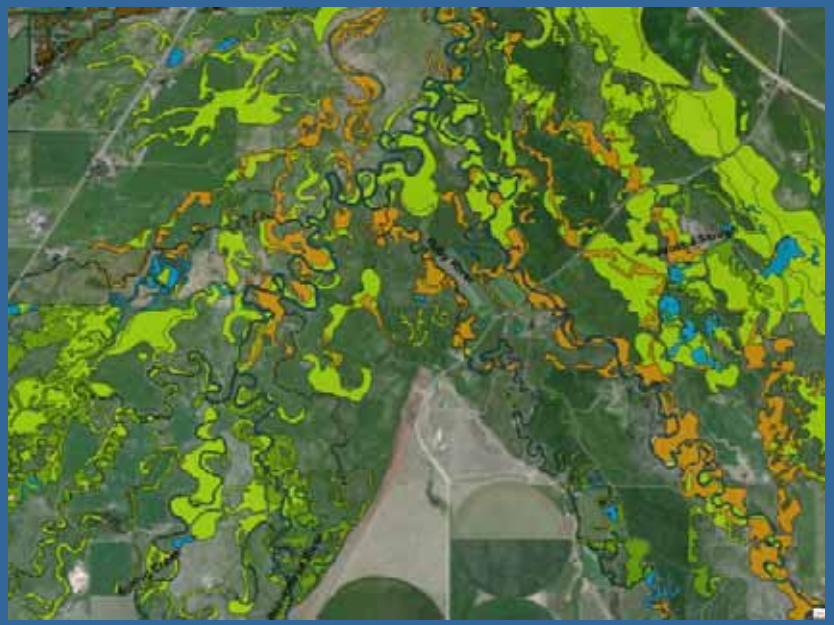
Summary

- Ideal for landscape or watershed scale assessment
- NWI is a starting point for more focused assessments requiring field verification
- Available from MTNHP before NWI web site
- Access method based on intended use and user skill level

Questions?

Karen Newlon, Ecologist/PM
MTNHP
knewlon@mt.gov
406-444-0915

Levia Shoutis, PWS
ERM, Inc.
levia.shoutis@erm.com
406-222-7600



Nine trainings + this webinar

- Helena. Montana Dept. Environmental Quality May 12, 2014
- Canyon Ferry. Montana Watershed Coordination Council. May 14
- Havre. June 25
- Helena. Floodplain Training. July 24
- Hamilton. MT Assoc. of Planners. September 17
- Bozeman. September 26
- Kalispell. MT American Water Resource Association. October 8
- Billings. November 6.
- Miles City. November 7
- Webinar. December 5, 2014

If you would like a wetland/riparian map training for your organization, contact Lynda Saul lsaul@mt.gov or 406-444-6652.

What's up next

- You will be emailed a survey through GoToWebinar
- Webinar series - January? Topics?
- Where to find the webinar http://Wetlands.mt.gov