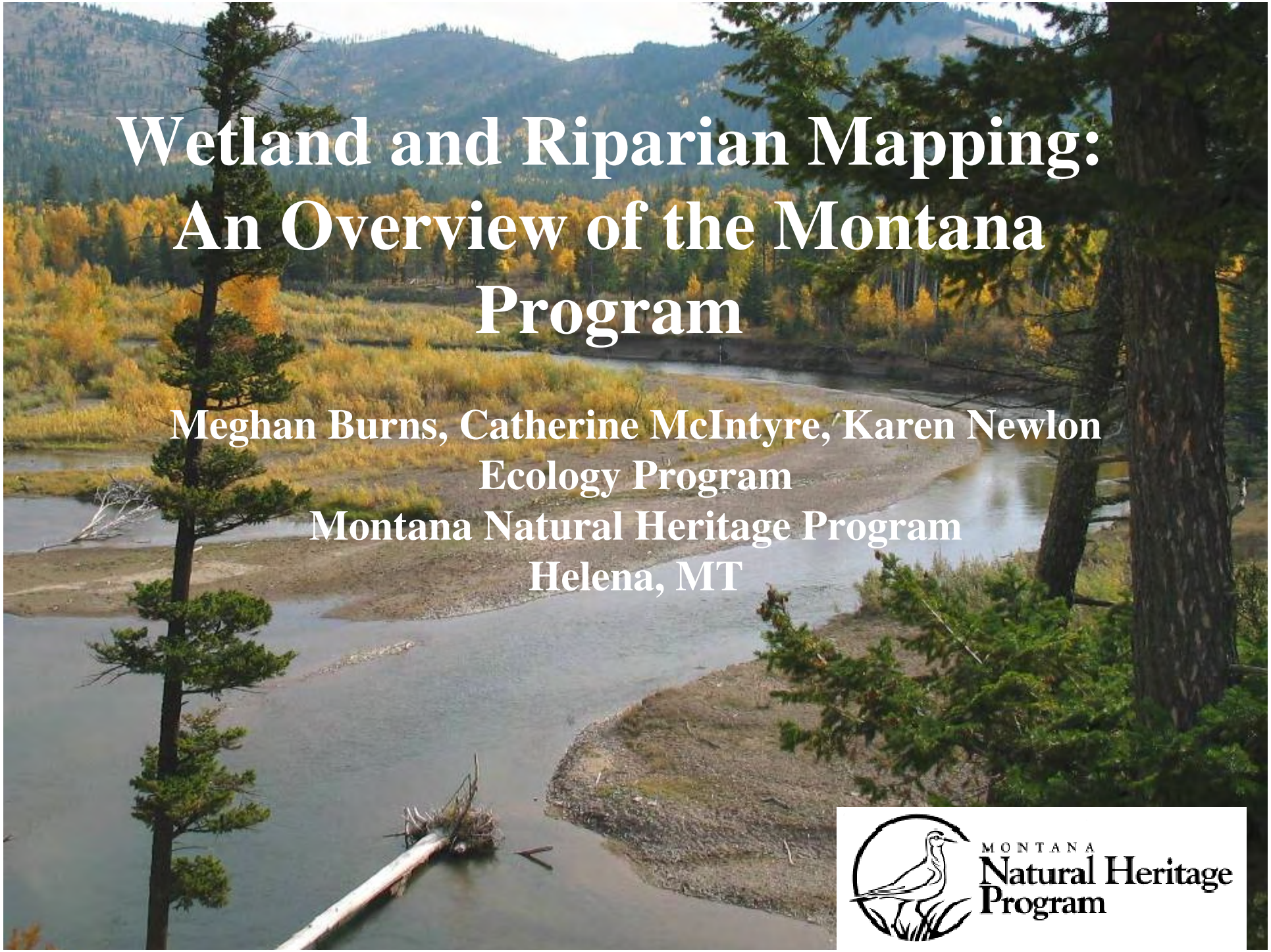


Wetland and Riparian Mapping: An Overview of the Montana Program

Meghan Burns, Catherine McIntyre, Karen Newlon
Ecology Program
Montana Natural Heritage Program
Helena, MT

MONTANA
Natural Heritage
Program

Montana Natural Heritage Program (MTNHP)

- Provides information on Montana's plants, animals and habitats
- Emphasizes those species or ecosystems of conservation concern
- Operated by the University of Montana as part of the Montana State Library's Natural Resource Information System (NRIS)

The University of Montana · Montana State Library · Montana Natural Resource Information System · Montana Natural Heritage Program

Montana Wetland and Riparian Mapping Center

- Goal: Create a statewide digital wetland and riparian layer
- Center started in 2006 with an EPA Pilot Grant
- Wetlands are one of the 13 framework layers in the Montana Spatial Data Infrastructure (MSDI)
- Mapping continues with funding from our many partners

Montana Department of Environmental Quality

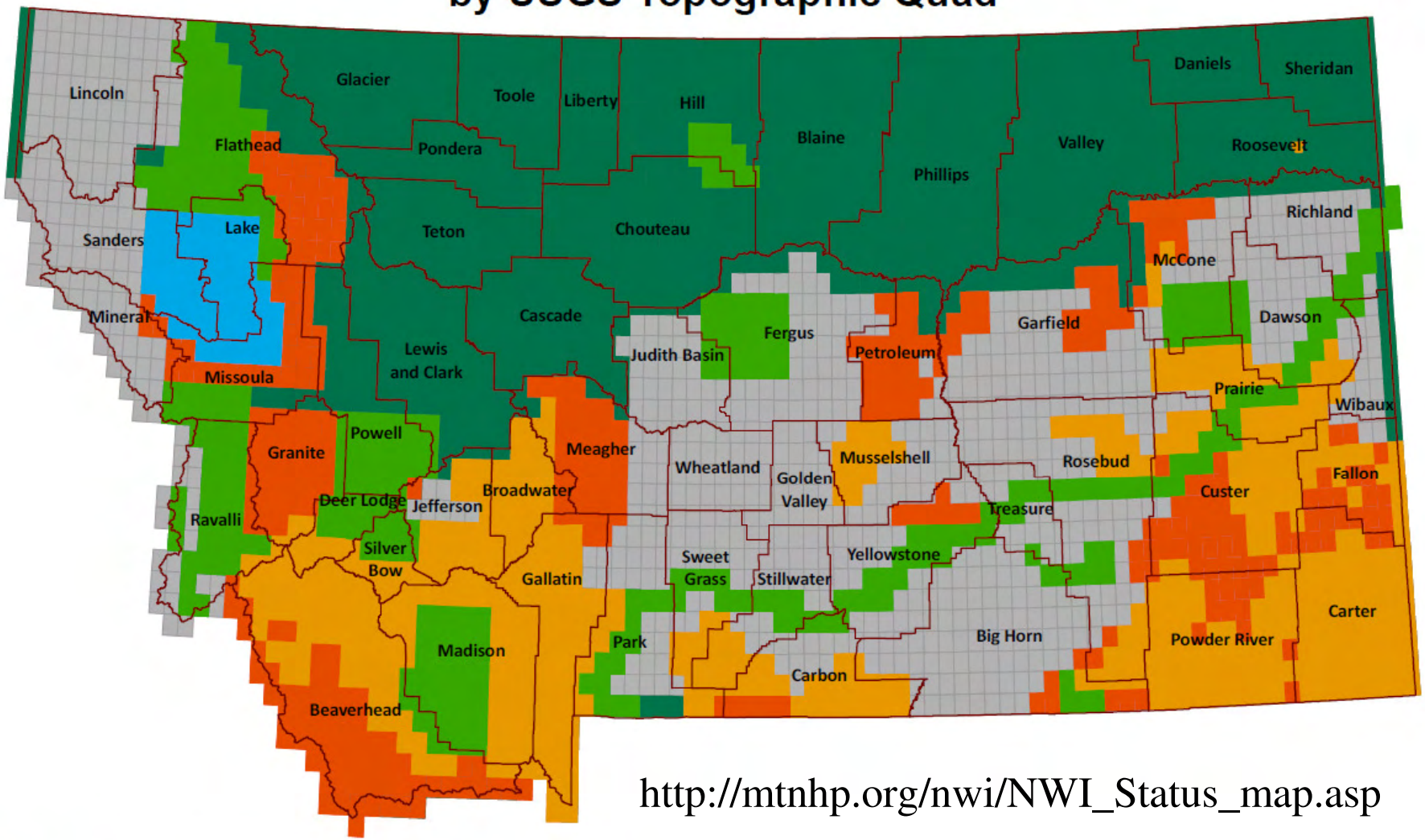
FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

THE GREAT SEAL OF THE CHIPPEWA CREE TRIBE OF THE ROCKY BOYS RESERVATION OF MONTANA

National Wetland Inventory Wetland Mapping Status by USGS Topographic Quad



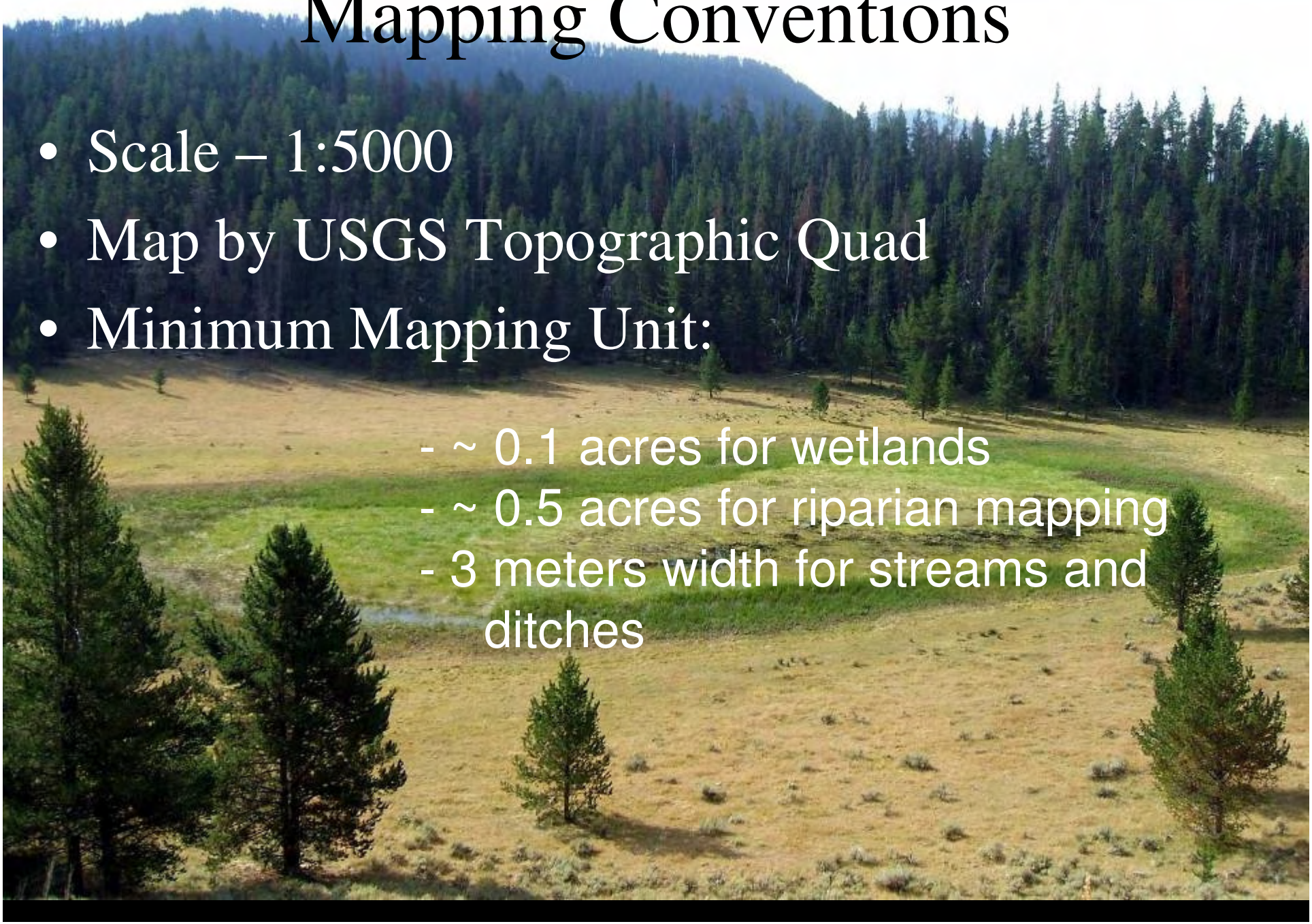
http://mtnhp.org/nwi/NWI_Status_map.asp

NWI Wetland Mapping Status

- Mapping in Progress (CSKT)
- NWI digitized from 1980s imagery and available from NWI
- No NWI Mapping Available
- Completed from 2005 imagery and available from NWI
- Mapping completed from 2005 imagery (provisional)
- Mapping in progress

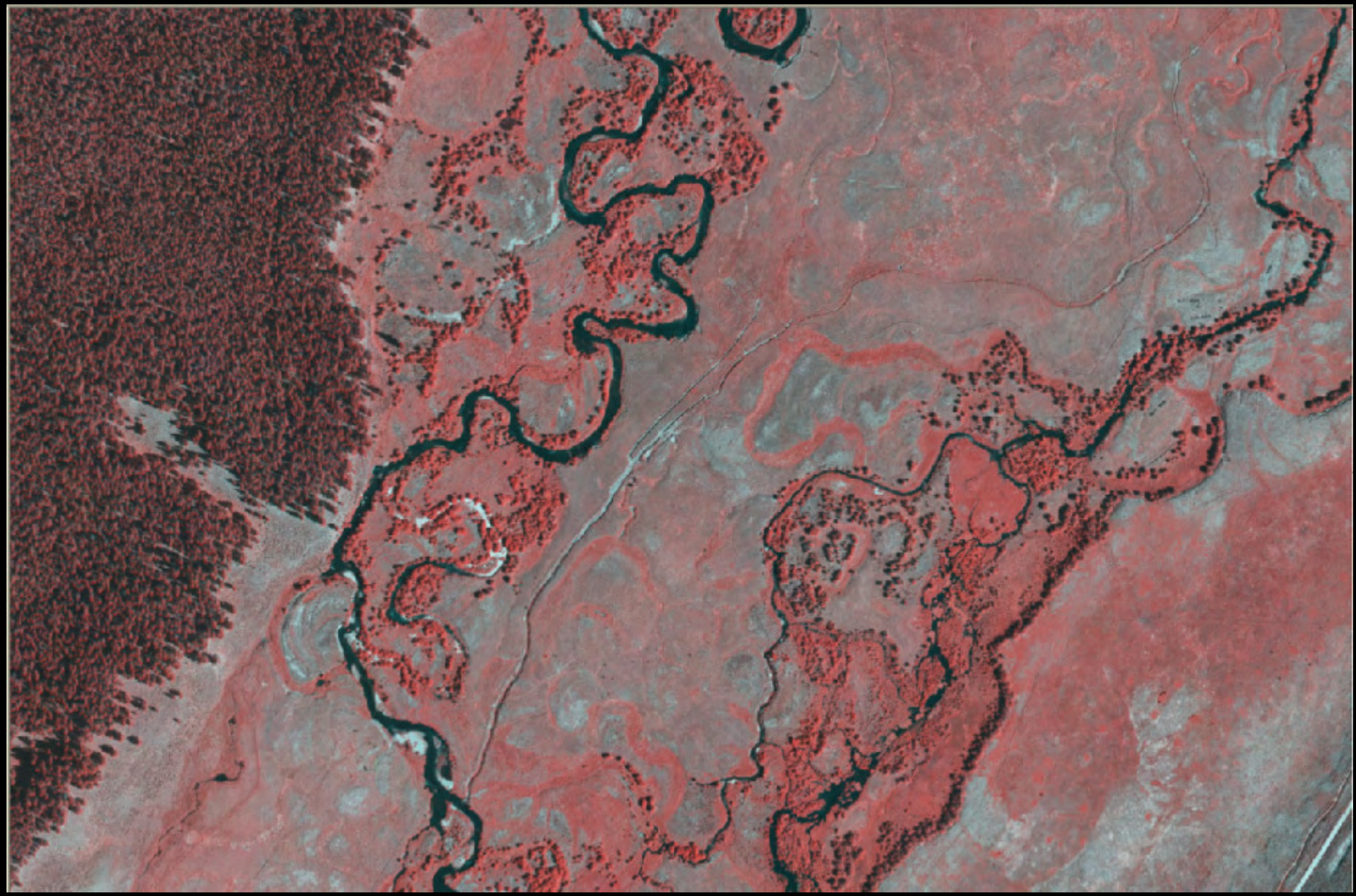
Last Updated: May 25, 2010

Mapping Conventions



- Scale – 1:5000
- Map by USGS Topographic Quad
- Minimum Mapping Unit:
  - ~ 0.1 acres for wetlands
  - ~ 0.5 acres for riparian mapping
  - 3 meters width for streams and ditches

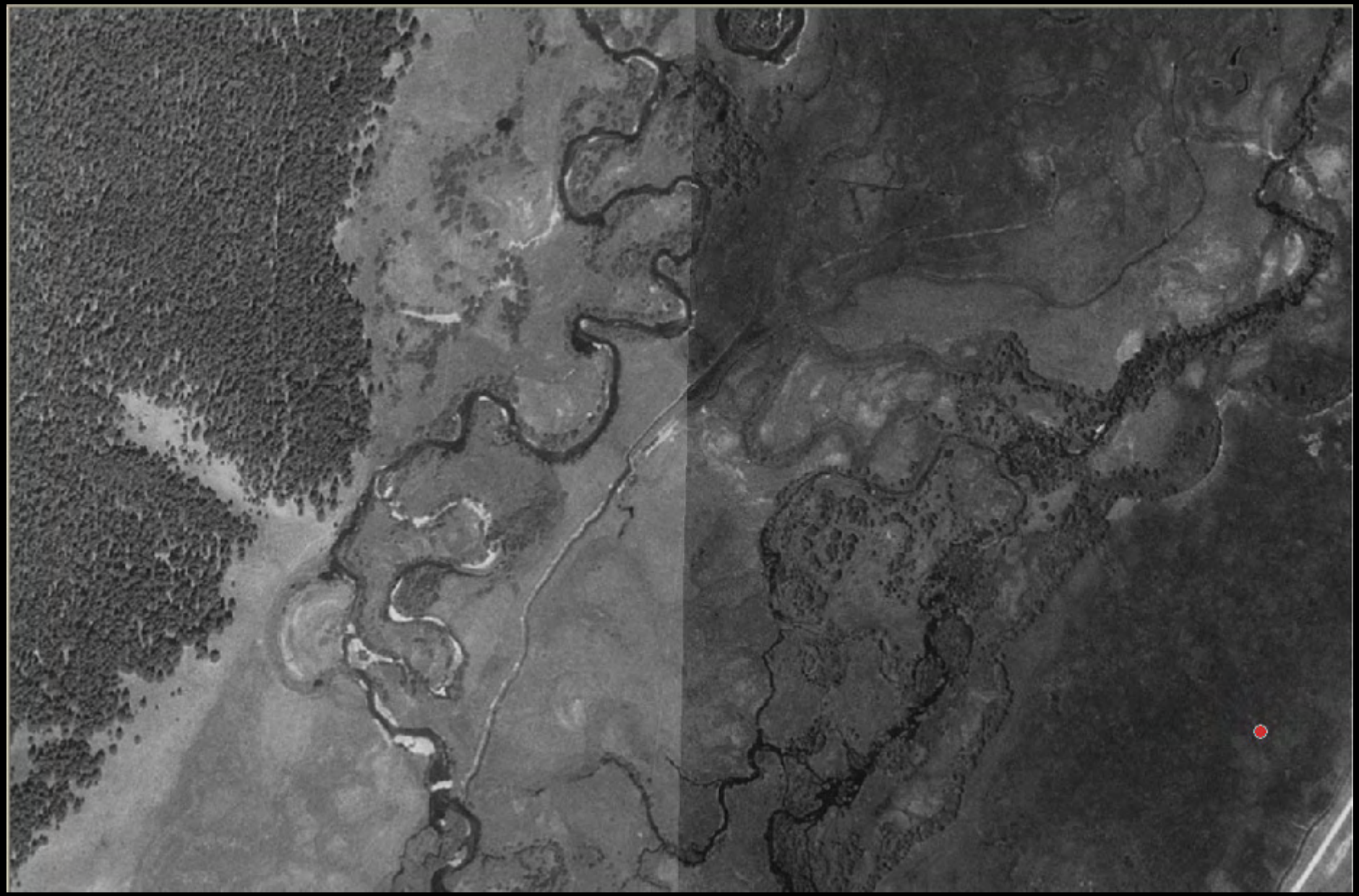
2005 NAIP CIR



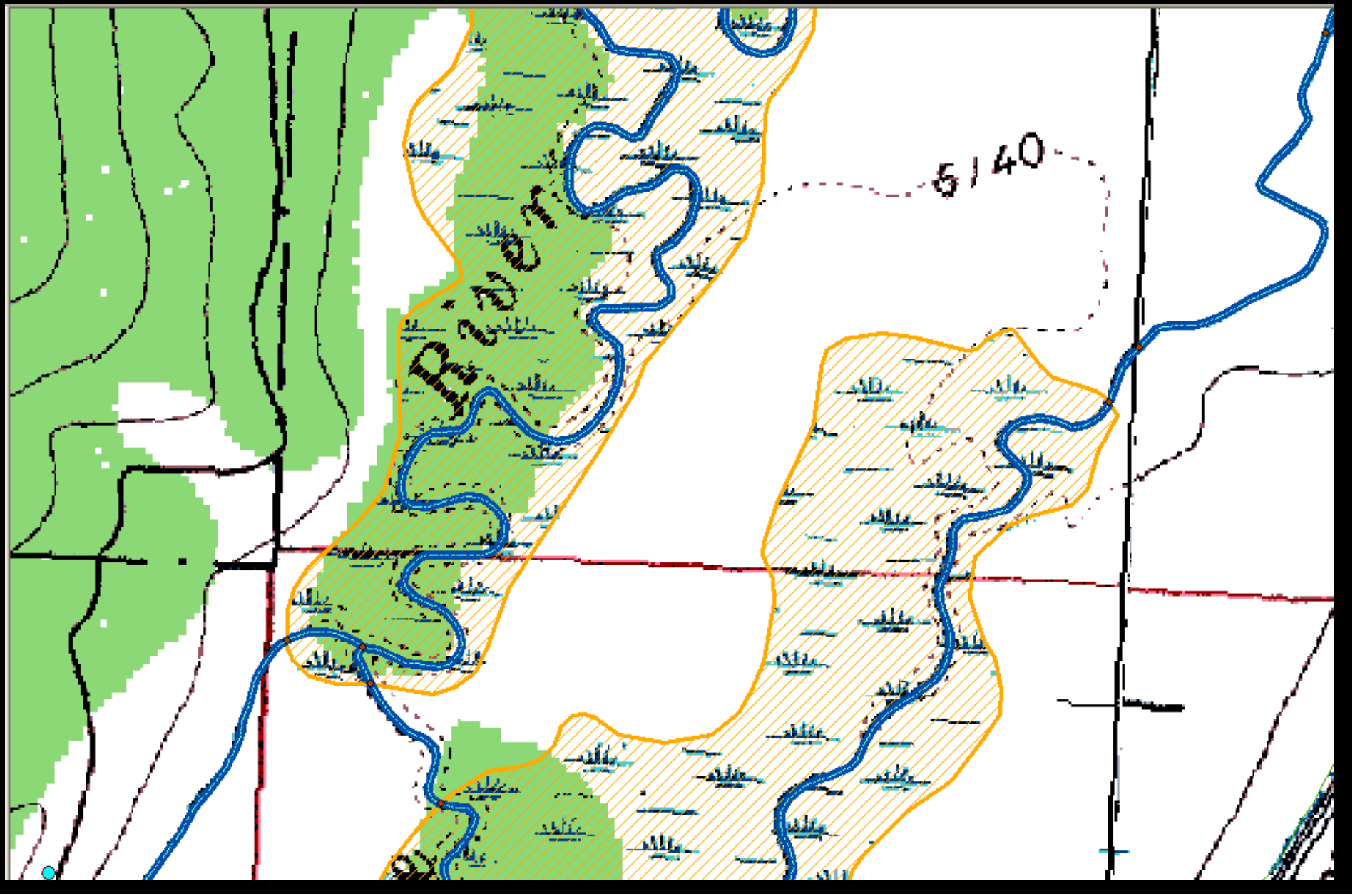
2005 NAIP CIR with Mapping

2005 True Color NAIP

1990s Digital Orthophoto Quarter Quads



Digital Raster Graphics (DRG) with NHD



National Wetland Inventory (NWI) Classification

Cowardin Code

- System: Riverine, Lacustrine, Palustrine
- Subsystem
- Class

– Water Regime

- A –Temporarily Flooded
- B – Saturated
- C – Seasonally Flooded
- F – Semi-permanently Flooded
- G – Intermittently Exposed
- H – Permanently Flooded
- K – Artificially Flooded

– Potential Special Modifiers:

- b – beaver
- h – impounded
- x – excavated
- f – farmed
- d – ditched/drained

National Wetland Inventory (NWI) Classification

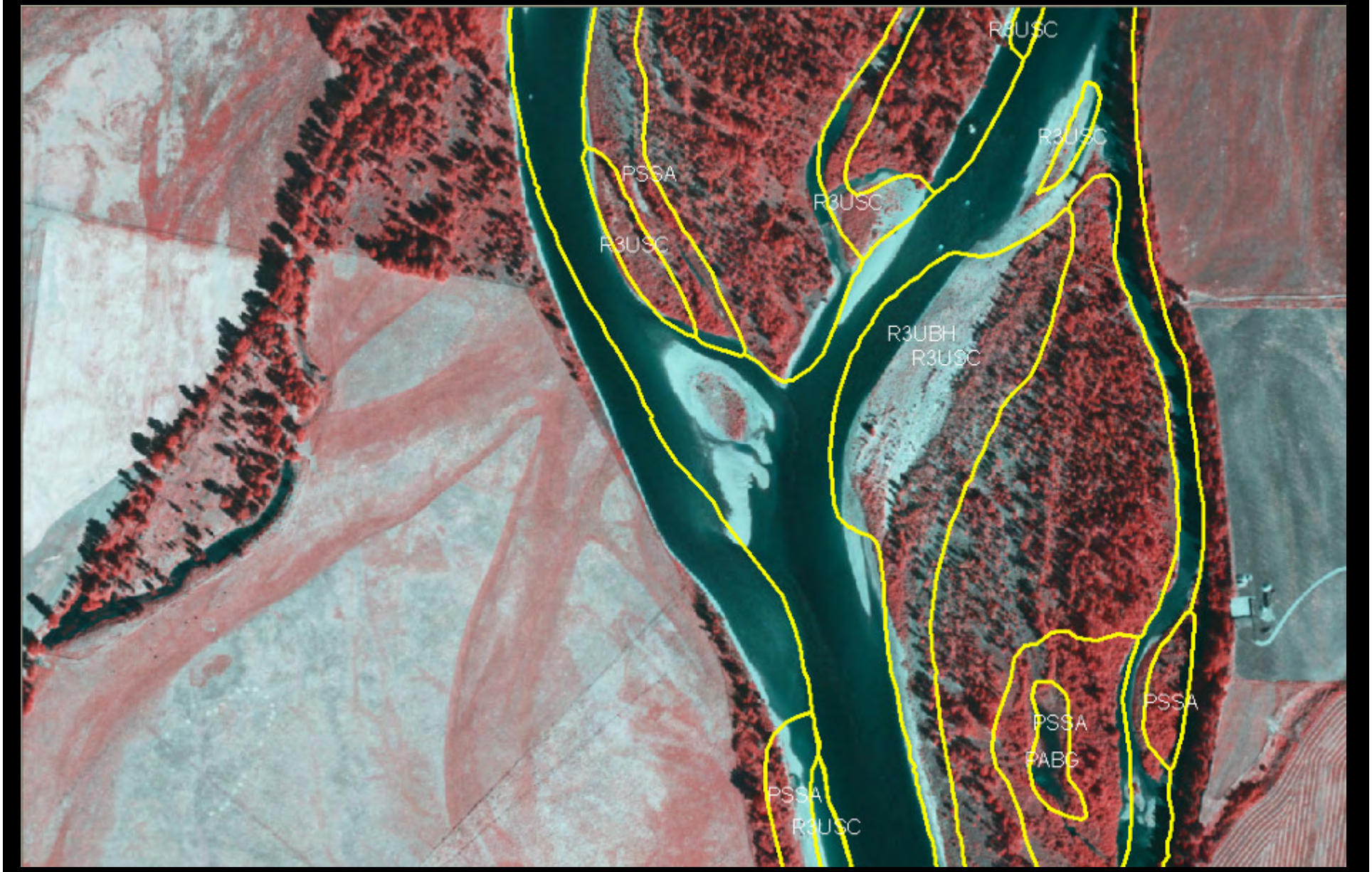
Mapping conventions follow USFWS system for western US (2009):

- System: Riparian
- Subsystem: Lotic or Lentic
- Class: Forested, Scrub-shrub, Emergent

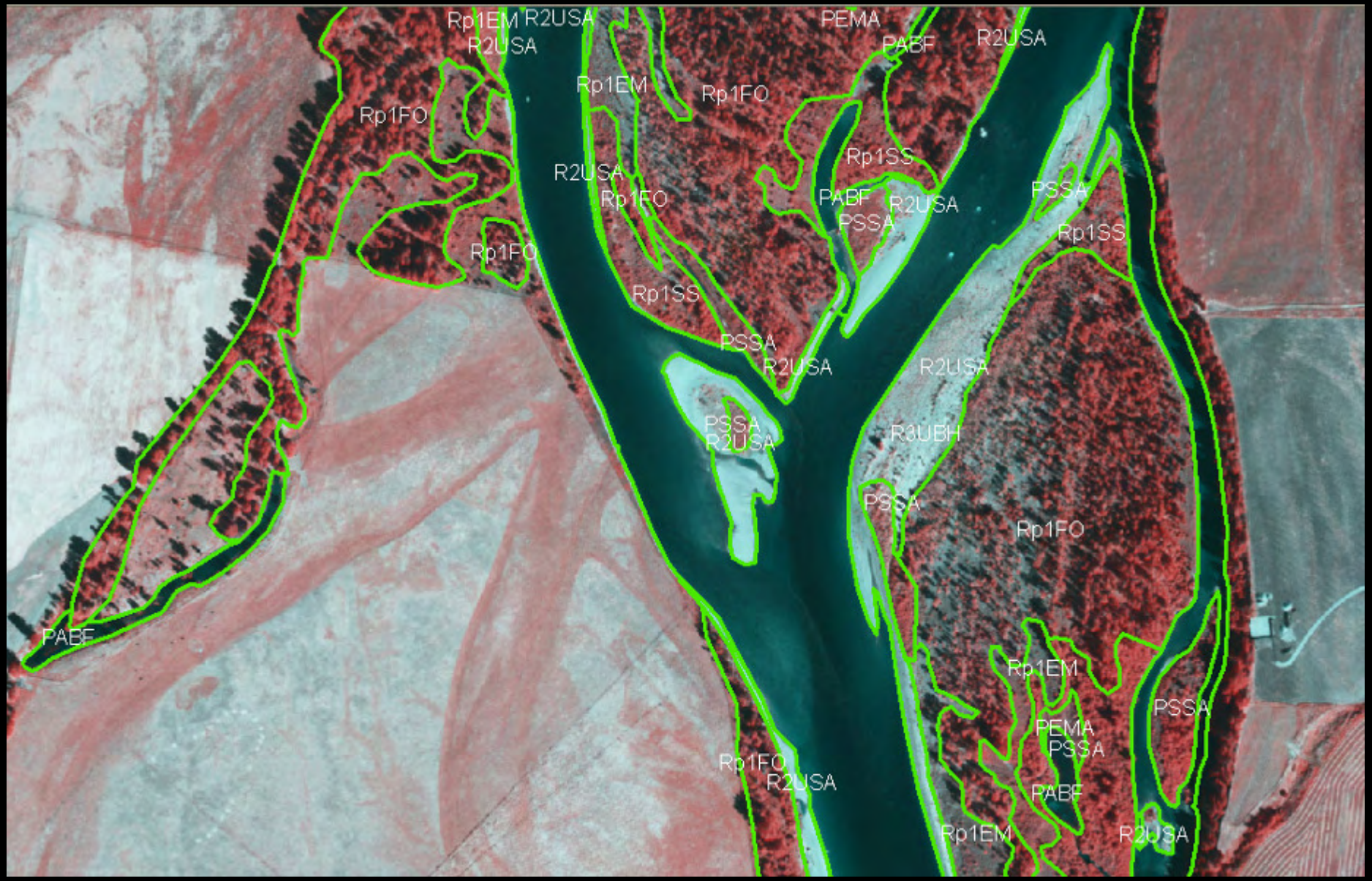
Additional levels of mapping:

- Subclass: Dead, Deciduous, Evergreen, Mixed
- Dominance type: Refers to specific plant species (e.g. cottonwood)

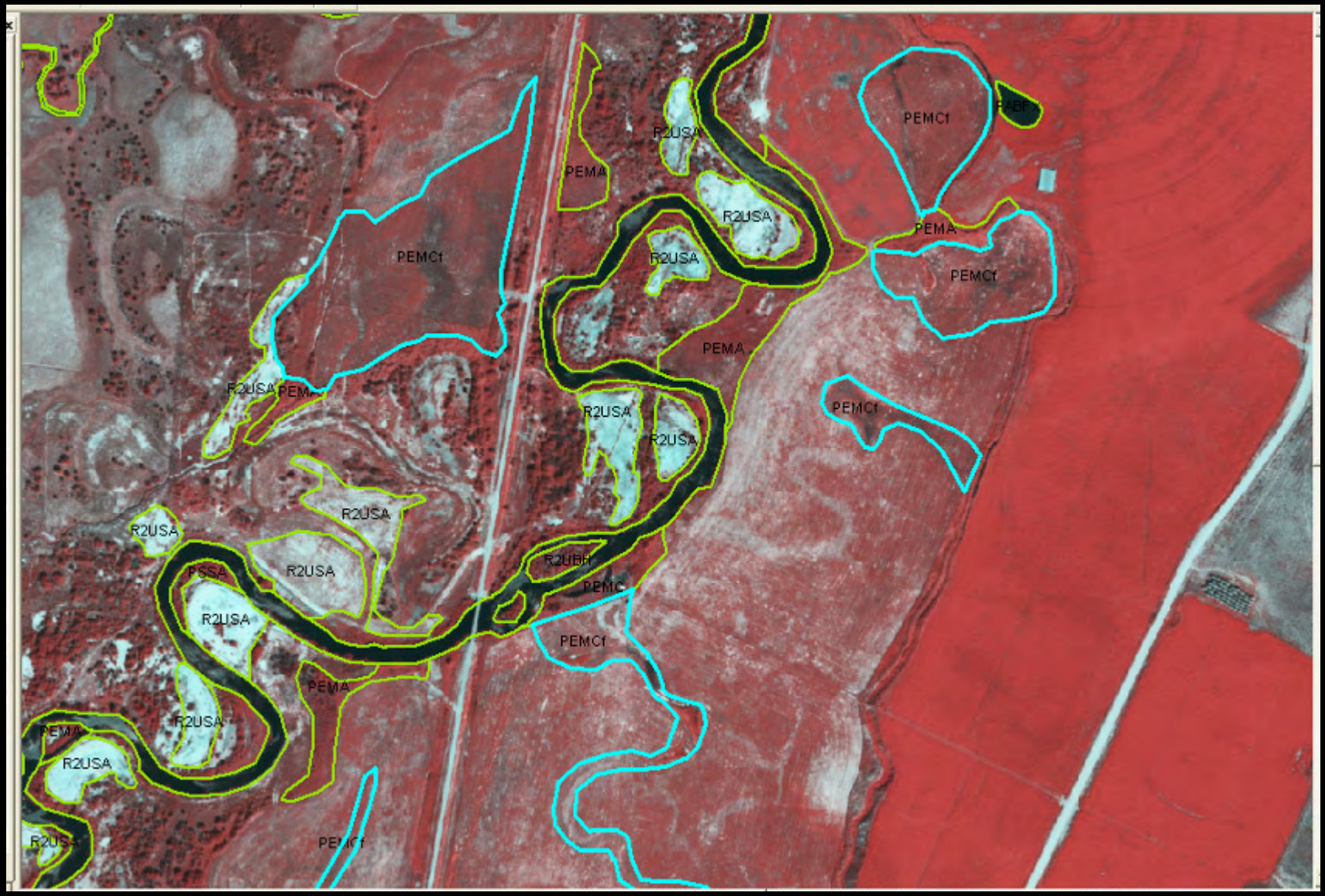
Old Mapping (1980s)

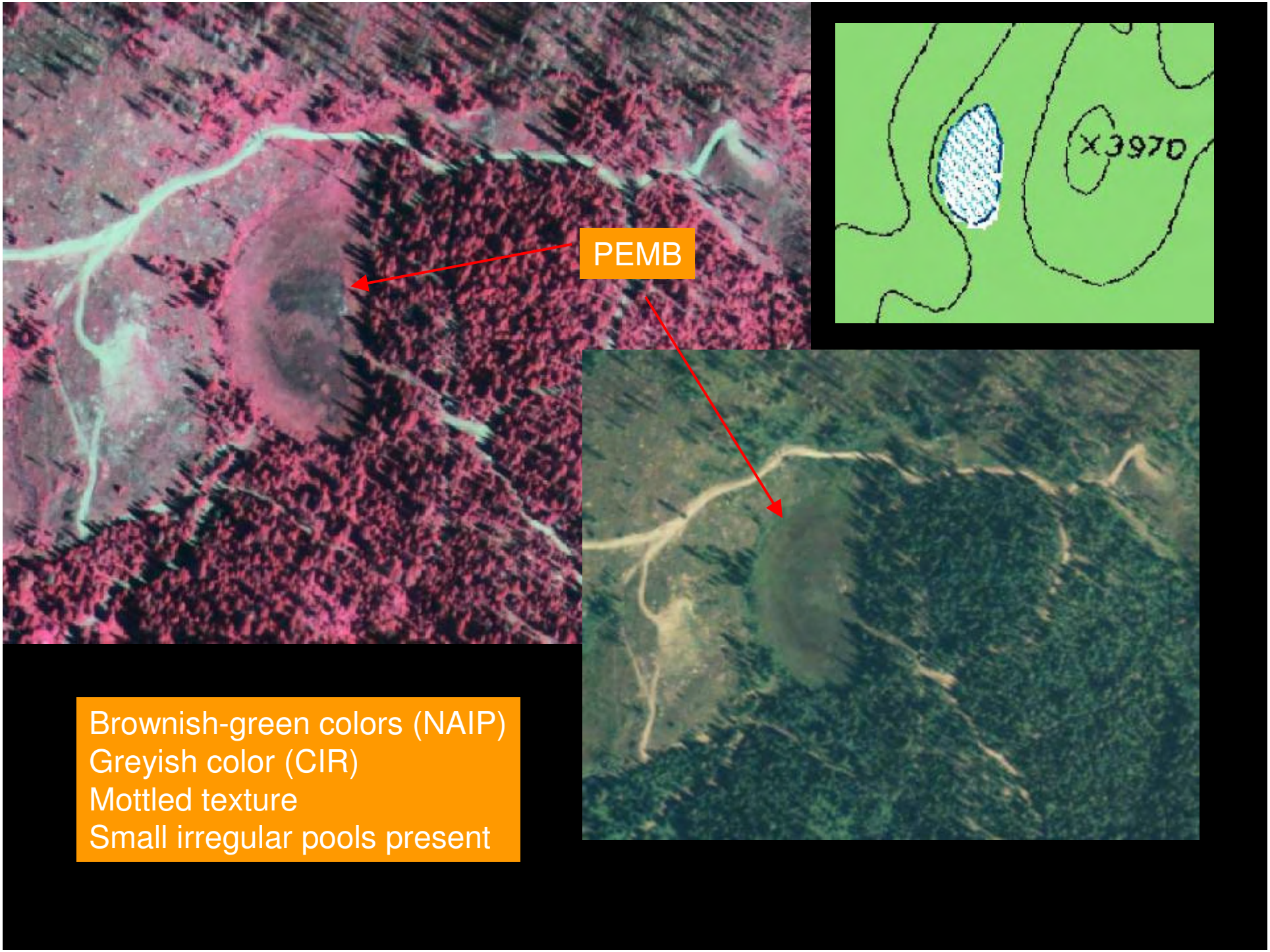


New Mapping


Rp1EM R2USA
R2USA
PEMA
PABF
R2USA
Rp1EM
Rp1FO
Rp1FO
Rp1SS
R2USA
Rp1FO
PABF
R2USA
PSSA
PSSA
Rp1SS
Rp1FO
Rp1SS
PSSA
R2USA
R2USA
PSSA
R2USA
R3UBH
PSSA
Rp1FO
PABF
Rp1EM
PSSA
PEMA
PSSA
Rp1FO
R2USA
PABF
Rp1EM
R2USA

Farmed (f) Modifier Examples




PEMB
X3970
Brownish-green colors (NAIP)
Greyish color (CIR)
Mottled texture
Small irregular pools present

HGM Descriptors

- Hydrogeomorphic-type Code includes:
  - Landscape position
  - Landform
  - Water flow path
  - Waterbody types
- Based on geomorphic setting, water source, and hydrodynamics
- Describes position on landscape
- Links wetland type with wetland function

What is a Wetland Profile?

- Wetland landscape profiling describe the types, abundance and distribution of wetlands across a defined area

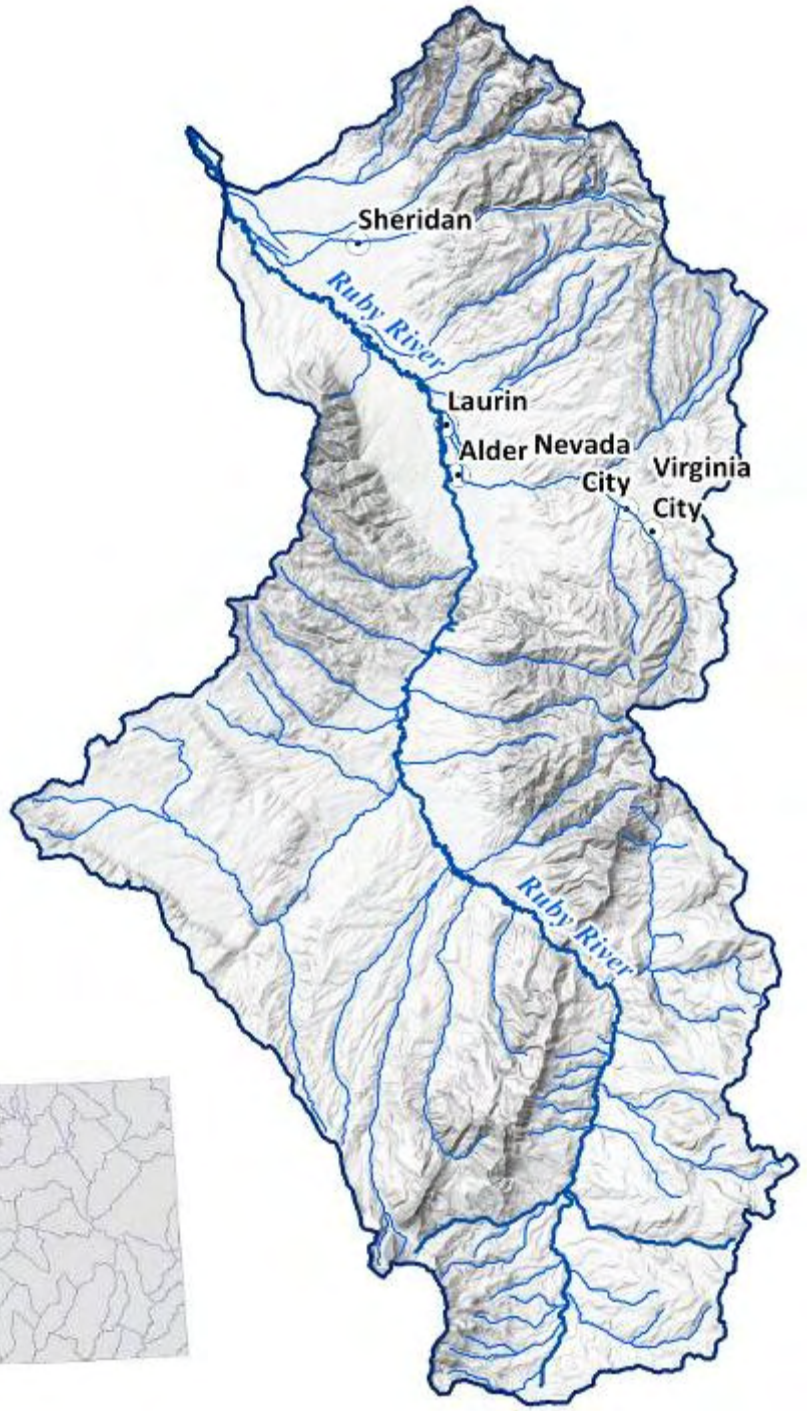
- It offers a rapid characterization of function and condition in a given subbasin or watershed, and help pinpoint management needs, including mitigation planning and conservation

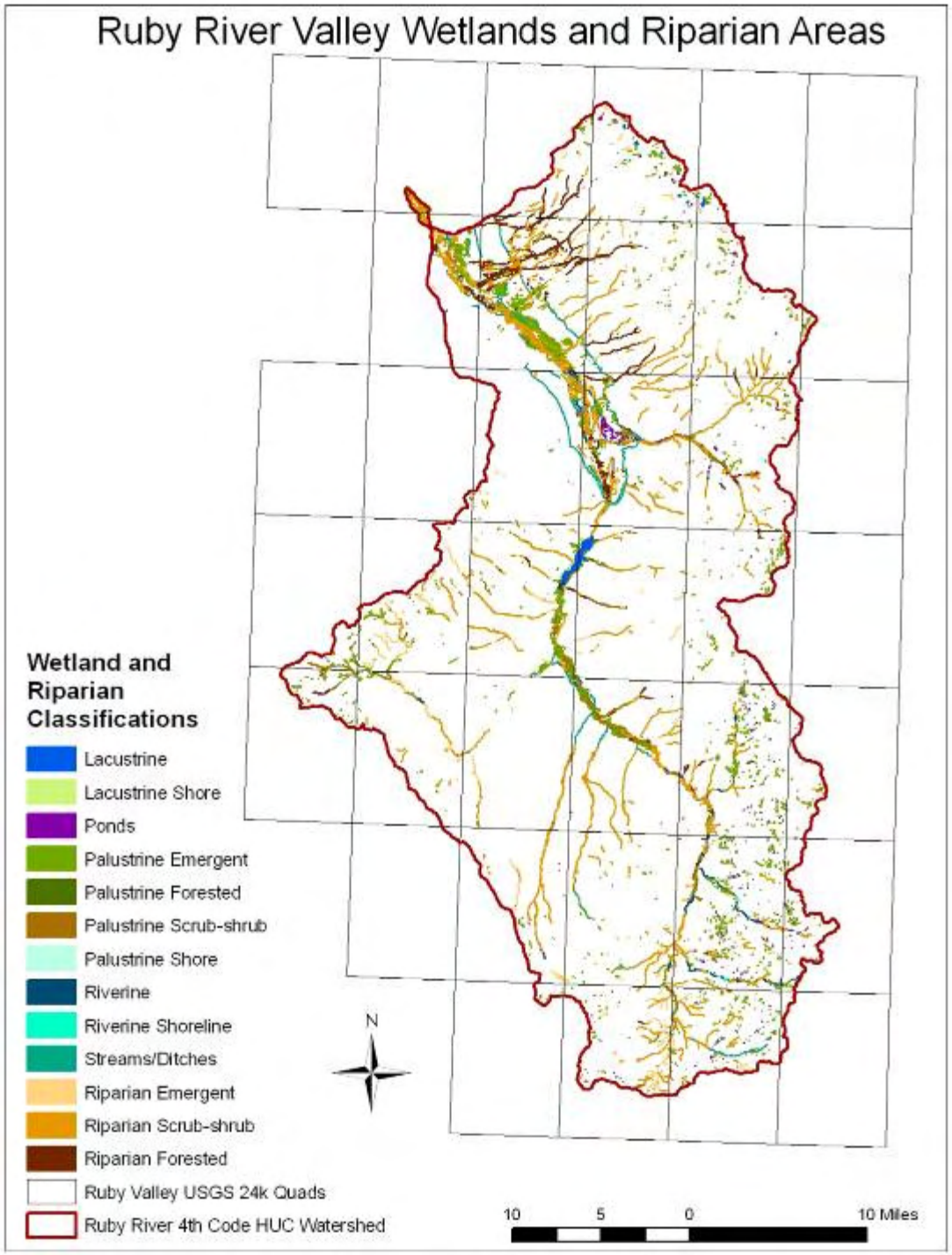
Example - Sediment Retention Function

- All wetlands perform some sediment trapping functions
- Functions are especially significant near watercourses in agricultural areas
- Floodplain and Interfluve Basin wetlands have “high” ranking
- Upland Terrene Basin rated “moderate”
- Flat wetlands are rated “low”

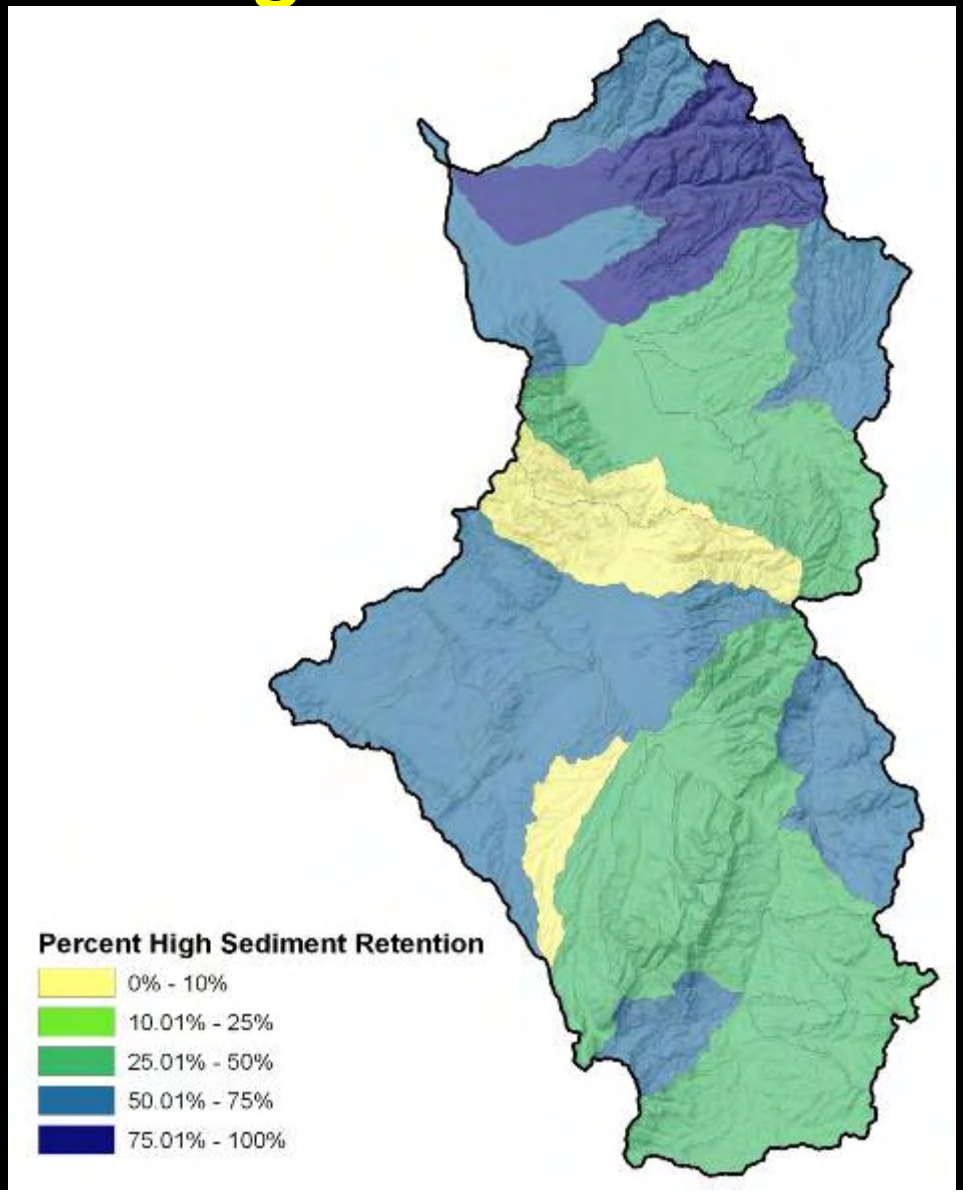
Wetland Profiling

An Example in the Ruby Valley

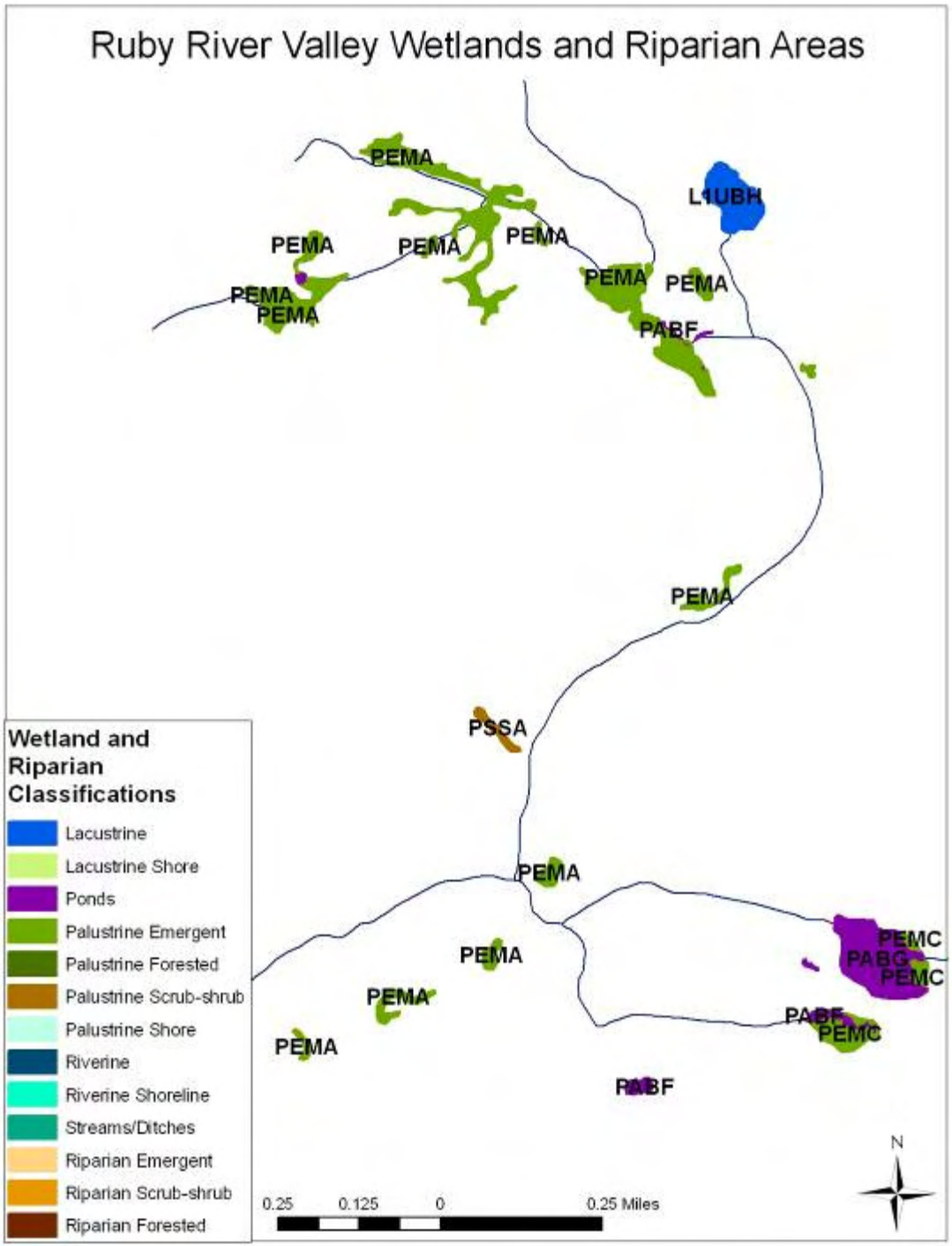



Ruby River Valley Wetlands and Riparian Areas
Wetland and Riparian Classifications
Lacustrine
Lacustrine Shore
Ponds
Palustrine Emergent
Palustrine Forested
Palustrine Scrub-shrub
Palustrine Shore
Riverine
Riverine Shoreline
Streams/Ditches
Riparian Emergent
Riparian Scrub-shrub
Riparian Forested
Ruby Valley USGS 24k Quads
Ruby River 4th Code HUC Watershed
N
10 5 0 10 Miles

Wetland Landscape Profile: High Sediment Retention Function



percent of wetlands in a given subwatershed (6th code hydrologic units) that have high sediment retention function


Ruby River Valley Wetlands and Riparian Areas
PEMA
L1UBH
PEMA
PEMA
PEMA
PEMA
PEMA
PEMA
PEMA
PABF
PEMA
PSSA
PEMA
PEMA
PEMC
PABG
PEMC
PEMA
PABF
PEMC
PEMA
PABF
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Lacustrine Shore
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Palustrine Emergent
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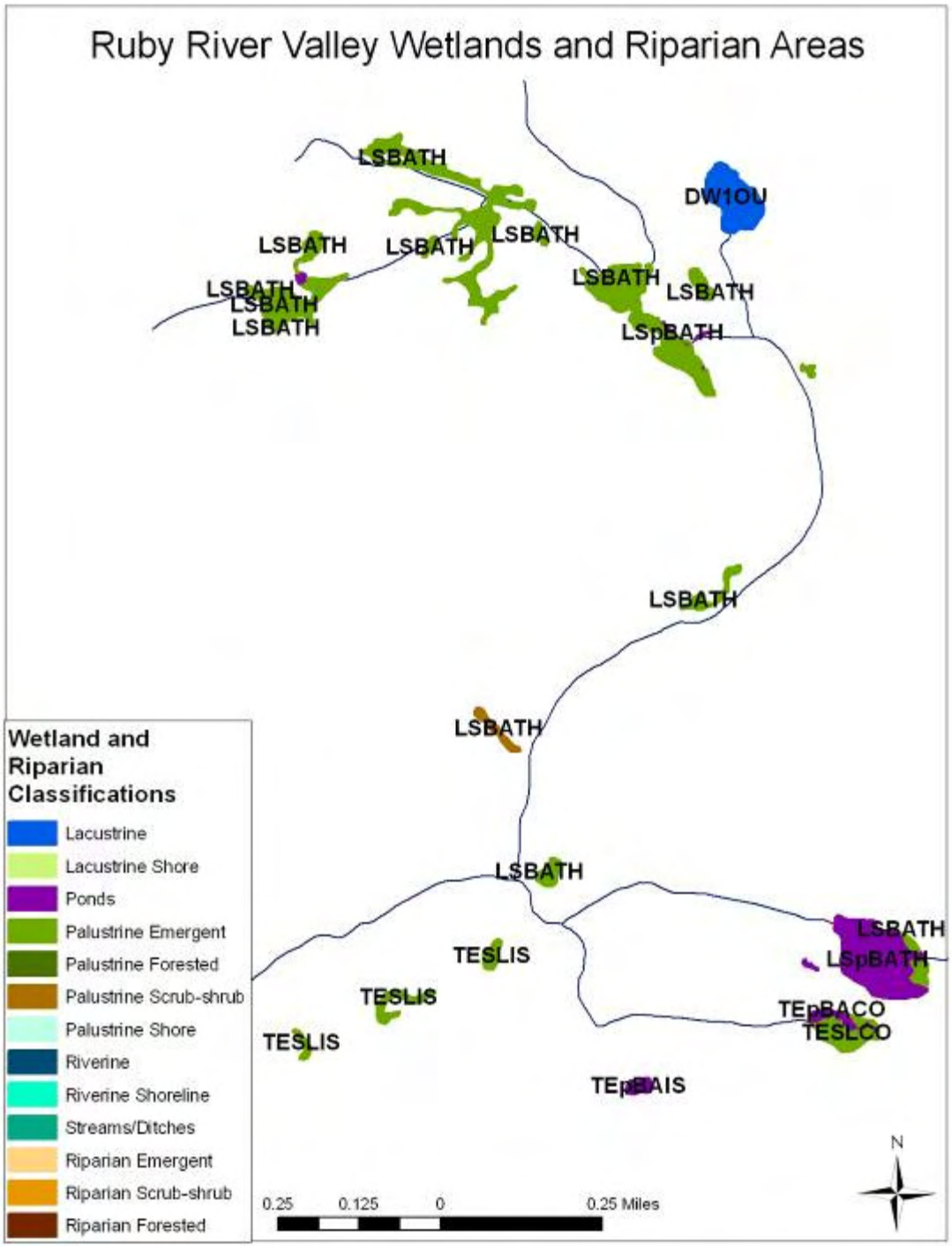
Palustrine Scrub-shrub
Palustrine Shore
Riverine
Riverine Shoreline
Streams/Ditches
Riparian Emergent
Riparian Scrub-shrub
Riparian Forested
0.25
0.125
0
0.25 Miles
N


Ruby River Valley Wetlands and Riparian Areas
LSBATH
DW1OU
LSBATH
LSBATH
LSBATH
LSBATH
LSBATH
LSBATH
LSBATH
LSpBATH
LSBATH
LSBATH
LSBATH
TESLIS
TESLIS
TESLIS
LSBATH
LSpBATH
TEpBACO
TESLCO
TEpBAIS
Wetland and Riparian Classifications
Lacustrine
Lacustrine Shore
Ponds
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Riverine Shoreline
Streams/Ditches
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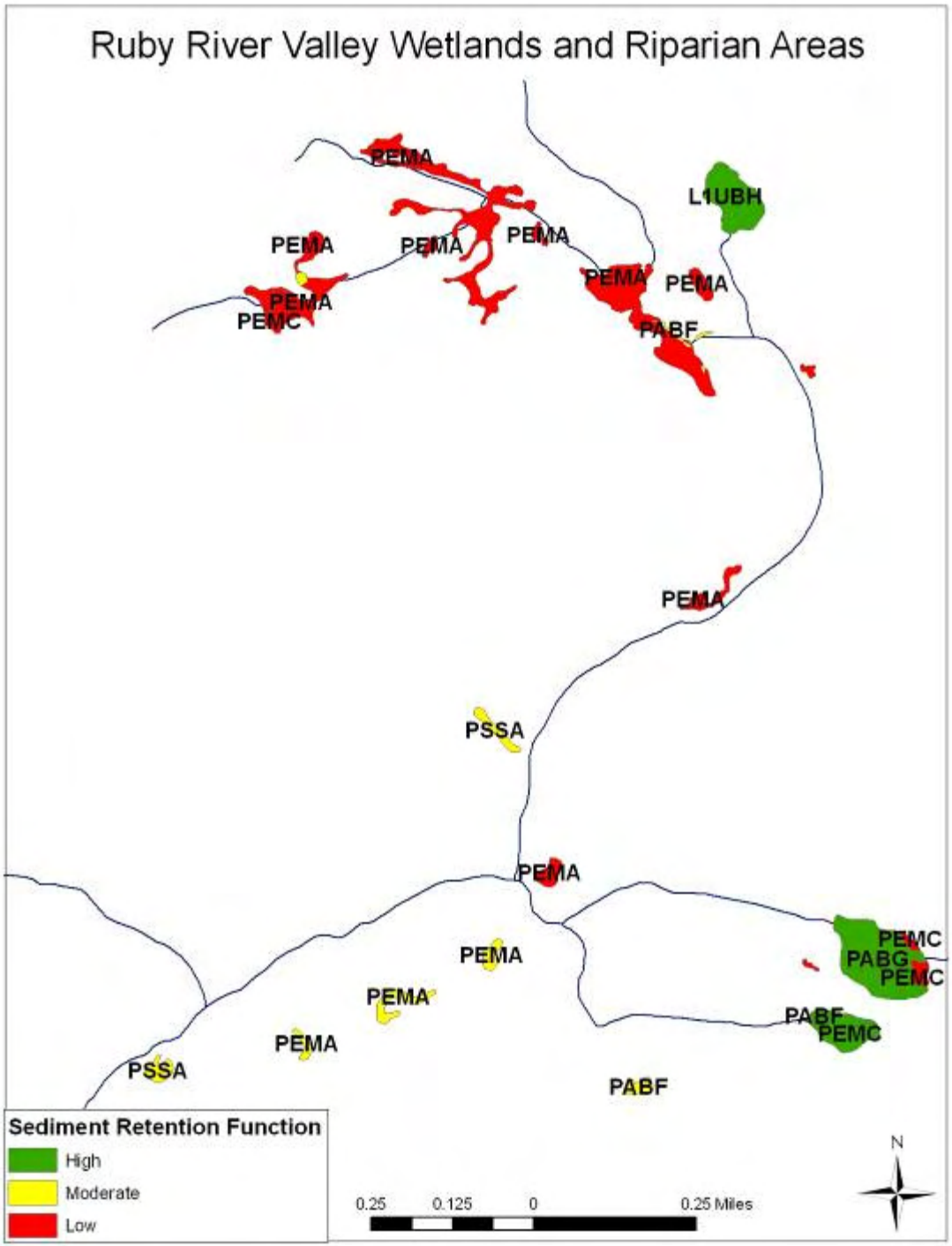
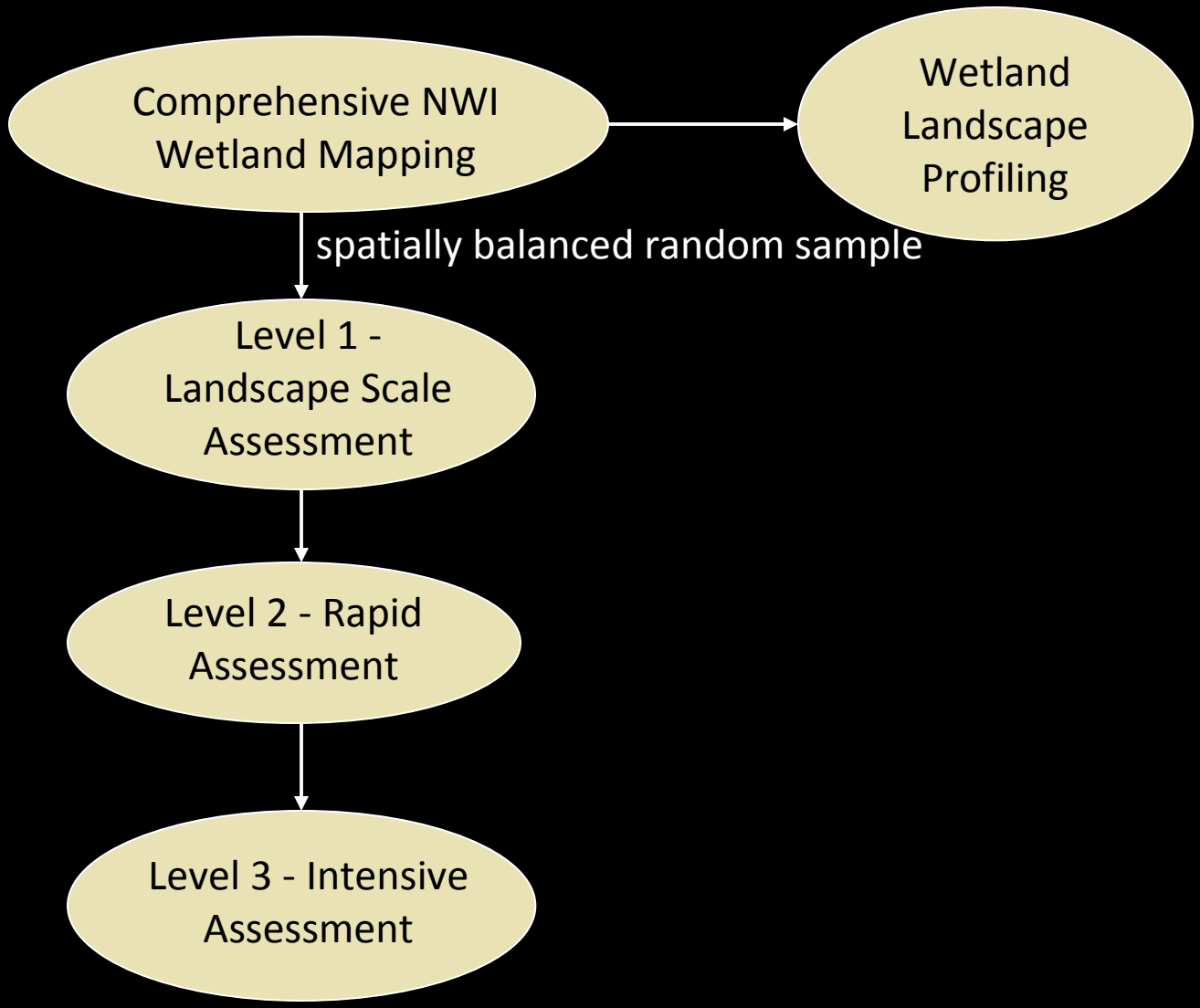
Riparian Scrub-shrub
Riparian Forested
0.25
0.125
0
0.25 Miles
N


Ruby River Valley Wetlands and Riparian Areas
PEMA
L1UBH
PEMA
PEMA
PEMA
PEMA
PEMA
PEMA
PEMC
PABF
PEMA
PSSA
PEMA
PEMC
PABG
PEMC
PEMA
PEMA
PABF
PEMC
PEMA
PSSA
PABF
Sediment Retention Function
High
Moderate
Low
0.25
0.125
0
0.25 Miles
N

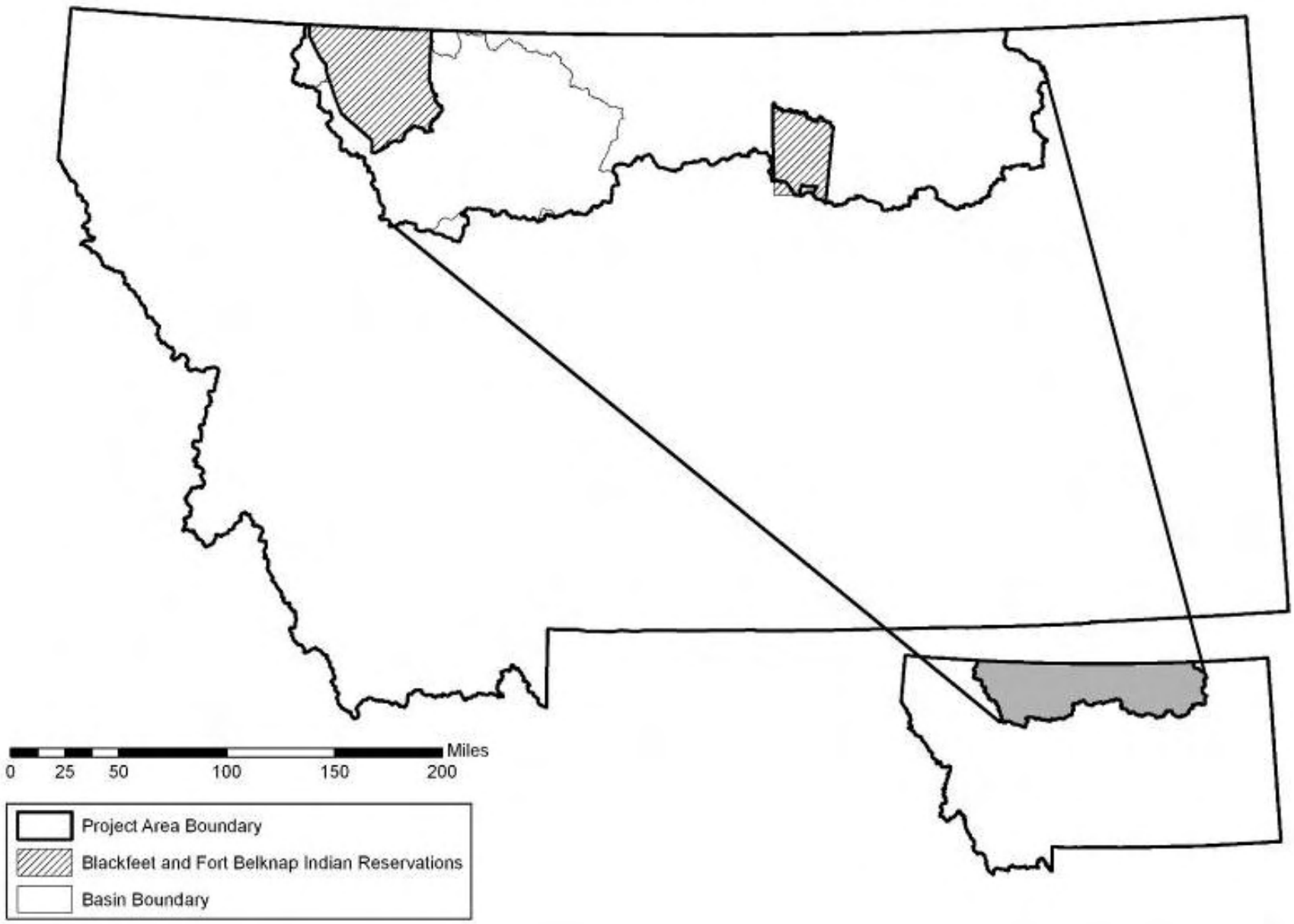
Conceptual Model of Rotating Basin Wetland Assessment and Monitoring Program



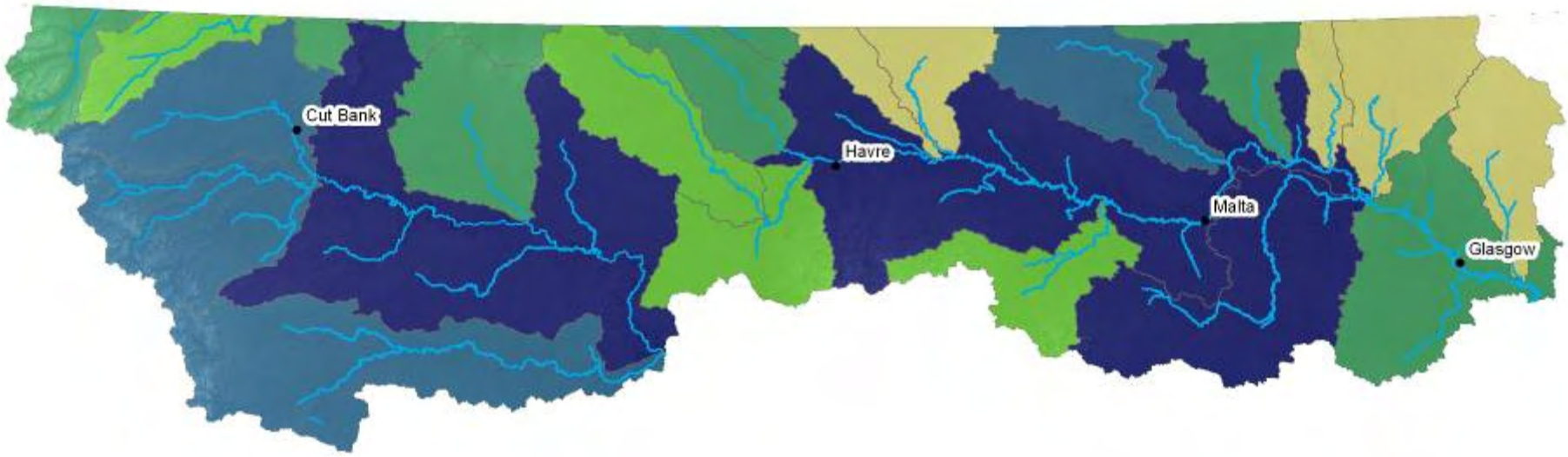
Rotating Basin Wetland Assessments

- Conducted first assessment in Milk-Marias basins in summer 2009 using historic NWI wetland mapping
- Second rotating basin assessment summer 2010 in SW Montana.
- Completing mapping in SE Montana in preparation for a third rotating basin assessment in 2011

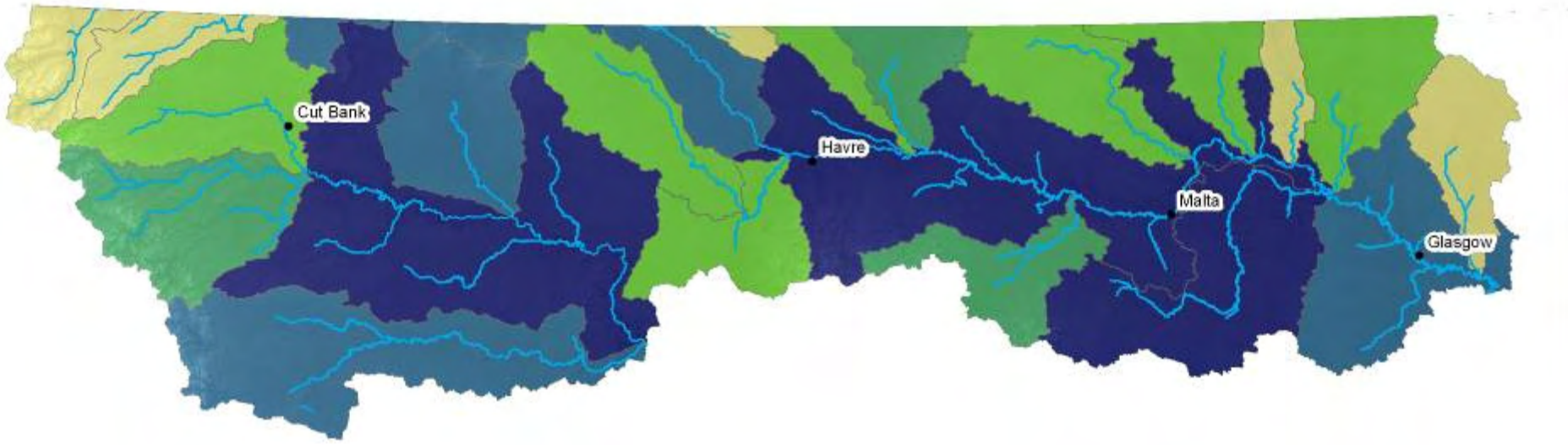
Milk and Marias Basin Assessment Project Area



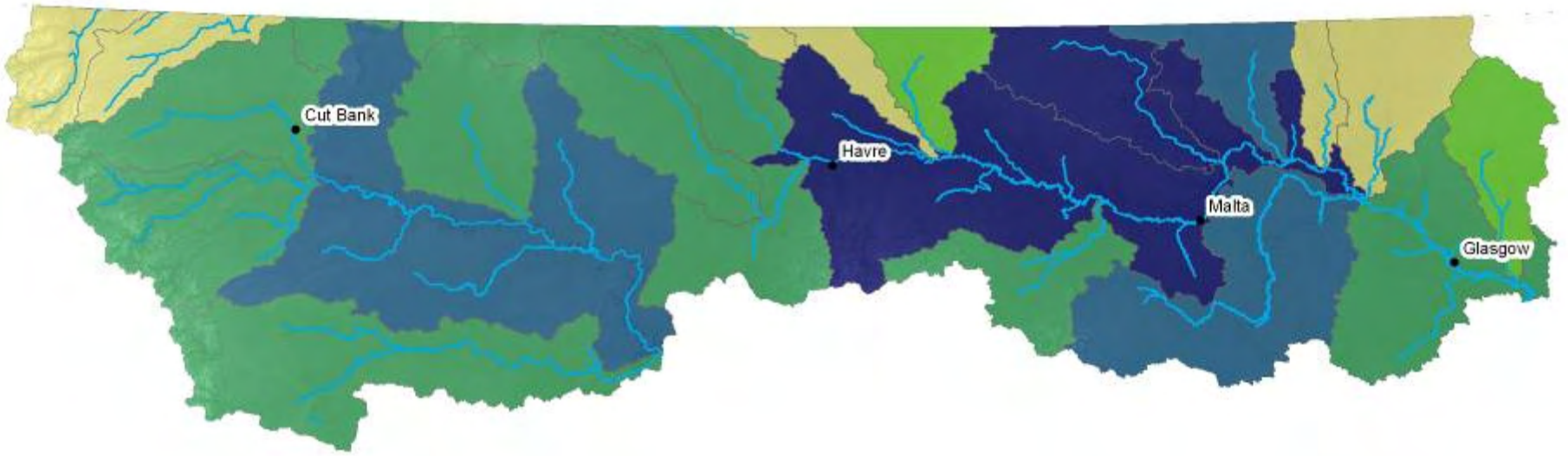
Milk-Marias Fourth-code Hydrologic Units



Milk-Marias Fourth-code Hydrologic Units



Milk-Marias Fourth-code Hydrologic Units



Outreach and Education

- Surveyed potential NWI users and found:
  - Many lack GIS knowledge
  - Many don't have GIS software
  - Many don't know how to use the NWI data
- Pilot Project in the Ruby Valley
  - Created a conservation planning geodatabase
  - Centered on the new wetland and riparian mapping
  - Based on the FREE ArcExplorer software

NWI Map Distribution

- Currently:
  - Download Geodatabase from Montana Natural Resource Information System (NRIS)
- Near Future:
  - Download Geopdfs of provisional data
  - Web Mapping Application
    - NWI maps, wetland assessments, and Landcover inofmraiton
    - Zoom, Query, and Print Maps

MORE INFORMATION:

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Wetland Ecologist
(406) 444-5381
cmcintyre@mt.gov