7-2022

Mapping of wetland and riparian habitat for the National Wetlands Inventory: east and southeast Idaho

Sara K. Owen

Eric J. Dressing

Ryhan T. Sempler

Kay L. Hajek

Linda Vance

See next page for additional authors

Authors

Sara K. Owen, Eric J. Dressing, Ryhan T. Sempler, Kay L. Hajek, Linda Vance, Danielle J. Yashinovitz, Halie Devos, Phoebe Ferguson, Shelby C. Erwin, Brianna B. Bal, and Brandon A. Brown

Mapping of wetland and riparian habitat for the National Wetlands Inventory: east and southeast Idaho

Sara K. Owen, Eric J. Dressing, Ryhan T. Sempler, Kay L. Hajek, Linda Vance, Danielle J. Yashinovitz, Halie Devos, Phoebe Ferguson, Shelby C. Erwin, Brianna B. Bal, Brandon A. Brown

July 2022

This research was funded by the Bureau of Land Management (BLM) for delivery to the National Wetlands Inventory (NWI) of the United States Fish and Wildlife Service. The data associated with this report can be downloaded from the NWI Wetlands Mapper.

NWI Project ID: R01Y20P02
BLM Funding ID: 140L0619F0342

If using this data, please cite this report as:

Owen, S.K., Dressing, E.J., Sempler, R.T., Hajek, K.L., Vance, L., Yashinovitz, D.J., Devos, H., Ferguson, P., Erwin, S.C., Bal, B.B., and Brown, B.A. "Mapping of wetland and riparian habitat for the National Wetlands Inventory: east and southeast Idaho" (2022). *EMMA Publications*. 3.

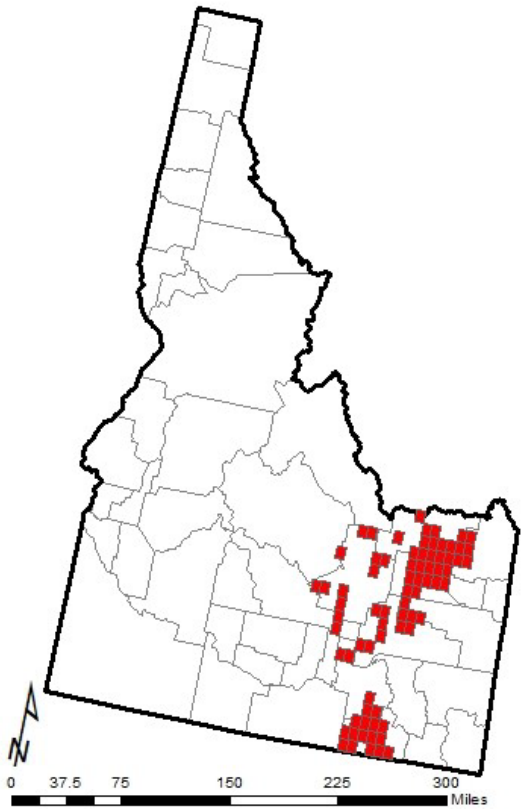
The Ecological Mapping, Monitoring and Analysis (EMMA) group is part of the O'Connor Center for the Rocky Mountain West at the University of Montana. The EMMA group supports informed management of public lands in the West. EMMA's team of trained ecologists and biologists collect data in upland, wetland, and aquatic habitats, using protocols developed by our own team and by partner agencies. Our GIS and data specialists map wetlands and riparian areas and assist EMMA scientists with data analysis. We provide direct support to partner agencies to help them answer questions about the effectiveness of land management actions and report on the ecological health of public land resources. As part of our commitment to science-based public lands management, we provide professional development opportunities for early-career scientists who are interested in pursuing applied science careers in agencies or universities.

The EMMA body of mapping work can be found through University of Montana ScholarWorks.

Supplemental Map Information (User Report) **July 2022**

Project ID: R01Y20P02

Project Title or Area: ID BLM 2019



A complete list of the quads mapped (74) with the state and county in which they are located can be found in Appendix A.

Source Imagery:

Mapping is based on 2019 National Agriculture Imagery Program (NAIP) imagery. The NAIP imagery for Idaho was collected during the summer. The spatial resolution is 60cm. Color infrared (CIR) is the primary imagery type used to accentuate vegetative wetland features and saturated soils.

Collateral Data:

Imagery:
Google Earth Pro Imagery (acquired in various years between 2000 and 2021)
HxGN content imagery

Ancillary data:

24k NRCS SSURGO Soils Data
24k National Hydrography Data (NHD)
24k USGS Topographic Maps

Inventory Method:

Mapping was accomplished via "heads up" digitizing at a scale of 1:4,500 using ESRI's ArcMap 10.8.1 over 2019 NAIP imagery and ancillary data listed above. The original aerial photo interpretation was completed by the Ecological Mapping, Monitoring, and Analysis (EMMA) group wetland mapping staff at the University of Montana's O'Connor Center for the Rocky Mountain West.

Classification:

Cowardin wetland classification (FGDC 2013)
USFWS Riparian classification (USFWS 2019)
No uplands classification

Data Limitations:

Regional mapping conventions limit attribution of wetland polygons to the class level for non-vegetated wetlands and restricts the use of modifiers to one water regime and one special modifier. Mono-interpretation of imagery may result in the misinterpretation of land cover types and water regimes. The imagery presents a 'snapshot in time' on a single day, usually in mid-summer, thus water regimes are assigned by assuming the average can be ascertained based on multiple years of imagery.

This mapping product is an estimation of where wetlands and riparian features may be on the landscape and is not intended to be used as an actual representation of on-the-ground conditions for regulatory purposes. All wetland and riparian mapping represent photo interpretation from aerial imagery.

General Description of the Project Area:

GEOGRAPHY: The project area consists of seventy-four (74) 1:24,000 USGS quads primarily in southeastern Idaho, with very small overlap into Utah and Montana. The project lies within five (5) Level III ecoregions: Middle Rockies, Idaho Batholith, Snake River Plain, Northern Basin and Range, and Central Basin and Range. There are eighteen (18) Level IV ecoregions within the project area. Given the large number of Level IV ecoregions in the project area, only Level III Ecoregions will be addressed in detail in Table 1 below. The Level IV Ecoregions in the project area are listed with each Level III ecoregion but the reader is referred to additional resources for further information (McGrath, et al 2002).

Table 1. Level III Ecoregions

Level III Ecoregion (Level IV Ecoregions)	Description	Approximate % of Project Area
Middle Rockies (Dry Intermontane Sagebrush Valleys, Dry Gneissic-Shistose-Volcanic Hills, Barren Mountains, High Elevation Rockland Alpine Zone)	The Middle Rockies lack a maritime influence and Pacific trees never dominate; forest can have open canopies. Foothills are shrub- or grass-covered and livestock grazing is a common land use in this ecoregion. High elevation sagebrush valleys are characteristic of this region. Streams have cold-water adapted assemblages, including salmonids, sculpins, and daces (McGrath, et al 2002).	14.2
Idaho Batholith (Dry Partly Wooded Mountains, Foothill Shrublands-Grasslands)	This ecoregion is mountainous and partially glaciated, underlain by granitic rock. When vegetation is removed, these granitics are highly erodible, thus streams are likely to see increased sedimentation after disturbance. Anadromous salmonids are present in this ecoregion but dams along major rivers in the Columbia basin have contributed to their decline (McGrath, et al 2002). Geologic and topographic diversity lend to floristic richness in this ecoregion. Streams are often spring-fed; alkaline parent material contributes to wetland communities with basic pH that are very productive (Ertter and Moseley 1992).	0.8
Snake River Plain (Lava Fields, Dissected Plateaus and Teton Basin, Upper Snake River Plain, Eastern Snake River Basalt Plains)	The Snake River plain is a xeric landscape that includes sagebrush-covered plains and low hills and barren lava flows. Streams are typically low gradient and warm, with minnows and suckers the primary fishes above the geographic barrier of Shoshone Falls (McGrath, et al 2002). Unique geographic features of this ecoregion include lava flows, sand dunes, and the Lost River sinks, where streams flowing into the northwest Snake River Plain disappear into the aquifer and emerge at Thousand Springs, over 100 miles away (Ertter and Moseley 1992).	61.6
Northern Basin and Range (Semiarid Hills and Low Mountains, High Elevation Forests and Shrublands, Sagebrush Steppe Valleys)	This ecoregion is composed dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains. The vegetation community is sagebrush-grassland or saltbush-greasewood. Its southern boundary is the highest shoreline of Pleistocene Lake Bonneville (McGrath, et al 2002). Playa-bottomed valleys common in the Central Basin and Range are generally lacking (Ertter and Moseley 1992).	19.7
Central Basin and Range	This unglaciated ecoregion consists of internally-drained, north-south trending fault-block	3.7

(Shadscale-Dominated Saline Basins, Sagebrush Basins and Slopes, Woodland- and Shrub-Covered Low Mountains, Malad and Cache Valleys)	mountain ranges with dry basins. Vegetation is primarily sagebrush grassland and saltbush-greasewood shrubs. Forests are absent from this area. This region encompasses parts of Nevada, California, Utah, and Idaho. The region was once largely covered by Lake Bonneville (McGrath, et al 2002).	

CLIMATE:

Southeastern Idaho has a continental climate, with warm, dry summers and cold, wet winters. The mean temperatures range more widely in the eastern part of the state than elsewhere in the state (WRCC (a)). At Craters of the Moon National Monument the highest mean monthly maximum temperature is in July (84.9° F, 29.4° C) and the lowest mean monthly minimum is in January (10.7° F, -11.8° C) (WRCC (b)). The growing season averages 125 days in the Snake River Plain area between Pocatello and Idaho Falls (WRCC (a)). Within the project area of eastern Idaho, the Upper Snake River Plain receives 10-15 inches (25.4-38.1 cm) of precipitation annually (CoCoRaHS, WRCC (a), WRCC (b)). Mountains may receive 20-30 inches (50.8-76.2 cm) annually (CoCoRaHS). Most of this precipitation is in the form of snow (NPS).

VEGETATION, SOILS, AND LAND USE:

This project area crosses five (5) different Level III ecoregions, and while distinctly different in terms of geology and vegetation communities, there are some general similarities among all of them. In the mountains of southeast Idaho, Douglas-fir (*Pseudotsuga menziesii*) is fairly ubiquitous. Engelmann spruce (*Picea engelmannii*), quaking aspen (*Populus tremuloides*), and subalpine fir (*Abies lasiocarpa*) can be found on wetter or north-facing slopes and at higher elevations (McGrath, et al 2002; NatureServe 2009). Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), basin big sage (*Artemisia tridentata* ssp. *tridentata*), and mountain big sage (*Artemisia tridentata* ssp. *vaseyana*) are dominant sagebrush species in this area and make up a large part of the landscape that isn't farmed, barren lava flows, or forested. Cool-season grasses that accompany these sagebrush communities include needle-and-thread (*Hesperostipa comata*), bluebunch wheatgrass (*Pseudoroegneria spicatum*), Idaho fescue (*Festuca idahoensis*), basin wild rye (*Leymus cinereus*), and bluegrasses (*Poa* asp.) (McGrath, et al 2002).

Soils are derived from Quaternary loess, basalt, volcanic ash, alluvium, and glacial outwash. Mollisols are common in the areas where farming is concentrated. Aridisols are also common, especially in the lava fields; rock outcrops are common in these areas as well (McGrath, et al 2022). The combination of lava flows, underlying fractured basalt and porous, sandy soils result in large areas in the Snake River Plain with no surface water.

Agriculture is the primary land use in this part of Idaho. Farming is primarily concentrated in the Snake River Plain, where irrigated potatoes, sugar beets, wheat, barley and alfalfa are the primary crops. Dryland farming is common in the valleys of the Basin and Range. Livestock grazing (cows and sheep) is common in the sagebrush plains as well as in forested areas. Recreation, in particular hunting and fishing, is another common and important land use (McGrath, et al 2002). There are several large areas of preserved habitat in the area, including Camas Lake National Wildlife Refuge, Craters of the Moon National Monument, Mud Lake Wildlife Management area, and Market Lake Wildlife Management Area, providing habitat for fish, large game and non-game wildlife, and migratory birds.

Regional specialized conventions:

Floodplains: Vegetation in floodplains with streams or rivers that are incised, regulated, or have other alterations to a normal flooding regime are typically mapped as Riparian, as are areas with soils that are sandy, cobbly, or otherwise indicated as well-drained. Russian olive-dominated floodplains are also mapped Riparian because they thrive in areas with a high water table but are not common in palustrine wetlands in arid West. Features associated with streams and rivers with minor to moderate floodplain development, old channel meander scars, and toe-of-slope wetlands may be mapped as palustrine if saturation and/or ponding is evident in the imagery, beaver are present, or ancillary soils information indicate a high percentage of hydric soils. Vegetation in narrow stream valleys with little to no floodplain development are typically not mapped, unless springs are present.

Impounded ponds: Many intermittent streams are impounded and springs may be excavated or piped to stock tanks to supply water for livestock. Most stock ponds are classified as PUBF/Gh (palustrine, unconsolidated bottom, semi-permanently flooded/intermittently exposed, impounded). Drier stock ponds are typically mapped as PEM1A/Ch (temporarily/seasonally flooded).

Agricultural canals/irrigation ditches: Excavated ditches used for agricultural purposes are typically mapped as R4SBCx. Most small irrigation ditches in this part of Idaho flow seasonally during the growing season (approximately May-August/September depending on water availability). Ditches that appear not to be in use or are dry during mid-summer are mapped as R4SBAx. Large ditches or canals with more perennial sources are mapped as R3UBFx in the project area.

Springs: Springs are typically mapped with the E or B (if drier-looking) water regime. While the NHD is used to identify potential springs, many springs are not included in the NHD dataset. If a spring is indicated in the NHD but is not visible as EM or SS, no wetland is mapped. Springs in forested areas are more rare and will almost always be mapped. The spring itself may not be visible in the imagery if the canopy species are not different than surrounding upland species.

Description of wetland habitats:

Only major classes of wetlands are represented here. A more detailed description of wetland and Riparian classification, as well as other information regarding wetland mapping are available on the MTNHP Wetland and Riparian Mapping Center website. Wetland classification codes and representative corresponding community type(s) in this project include:

PEM: Palustrine emergent wetlands consist of temporarily and seasonally flooded wet meadows dominated by native sedges (*Carex* spp.), rushes (*Juncus* spp.), and spikerushes (*Eleocharis* sp.), and nonnative pasture grasses such as Kentucky bluegrass (*Poa pratensis*). Saturated emergent wetlands are dominated by sedge species such as Northwest Territory sedge (*Carex utriculata*) and water sedge (*C. aquatilis*). Semipermanently flooded sites may be dominated by bulrushes (*Schoenoplectus* spp., *Scirpus* spp.) or cattail (*Typha* spp.). Reed canary grass (*Phalaris arundinacea*) is common on disturbed sites.

PSS: Palustrine scrub-shrub wetlands consist of temporarily flooded, seasonally flooded, and saturated shrublands dominated by several willow species including Bebb willow (*Salix bebbiana*) and sandbar willow (*S. exigua*). Other shrubs include gray alder (*Alnus incana*) and red osier dogwood (*Cornus sericea*).

L1AB and L2AB: Lacustrine limnetic and lacustrine littoral aquatic bed wetlands are associated with large reservoirs or natural waterbodies greater than 20 acres. Pond vegetation is variable and often strongly zoned. In shallow areas, vegetation is similar to the species occurring in flooded emergent wetlands. Deeper water areas have submerged or floating species such as coontail (*Ceratophyllum demersum*), pondweed (*Potamogeton pectinatus*), waterweed (*Elodea* spp.), stonewort (*Chara* spp.), and duckweed (*Lemna* spp.).

L1UB and L2UB: Lacustrine limnetic and lacustrine littoral unconsolidated bottom wetlands are associated with large reservoirs or natural waterbodies greater than 20 acres.

PAB, PUB: Palustrine aquatic bed and palustrine unconsolidated bottom wetlands are associated with ponds. Pond vegetation is variable and often strongly zoned. In shallow areas, vegetation is similar to the species occurring in flooded emergent wetlands. Deeper water areas have submerged or floating species such as coontail (*Ceratophyllum demersum*), pondweed (*Potamogeton pectinatus*), waterweed (*Elodea* spp.), stonewort (*Chara* spp.), and duckweed (*Lemna* spp.).

PUS: Palustrine unconsolidated shore wetlands are usually associated with ponds or saline areas that are seasonally flooded, like playas. Substrates are typically composed of fine silts, sands, or gravels. There is always less than 30% cover of vegetation, except for pioneer plants that are usually killed under conditions of prolonged inundation.

R2UB/R2US: Lower perennial riverine (R2) wetlands occur within the active channel of high order rivers with slower gradient, large, active floodplains, and fine substrates such as sands and silts.

R3UB/R3US: Upper perennial riverine (R3) wetlands occur within the active channel of higher order streams and rivers.

R4SB: Intermittent streams (R4) are stream channels that only have surface flow during a portion of the year. They also include excavated ditches and canals used for irrigation within valleys. Streams with no water visible in the imagery but with minor floodplain development and/or some sources of groundwater from springs or seeps were typically classified as temporarily flooded (R4SBA). Streams with some standing water visible in the imagery, yet still designated as intermittent in the National Hydrography Dataset (NHD), were classified as R4SBC (seasonally flooded).

Description of other habitats:

Riparian: The riparian canopy may include a wide range of vegetation, from the drier Douglas-fir (*Pseudotsuga menziesii*) to the wetter cottonwoods (*Populus* spp). Riparian scrub-shrub areas along streams may have a diverse plant community, including common chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*), red-osier dogwood (*Cornus sericea*), black hawthorn (*Crataegus douglasii*), and wood's rose (*Rosa woodsii*). Non-native Russian olive (*Elaeagnus angustifolia*) is a common riparian tree or shrub. The herbaceous layer is largely dominated by non-native pasture grasses, particularly Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and common timothy (*Phleum pretense*), though the native forb American licorice (*Glycyrrhiza lepidota*) may be present. Woody vegetation along steep and narrow draws are considered wooded draws, not Riparian, and are not mapped.

List of common wetland and riparian plant species with indicator status:

Genus species	**Common Name**	**Wetland Indicator Status**
Carex spp.	sedge species	FACW or OBL
Typha spp.	cattail species	OBL
Juncus balticus	Baltic rush	FACW
Schoenoplectus spp.	bulrush species	OBL
Salix spp.	willow species	FACW or OBL
Pascopyron smithii	western wheatgrass	FACU
Glycyrrhiza lepidota	American licorice	FACU
Prunus virginiana	common chokecherry	FACU
Rosa woodsii	Wood's rose	FACU

References:

CoCoRaHS (Community Collaborative Rain, Hail, & Snow Network). State Climate series: Idaho climate summary (Idaho Contrasts from Mountains to Plains) and map. Online: https://www.cocorahs.org/Content.aspx?page=50StatesClimates. Accessed July 8, 2022.

Ertter, B. and B. Moseley. 1992. Floristic Regions of Idaho. Journal of the Idaho Academy of Sciences. Vol 28 (2): 57-70.

FDGC (Federal Geographic Data Committee). 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C.

McGrath C.L., Woods A.J., Omernik, J.M., Bryce, S.A., Edmondson, M., Nesser, J.A., Shelden, J., Crawford, R.C., Comstock, J.A., and Plocher, M.D., 2002, Ecoregions of Idaho (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,350,000).

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, USA. Data current as of February 2009.

NPS (National Park Service). Craters of the Moon National Monument & Preserve. Online: https://www.nps.gov/crmo/index.htm. Accessed July 8, 2022.

USFWS (U.S. Fish and Wildlife Service). 2019. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

WRCC (Western Regional Climate Center) (a). Climate of Idaho. Online: https://wrcc.dri.edu/Climate/narrative_id.php. Accessed July 8, 2022.

WRCC (Western Regional Climate Center) (b). Climate Summary for Craters of the Moon, Idaho. Online: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?id2260. Accessed July 8, 2022.

Appendix A. ID BLM 2019 quads mapped (74).

Quad Name	State	County
Arbon	ID	Power/Oneida
Arco South	ID	Butte
Atomic City	ID	Bingham/Butte
Badger Hole Spring	ID	Oneida
Baldy Knoll	ID	Bingham
Bannock Peak	ID	Power
Bear Park East	ID	Blaine
Bell Mountain	ID	Butte/Lemhi
Big Fill Reservoir	ID	Bingham
Big Grassy Ridge	ID	Fremont
Big Grassy Ridge NE	ID	Fremont
Black Knoll	ID	Fremont
Black Pine	ID/UT	Oneida/Cassia/Box Elder
Blizzard Mountain North	ID	Butte/Custer
Buist	ID	Oneida
Camas	ID	Clark/Jefferson/Fremont
Cedar Butte	ID	Clark/Jefferson
Cedar Butte SW	ID	Clark/Jefferson
Cedarhill	ID	Oneida
Champagne Creek	ID	Butte
Coffee Point SW	ID	Bingham
Co-op Spring	ID/UT	Oneida/Box Elder
Crystal Butte	ID	Fremont
Daniels	ID	Oneida
Deep Creek Peak	ID	Power/Oneida
Deer Parks	ID	Jefferson
Diamond Peak	ID	Butte/Lemhi
Dubois	ID	Clark
Dubois NE	ID	Clark/Fremont
Dubois SE	ID	Fremont/Clark
Fingers Butte	ID	Butte
Grover Canyon	ID/UT	Oneida/Box Elder
Hamer	ID	Jefferson/Fremont
Holbrook	ID	Oneida
Ireland Springs	ID	Oneida
Juniper	ID	Oneida/Cassia
Kettle Butte	ID	Bonneville/Jefferson
Kettle Butte NE	ID	Jefferson
Kettle Butte NW	ID	Jefferson
Little Lost River Sinks	ID	Butte

Lone Butte	ID	Clark
Market Lake	ID	Jefferson
Market Lake NE	ID	Jefferson/Fremont
Menan Buttes	ID	Madison/Jefferson
Methodist Creek	ID	Butte/Custer
Middle Butte	ID	Bingham
Morgans Pasture NE	ID	Bonneville/Bingham
Morgans Pasture NW	ID	Bonneville/Bingham
Mud Lake NW	ID	Jefferson
Mud Lake SE	ID	Jefferson
Pillar Butte	ID	Power/Blaine/Bingham
Pillar Butte NE	ID	Power/Bingham
Pine Butte	ID	Fremont/Clark
Plano	ID	Fremont/Madison/Jefferson
Pratt Butte	ID	Butte/Blaine
Rays Lake	ID	Jefferson
Richard Butte	ID	Butte/Clark
Rose	ID	Bingham
Roy	ID	Oneida
Samaria	ID/UT	Oneida/Box Elder
Shamrock Gulch	ID	Clark
Sheep Creek Spring	ID	Oneida
Snowshoe Butte	ID	Clark/Fremont
Spencer South	ID	Clark
Split Butte	ID	Fremont
Split Rock	ID	Fremont/Clark
Springfield NW	ID	Bingham
Taber	ID	Bingham
Tepee Draw	ID/MT	Clark/Beaverhead
Terreton	ID	Jefferson
The Cove	ID/UT	Oneida/Box Elder
Thunder Gulch	ID	Clark
Tyler Peak	ID	Butte/Clark
Woodville	ID	Bonneville/Bingham