



# Uncompahgre River Corridor

*Ecological Assessment and Recommendations Report*

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TOWN OF RIDGWAY, COLORADO

DHM DESIGN

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Prepared By: DHM DESIGN





## Executive Summary

Under contract with the Town of Ridgway, DHM Design (DHM) and LOTIC Hydrological (LOTIC) completed a River Corridor Assessment for approximately 120 acres along the Uncompahgre River. The purpose of the Assessment was to characterize river function, channel stability and ecosystem health within the river corridor to inform current and future management decisions. The Assessment is the initial step in a larger ongoing process to improve the condition of the Uncompahgre River within the Town Ridgway. DHM and LOTIC completed a comprehensive review of existing documentation including the Town of Ridgway Master Plan (2019), Uncompahgre Watershed Plan (2018), Ordinance 18-01 – Uncompahgre Overlay District and other pertinent documents. DHM and LOTIC completed rapid field assessments in September of 2021 to assess both “in channel” river function (LOTIC) and adjacent riparian ecological health and function (DHM). A summary of findings is included below and detailed findings for the riparian ecological health and function as well as recommendations for improvements are included within this report. A separate report – *River Channel Characteristics of the Uncompahgre River in Ridgway, CO* provides an analysis of the river function.

It was concluded that the current river corridor function and riparian ecological health within the Project Assessment Area is a product of both diverse landscape transitions and anthropogenic influences. Overall, the riparian ecology of the Assessment Area was observed to be in overall good health. Opportunities for ecological interventions including restoration, creation and preservation have been identified and mapped within the Assessment Area. Individual projects have been also identified with the intent that these project types can be implemented in selection locations within the Assessment Area in the future.

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## **1.0 Introduction**

The purpose of this document is to present a comprehensive analysis of the existing ecological communities and their current condition within the Uncompahgre River Corridor Assessment area (Project Area) to be used as a reference for current management and future planning projects. DHM Design Ecological Services Staff (DHM) have completed a comprehensive site analysis to evaluate existing ecological conditions, opportunities, and constraints as they relate to current and future management of the property. The information included in this report is intended to guide decisions for ecological management and recreational use on the property. The Town of Ridgway (Town), The Uncompahgre Watershed Partnership (UWP) and other stakeholders recognize and value the Uncompahgre River as an irreplaceable resource that should be celebrated and protected. The Town's community value number one – Healthy Natural Environment, as described in 2019 Master Plan, includes goals and policies to address the following:

- Preservation of natural habitats and ecosystems
- Conservation of open space and ranch lands
- Sustainable development practices
- Access to and protection of the river corridor
- Community forest management
- Climate adaptation
- Source-water protection
- Air quality protection

This ecological evaluation takes into consideration these overarching goals and policies and describes the natural resources that are present on the property including vegetation types, plant communities, aquatic resources, fisheries, stream function and wildlife habitat. Detailed recommendations by resource type can be found in *Appendix 4 – Restoration Activities Table*. Grant funding opportunities for recommended restoration and management activities are also provided in Appendix 4.



*Figure 1 - View looking south at Uncompahgre River corridor. High quality riparian habitat with good species diversity.*

A rapid stream assessment was conducted by LOTIC Hydrological to assess stream health and function. Their report has been provided as a companion document to this report.

## 2.0 Methods

### 2.1 Desktop Analysis

To initiate the property analysis, DHM Design Ecological Services staff completed a comprehensive desktop analysis to assess and evaluate existing data for the property. The desktop review includes all data and information provided to date by the Town of Ridgway. In addition, DHM conducted a further refined review of available resource data for the property that would best support the project vision. This analysis provides the most available resource data to date including but not limited to:

- Town of Ridgway Master Plan (2019)
- Uncompahgre Watershed Plan (2018)
- Ordinance NO. 18-01 – Uncompahgre River Overlay District (UROD)
- Ridgway Comprehensive Plan – Integrated Weed Management and Native Plant Restoration Plan (2011)
- National Vegetation Classification Standard, Version 2 (2008)
- Colorado Parks and Wildlife Species Activity Mapper (SAM)
- USDA NRCS Geospatial Data Gateway (2021)
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC)
- National Wetlands Inventory (NWI) Wetland Mapper (USFWS) 2021
- NRCS Web Soils Mapper (2021)
- Google Earth Imagery
- Natural Resources Conservation Service (NRCS) National Agriculture Imagery Program (NAIP) aerial photographs.

### 2.2 Field Survey

DHM Design Ecological Services staff completed pedestrian surveys of the property on August 26<sup>th</sup> and September 16, 2021. DHM completed a rapid assessment of the Project Area to identify and map existing ecological conditions and evaluate opportunities and constraints for future management of the property. GPS data was collected in ArcGIS Collector on a handheld mobile device connected to an external GNSS receiver. The average accuracy for data collection was 8 -14 inches. GIS data, field notes and photo documentation were collected during the field site visit.

### 2.3 Data Processing and Mapping

GIS data was processed in ArcGIS Pro version 2.8.2 and mapping digitization for property features was completed at a 1:500 scale using high resolution aerial imagery available through ESRI databases, Google Earth and NAIP. Additional data including wildlife, wetland, soils and Threatened and Endangered Species (T&E) data was utilized directly from their respective sources listed above.

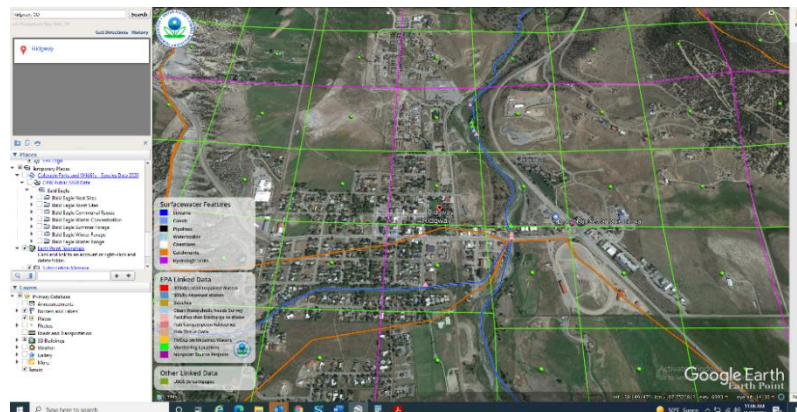


Figure 2 - Data analysis and overlay process utilizing Google Earth and ArcGIS online platforms.

### 3.0 Existing Conditions

#### 3.1 Location

The Assessment Area is located along the Uncompahgre River in the Town of Ridgway in Ouray County (Figure 3). Public access to the assessment area is extensive with the Uncompahgre Riverway Trail and multiple parks locations. The parcel information for public properties within the Project Assessment Area are included in Table 1. Additional description for the property is included below.

Table 1 - Public Parcel Information within Assessment Area

Location	Parcel Number
<b>Town of Ridgway</b>	430516324003
	430516207002
	430509211010
	430516215004
<b>Ouray County</b>	430516200004
<b>BLM</b>	425504200080

County, State: Ouray County, Colorado

Legal Description: Sections 09, 16; Township 45N; Range 8W

Latitude and Longitude: 38°9'31"N; -107°45'17"W

U.S. Geological Survey (USGS) 7.5 Minute Quadrangles: Ridgway and Dallas, CO 1984

#### 3.2 Assessment Area

The Town of Ridgway is situated on the Uncompahgre River in Ouray County, Colorado. The project Assessment Area is characterized at north end of the reach by a mostly undeveloped and undisturbed river corridor, with the exception of Dennis Weaver Park and the Natural Areas and Rural Neighborhoods, followed by commercial core with public riverfront access and transitioning back to rural neighborhoods at the southern intersection with the town boundary.

#### 3.3 Landform, Elevation and Size

The project area is approximately 120 acres in size and is situated at approximately 7000 feet in elevation. The project area includes both the floodplain and terrace topography.

#### 3.4 Soils

Soils of the valley range widely in age from recent alluvial deposits along stream flood plains to the well-weathered soils of higher terraces and benches. Flood plain soils of the lower Uncompahgre River are largely alkaline deposits over a relatively high ground water table. The alluvial deposits contain relatively coarse, unconsolidated and stratified soils of poorly graded, well-sorted sand and gravel derived from igneous and sedimentary rock formations. More developed soils range in texture from silty clay loam to very fine sandy loam (USDA 1967). A total of six (6) mapped NRCS soil map

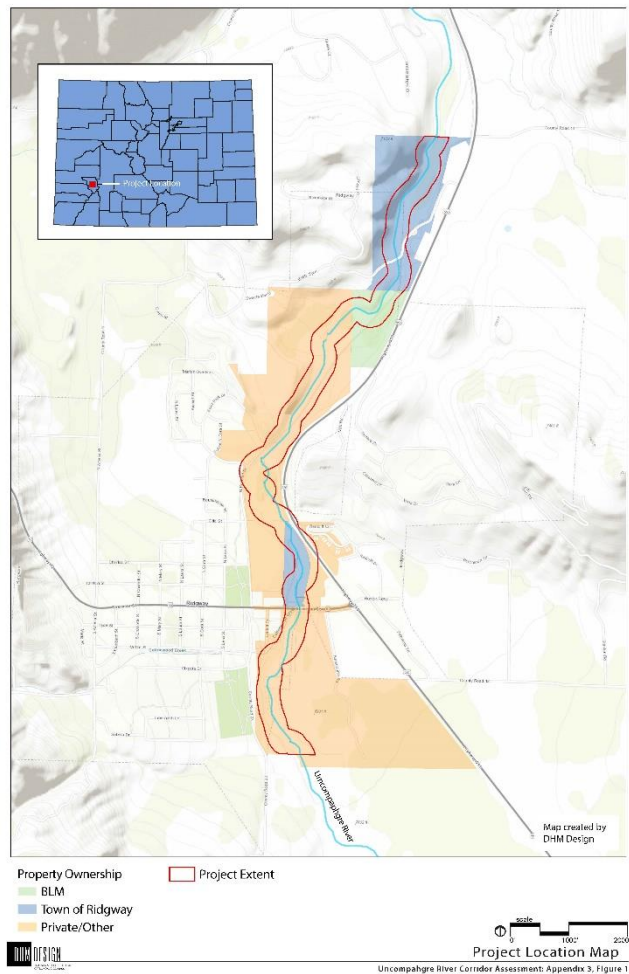


Figure 3 - Project Assessment Area Location.



units (MU) are located within Uncompahgre River Assessment Area and are shown in *Appendix 5 – NRCS Soil Survey Report*, along with more detailed soil descriptions. It is recommended that soil analysis is completed prior to restoration efforts to fully understand the composition and state of the soils in the area. NRCS mapped soil types are included in Table 2 below. The dominant soil type within the Project Assessment Area is Vastine fine sandy loam.

*Table 2 - NRCS Mapped Soil Units within Uncompahgre River Corridor Assessment Area.*

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
853	Wellsbasin very cobbly loam, 3 to 20 percent slopes, extremely stony	5.8	4.9%
896	Barboncito, extremely flaggy-Badland complex, 15 to 65 percent slopes	12.7	10.5%
900	Urban land	1.7	1.4%
901	Gravel pits	0.5	0.4%
977	Vastine fine sandy loam, 0 to 5 percent slopes, occasionally flooded	86.7	72.0%
989	Mudcap loam, 1 to 6 percent slopes	12.9	10.7%
<b>Totals for Area of Interest</b>		<b>120.4</b>	<b>100.0%</b>

### 3.5 Hydrology

The Uncompahgre River is the primary hydrological feature within the project survey area. This section of the Uncompahgre River is located within the Coal Creek – Uncompahgre River (HUC12 – 140200060205) Watershed. The overall drainage area for this watershed is approximately 28,645 acres. The Uncompahgre River begins in the high San Juan Mountains at Alaska Basin, in San Juan County, and flows northwest to join the Gunnison River at Delta, Colorado. Dallas Creek contributes water from the area west of Ridgway, while Cow Creek comes in from the east downstream from the Ridgway Reservoir. Today, river flows are uncontrolled above Ridgway, and there is a high runoff from melting snow in the spring. North of Ridgway, the Ridgway dam was constructed for water storage purposes and to provide late season irrigation water to the Uncompahgre Valley. The Uncompahgre River has felt the impacts of mining at its headwaters, gravel extraction, water diversions, conversion of flood plain for agriculture, road building, railroad realignment, channelization, and other human activities. The natural hydrology of the river has been severely altered, resulting in reduction of riparian vegetation and poor water quality. Additional stream segment data for the Uncompahgre River is included in Table 3 below.

*Table 3 - Stream Segment Data (NHDP V2)*

FOR THE STREAM SEGMENT (REACH)	VALUE
STREAM NAME	Uncompahgre River
STREAM ORDER	3
STREAM LEVEL	6
MEAN ANNUAL FLOW VOLUME (ESTIMATE)	167.21 cfs
MEAN ANNUAL FLOW VELOCITY (ESTIMATE)	1.52 fps
STREAM LENGTH	2.19 miles

### 3.6 Ecological Setting



Figure 4 - Ecological communities within the Project Assessment Area.

The Project Assessment Area is located in the Uncompahgre River Valley at the base of the San Juan Mountain Range. The Uncompahgre Valley above Ridgway was glaciated during the Pleistocene Period, which ended between 8,000 and 10,000 years ago. This is revealed in the U-shape typical of glacier carved valleys. Terminal moraines of the glacier are visible today north of Ridgway. When the glaciers melted, the river swelled to many times its present size. Sediments of gravel and cobblestones were deposited on the valley floor, filling in the U-shaped bottom and creating the flat valley floor that exists today between Ouray and Ridgway. South of Ridgway, the large volume of water created the wide floodplain that continues the length of the river.

The Project Assessment Area is located in the Colorado Plateaus Province, Canyonlands section, of Bailey's Ecoregions, and in the Southern Rocky Mountains Province (Bailey 1994). The location of the property is on the far eastern extent of the Colorado Plateau and is considered to be in a semiarid climatic zone. The ecology and vegetation of the warm high desert basin is strongly influenced by the hydrology of the major river systems that arise from the surrounding high elevation mountains. The floodplains and Riparian areas are often dominated by shrub species that are adapted for the more mesic site conditions with regular to periodic flooding. As the topology transitions from the floodplain to the upland communities, the conditions become more xeric; low growing shrubs, forbs and grasses that are more suited to the dryer conditions are the dominant understory to a pinyon and juniper woodland.

### 3.7 Vegetation

#### 3.7.1 Vegetative Communities

The Project Assessment Area is focused around the Uncompahgre River and its riparian corridor, therefore, from a broad ecological perspective, the land encompassing the assessment area is largely associated with riparian community types including wetlands and transitional montane upland communities in the higher elevations and valley slopes. These broader categories are primarily distinguishable by land form and positioning in relation to the Uncompahgre River. Additionally, the development of the Town of Ridgway and historic land uses have altered the vegetation and associated communities from their native, natural state throughout the sections of the reach.

DHM Design Ecological Services team reviewed the overall ecological systems found within the project reach and discussed the ecological value of each. The overall reach has a good diversity of habitat with high quality habitat in some locations.

To better define the 120-acre site ecology and guide restoration and management needs for the property, the site has been delineated into a more descriptive and accurate set of niche ecological communities based upon defining vegetative and hydrologic characteristics. A total of four (4) vegetative communities with two (2) associated wetland types have been identified within the Ridgway River Project Area in accordance with the United States National Vegetation Classification (NVC, 2020) and Cowardin wetland classification system. These communities are listed below and shown in Figure 5 and *Appendix 1 – Existing Conditions Maps*.

- Xeric Shrubland, Sagebrush Pinyon Juniper Steppe
- Lower Montane Riparian Woodland and Shrubland
- Western Emergent Marsh
- Palustrine Emergent Wetlands
- Palustrine Scrub Shrub Wetlands
- Recreational/Open Space Herbaceous Vegetation

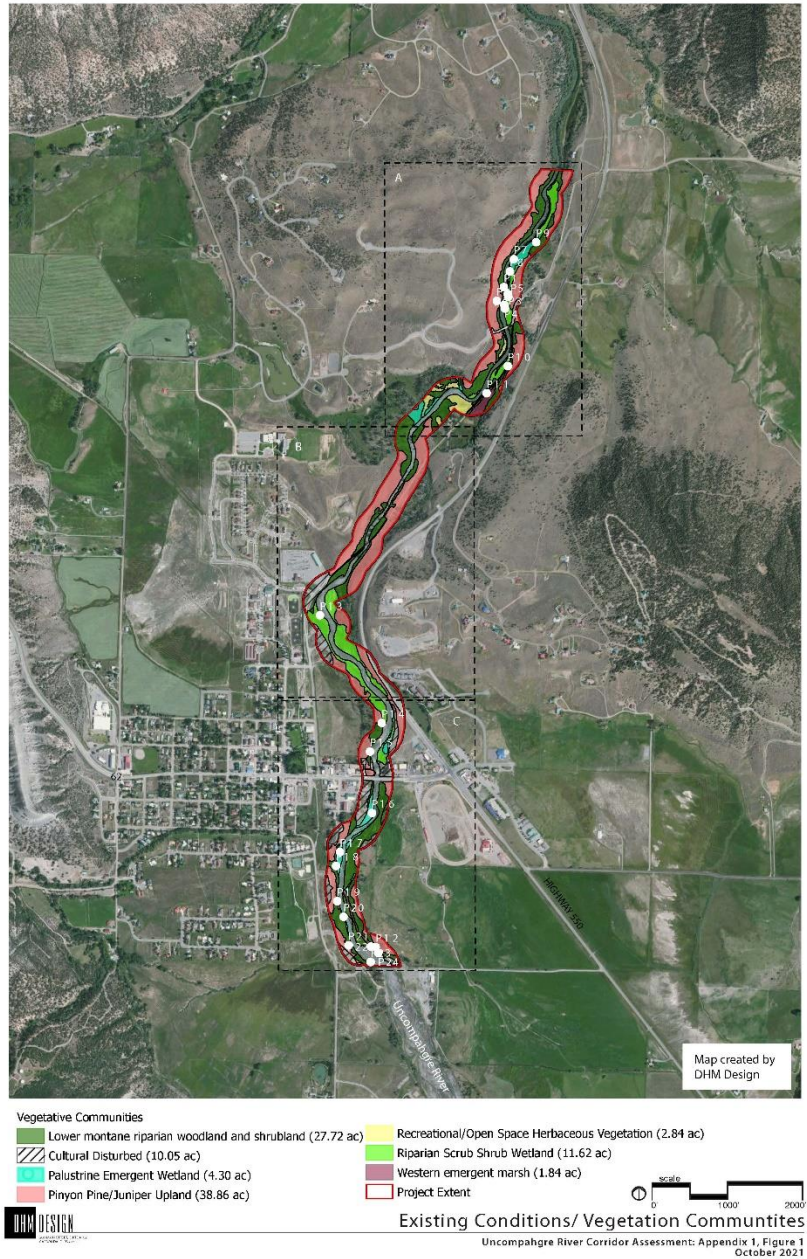


Figure 5 - Existing conditions and vegetative communities map for Project Assessment Area.



#### *Xeric Shrubland, Sagebrush Pinyon Juniper Steppe*

This vegetation community is found outside of the riparian zone. This shrub-steppe vegetation is dominated by species of sagebrush with Colorado pinyon and Rocky Mountain juniper. Several shrubby species of sagebrush are found along the assessment area and each have their own ecological requirements. Big sagebrush (*Artemisia tridentata*) occupies deep soils and is a frequent component of a tall shrub community with greasewood, spearleaf and rubber rabbitbrushes. Mountain big sage tends to grow at slightly higher elevations with pinyon-juniper and mountain shrub communities. It is frequent on the slopes on the northern portion of the reach. Native species observed with the sagebrush community included rabbitbrush (*Chrysothamnus spp.*), broom snakeweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), prickly pear cactus (*Opuntia spp.*), western wheatgrass (*Pascopyrum smithii*) and several bunch grasses, including Indian rice grass (*Oryzopsis hymenoides*), needle and thread (*Hesperostipa comate*), and Sandberg bluegrass (*P. secunda*) these species are less prevalent and found in scattered, low densities. Sagebrush areas have been identified by the CDOW as critical deer and elk winter habitat.



Figure 6 - View looking south at xeric shrubland, sagebrush Pinyon Juniper Steppe vegetative community.

#### *Lower Montane Riparian Woodland and Shrubland*

This vegetation community forms a narrow riparian corridor, consisting of patchy shrub stands and cottonwood woodlands throughout the project area. The shrubland areas are distinguishable by the presence of hydrophytic shrub species including Coyote willow (*Salix exigua*), thinleaf alder (*Alnus incana*), and silver buffaloberry (*Shepherdia argentea*) and whitestem gooseberry (*Ribes inerme*). The understory vegetation is comprised of a diversity of herbaceous forbs and graminoids, including tall fleabane (*Erigeron elatior*), cow parsnip (*Heracleum maximum*), Columbian monkshood (*Aconitum columbianum*), watercress (*Nasturtium officinale*), fringed willowherb (*Epilobium ciliatum*), reed canary grass (*Phalaris arundinacea*), horsetail (*Equisetum spp.*) sedges (*Carex spp.*) and rushes (*Juncus spp.*).



Figure 7 - View looking south along lower montane riparian woodland and shrubland vegetative community.

The presence of large overstory trees are indicative of the woodland areas of the riparian corridor, primarily consisting of mature narrow leaf cottonwood's (*Populus angustifolia*). The understory of these woodlands varies, but often consists of a diversity of shrub and forb species similar to that found within the shrubland matrix of this riparian community.

### Western Emergent Marsh

The Western North American Emergent Marsh system includes wetlands with permanent to semi-permanent standing water that support aquatic, submerged, and coarse emergent plants. Natural marshes may occur in depressions (impounded ponds or kettle ponds), on lake fringes, or within riparian and floodplain areas as beaver ponds, backwater channels, oxbows, or sloughs. Marshes are frequently or continually inundated, with water depths up to 2 m. Water levels may be stable, or may fluctuate 1 m or more over the course of the growing season. Hydrologic inputs include direct precipitation, surface water inflows, and groundwater discharge. Marshes have distinctive soil characteristics that result from long periods of anaerobic conditions in the soils (e.g., gleyed soils, high organic content, redoximorphic features). The vegetation is characterized by herbaceous plants that are adapted to saturated soil conditions. Common emergent and floating vegetation includes species of bulrush (*Scirpus* and/or *Schoenoplectus*), cattail (*Typha*), rush (*Juncus*), pondweed (*Potamogeton*), smartweed (*Polygonum*), pondlily (*Nuphar*), and canarygrass (*Phalaris*). There are two (2) locations within the Assessment Area including a transitional backwater channel on the southeastern end of the reach where beaver dams have aided the development of this ecosystem. A created marsh wetland exists on the BLM parcel in the middle section of the reach.



Figure 8 - View looking south at western emergent marsh habitat within Project Assessment Area.

### Palustrine Emergent Wetlands

The palustrine emergent wetlands are typically located in areas adjacent to the Uncompahgre River and other hydrologic features and drainages, where the hydrology and morphology of the stream channel permits the establishment emergent wetland vegetation. The extent of these wetlands is strongly reliant on the morphology of the Uncompahgre River and other associated hydrological sources, and vary conditionally based upon the vegetative composition, often times being formed in depressional swales within the floodplain or abandon oxbows. The distribution of these wetlands is widespread, being found on both the eastern and western banks of the Uncompahgre River throughout the project extent. Characteristic emergent vegetation consists of a diversity of hydrophytic graminoid species, including: swordleaf rush (*Juncus ensifolius*), Nebraska sedge (*Carex nebrascensis*), common threesquare (*Schoenoplectus pungens*), hardstem bulrush (*Schoenoplectus acutus*), bluejoint reedgrass (*Calamagrostis canadensis*) cattails (*Typha* sp.), and horsetails (*Equisetum* spp.).



Figure 9 - Palustrine Emergent Wetland located within the floodplain of the Uncompahgre River.



*PSS1C - Palustrine Scrub Shrub, Broad-leaved Deciduous, Seasonally Flooded*



Figure 10 - Palustrine Scrub Shrub Wetland situated on broad floodplain shelf along the mid-reach of the Uncompahgre River.

The palustrine scrub shrub communities are distinguishable by the dominance of willow (*Salix* spp.), with coyote willow (*Salix exigua*) and Rocky Mountain willow (*Salix monticola*) being the primary species found. A secondary shrub species, that may be co-dominant at times include thinleaf alder (*Alnus incana*). Typically found along the banks of the Uncompahgre River, landform and hydrology are the main factors dictating the distribution of these communities. Point bars on large inside bends and broad, flat floodplain shelves that are regularly inundated and close to the water table of the Uncompahgre River are common features supporting these scrub shrub communities. Hydrology of the site is the main characteristic distinguishing the scrub-shrub wetland communities from the riparian shrubland communities.

*Recreational/Open Space Herbaceous Vegetation*

This vegetative community is used to distinguish the expansive recreational and open space influenced areas with a more park like or naturally maintained herbaceous vegetation community. They are found within the BLM parcels and park areas found along this stretch of the Uncompahgre River and are distinguishable by established herbaceous vegetation, primarily consisting of both native and non-native graminoid species. The influence of human activity is observable and attributes to the condition of these vegetated zones.



Figure 11 - Herbaceous vegetation found within Dennis Weaver Memorial Park



### 3.8 Wildlife



Figure 12 - Wildlife species observed along Project Assessment Area. (Left to right) Great Blue Heron, raccoon tracks and roosting common ravens.

The Riparian Ecosystem the Uncompahgre River and its associated wetland systems supports a diversity of wildlife. In addition to onsite observations, the Colorado Parks and Wildlife (CPW) Species Activity Map (SAM) and the USFS Information for Planning and Consultation (IPaC) was used to determine potential species that could inhabit the Project Area. Wildlife species associated with CPW’s SAM data are included in *Table 4* below. It is recommended that consultation with CPW occur prior to any development of the property. In addition to the species listed above, and shown in table 3 below, the improved riparian corridor is likely to provide habitat to a number of other species, including: Northern leopard frogs, coyote, fox, bobcat, beaver, badger, striped skunk, raccoon, cottontail, jackrabbit, porcupine, long-tailed weasel, squirrels, chipmunks, mice, voles, and shrews.

Table 4 -Colorado Parks and Wildlife Species Activity Map Species List for Ridgway River Project Area.

<b>Mammals</b>		<b>Mammals</b>	
<b>Species</b>	<b>Habitat Utilization</b>	<b>Species</b>	<b>Habitat Utilization</b>
<b>Black Bear (<i>Ursus americanus</i>)</b>	Overall Range/Human Conflict Area Summer Concentration	<b>Mule Deer (<i>Odocoileus hemionus</i>)</b>	Overall Range
<b>Dwarf Shrew (<i>Sorex nanus</i>)</b>	Overall Range	<b>Southern Red-backed vole (<i>Myodes gapperi</i>)</b>	Overall Range
<b>Elk (<i>Cervus canadensis</i>)</b>	Overall Range Winter Range Winter Concentration Severe Winter Range	<b>White-tailed Jackrabbit (<i>Lepus townsendii</i>)</b>	Overall Range
<b>Mountain Lion (<i>Puma concolor</i>)</b>	Overall Range	<b>White-tailed Prairie Dog (<i>Cynomys leucurus</i>)</b>	Overall Range
<b>Reptiles</b>		<b>Reptiles</b>	
<b>Species</b>	<b>Habitat Utilization</b>	<b>Species</b>	<b>Habitat Utilization</b>
<b>Bull Snake (<i>Pituophis catenifer sayi</i>)</b>	Overall Range	<b>Prairie Lizard (<i>Sceloporus undulates</i>)</b>	Overall Range
<b>Hernandez’s Short-horned Lizard (<i>Phrynosoma hernandesi</i>)</b>	Overall Range	<b>Smooth Green snake (<i>Opheodrys vernalis</i>)</b>	Overall Range

<b>Ornate Tree Lizard</b> <i>(Urosaurus ornatus)</i>	Overall Range	<b>Snowshoe Hare</b> <i>(Lepus americanus)</i>	Overall Range
<b>Plateau Striped Whiptail</b> <i>(Aspidoscelis velox)</i>	Overall Range	<b>Terrestrial Garter snake</b> <i>(Thamnophis elegans)</i>	Overall Range
<b>Birds</b>		<b>Birds</b>	
<b>Species</b>	<b>Habitat Utilization</b>	<b>Species</b>	<b>Habitat Utilization</b>
<b>Bald Eagle</b> <i>(Haliaeetus leucocephalus)</i>	Roost Site Communal Roosts Winter Concentration Winter Forage Winter Range	<b>Lewis Woodpecker</b> <i>(Melanerpes lewis)</i>	Breeding Range
<b>Band-tailed Pigeon</b> <i>(Patagioenas fasciata)</i>	Breeding Range	<b>Northern Harrier</b> <i>(Circus hudsonius)</i>	Breeding Range
<b>Brewer Sparrow</b> <i>(Spizella breweri)</i>	Breeding Range	<b>Olive-sided Flycatcher</b> <i>(Contopus cooperi)</i>	Breeding Range
<b>Brown-capped Rosy Finch</b> <i>(Leucosticte atrata)</i>	Overall Range	<b>Pinyon Jay</b> <i>(Gymnorhinus cyanocephalus)</i>	Breeding Range
<b>Canada Geese</b> <i>(Branta canadensis)</i>	Winter Range Winter Concentration Production Area Brood Concentration	<b>Rufous Hummingbird</b> <i>(Selasphorus rufus)</i>	Migration Range
<b>Golden Eagle</b> <i>(Aquila chrysaetos)</i>	Breeding Range	<b>Virginia Warbler</b> <i>(Oreothlypis virginiae)</i>	Breeding Range
<b>Grace Warbler</b> <i>(Setophaga graciae)</i>	Breeding Range	<b>Wild Turkey</b> <i>(Meleagris gallopavo)</i>	Overall Range
<b>Lazuli Bunting</b> <i>(Passerina amoena)</i>	Breeding Range		

U.S. Fish and Wildlife IpAC data was accessed to determine what potential Threatened and Endangered Species (T&E) species and habitat could exist on the property. There is no mapped critical habitat within the Assessment Area. *Table 5* includes a list of T&E species with the potential to occur within the Assessment Area. In review of preferred habitat for Mexican Spotted Owl's, it is deemed unlikely that they would inhabit the project area. The vegetative communities within the Uncompahgre River Assessment area are not suitable for the Mexican Spotted Owl, as they prefer pine-oak forests or mixed conifer forests dominated by Douglas-fir and pine species. Suitable habitat for the Yellow-billed Cuckoo may exist within the Assessment Area, but the bird is quite rare in the west, and though occurrence of this species unlikely, it should be considered in management efforts. If impacts to potential habitat are likely to occur, it is recommended that a consultation with USFWS take place prior to any impact to the riparian corridor.

Birds	
Species	Status
Mexican Spotted Owl ( <i>Strix occidentalis lucida</i> )	Threatened
	Threatened
Fishes	
Bonytail ( <i>Gila elegans</i> )	Endangered
Colorado Pikeminnow ( <i>Ptychocheilus lucius</i> )	Endangered
Humpback Chub ( <i>Gila cypha</i> )	Endangered
Razorback Sucker ( <i>Xyrauchen texanus</i> )	Endangered
Insects	
Monarch Butterfly ( <i>Danaus plexippus</i> )	Canidate

*Table 5 – USFWS List of potential species within the Project Assessment*

### 3.8.1 Fisheries

The Uncompahgre River in this reach is a considered a freestone river, meaning has not been impeded by the construction of a dam across its width and therefore has a period of snowmelt runoff with high flows and muddy water and then lower flows throughout the rest of the year. In a freestone river, trout are products of their natural, unaltered river environment. Fish habitat throughout the reach of the River on through the reach is indicative of a freestone river and is characterized by riffles, runs, pools and glides. Riffle habitat is highly productive for macroinvertebrate production and provides increased oxygen and colder water temperatures for fish. Runs and glides are also productive fish habitat that provides good feeding and resting opportunities for fish. Pool habitat provide fish resting areas as well as good overwinter habitat. Minimal spawning habitat was observed within this section of the River. Fish species likely to occur within this section of river include rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*).

There are a number of transitioning oxbows that provide backwater and side channel habitat which are considered high quality fish rearing habitat. Juvenile fish will utilize this habitat in their first few years to feed and avoid predation by larger fish.

### 3.9 Noxious Vegetation

A total of six (6) species classified as noxious weeds in Colorado were observed within the Ridgway River project extent (*Table 6*). As a part of this effort detailed mapping was not completed at the time of the survey, but the extent of observances was documented and the overall extent of noxious vegetation concentration areas were mapped and are included in *Appendix 2 – Restoration Opportunities Map*. Additionally, many non-native weedy species have been observed on site, with sweet clover (yellow and white) being the primary species of concern with large swaths of high-density areas being identified. Sweet clover is known to be aggressive and is considered to be an ecological threat, forming monocultures and reducing species diversity. Therefore, this species is included in management recommendations. These populations of yellow and white sweet clover were observed in high density monocultures along some river bars, this aggressive weed is out competing native emergent wetland plants in this area. Specific mitigation activities have been identified and are included in *Appendix 4 – Restoration Activities Table*.



*Figure 13 - View looking south at emergent wetland with infestation of white sweet clover.*



Table 6 - Noxious vegetation species observed within project area.

Scientific Name	Common Name	<sup>1</sup> State List Status	Life Cycle
<i>Arctium minus</i>	Common burdock	C	Biennial
<i>Cirsium arvense</i>	Canada thistle	B	Perennial
<i>Carduus acanthoides</i>	Plumeless Thistle	B	Biennial
<i>Elaeagnus Angustifolia</i>	Russian Olive	B	Perennial
<i>Conium maculatum</i>	Poison hemlock	B	Biennial
<i>Centaurea stoebe</i>	Spotted knapweed	B	Perennial

The suppression and eradication of noxious vegetation within the project extent will be essential throughout the restoration activities, providing both aesthetical and ecological benefits. Given the scope of the Assessment Area, it is recommended that a comprehensive review and update to the *Ridgway Master Plan - Integrated Weed Management and Native Plant Restoration Plan (2011)* be completed. This effort would include field data collection and mapping updates for current species locations and densities. It is recommended that coordination with Ouray County Vegetation Management and Weed Control Department occur to best understand resource availability to assist in this effort.

In general, management efforts for existing noxious vegetation should be implemented based upon prevalence throughout the site and the target plants life cycle (annual, biennial, perennial and woody perennial species). Given the current conditions, the priority species for management, and the species that will be the most inhibiting to restoration activities and successful development, include: Canada thistle, spotted knapweed, Russian olive, poison hemlock and sweet clover. The management of other species will also be important, and should not be neglected at expense of treating the more prevalent species. It is important to treat species before they become more wide spread, and the management of these species will be easier if managed no matter the size or extent of infestation. Persistent efforts, with timely treatments throughout the growing season – ideally spring, summer, and fall – should be utilized for the property, following the generalized management strategies.

### 3.9.1 Biennial Species

The biennial forb species found on site consist of common burdock, plumeless thistle, poison hemlock, and sweet clover. These species reproduce solely by seed and are considered aggressive due to their high seed production rates. The key to control for these species is to suppress seed production and to eliminate the seed bank. Targeting first year plant growth in the early rosette stage, and second year plant growth as it starts to bolt in the late spring/early summer with repeated applications of herbicide or mechanical control are strategies to manage these species. Specifically, management efforts for these species will utilize a hybrid option of mechanical and chemical treatments, targeting spring and fall rosettes with chemical spot spray treatments and mechanical removal of any flowering plants before they go to seed.

### 3.9.2 Perennial Species

The perennial, state listed noxious vegetation species found on site consist of Canada thistle and Russian knapweed. In general, these species are deep-rooted perennial forbs that tend to form large colonies connected by a common root system. These root systems are often extensive, reaching depths of up to 20 feet and spreading up to 15 feet laterally. They have the ability to reproduce by rhizomes and via seed, therefore it is essential to both suppress seed production and systematically kill the below ground root systems. Using a combination of chemical, mechanical and cultural treatments, the key to control of these species is to continually stress the plants to diminish their energy reserves deplete their rhizomatous root systems beneath the ground.

### 3.9.3 Woody Species

Russian olive is the primary woody species of concern identified within the Uncompahgre River riparian area, with localized established populations to be eradicated. Cut stump treatments timed in the fall, when trees are focusing transfer energy to the root systems, is the recommended treatment strategy for Russian olive. Follow up foliar treatments to newly-established sucker growth is likely in the years following removal.

## **4.0 Restoration Opportunities and Constraints**

The Ridgway River Project extent offers numerous opportunities for restoration and preservation. Constraints within the Project Area include land ownership and use. The management and restoration recommendations provided in this report are high level recommendations that provide a holistic approach to improving ecological conditions within Ridgway's Uncompahgre River riparian corridor and floodplain. All recommendations are summarized in *Appendix 4 – Restoration Activities Table*. Management recommendations are included below:

- Take a proactive approach to weed control on the Town owned properties. Give adequate support, in funding and manpower for weed control. Recognize that weeds affect both agriculture and native plant communities.
- Consider the natural heritage values of all sites for which land use decisions are made. Use this report as a guide for values to be considered. Also, consider the impact developments may have on adjacent natural areas. Insist on careful assessments of potential damages, including weed invasion and fragmentation. It's easier to avoid disturbing an area than to try to control weed invasion later.
- When disturbance of the land cannot be avoided, it may be necessary to prevent weed invasion by reseedling. In these cases, only native plants should be used. Ideally, seed should be locally harvested.
- Do not fragment large natural areas unnecessarily. Although large migrating animals like deer and elk are not tracked like other rare or endangered species, they are a part of our natural diversity, and their needs for winter range and protected corridors to food and water should be taken into consideration. Fragmentation of the landscape also affects smaller animals and plants, opening more edge habitats and introducing exotic species.
- Locate future trails and roads to minimize impacts on native plants and animals.
- Inventory efforts should be continued, especially in areas where construction or habitat alteration is proposed.

Based upon current site conditions, areas have been identified for restoration utilizing the following types of interventions:

1. **Wetland Creation** – Identifying and re-establishing areas that are degraded but have the opportunity for wetland habitat creation based off their proximity to a water source and existing wetland vegetation.
2. **Riparian Enhancement** - The restoration of partially functioning uplands, wetlands and riparian areas. This can include noxious weed elimination, planting, seeding, and other restoration Techniques as well as the utilization of wetland benching to improve hydrological connectivity to existing wetlands.
3. **Habitat Preservation** - The protection of intact and functioning upland, wetland or riparian areas through ecologic and landscape planning. Installation of habitat enhancing elements as recommended.

The interventions listed above could be applied to a number of locations within the Project Assessment Area. For the purposes of this assessment, specific individual locations for interventions have been identified and are described below. Further review and assessment would be necessary to identify additional locations for wetland creation.

It is recommended that restoration activities are focused on short, medium, and long-range planning activities and that established restoration goals are identified to provide a base for monitoring success. Through restoration interventions, the goal is to improve portions of the riparian ecological setting prior to anthropogenic influences. The size and scope of the planning area provides various types of restoration opportunities. The specific recommendations examples provided below could be later extrapolated throughout the Project Assessment Area.

Additionally, there are diverse opportunities to engage the local community in volunteer efforts and educational campaigns. These outreach events could have the additional benefit of gaining community buy in and support for the riparian corridor. This will not only provide the benefit of a restored ecological systems to the site, but allow the Town of Ridgway to gain experience and build the capacity to conduct other restoration projects in the future. A summary of recommendations for specific areas is included below. Locations and overview of restoration areas are shown in Figure 14 and provided in *Appendix 2 – Restoration Opportunities Map*. Specific restoration activities have been identified and are included in *Appendix 4 – Restoration Activities Table*.

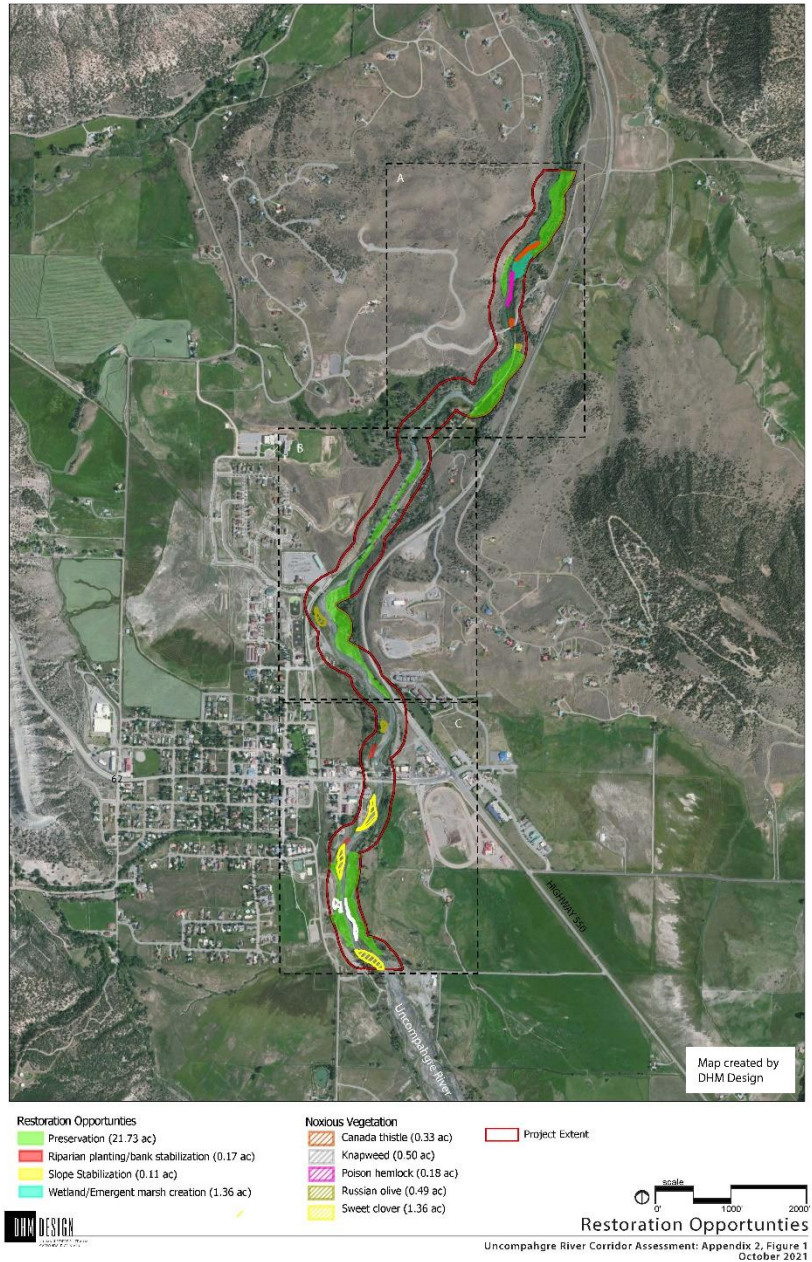


Figure 14 - Restoration Opportunities Map



### Wetland Creation - 1.36 acres

There is a unique opportunity for wetland marsh creation on the north end of the project reach. This area is located on Town of Ridgway Property north of Dennis Weaver Park on the east side of the Uncompahgre river (Figure 15 below). The photo on the right is an image of an existing wetland marsh habitat created on the BLM parcel. This recommended location exists on a large wetland bench outside of the floodway and exhibits existing hydrology and wetland vegetation. Wetland vegetation that exists today is of good quality but minor earthwork improvements would allow for succession of the existing emergent wetland to an emergent wetland marsh. These open water habitats provide excellent opportunity for increased biodiversity of plant species and wildlife utilization. Waterfowl nesting platforms could be installed to promote nesting. Additionally, this location in proximity to the existing Uncompahgre Riverway Trail is ideal for an expansion boardwalk loop trail segment through and or around the wetlands. There is what appears to be an historic ditch alignment in this location, further investigation of the ditch and current utilization would be necessary. Interpretive/educational opportunities could also be tied in with any improvements to this location.

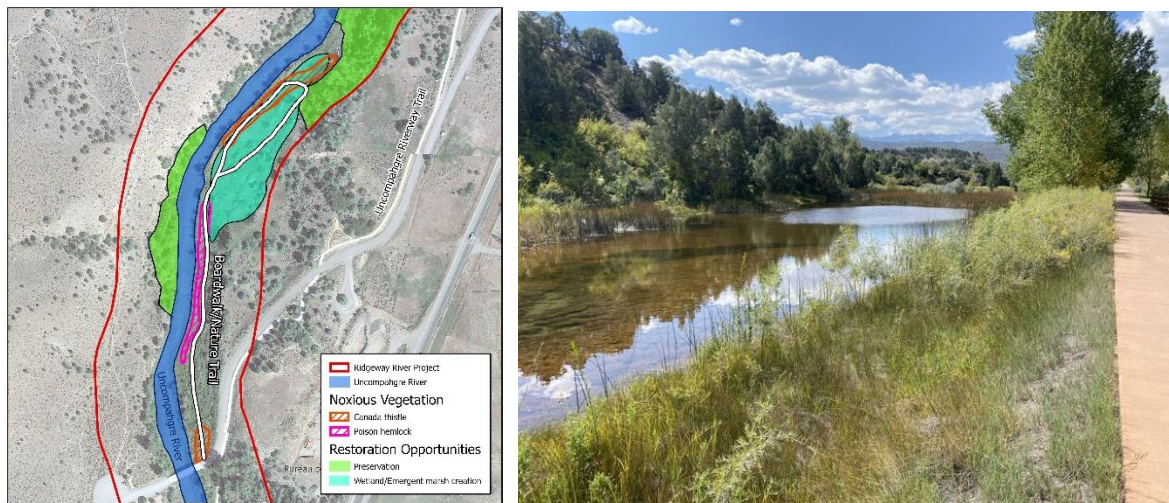


Figure 15 - Potential location for wetland creation (left). Existing created wetland marsh on BLM Property (right).

### Riparian Planting/Bank Stabilization – 0.17 acres

There are numerous locations for potential bank stabilization to protect existing and future infrastructure using natural design techniques that incorporate bioengineering methods using natural materials such as large woody debris or root wads. If installed properly, these techniques can be effective over the long term. Incorporating longitudinal bank lowering and wetland benching can be effective in stabilizing eroding banks. Further studies and prioritization of bank stabilization locations should be considered as part of future planning activities for the Project Assessment Area. DHM identified a location north of Sherman Street in Rollans Park (Figure 16 Below). Large rock material has been placed within the river channel in this location and the bank consists of small diameter cobble and gravel. There is a high likely hood that this material would wash away during a high water event. Reconfiguring the bank design and materials in this location along with vegetative plantings could provide significant improvements to the longevity of the existing bank/river improvements as well as overall aesthetics. Other opportunities for bank stabilization and riparian planting includes the east side of the river along the newly approved Riverfront Village development. Specific locations for bank stabilization and restoration planting should be carefully evaluated as part of the trail design and installation.



Figure 16 - Potential bank stabilization/vegetative restoration location (left). Current condition of bank, loose small aggregate materials.

Slope Stabilization 0.11 acres

There are a number of areas located along the Uncompahgre River Trail where slope stabilization through vegetative planting and seeding could be beneficial to protect infrastructure and reduce potential for sediment input into the Uncompahgre River. One of these locations is on the east side of the River across from Dennis Weaver Park (Figure 17 Below). The development of a restoration planting and seeding plan for this area that incorporates erosion control materials such as straw wattles could significantly reduce active erosion and allow for establishment of native vegetation along the slope.



Figure 17 - Potential slope stabilization location east of Dennis Weaver Park (left). Steep slope with active erosion occurring. Revegetation recommended to stabilize slope.

## **5.0 Grant Funding Opportunities**

A detailed review of applicable grant funding opportunities was completed for the restoration interventions that are included in this report. These opportunities include funding for instream and riparian habitat improvements, noxious vegetation control, design and construction for trails and other recreational amenities. A preliminary list of grant opportunities is provided in *Appendix 4 – Restoration Activities Table*.



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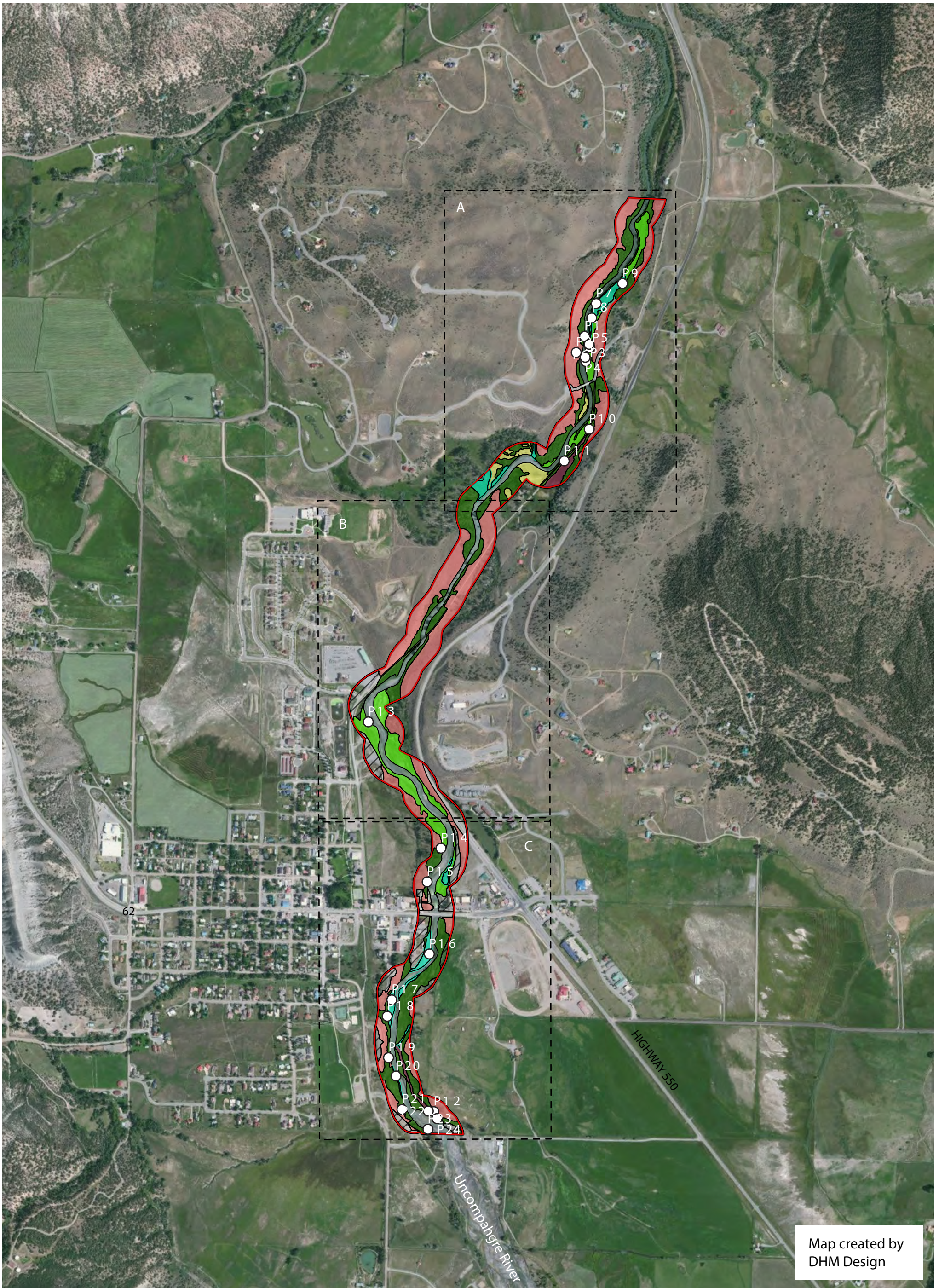
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## Appendix 1 – Existing Conditions Maps





Map created by  
DHM Design

Vegetative Communities

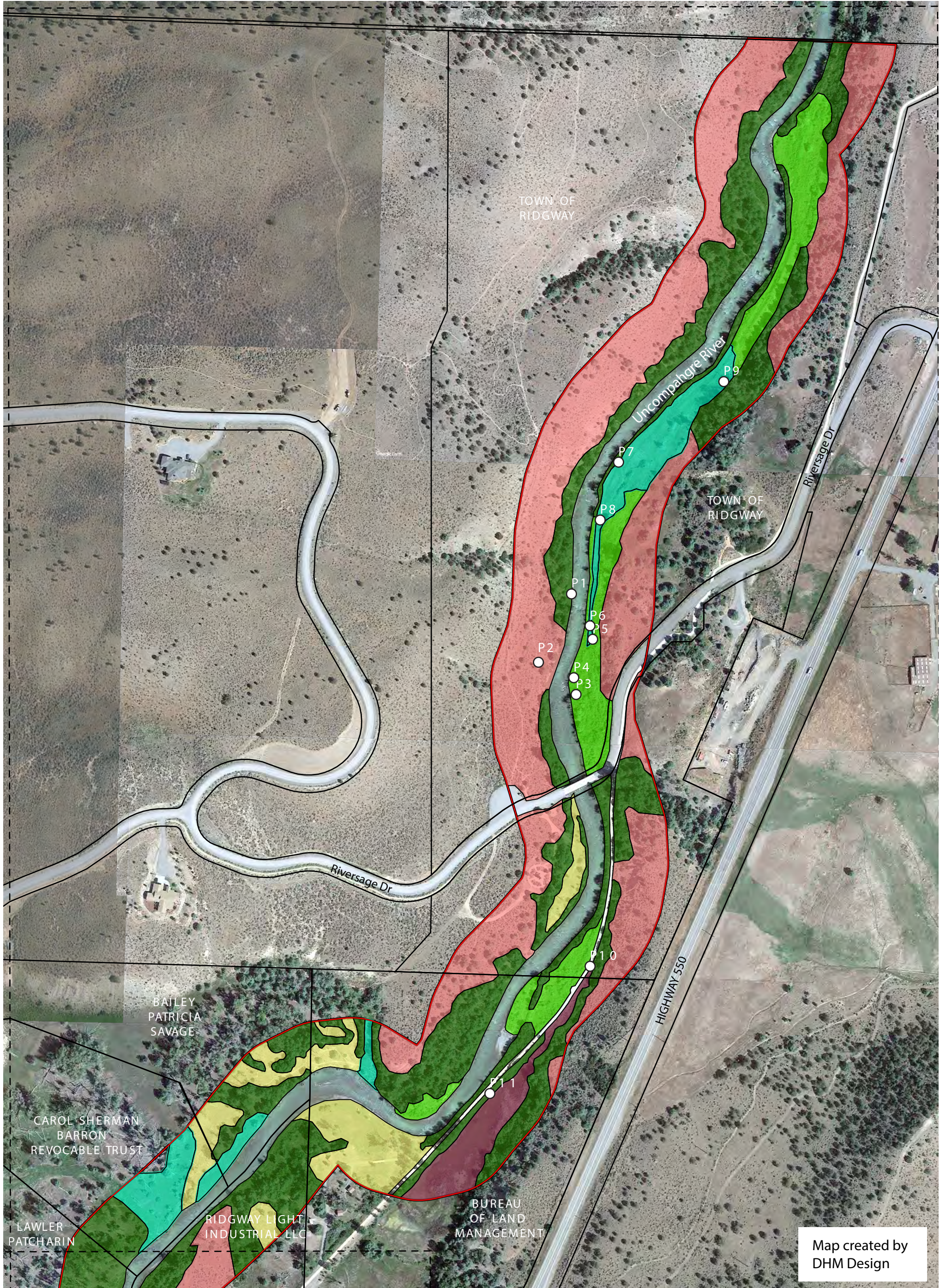
- Lower montane riparian woodland and shrubland (27.72 ac)
- Cultural Disturbed (10.05 ac)
- Palustrine Emergent Wetland (4.30 ac)
- Pinyon Pine/Juniper Upland (38.86 ac)

- Recreational/Open Space Herbaceous Vegetation (2.84 ac)
- Riparian Scrub Shrub Wetland (11.62 ac)
- Western emergent marsh (1.84 ac)
- Project Extent
- Photo Point



Existing Conditions/ Vegetation Communities



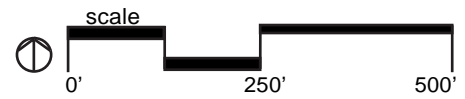


Map created by  
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Vegetative Communities

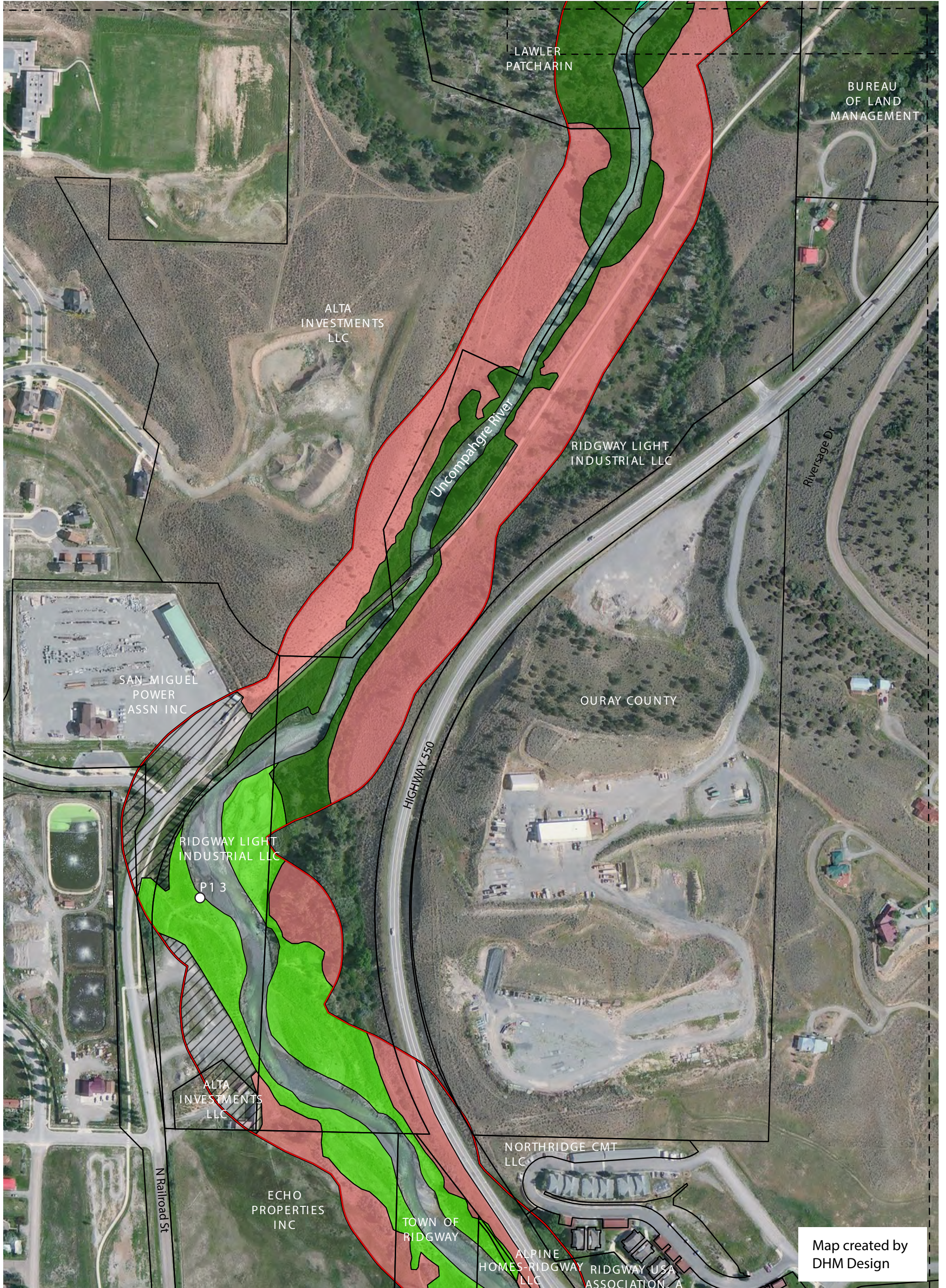
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Existing Conditions/ Vegetation Communities



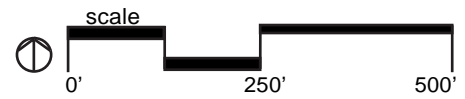


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Vegetative Communities

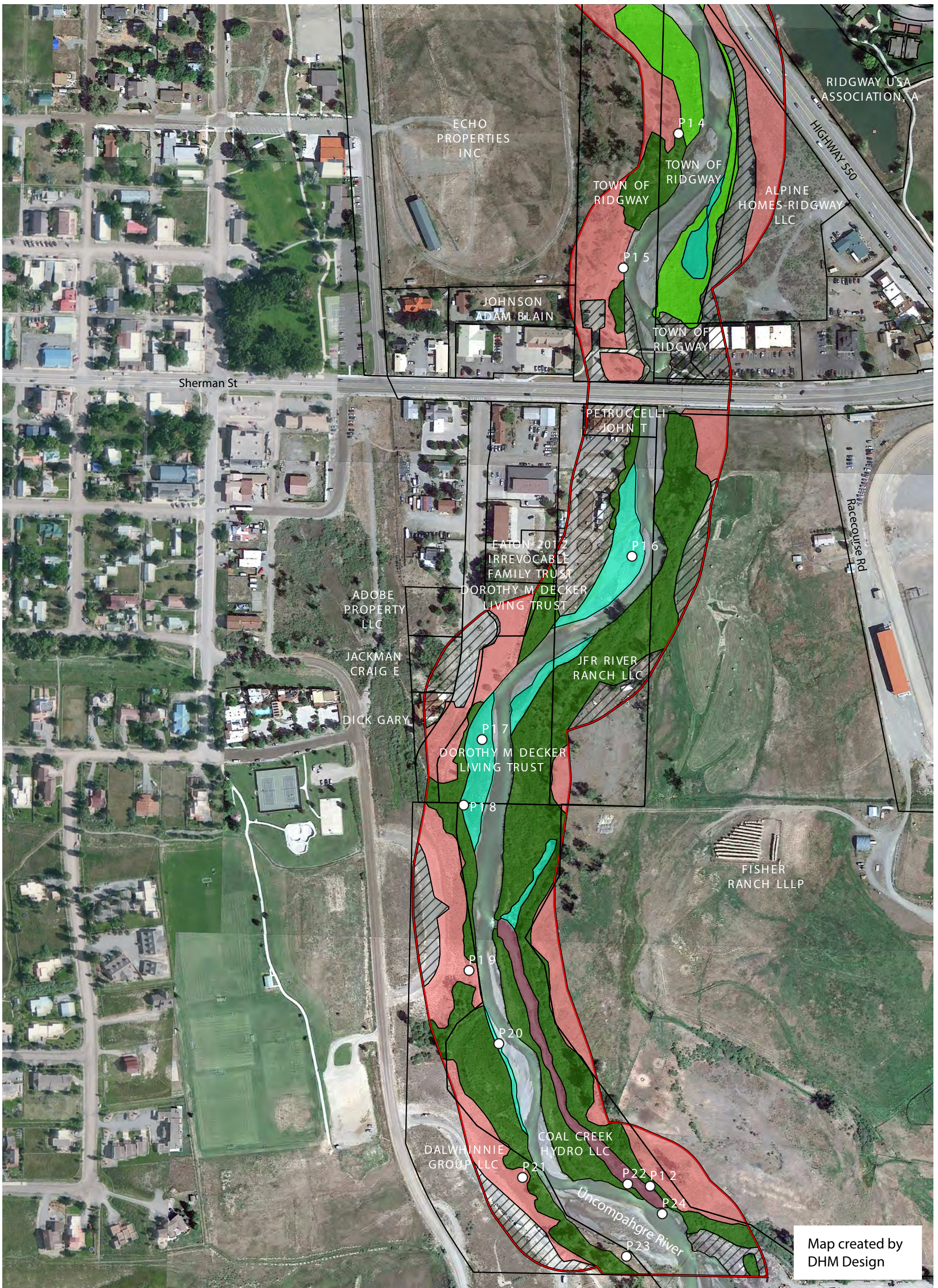
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Existing Conditions/ Vegetation Communities



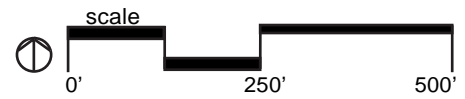


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Vegetative Communities

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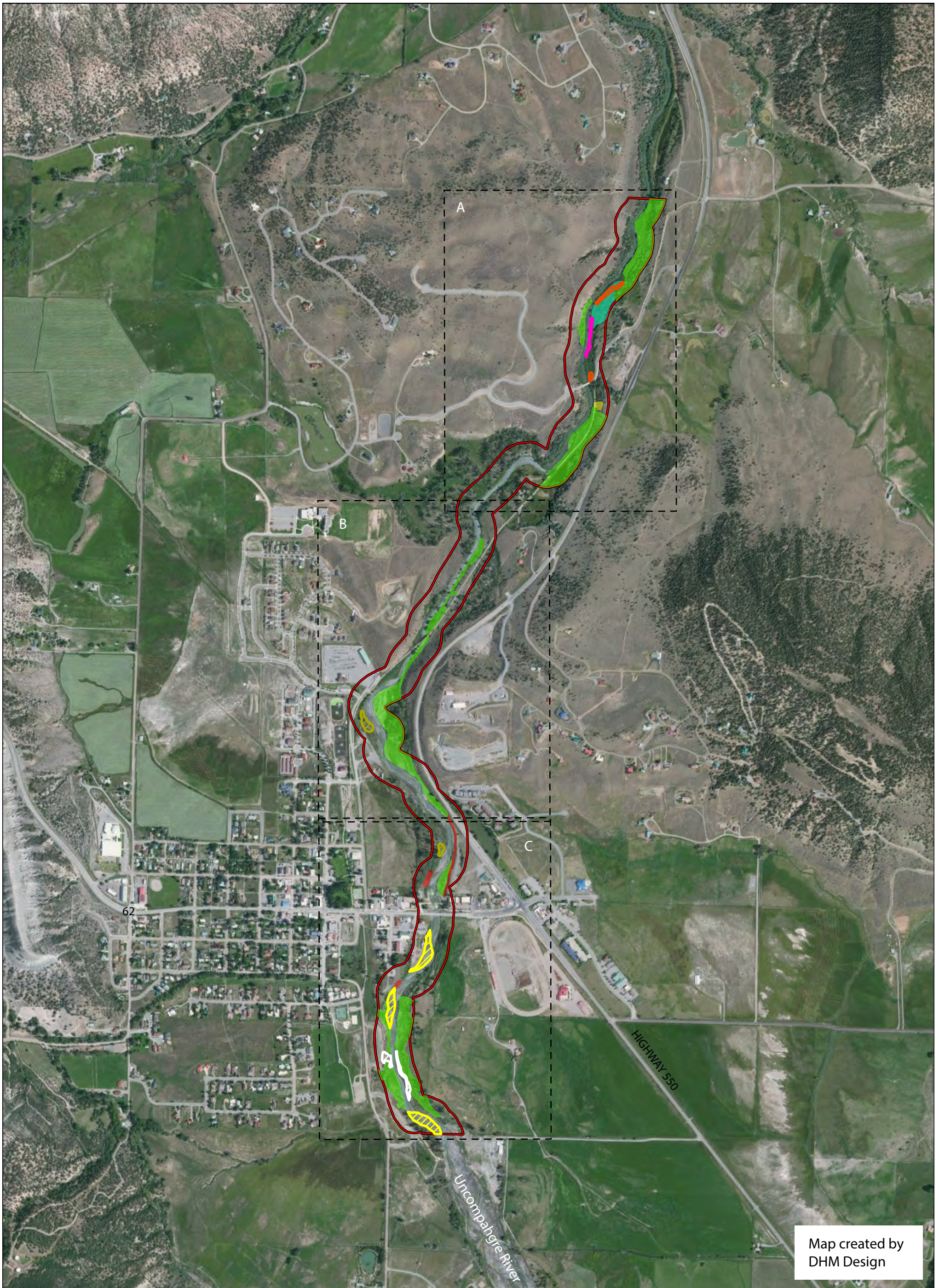


Existing Conditions/ Vegetation Communities









Map created by  
DHM Design

Restoration Opportunities

- Preservation (21.75 ac)
- Riparian planting/bank stabilization (0.22 ac)
- Slope Stabilization (0.11 ac)
- Wetland/Emergent marsh creation (1.36 ac)

Noxious Vegetation

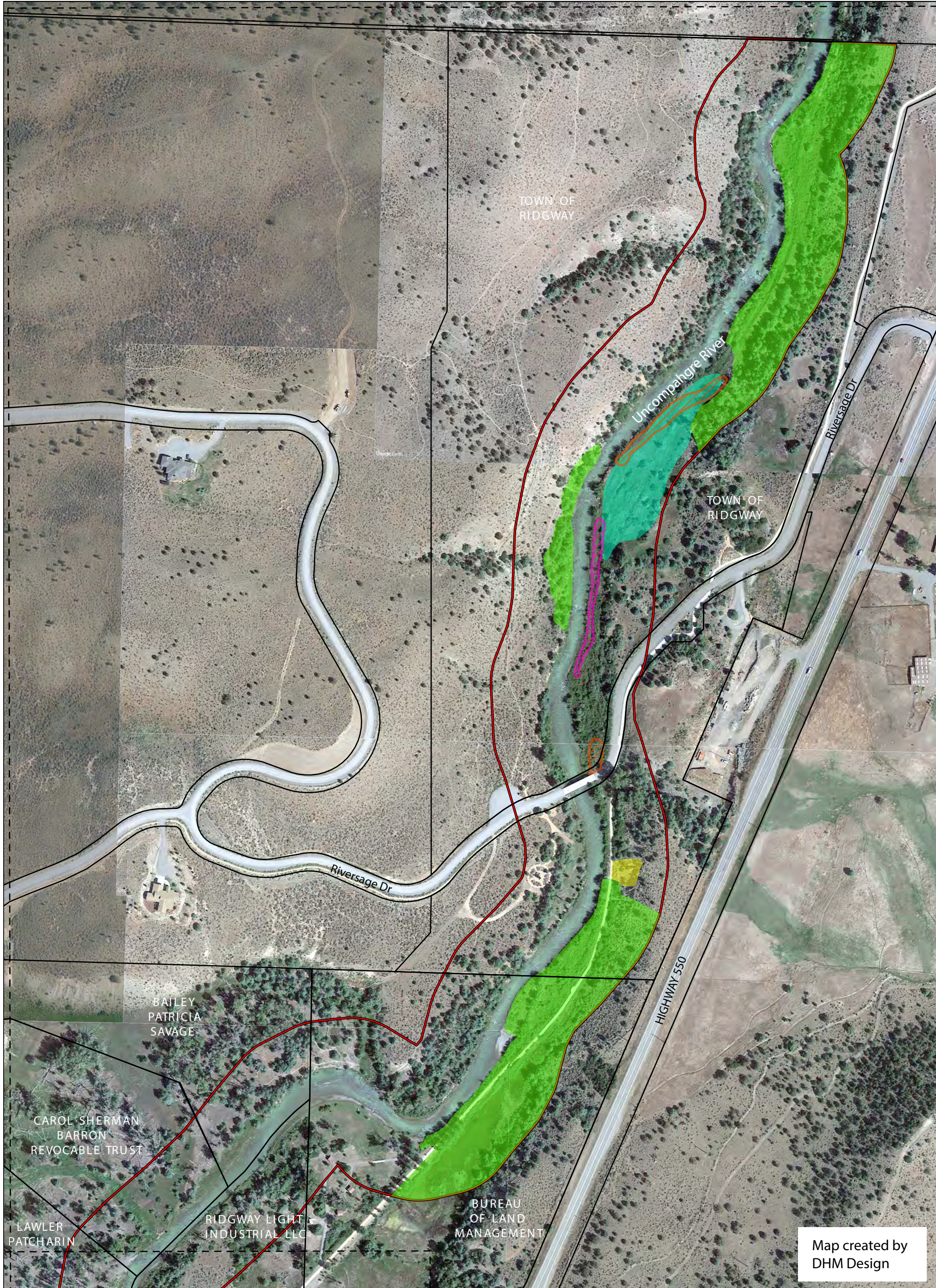
- Canada thistle (0.33 ac)
- Knapweed (0.50 ac)
- Poison hemlock (0.18 ac)
- Russian olive (0.49 ac)
- Sweet clover (1.36 ac)

Project Extent



Restoration Opportunities





Map created by  
DHM Design

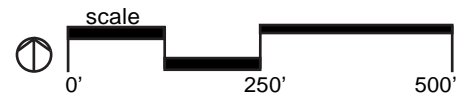
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Project Extent



Restoration Opportunities





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DHM Design

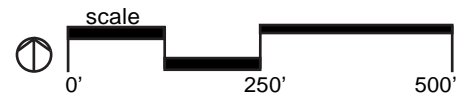
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**Noxious Vegetation**

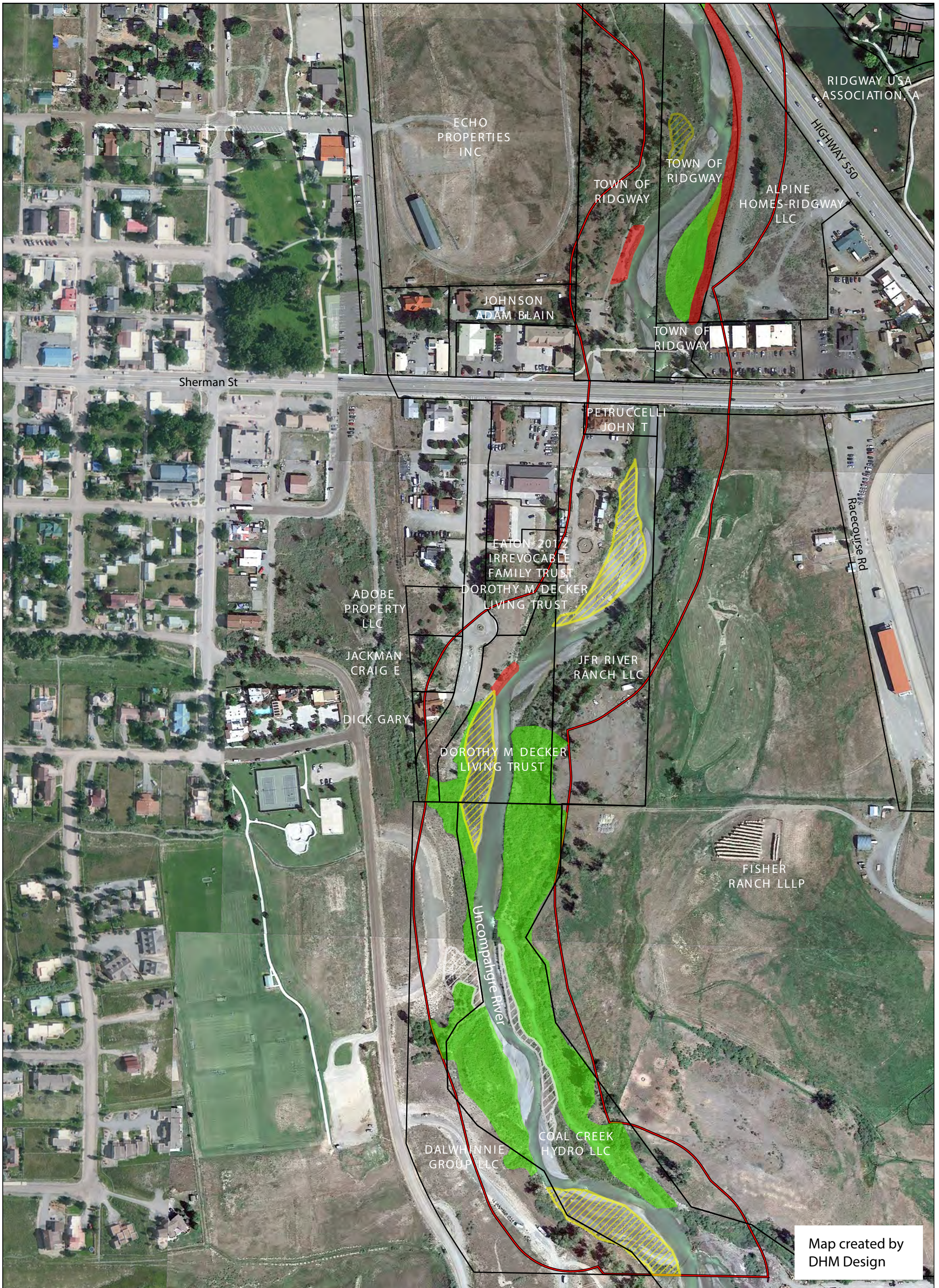
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Project Extent



**Restoration Opportunities**





Map created by  
DHM Design

**Restoration Opportunities**

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**Noxious Vegetation**

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Project Extent

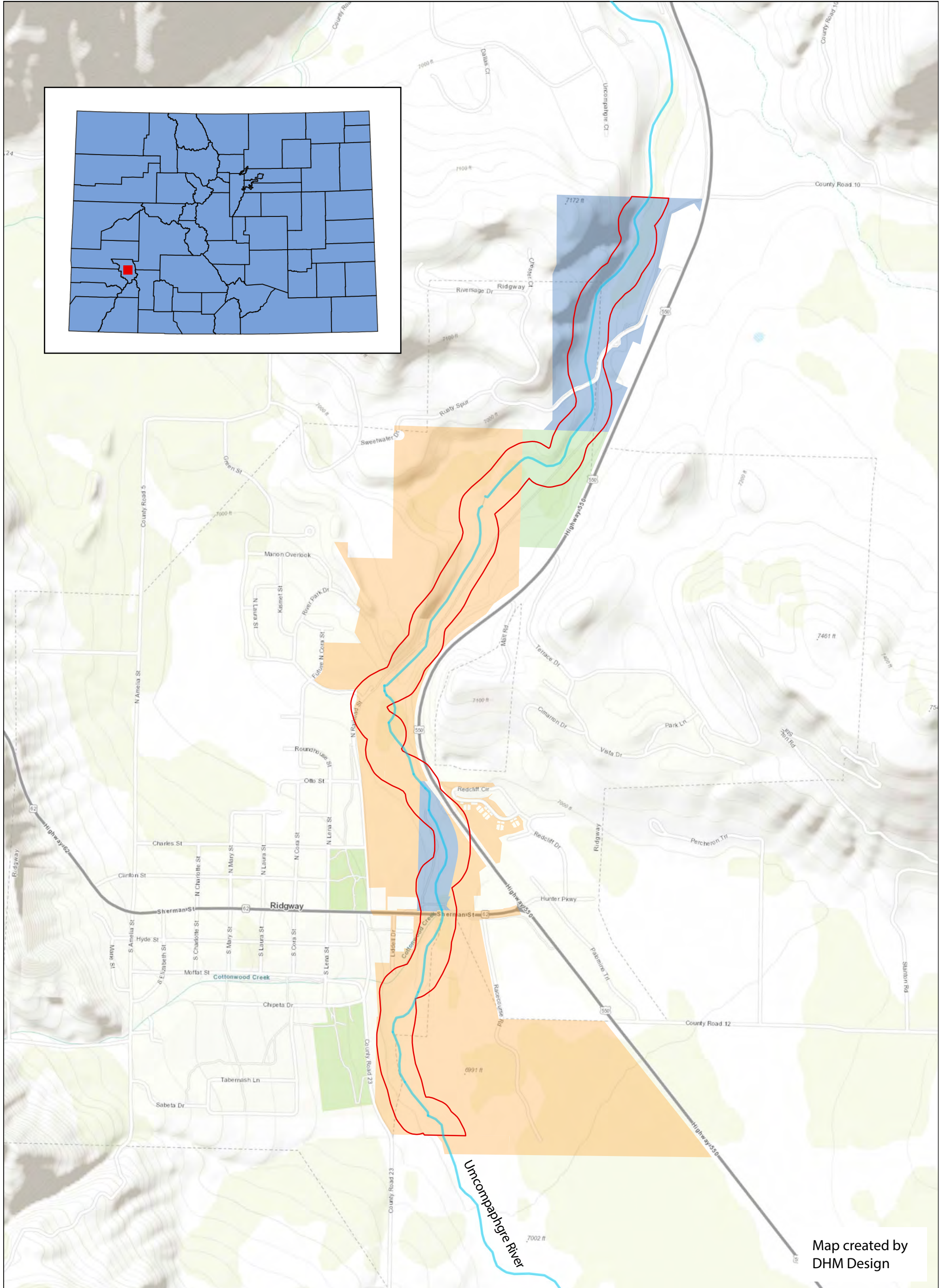


**Restoration Opportunities**



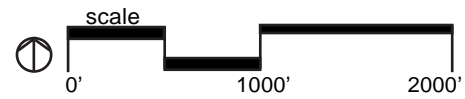
## Appendix 3 – Supporting Maps





Map created by  
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- Property Ownership
- BLM
- Town of Ridgway
- Private/Other
- Project Extent



### Project Context Map

## Appendix 4 – Restoration Activities Table



Restoration Activity	Restoration Protocol	Ecological Priority	Restoration Timeframe	Expertise Level & Citizen Science	Potential Partnerships	Initial Capital Investment	Estimated Annual Costs	Grant & Additional Funding Opportunities
<b>VEGETATION MANAGEMENT</b>								
<b>Noxious Vegetation Management:</b> Successfully manage noxious vegetation found throughout the project extent of the Uncompahgre River Corridor utilizing adaptive management strategies to promote establishment of native vegetation and maintain healthy ecosystems. Establish management plots, utilizing specified management activities and monitor to establish success and guide further management of species across the site.								
<i>Mechanical:</i> Target annual and biennial species for management and populations of small to moderate size.	Utilize mowing, digging, hand-pulling, and other mechanical methods - removing rosettes and flowering plants, with the focus on prevent establishment and spread of seed. Target three (3) treatments per year: Spring , Summer and Fall.	High	Short-Long term, starting spring of 2022	C1, C2, S1	Local commercial applicators, Local landscaping services, Youth Corps, Ouray County Vegetation Management	B	B	Ouray County Noxious Vegetation Cost Share Program (up to 50% cost share for treatments). <a href="https://ouraycountyco.gov/DocumentCenter/View/14467/2021-OC-Cost-Share-Application">https://ouraycountyco.gov/DocumentCenter/View/14467/2021-OC-Cost-Share-Application</a> CDA Noxious Weed Management Fund: (WMF) Grant Program. <a href="https://ag.colorado.gov/conservation/noxious-weeds/grants">https://ag.colorado.gov/conservation/noxious-weeds/grants</a>
<i>Chemical:</i> Target all species, but prioritize deep rooted perennials (Canada thistle and Russian Knapweed), with timely treatments.	Use species appropriate herbicides for foliar chemical applications at susceptible stages in a plants lifecycle. Target three (3) treatments per year: Spring, Summer and Fall.	High	Short-Long term, starting spring of 2022	C1, C2, S2	Local commercial applicators, Ouray County Vegetation Management	B	B	Ouray County Noxious Vegetation Cost Share Program (up to 50% cost share for treatments). CDA Noxious Weed Management Fund: (WMF) Grant Program.
<i>Biological:</i> utilize various biological controls for susceptible species, including but not limited to: grazing and species specific predators.	Biological controls are available through the CDA Palisade insectary for the following species known to occur on the property: <b>Canada thistle</b> - host specific pathogenic rust fungus ( <i>Puccinia punctiformis</i> ). <b>Russian knapweed</b> - gall midge ( <i>Jaapiella ivannikovi</i> ) and gall wasp ( <i>Aulacidea acroptilonica</i> ).	High	Short-Long term, starting spring of 2022	C1, C2, S3	Local commercial applicators, Ouray County Vegetation Management	B	B	Ouray County Noxious Vegetation Cost Share Program (up to 50% cost share for treatments). CDA Noxious Weed Management Fund: (WMF) Grant Program.
<i>Cultural:</i> establish native vegetation to compete with noxious vegetation.	Identify desirable native species that are known to be competitive to are adapted to the site conditions and establish through seeding efforts to compete with noxious vegetation.	High	Short-Long term, starting spring of 2022	C1, C2, S4	Local commercial applicators, Local landscaping services, RFOV, Youth Corps, Ouray County Vegetation Management	B	B	Ouray County Noxious Vegetation Cost Share Program (up to 50% cost share for treatments). CDA Noxious Weed Management Fund: (WMF) Grant Program.
<b>Woody Vegetation Removal and Management:</b> Identify all noxious woody tree and shrub species (Russian olive) and implement for removal.								
Remove and treat all Russian olive shrubs and small trees located within the project extent of the Uncompahgre River Corridor.	Remove using a combination of cut stump, basal bark, and drill and methods (prioritize cut stump). Remove all material from site. Plan follow up foliar treatments to regrowth.	High	Short-Long term (removal short term; monitoring long term)	C1, C2, S1	Local commercial applicators, Local tree services, Ouray County Vegetation Management	B	A-B	Ouray County Noxious Vegetation Cost Share Program (up to 50% cost share for treatments). CDA Noxious Weed Management Fund: (WMF) Grant Program.

Restoration Activity	Restoration Protocol	Ecological	Restoration	Expertise Level & Citizen	Potential Partnerships	Initial Capital	Estimated Annual	Grant & Additional
<b>ECOSYSTEM CREATION, ENHANCEMENT AND PRESERVATION</b>								
<b>Wetland/Emergent Marsh Habitat Creation:</b> Creation of a new, biologically diverse wetland/emergent marsh ecosystem in the northern portion of the project reach. This area is located on Town of Ridgway Property north of Dennis Weaver Park on the east side of the Uncompahgre river and provides a unique opportunity to develop an ecologically significant wetland community and provide an educational and recreational interface for the community with potential boardwalk and nature trail with wildlife viewing areas and educational signs.								
Establish and review reference community.	The establishment of a reference community and conditions is essential to define the restoration goals, guide restoration efforts and set a benchmark for success. The emergent marsh ecosystem identified on BLM property is an excellent option.	High	Short term		NRCS, Restoration Ecologist, Landscape architect, wildlife biologist	B		
Development and acquisition of seed mix and other planting materials, including herbaceous and woody plugs and containerized plants.	Establish vegetative community specific seed mixes and planting lists, utilizing existing native vegetation found on site and utilizing the established reference community. Additional species diversity can be established referencing documents on western marsh emergent communities.	High	Moderate	C1,C2,C3,S1	NRCS, Restoration Ecologist, Landscape architect, wildlife biologist	C	A	
Site excavation and earthwork	Improve site topography to support transition from emergent and wet meadow ecosystem and provide the foundation for needed hydrological conditions to maintain the marsh ecosystem.	High	Moderate		Engineer, Restoration Ecologist, Landscape Architect, local excavation company.	F		
Hydrological improvements	Assess the needs to maintain the site hydrology to support the hydrological inputs for the emergent marsh ecosystem.	High	Moderate		NRCS, Hydrologist, Engineer, Restoration Ecologist, Landscape architect, wildlife biologist	E	B	
Revegetation	Utilizing established seed mixes and plant lists, revegetate the site as needed to establish native vegetation conducive of an emergent marsh ecosystem and improve species diversity.	High	Moderate		Youth Corps, NRCS, Restoration Ecologist, Landscape architect, wildlife biologist, local landscaping company specializing in ecological restoration	E	B	
Establishment of Boardwalk and Nature Trail	Following successful completion of restoration work and development of emergent marsh community, design and establish boardwalk, nature trail and other wildlife viewing and educational infrastructure.	Moderate	Moderate - Long term		Engineer, Restoration Ecologist, Landscape Architect.	G	B	
Monitor establishment of native vegetation and manage noxious vegetation	Develop a monitoring protocol and monitor site monthly to assess establishment and success of seeding and plantings. Manage noxious and nuisance vegetation three (3) times per year following restoration.	High	Moderate-Long Term (noxious vegetation management and monitoring long term)	C1,C2,S1	Restoration Ecologist, Wildlife Biologist, Ouray County Staff	C	B	



Restoration Activity	Restoration Protocol	Ecological	Restoration	Expertise Level & Citizen	Potential Partnerships	Initial Capital	Estimated Annual	Grant & Additional
<b>Riparian planting and bank stabilization (Riparian Habitat Enhancement):</b> Restore and enhance riparian vegetation communities and highly erosive river banks, prioritizing bank stabilization based on protection of critical infrastructure and resources. Utilize establishment of native vegetation and development of wetland benching as primary activities for natural bank stabilization.								
Site excavation and earthwork	Establish slope and wetland benching elevations to successfully prevent erosion and support the establishment of riparian plant material and tie into the surrounding natural topography. Utilization of brush bundles, fascines, and large woody debris (mature trees and logs) to be recommended in establishing base conditions.	High	Short-moderate term	C1,C2,S1	Local commercial applicators, Local tree services, Ouray County Vegetation Management	F		
Wetland benching vegetation establishment	Establish site specific wetland seed mix and plant material lists, utilizing a diversity of emergent herbaceous vegetation species. Implement planting and seeding efforts following BMP's standards.	High			Youth Corps, NRCS, Restoration Ecologist, Landscape architect, wildlife biologist, local landscaping company specializing in ecological restoration	C	B	
Riparian Vegetation establishment	Establish site specific riparian vegetation seed mixes and plant material lists, utilizing a diversity of forbs, shrub and tree species. Livestakes, bare roots, potted plants and B&B shrub species to be utilized. Establish diversity of native riparian vegetation properly placed to protect the bank from erosion.	High	Short-moderate term	C1,C2,C3,S1	Youth Corps, NRCS, Restoration Ecologist, Landscape architect, wildlife biologist, local landscaping company specializing in ecological restoration	C	B	
Monitor establishment of native vegetation and manage noxious vegetation	Develop a monitoring protocol and monitor site monthly to assess establishment and success of seeding and plantings. Manage noxious and nuisance vegetation three (3) times per year following restoration	High	Moderate-Long Term (noxious vegetation management and monitoring long term)	C1,C2,S1	Restoration Ecologist, Wildlife Biologist, Ouray County Staff	C	B	
<b>Slope Stabilization (Upland Habitat Enhancement):</b> Restore and enhance upland slopes with erosional issues and poor vegetation establishment.								
Implementation of erosional control structures and needed earthwork.	Based upon site conditions and topography of erosional areas, develop site specific erosion control practices - utilizing terracing earthwork, site excavation to decrease slope, straw or coconut blanketing, waddles, etc. to stabilize bank.	High	Short-Long term	C1,C2,S1	Local contractor specializing in earthwork, engineer, Landscape Architect	E		
Establishment of Native Vegetation	Establish upland seeding mix consisting of native vegetation that provides quick and robust establishment for erosion control needs. Focus on coverage and establishment, not biodiversity. Implement native shrubs and trees through selective planting efforts.	Moderate	Moderate-Long Term	C1,C2,C3, S1	Youth Corps, NRCS, Restoration Ecologist, Landscape architect, wildlife biologist, local landscaping company specializing in ecological restoration	C	B	
Monitor establishment of native vegetation and manage noxious vegetation	Develop a monitoring protocol and monitor site monthly to assess establishment and success of seeding and plantings. Manage noxious and nuisance vegetation three (3) times per year following restoration.	High	Moderate-Long Term (noxious vegetation management and monitoring long term)	C1,C2,S1	Restoration Ecologist, Wildlife Biologist, Ouray County Staff	C	B	

Cost Class Categories	
A	\$0-500
B	\$501-1000
C	\$1001-5000
D	\$5001-10,000
E	\$10,001-20,000
F	\$20,001-50,000
G	\$50,000+

Personnel Type	Description	P Code
Volunteer	Generalist 1-4 years experience	C1
Consultant- Level 2	Generalist or field technician with specific training- 5 years+	C2
Consultant- Level 3	Advanced degree or specialty for high level analysis, or in-depth knowledge of a phenomena	C3
County or Town Staff	Government staff, with relevant degree and on-the-job training	S1

**GRANT/FUNDING OPPORTUNITIES**

<b>Environmental Conservation Focused</b>	Environment Initiative Grants	Roy A Hunt Foundation	\$25k - \$75k
	Wetland Project Funding	Colorado Parks & Wildlife	< \$20m
	Environment Foundation Grant	Aspen Skiing Company's Environment Foundation	< \$15k
	GOCO: Restore Colorado Grant Program	Great Outdoors Colorado	> \$100 k
	Colorado Watershed Restoration Grants	Colorado Dept of Nat Resources	< \$100k
	Colcom Foundation Grant: National Giving	Colcom Foundation	
	Severance Tax Trust Fund Operational Account Grants	Colorado Dept of Nat Resources	\$50k
	Noxious Weed Management Fund	Colorado Dept of Ag	
	Environmental Initiative Grant Program	Laura Jane Musser Fund	< \$35k
	AW Environmental Grant Program	American Water Works Company, Inc.	< \$10k
DEAR Grants	Desert Ecosystem Analysis & Restoration	< \$10k	
<b>Habitat Focused</b>	Partners for Fish and Wildlife	US Dept. of the Interior: Fish and Wildlife Service (FWS)	< \$750,000
	Colorado Wildlife Habitat Program	Colorado Parks & Wildlife	< \$1.1m
	The Lois Webster Fund Grant	Audubon Society of Greater Denver	< \$7.78k
	Research, Education & Conservation Grant	Denver Field Ornithologists	\$2k
	Land Trust Bird Conservation Initiative	Cornell Lab of Ornithology	\$5k - \$50k
	Fishing is Fun Grant Program	Colorado Parks & Wildlife	< \$400k
	WCS Climate Adaptation Fund Grant	Wildlife Conservation Society	< \$300k
	Trout and Salmon Foundation Grant	Trout and Salmon Foundation	< \$5k
	Habitat Partnership Program	Colorado Parks & Wildlife	\$100k - \$500k
	International Federation of Fly Fishers: Conservation Small Grants Program	International Federation of Fly Fishers	< \$3k
Open Applications: Local Community Grants	Walmart Foundation	\$250 - \$5k	

<b>General/Broad</b>	North American Partnership for Environmental Community Action Grants Program	Commission for Environmental Cooperation	< \$165,000
	GFF Capitol Grants	Gates Family Foundation	< \$300k
	NPS Challenge Cost Share Program	US Dept of the Interior: National Park Service	< \$25k
	Non-Reimbursable Project Investment Grants	Colorado Dept of Nat Resources	
	Youth Corps Grants	Great Outdoors Colorado	< \$250k
	George and Miriam Martin Foundation Grant	George & Miriam Martin Foundation	\$1k - \$200k
	FY2022 AmeriCorps State and National Grants	Corporation for National and Community Service (CNCS)	
<b>Colorado Programs</b>	Colorado Water Conservation Board	Colorado Water Plan Grant, Water Supply Reserve Font Grants,	
	Colorado State Conservation Board	Matching Grants Program	
	Natural Resources Conservation Service		
	National Fish and Wildlife Foundation	Five Star and Urban Waters Restoration Grant	
	Wetlands Project Funding		< 20 m

\*\*\*Highlighted cells appear to the most applicable grants available for the associated categories in relation to the identified restoration opportunities for the site.



## Appendix 5 – Soils Report



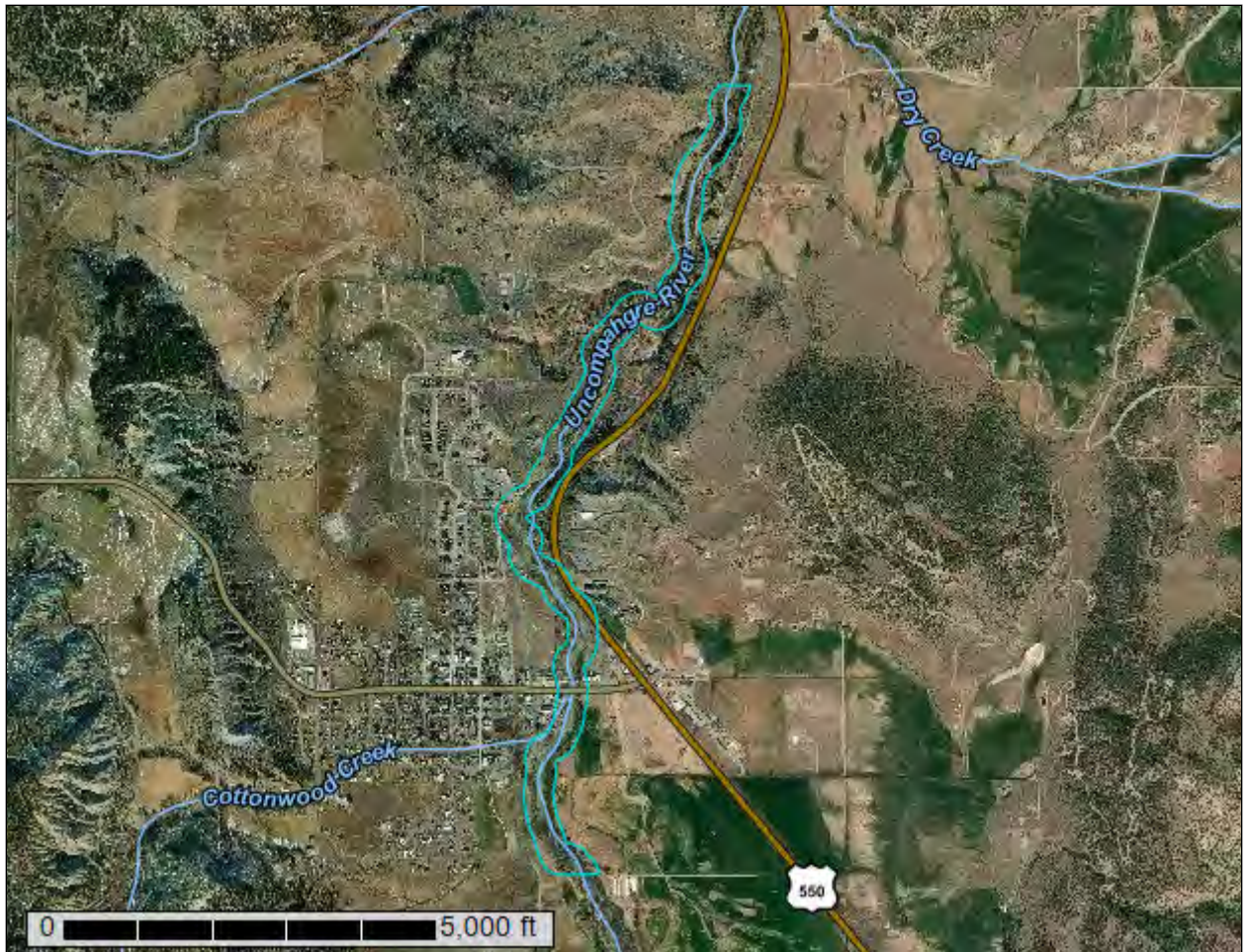
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Ridgway Area, Colorado, Parts of Delta, Gunnison, Montrose, and Ouray Counties



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

## Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and



## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.



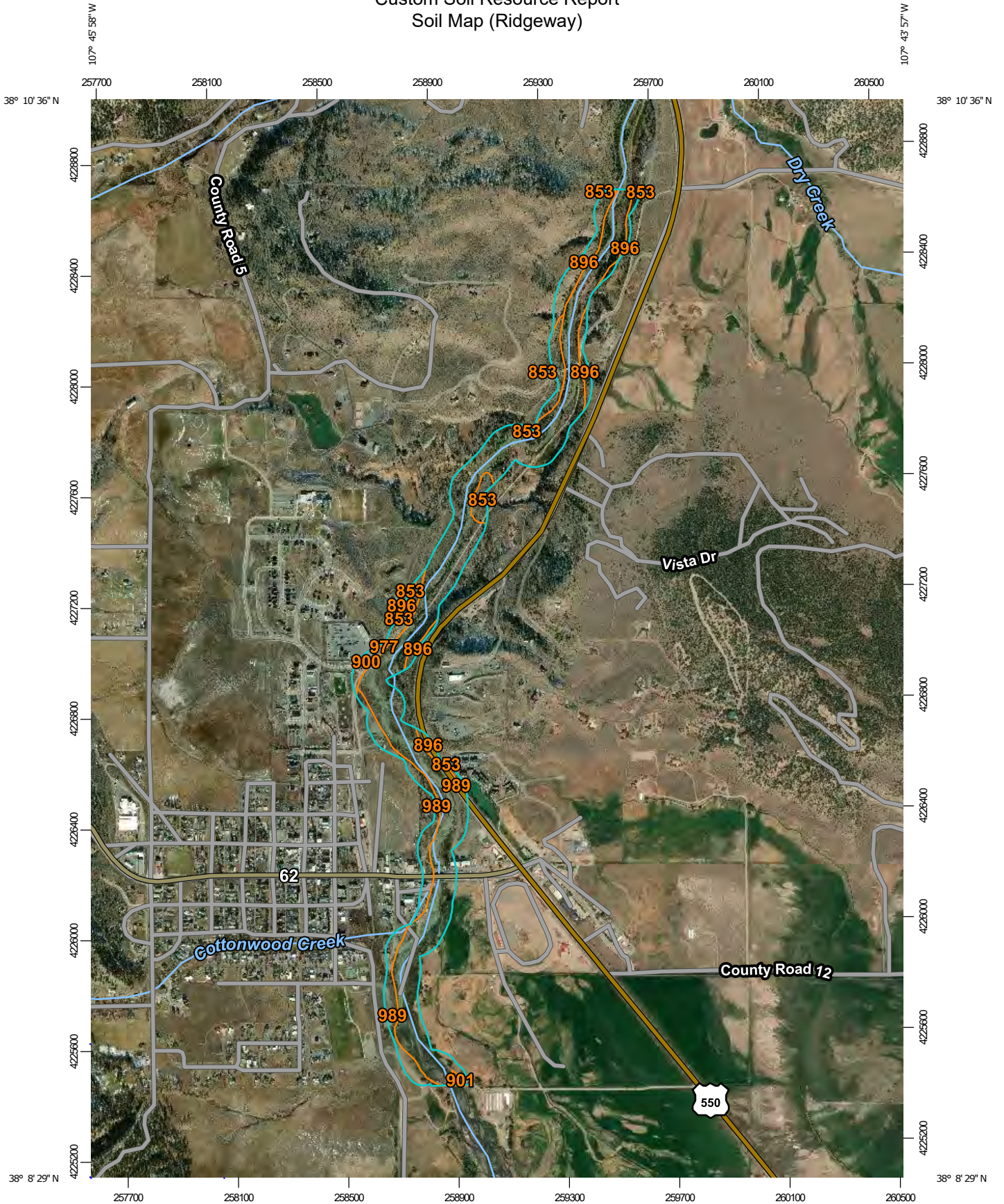
# Soil Map

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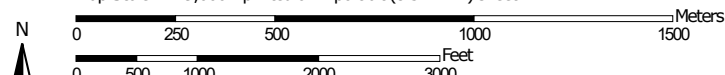
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



# Custom Soil Resource Report Soil Map (Ridgeway)



Map Scale: 1:19,000 if printed on A portrait (8.5" x 11") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ridgway Area, Colorado, Parts of Delta, Gunnison, Montrose, and Ouray Counties  
 Survey Area Data: Version 13, Sep 2, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 26, 2010—Oct 13, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend (Ridgeway)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
853	Wellsbasin very cobbly loam, 3 to 20 percent slopes, extremely stony	5.8	4.9%
896	Barboncito, extremely flaggy-Badland complex, 15 to 65 percent slopes	12.7	10.5%
900	Urban land	1.7	1.4%
901	Gravel pits	0.5	0.4%
977	Vastine fine sandy loam, 0 to 5 percent slopes, occasionally flooded	86.7	72.0%
989	Mudcap loam, 1 to 6 percent slopes	12.9	10.7%
<b>Totals for Area of Interest</b>		<b>120.4</b>	<b>100.0%</b>

## Map Unit Descriptions (Ridgeway)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not



## Custom Soil Resource Report

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.



## Ridgway Area, Colorado, Parts of Delta, Gunnison, Montrose, and Ouray Counties

### 853—Wellsbasin very cobbly loam, 3 to 20 percent slopes, extremely stony

#### Map Unit Setting

*National map unit symbol:* v38f  
*Elevation:* 6,000 to 7,500 feet  
*Mean annual precipitation:* 12 to 16 inches  
*Mean annual air temperature:* 45 to 50 degrees F  
*Frost-free period:* 105 to 155 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Wellsbasin, extremely stony, and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Wellsbasin, Extremely Stony

##### Setting

*Landform:* Dip slopes  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Cretaceous source colluvium and/or slope alluvium derived from sandstone and shale

##### Typical profile

*A - 0 to 7 inches:* very cobbly loam  
*Bt1 - 7 to 11 inches:* very cobbly clay loam  
*Bt2 - 11 to 13 inches:* very cobbly clay loam  
*Btk1 - 13 to 27 inches:* very gravelly clay loam  
*Btk2 - 27 to 31 inches:* silty clay loam  
*Bk - 31 to 47 inches:* silty clay loam  
*C - 47 to 65 inches:* silt loam

##### Properties and qualities

*Slope:* 3 to 20 percent  
*Surface area covered with cobbles, stones or boulders:* 10.0 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.21 to 0.71 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 40 percent  
*Gypsum, maximum content:* 1 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.5 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 1.0  
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 6s



## Custom Soil Resource Report

*Land capability classification (nonirrigated): 6s*  
*Hydrologic Soil Group: C*  
*Ecological site: R036XY287CO - Stony Foothills*  
*Hydric soil rating: No*

### Minor Components

#### **Xeribrush, extremely stony**

*Percent of map unit: 10 percent*  
*Landform: Dip slopes*  
*Down-slope shape: Linear*  
*Across-slope shape: Concave*  
*Ecological site: R036XY289CO - Clayey Foothills*  
*Hydric soil rating: No*

#### **Signalhill, very stony**

*Percent of map unit: 10 percent*  
*Landform: Dip slopes*  
*Down-slope shape: Linear*  
*Across-slope shape: Convex*  
*Ecological site: R036XY287CO - Stony Foothills*  
*Hydric soil rating: No*

## **896—Barboncito, extremely flaggy-Badland complex, 15 to 65 percent slopes**

### Map Unit Setting

*National map unit symbol: wntg*  
*Elevation: 5,200 to 7,000 feet*  
*Mean annual precipitation: 9 to 12 inches*  
*Mean annual air temperature: 49 to 54 degrees F*  
*Frost-free period: 120 to 165 days*  
*Farmland classification: Not prime farmland*

### Map Unit Composition

*Barboncito, extremely flaggy, and similar soils: 50 percent*  
*Badland: 35 percent*  
*Minor components: 15 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Barboncito, Extremely Flaggy

#### **Setting**

*Landform: Escarpments*  
*Down-slope shape: Convex*  
*Across-slope shape: Linear*  
*Parent material: Colluvium over residuum weathered from igneous and sedimentary rock*

#### **Typical profile**

*A - 0 to 3 inches: sandy loam*



## Custom Soil Resource Report

*BA - 3 to 5 inches: fine sandy loam*  
*Bt - 5 to 11 inches: clay loam*  
*Btk - 11 to 13 inches: channery clay loam*  
*R - 13 to 17 inches: bedrock*

### Properties and qualities

*Slope: 15 to 65 percent*  
*Surface area covered with cobbles, stones or boulders: 5.0 percent*  
*Depth to restrictive feature: 11 to 19 inches to lithic bedrock*  
*Drainage class: Well drained*  
*Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high*  
*(0.01 to 0.57 in/hr)*  
*Depth to water table: More than 80 inches*  
*Frequency of flooding: None*  
*Frequency of ponding: None*  
*Calcium carbonate, maximum content: 14 percent*  
*Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)*  
*Available water supply, 0 to 60 inches: Very low (about 2.0 inches)*

### Interpretive groups

*Land capability classification (irrigated): 7s*  
*Land capability classification (nonirrigated): 7s*  
*Hydrologic Soil Group: D*  
*Ecological site: R036XY113CO - Semidesert Juniper Loam*  
*Hydric soil rating: No*

### Description of Badland

#### Interpretive groups

*Land capability classification (irrigated): 8*  
*Land capability classification (nonirrigated): 8*  
*Hydric soil rating: No*

### Minor Components

#### Shavano

*Percent of map unit: 10 percent*  
*Landform: Escarpments*  
*Down-slope shape: Convex*  
*Across-slope shape: Linear*  
*Ecological site: R036XY325CO - Semidesert Loam*  
*Hydric soil rating: No*

#### Rock outcrop

*Percent of map unit: 5 percent*  
*Hydric soil rating: No*

## 900—Urban land

### Map Unit Composition

*Urban land: 100 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Urban Land

#### Interpretive groups

*Land capability classification (irrigated): 8*

*Land capability classification (nonirrigated): 8*

*Hydric soil rating: No*

## 901—Gravel pits

### Map Unit Composition

*Gravel pits: 100 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Gravel Pits

#### Interpretive groups

*Land capability classification (irrigated): 8*

*Land capability classification (nonirrigated): 8*

*Hydric soil rating: No*

## 977—Vastine fine sandy loam, 0 to 5 percent slopes, occasionally flooded

### Map Unit Setting

*National map unit symbol: vtjj*

*Elevation: 6,800 to 9,000 feet*

*Mean annual precipitation: 16 to 20 inches*

*Mean annual air temperature: 40 to 45 degrees F*

*Frost-free period: 80 to 110 days*

*Farmland classification: Farmland of statewide importance*

### Map Unit Composition

*Vastine, occasionally flooded, and similar soils: 75 percent*

*Minor components: 25 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*



## Description of Vastine, Occasionally Flooded

### Setting

*Landform:* Flood-plain steps

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from igneous, metamorphic and sedimentary rock

### Typical profile

*Oe - 0 to 1 inches:* mucky peat

*A - 1 to 9 inches:* fine sandy loam

*Ag - 9 to 11 inches:* silt loam

*Bg - 11 to 32 inches:* loam

*2Cg1 - 32 to 41 inches:* sand

*2Cg2 - 41 to 47 inches:* loamy sand

*2Cg3 - 47 to 51 inches:* coarse sand

*3Cg4 - 51 to 62 inches:* extremely gravelly sand

### Properties and qualities

*Slope:* 0 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.71 to 2.13 in/hr)

*Depth to water table:* About 6 to 18 inches

*Frequency of flooding:* OccasionalNone

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 1 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Moderate (about 7.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* 6w

*Land capability classification (nonirrigated):* 5w

*Hydrologic Soil Group:* B/D

*Ecological site:* R048AY241CO - Mountain Meadow

*Hydric soil rating:* Yes

## Minor Components

### Riverwash

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

### Swansonlake, occasionally flooded

*Percent of map unit:* 10 percent

*Landform:* Flood-plain steps

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Ecological site:* R048AY241CO - Mountain Meadow

*Hydric soil rating:* Yes

### Water

*Percent of map unit:* 5 percent

*Hydric soil rating:* Unranked

## 989—Mudcap loam, 1 to 6 percent slopes

### Map Unit Setting

*National map unit symbol:* v17h

*Elevation:* 6,800 to 9,000 feet

*Mean annual precipitation:* 16 to 20 inches

*Mean annual air temperature:* 40 to 45 degrees F

*Frost-free period:* 80 to 110 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Mudcap and similar soils:* 95 percent

*Minor components:* 5 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Mudcap

#### Setting

*Landform:* Stream terraces

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from igneous, metamorphic and sedimentary rock

#### Typical profile

*Ap1 - 0 to 2 inches:* loam

*Ap2 - 2 to 8 inches:* clay loam

*Bt - 8 to 24 inches:* clay loam

*Btk - 24 to 30 inches:* gravelly clay loam

*Bk1 - 30 to 37 inches:* very gravelly loam

*Bk2 - 37 to 47 inches:* very gravelly fine sandy loam

*C - 47 to 60 inches:* extremely gravelly sandy loam

#### Properties and qualities

*Slope:* 1 to 6 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.21 to 0.71 in/hr)

*Depth to water table:* About 18 to 36 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 35 percent

*Gypsum, maximum content:* 1 percent

*Maximum salinity:* Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 4.0

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 7s



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*Land capability classification (nonirrigated): 7s*  
*Hydrologic Soil Group: C/D*  
*Ecological site: R048AY241CO - Mountain Meadow*  
*Hydric soil rating: No*

### **Minor Components**

#### **Cerro**

*Percent of map unit: 5 percent*  
*Landform: Stream terraces*  
*Down-slope shape: Concave*  
*Across-slope shape: Convex*  
*Ecological site: R048AY247CO - Deep Clay Loam*  
*Hydric soil rating: No*

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## Appendix 6 – Photo Documentation





**Photo 1:** High quality riparian habitat. Good native species diversity and distribution. Minimum nuisance or noxious vegetation observed.



**Photo 2:** View looking south at Sagebrush stepp, Pinyon juniper steppe vegetative community. High value wildlife habitat.



**Photo 3:** View looking at active bank erosion.



**Photo 4:** View looking south along historic ditch and emergent wetland. Coyote willow adjacent to wetland.





**Photo 5:** View looking south along riparian emergent and scrub shrub wetland type.



**Photo 6:** High density poison hemlock



**Photo 7:** High density Canada thistle located within emergent wetland area.



**Photo 8:** View looking north at existing emergent wetland. Potential location for wetland creation - emergent marsh and boardwalk.





**Photo 9:** Significant infestation of musk thistle.



**Photo 10:** Existing constructed boardwalk over wetlands on BLM property.



**Photo 11:** View looking south at Uncompahgre River. Pinyon juniper encroachment to river edge (foreground). Large cottwood community in background.



**Photo 12:** View looking south at transitional side channel marsh habitat. High wildlife utilization (tracks) observed in this location.





**Photo 13:** View looking south towards water treatment facility and planted cottonwoods. White sweetclover investment on river right. Coyote willow scrub shrub on left.



**Photo 14:** View looking at Russian olive located in Rollans Park. Recommend removal.



**Photo 15:** View looking north at area recommended for bank stabilization



**Photo 16:** View looking northeast at large infestation of white sweet clover.





**Photo 17:** View looking north at emergent wetland with white sweet clover infestation occurring. Side channel on right good quality fish rearing habitat.



**Photo 18:** Spring input located along side channel.



**Photo 19:** Spotted knapweed located on river right.



**Photo 20:** View looking south along riparian scrub shrub and emergent wetland boundary.





**Photo 21:** View looking south along Uncompahgre River Assessment Area.



**Photo 22:** View looking north at high quality emergent wetland and scrub shrub wetland interface. High quality wildlife habitat.



**Photo 23:** View looking south at decadent narrowleaf cottonwood tree grouping. High quality avian habitat.



**Photo 24:** View looking south along braided section of Uncompahgre River.