US 93
POLSON-SOMERS
CORRIDOR STUDY

APPENDIX 3:

Environmental Scan

US 93 POLSON-SOMERS CORRIDOR STUDY

ENVIRONMENTAL SCAN

Technical Memorandum

August 8, 2024

MONTANA
MDT
DEPARTMENT OF TRANSPORTATION

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1.0. INTRODUCTION

The Montana Department of Transportation (MDT) is developing a corridor study of US Highway 93 (US 93) between Polson and Somers, Montana. The purpose of the *US 93 Polson-Somers Corridor Study* is to develop a comprehensive long-range plan for managing the corridor and determining what improvements can be made to address identified needs while considering public and agency input, environmental constraints, access management, and financial feasibility. The study is a collaborative process with MDT, the Federal Highway Administration (FHWA), the Confederated Salish and Kootenai Tribes (CSKT), local jurisdictions, resource agencies, and the public to identify transportation needs and potential solutions.

This *Environmental Scan* provides a planning-level overview of environmental resources within the corridor and identifies potential constraints and considerations that may influence the development of improvement options for the study corridor. This scan is not a detailed environmental investigation and is based on readily available environmental information for the study area. If improvement options are forwarded from the planning study into project development, an analysis for compliance with the National and Montana Environmental Policy Acts (NEPA and MEPA) and other applicable Federal and State regulations will be completed as part of the project development process. Information provided in this report is intended to help support future NEPA/MEPA compliance processes.

1.1. Study Area

The study area includes US 93 starting north of Polson at reference point (RP) 63.0 and ending north of Somers at RP 104.2. The Polson to Somers corridor spans Lake and Flathead Counties, crosses the Flathead Reservation, and follows the western shore of Flathead Lake, passing through many small and medium-sized communities including Polson, Big Arm, Elmo, Dayton, Rollins, Lakeside, and Somers. The study area for this *Environmental Scan* encompasses a 0.25-mile buffer from the centerline of the roadway along the 41.2-mile corridor as shown in **Figure 1.1** (also included as **Figure A.1** in **Appendix A**). The study area occurs in all or part of the following legally described areas in Lake and Flathead Counties:

- Township 23 North, Range 20 West, Sections 19, 29, 30, 31, and 32
- Township 23 North, Range 21 West, Sections 1, 2, 11, 12, 13, 24, and 25
- Township 24 North, Range 20 West, Section 6
- Township 24 North, Range 21 West, Sections 1, 2, 3, 4, 9, 10, 15, 16, 17, 18, 19, 25, 26, 27, 29, 30, 32, 33, 34, and 36
- Township 24 North, Range 22 West, Sections 13, 24, and 25
- Township 25 North, Range 20 West, Sections 4, 5, 8, 9, 15, 16, 19, 20, 21, 22, 29, 30, 31, and 32
- Township 25 North, Range 21 West, Section 36
- Township 26 North, Range 20 West, Sections 6, 7, 17, 18, 19, 20, 29, 32, and 33
- Township 27 North, Range 21 West, Sections 14, 23, 26, 27, and 35

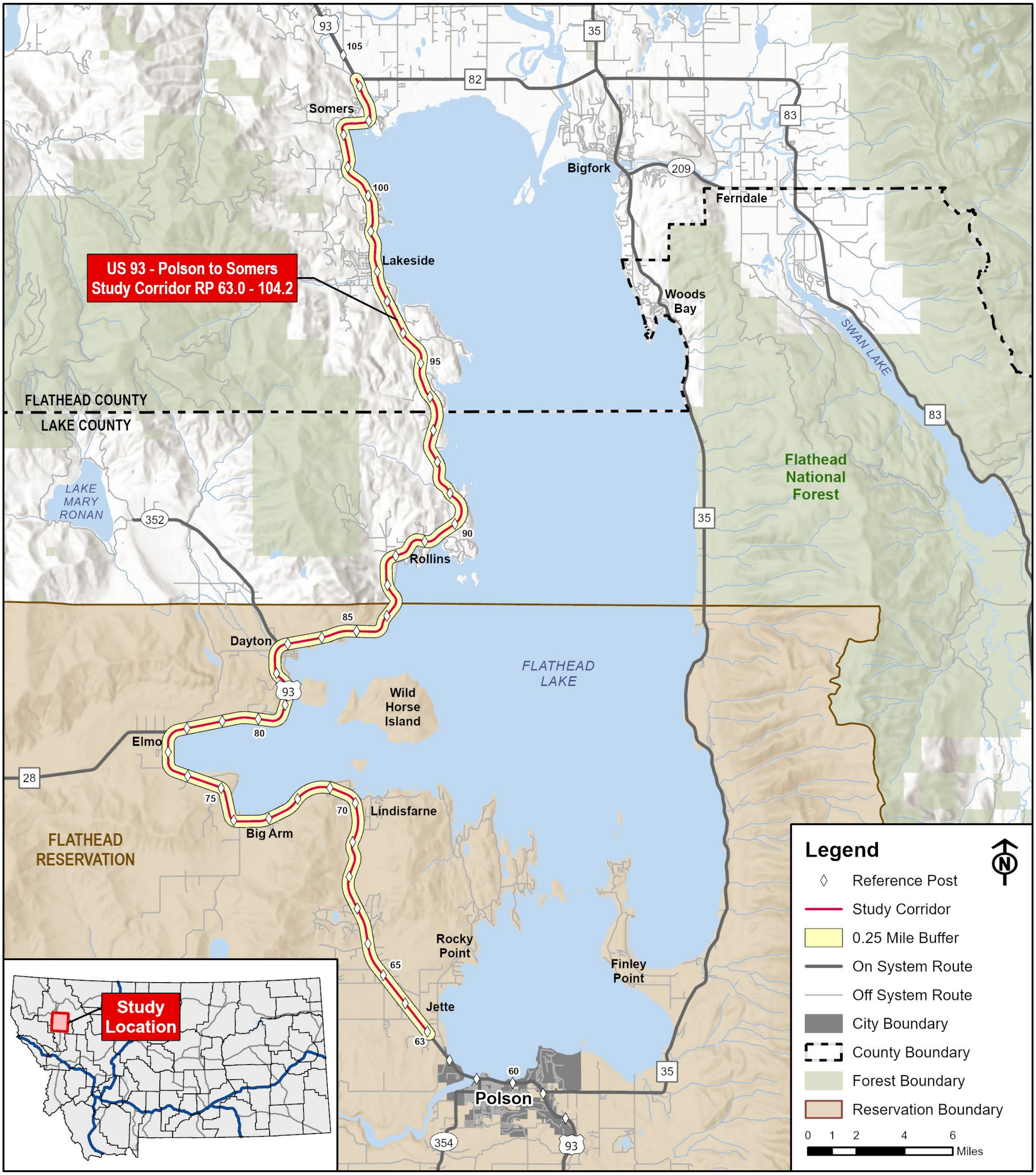

Figure 1.1: Study Area

1.2. Background

US 93 is a major north/south National Highway System (NHS) route in the western US that is important to the local, State, and Federal transportation system. It begins in Arizona and ends in Montana at the US-Canada border where it continues north as a Canadian highway. The Polson to Somers corridor connects the major Montana cities of Missoula and Kalispell, providing a regional travel route.

The study area has experienced substantial growth in recent years, resulting in increased commuter, tourist, recreation, and commercial/construction truck traffic along the corridor. The increase in traffic has put considerable strain on the existing infrastructure. Numerous planning and visioning efforts have been undertaken by communities along the US 93 corridor to address the area's changing needs.

The roadway follows the western shore of Flathead Lake throughout the majority of the study area. Flathead Lake—the largest freshwater lake west of the Mississippi River—represents a significant fishery and is important both ecologically, culturally, historically, and economically within the region and broadly to the CSKT. Recreation sites along the US 93 corridor offer numerous opportunities for convenient access to the lake and surrounding lands for sailing, power boating, waterskiing, swimming, fishing, picnicking, and camping. This section of US 93 also serves as a popular scenic route for visitors traveling between Yellowstone National Park and Glacier National Park.

The Polson to Somers corridor is also culturally significant to the CSKT. Areas bordering Flathead Lake and the Polson area have heightened historic and prehistoric values due to the geographic significance of the confluence of Flathead Lake and Flathead River. All recreational activities on Tribe-owned lands require the purchase of a Tribal recreation permit.

In addition to providing access to public lands for many recreational visitors and commercial recreation operations, the corridor serves numerous individual residences, rural subdivisions, and commercial enterprises. The use of lands, water sources, and recreation areas accessed by US 93 has historically provided substantial tourism traffic and economic subsistence for the rural communities along the corridor.

1.3. Information Sources

Multiple studies, including growth policies, transportation plans, forest plans, and project development documents, have been conducted in the study area over the course of several decades. Some of these have addressed proposed improvements to US 93, while others have been concerned with larger-scale issues of land and resource management in the area. This *Environmental Scan* draws pertinent information from these previous planning documents in addition to publicly available data from Federal, State, Tribal, and local agencies to provide the information presented in the following sections. The information includes the most recently available data as of May 2024. As changes occur over time, it is appropriate to review and update this information during future environmental analyses completed for any projects that may be forwarded from this corridor study.

2.0. PHYSICAL ENVIRONMENT

2.1. Land Ownership and Land Use

The land in the study area is primarily owned by private landowners, though some lands are publicly held by CSKT, Flathead County, Lake County, and various State agencies. Four State Parks, including Big Arm (RP 74.5), Wild Horse Island (RP 81.0, island within Flathead Lake only accessible by boat), West Shore (RP 92.7), and Somers Beach (RP 103.1) are located within or adjacent to the corridor. Several lands surrounding the corridor are Tribal trust lands managed by the CSKT. Conservation easements held by Montana Land Reliance exist near or adjacent to the study corridor northeast of Dayton, approximately between RP 83 and 87. Additional conservation easements, held independently by both Montana Land Reliance and the Nature Conservancy, are located approximately 0.5 mile east of RP 96 on Conrad Point.[1] **Figure A.2** shows the existing land ownership.

The valley floor surrounding Flathead Lake is open as a result of extensive logging in the late 19th and early 20th centuries, making way for a variety of agricultural uses, extractive industries, and residential and commercial development. The lands within the communities adjacent to the study corridor are primarily used for residential and commercial uses, while the lands outside the community boundaries are primarily used for crop production, grazing, timber activity, mineral production, and recreation.

Several zoning districts border or cross the study corridor where the majority of residential parcels exist. Additional information about zoning districts and applicable regulations is provided in the *Existing and Projected Conditions Report* for this study.

If any improvement options are forwarded from the corridor study, additional research and coordination would be needed to determine impacts to existing right-of-way or easements on private, Tribal trust, and other public lands.

2.2. Soil Resources and Prime Farmland

The *Farmland Policy Protection Act* (FPPA) (7 U.S.C. 4201 et. seq.) requires deliberate analysis for potential farmland impacts of projects with Federal involvement. The FPPA defines the term farmland only as prime farmland, unique farmland, and farmland of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. The FPPA does not apply to lands already in or committed to urban development but does stipulate that Federal programs must be compatible with state, local and private efforts to protect farmland.

The US Department of Agriculture Natural Resources Conservation Service (NRCS) determines where prime farmland exists and maintains mapping resources and information to support the FPPA. Prime farmland soils are those that have the best combination of physical and chemical characteristics for producing food, feed, and forage; the area must also be available for these uses. Prime farmland can be either non-irrigated or lands that would be considered prime if irrigated. Farmland of statewide importance is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops.

The study area has been mapped by the NRCS and is included in the Flathead County Area and Part of Lincoln County, Montana (MT618), Lake County Area, Montana (MT629), and Upper Flathead Valley Area, Montana (MT617) soil survey areas. **Figure A.3** shows that within the study area, less than 1 percent of the lands are classified as prime farmland, 9 percent as prime farmland if irrigated, 7 percent as farmland of statewide importance, 22 percent as farmland of local importance, and 20 percent as farmland of unique importance.[2] Within these mapped locations, undeveloped areas without buildings, roads, or utilities that are classified under one of the farmland designations occur throughout the corridor and could be impacted by future projects.

Federally funded projects apply the FPPA requirements to determine if designated farmland may be irreversibly converted to nonagricultural use. If any improvement options are forwarded from the planning study to become Federally funded projects, coordination with the NRCS will be required to determine the necessary NRCS processing requirements. Projects planned and completed without the assistance of a Federal agency are not subject to the FPPA.

2.3. Geologic Conditions

The study area is located along the western shore of Flathead Lake which is situated in the intermontane valley surrounded by the Mission Range to the southeast, Swan Range to the northeast, and Salish Mountains to the west. The Flathead River drains the entire watershed.

Flathead Lake is a remnant of Glacial Lake Missoula, which covered much of Western Montana until roughly 15,000 years ago. Periodic rupturing of the ice dam that created the lake resulted in cataclysmic floods that swept across Washington and Oregon, removing and transporting huge amounts of sediments. Tectonics, erosion, and glaciation have resulted in the deposition of complex sequences of sedimentary materials within the region’s intermontane valleys. The region’s continued extension is evidenced by the uplift of mountains, subsidence of valleys and numerous earthquakes that still occur in the area.

The study corridor traverses alternating regions of Glacial Deposits (Qgt), Glacial Lake Deposit (Qgl), Piegan Group: Helena and Wallace formations (Ypg) and Precambrian Bedrock of the Ravalli Group (Yr) from RP 63 to RP 86. The glacial deposits are predominately till and outwash composed of silt, sand, gravel, cobbles and boulders, with less common areas of silt and clay glacial lake deposits. The Helena formation has cycles of basal white quartzite or intraclast beds overlain by couplets of green siltite and argillite, capped by dolomite beds. Calcite pods and ribbons (molar tooth structure) are common. The Wallace formation has Tan-weathering, dolomitic quartzite and siltite, and black argillite with calcite ribbons (molar tooth structure) in graded pinch-and-swell couples and couplets. From RP 86 to the north end of the corridor study, the geology is mapped as the Precambrian Piegan Group (Yr) which is composed of quartzite, siltite, argillite and some limestone and dolomite, but there are frequent glacial deposits between the bedrock outcrops. **Figure A.4** presents a geologic map of the study area as depicted on the geologic maps of the *Wallace*[3] and *Kalispell*[4] quadrangles produced by the Montana Bureau of Mines and Geology.

Montana is considered to be seismically active. Most seismic activity occurs in western portions of the State generally west of a Livingston-Great Falls-Cut Bank line. According to the *Seismic-Hazard Map for the State of Montana*[5], the US 93 Polson to Somers corridor is in a moderate to high seismic risk zone. According to area experts, the Flathead Valley is an active seismic area with seismic monitors detecting as many as 10 small (less than magnitude 2.0) earthquakes per day in the region. However, the Flathead area has also had at least five earthquakes above magnitude 4.0 since 1970, including a 5.2 magnitude earthquake in 1952 with that sent widespread aftershocks across the valley. Seismic history suggests that larger earthquakes of higher magnitudes occur infrequently, at an average frequency of 10 to 15 years. Although significant fault lines exist in the area, including the Mission and Swan faults, none of the strongest earthquakes in the valley can be clearly attributed to activity along these known faults.[6]

Geotechnical investigations would be required for reconstruction or significant improvements to US 93 to determine potential stability, erosion, and settlement concerns posed by surface geology and soil conditions.

2.4. Surface Waters

The study area lies entirely within the Flathead Watershed (Hydrologic Unit Code [HUC] 170102) as delineated by the United States Geological Survey (USGS). More specifically, the roadway lies within the Flathead Lake (HUC 17010208) sub watershed. The Flathead, Stillwater, Whitefish, and Swan Rivers all join at Flathead Lake. Altogether, the Flathead Watershed drains six million acres of land.

US 93 generally follows the western shore of Flathead Lake and crosses the outlet of the lake, the Flathead River, approximately 1.6 miles east of the study corridor. Except between approximately RP 63.0 and 70.0 and at various peninsulas, the highway corridor is located within 0.25 mile of the lake shoreline. Although the study corridor never crosses the lake or any major rivers, the highway does cross several streams that are mapped in the USGS National Hydrography Dataset for Montana (**Figure A.5**) within the study limits. The named streams crossed by the study corridor are listed in **Table 2.1**. Information about fish-bearing streams can be found in **Section 3.2.3**. **Fisheries.** Additional unnamed intermittent streams, drainages, wetlands (**Section 2.7**), irrigation canals and ditches (**Section 2.4.4**), and other aquatic resources are also present in and around the study area.

Table 2.1: Stream and River Crossings

Name	Approximate Location (RP)	Crossing Structure	Stream Type
Stoner Creek	97.85	Culvert	Perennial
Forrey Creek	91.45	Culvert	Perennial
Big Lodge Creek	88.18	Culvert	Intermittent
Birch Creek	87.65	Culvert	Intermittent
Spring Creek	82.84	Culvert	Intermittent
Proctor Creek	82.46	Culvert	Perennial
Dayton Creek	82.23	Bridge	Perennial

Road construction and reconstruction activities such as bridge or culvert installation or replacement, placement of fill, or bank stabilization have potential impacts to surface waters. Coordination with Federal, State, and local agencies would be necessary to determine the appropriate permits based on the improvement options forwarded from this study. Impacts should be avoided and minimized to the maximum extent practicable. Impacts to streams and wetlands may trigger compensatory mitigation requirements.

2.4.1. Water Quality

The *Clean Water Act* (CWA) is the principal Federal legislation directed at protecting water quality. The Montana Department of Environmental Quality (MDEQ) is the State agency responsible for implementing components of the CWA outside of Reservation lands. On the Flathead Reservation, the CSKT Water Quality Program has US Environmental Protection Agency (USEPA)-approved water quality standards that are regulated by the CSKT and USEPA.

As directed by the *Montana Water Quality Act*, MDEQ prepares an Integrated Report every two years listing the status of water quality for waterbodies under State jurisdiction. The MDEQ biennial Integrated Reports include a list of all surface waters where pollutants have impaired the beneficial uses of water for drinking, recreation, aquatic habitats, and other uses. The CWA requires the development and implementation of cleanup plans for waterbodies that fail to meet State water quality standards. This typically involves the development of a Total Maximum Daily Load (TMDL) in which

MDEQ determines the sources of pollutants and sets the maximum amount of pollutants that each source can discharge to a waterbody.

All of the water features crossed by the study corridor are tributaries or artificial reaches of Flathead Lake and are classified as Use Class A-1 by MDEQ. Class A-1 water sources are considered high quality with a principal beneficial use of public water supply and secondary beneficial uses of bathing, swimming, recreation, agricultural, and industrial supply. Furthermore, Use Class A-1 is used to distinguish waters in national parks, wilderness and primitive areas which support salmonid fishes.

Flathead Lake is the 79th largest of the natural freshwater lakes in the world, and the largest west of the Mississippi River in the continental US. The lake is also renowned for its water transparency and is known as one of the cleanest lakes in the world. The high water quality is a result of rapid flushing of the lake (all water in the lake is replaced every 2.2 years), being located in a watershed where over 60 percent of lands are national park, designated wilderness, or managed forest lands, being in an area of relatively low population density, being dominated by very old, low-nutrient soils, and receiving high amounts of precipitation primarily from mountain snow.[7]

Water quality testing at Flathead Lake has been conducted for more than 100 years, providing insights into ecological conditions and changes over time. Samples dating to 1977 exposed declining water quality, evidenced by increases in algal growth and algal blooms and declines in oxygen in bottom waters. This decline was attributed to nutrient pollution from human sources, such as untreated or poorly treated sewage, and shoreline erosion. These observations of early signs of water quality deterioration stimulated one of the nation's first phosphate detergent bans and the implementation of advanced wastewater treatment plants to head off further water quality deterioration. Ongoing monitoring efforts suggest these efforts have been successful, and while nutrient levels (phosphorus and nitrogen) have been variable year-to-year, no long-term declining trends have been observed.[8]

Despite ongoing water quality management efforts, MDEQ's *Final 2020 Water Quality Integrated Report*[9] currently lists the northern portion of Flathead Lake within its area of jurisdiction outside the Flathead Reservation as being impaired and not fully supporting its beneficial use of supporting aquatic life due to mercury and polychlorinated biphenyl (PCB) impairments. The lake was first listed as impaired in 2000 and the status of the impairments was last assessed in 2021 with potential causes of impairment identified as impacts from hydrostructure flow regulation/modification, atmospheric deposition - nitrogen, silviculture harvesting, unspecified urban stormwater, municipal point source discharges, and dam or impoundment.[10] Impairment status for the portion of the lake within the Flathead Reservation is not publicly available.

Flathead Lake was previously delisted for impairments of phosphorus (2002), nitrogen (2002), and sedimentation/siltation (2014). The 2014 *Flathead Lake Watershed Restoration Plan*[11] and 2001 *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake*[12] describe the past and ongoing efforts to reduce nutrient loading (phosphorus and nitrogen), improve water quality, and address impairments. Flathead Lake is under the dual jurisdiction of both the State of Montana and CSKT so all TMDLs must satisfy the water quality standards of both entities.

None of the streams crossed by the study corridor are currently listed as impaired, though these waterbodies do fall within the Flathead Lake Watershed and are therefore addressed and monitored through the management plans mentioned previously.

Stormwater Management

In Montana, stormwater management is regulated by MDEQ outside of Reservation lands. On the Flathead Reservation, the USEPA regulates stormwater discharges in coordination with the CSKT.

A Montana Pollutant Discharge Elimination System (MPDES) general permit is required for stormwater discharges from construction activities that result in the disturbance of equal to or greater than one acre of total land area in locations under State jurisdiction. The applicability of MPDES permits for improvements on US 93 would need to be reviewed for any projects that may be advanced from the corridor study. The USEPA remains the permitting authority for National Pollutant Discharge Elimination System (NPDES) permits on the Flathead Reservation. The USEPA consults with CSKT and sends draft permits to CSKT to conduct CWA Section 401 certification to ensure the permit is in accordance with CSKT Water Quality Standards.

Special permits for small municipal separate storm sewer systems (MS4s) are required for incorporated cities with a population of at least 10,000 people. The Kalispell urban area, located north of the study corridor, is a designated MS4 area, but the US 93 Polson to Somers corridor falls outside all currently designated MS4 boundaries.

MDT's *Permanent Erosion and Sediment Control (PESC) Design Guidelines*[13] indicate that incorporation of PESC measures should be considered with projects disturbing one acre or more, or projects having the potential to adversely affect water quality. Incorporation of PESC measures would typically be limited to projects with scopes related to rehabilitation or reconstruction and locations in proximity to sensitive resources such as impaired waterways or high-quality aquatic habitat and spawning areas. PESC measures can also provide solutions for areas with a history of erosion or sedimentation problems. The applicability of PESC measures would need to be reviewed for any projects that may be advanced from the corridor study.

2.4.2. Lakeshore Protection

Statute 75-7-207 of *Montana Code Annotated* authorizes local governments to adopt regulations governing the issuance of permits for work within 20 feet of the perimeter of lakes within their jurisdiction. In order to proceed, any construction work, landscape modification, or maintenance that alters or disturbs the lakeshore protection zone must have a valid Lakeshore Construction Permit issued by the governing body. These regulations and permits are intended to help conserve and protect the value of lakes and lakeshore property.

The *Lake County Lakeshore Protection Regulations*[14] govern work that will alter the character of any lake, lakebed, and lakeshore within the boundaries of Lake County, excluding the portions of Flathead Lake within the jurisdictional area of the City of Polson and the waters below the elevation of 2,893.2 feet (Somers Datum) of Flathead Lake within the Flathead Reservation. The *Flathead County Lake and Lakeshore Protection Regulations*[15] govern work within all lakes within the boundaries of Flathead County having at least 20 acres of water surface area for at least six months in a year of average precipitation, including Flathead Lake, without limitation. Additionally, the CSKT Shoreline Protection Program Office administers the *Aquatic Lands Conservation Ordinance* (ALCO), which is intended to prevent the degradation of Reservation waters and aquatic lands by regulating construction or installation of projects upon aquatic lands whenever such project may cause erosion, sedimentation, or other disturbances adversely affecting the quality of Reservation waters and aquatic lands.[16]

Work efforts that require a permit include excavation, dredging, filling, clearing/removal/stockpiling of vegetation, installation of utilities, development of roads to serve boat ramps, pilings, reconstruction of existing facilities, operation of any mechanized equipment, construction of ditches, lagoons, buildings, boat service facilities, aerial structures, retaining walls, and docks, and any other work that many have an impact on a lake, lakebed, or lakeshore. Certain repair, maintenance, and emergency work is exempt from permit provisions, as noted in the respective regulations for each jurisdiction.

Road construction and reconstruction activities such as widening, placement of fill, or bank stabilization may have potential lakeshore impacts to Flathead Lake. Coordination with Flathead County, Lake County, and the CSKT would be necessary to determine the appropriate permits based on the improvement options forwarded from this study.

2.4.3. Wild and Scenic Rivers

The *Wild and Scenic Rivers Act*, created by Congress in 1968, provided for the protection of certain rivers and their immediate environments that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. In 1976, Congress designated portions of the North, South, and Middle Forks of the Flathead River and portions of the Missouri River downstream of Fort Benton as wild, scenic, or recreational components of the National Wild and Scenic River System. In 2018, East Rosebud Creek was also added to the System. Though the Flathead River drains into Flathead Lake, none of the sections of the Flathead River that are designated under the *Wild and Scenic Rivers Act* (North, Middle, and South Forks) are located within the study area.

2.4.4. Irrigation Features

The farming area of Flathead County is primarily confined to the floor of the Flathead Valley. About 40 percent of the viable cropland lies in the first 100 feet of altitude above Flathead Lake. Historically, the lands were dryland farmed, but after sprinkler irrigation was introduced to the County in 1947, irrigated farmlands have become the most common.[17] In Lake County, the Irving Flats and Valley View areas, located southwest of Flathead Lake, were historically dryland farmed while the rest of the County's farmland was primarily irrigated by the Flathead Indian Irrigation Project.[18] The project was authorized by the Federal government in 1908 as an amendment to the Flathead Allotment Act of 1904 to bring water to the Flathead Reservation. Today, the irrigation system includes 15 reservoirs and dams, over 1,300 miles of canal and lateral systems, and over 10,000 minor structures for the diversion and control of the water supply. The sources of water supply come primarily from the Flathead, Jocko, and Little Bitterroot Rivers; Mud, Crow, Post, Mission, Dry, Finley, Agency, Big Knife, Valley, and Fall Creeks; and, as many as sixty other small streams. These waterways cover a drainage basin area of approximately 8,000 square miles and supply irrigation to approximately 127,000 acres of agricultural land on the Flathead Reservation.[19]

In 2022, 160,817 of farmland were reported for Flathead County. Of that land, 72,436 acres (45%) were used for crop production and 17,264 acres of that cropland (24%) was irrigated. Lake County reported nearly four times as much farmland (596,272) but similar acreage of cropland (79,393, 13%). Nearly all of the cropland in Lake County was irrigated (78,526 acres, 99%). Compared to 2017, the acreage of irrigated land in both Flathead and Lake County has decreased by 28% as historical areas of farmland are converted to commercial and residential developments.[20]

Maps from the Montana Water Resources Survey prepared by the Department of Natural Resources and Conservation (DNRC) in the mid-1960s showing the historic water resources in the study area can be found in **Appendix B**. Based on mapping available from the US Geological Survey's National Hydrography Dataset, no irrigation features are crossed by the US 93 Polson to Somers Corridor. The majority of the Flathead Indian Irrigation Project system is located south of Polson.

Coordination with appropriate overseeing authorities and affected landowners would be undertaken if irrigation facilities may be affected by improvement options advanced from this planning project to help avoid or minimize impacts to agricultural operations and downstream water users.

2.5. Groundwater

Groundwater is the water present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. In Montana, groundwater is an important source of drinking water for individual homes and public water systems. Groundwater is also important for irrigation and livestock.

Groundwater is a plentiful and vital resource throughout the Flathead Lake area. Shallow aquifers occur in unconsolidated alluvial deposits along stream valleys, in areas of surficial outwash, or in water saturated bedrock near land surface. Shallow aquifers are important sources of water locally but are generally limited to floodplains associated with rivers and streams, and to glacial outwash. The intermediate and deep alluvial aquifers, on the other hand, are the most utilized aquifers in the Flathead Lake area and form the majority of groundwater flow systems in the valley. In general, there is sufficient fracture permeability in the bedrock within the Flathead Lake area to yield water to wells. However, the number, size, and orientation of the openings are unpredictable and can change abruptly over short distances.[21]

As of April 2024, records maintained by the Groundwater Information Center (GWIC) at the Montana Bureau of Mines and Geology show 21,497 wells on record in Flathead County and 8,072 wells in Lake County. In both counties, about 25-30% of the wells are drilled to depths of less than 100 feet, another 30% are drilled to depths between 100 and 200 feet and 15-20% are drilled to depths of 200 to 300 feet. The remaining approximately 25 percent of wells are drilled to depths greater than 300 feet. The most common use for wells in both counties is domestic use (76% in Flathead County and 66% in Lake County). A larger percentage of wells in Lake County are used for agricultural use (stockwater and irrigation) than in Flathead County. Other, less dominant uses include monitoring or testing groundwater and public water supply.

Based on interactive mapping from the GWIC, more than 600 wells are located within 0.25 mile of the study corridor. Well depths in the study area vary by individual location, but the majority of wells drilled in the study area have been drilled to depths of between 100 and 400 feet (70%). Only about 10% of wells were drilled to depths less than 100 feet, however, about 75% of static water levels are less than 100 feet below the ground surface.

High groundwater may be locally present near drainages and perched in small pockets above the (relatively uncommon) layers of clay, but in general, elevated groundwater is not anticipated to be a widespread problem within the study corridor.

There are 32 public water supply wells within the study area. These wells are primarily located at local businesses, subdivisions, or within rural communities. Public water supply wells have a setback requirement from MDEQ of a 100-foot isolation zone in which no source of pollutant can be located. Public water supply wells are also typically deeper and require a higher volume of water to be discharged.

Six water and sewer districts are located within the study area, including Somers, Lakeside, Dayton, Big Arm, Jette Meadows, and West Shore. Water and sewer districts are units of government within Montana with limited powers related to water and wastewater services for the communities in which they are located. The Somers, Lakeside, Dayton, and Jette Meadows Districts supply both water and wastewater treatment, while the Big Arm and West Shore Districts only provide sewer treatment.

Figure A.5 shows the locations of the public water supply, domestic, agricultural, and monitoring wells only within the study area. The water and sewer districts are also shown on the map. Impacts to the groundwater supply should be considered in any improvement option that may be brought forward from the planning study.

2.6. Floodplains and Floodways

Floodplains are the flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. The floodplain includes the "floodway" which consists of the stream channel and adjacent areas that carry flood flows and the "flood fringe" includes the area covered by the flood.

Executive Order (EO) 11988, *Floodplain Management*, requires efforts be taken to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The natural and beneficial values of floodplains include providing habitat for fish, wildlife, plants, open space, natural flood moderation, water quality maintenance, and groundwater recharge. EO 11988 requires projects undertaken or funded by Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Compliance with this directive requires an evaluation of a proposed project and its alternatives to determine the effects of any encroachments on the "base" floodplain. The base floodplain is the area covered by water from the 100-year flood and is a regulatory standard used by Federal agencies and states to administer floodplain management programs. The 100-year flood represents a flood event that has a 1 percent chance of being equaled or exceeded in any given year.

For the majority of the length between Polson and Somers, US 93 lies adjacent to Flathead Lake floodplain but the roadway itself lies outside the floodplain boundary in Zone X (area of minimal flood hazard). The Flathead Lake 100-year floodplain (Zone A) crosses parts of the 0.25-mile study area buffer but never crosses the roadway. Floodplains within the study area are shown in **Figure A.6**. Many parts of the Flathead Reservation have not been included in past floodplain mapping studies.

While flooding has occurred in the Flathead Watershed in the past, it has generally been constrained to the rivers and streams in the watershed and has not extended to Flathead Lake. The lake generally maintains regular water levels and helps regulate flows of downstream rivers through the use of dams. Hungry Horse Dam, located north of the lake on the South Fork of the Flathead River, partially regulates flows into Flathead Lake while the Selis Ksanka Qlispe Dam (formerly Kerr Dam) located in the Polson area regulates flows out of the lake.[22]

The *Flathead County*[23] and *Lake County Floodplain Management Regulations*[24] regulate development activities in floodplains mapped by the Montana Department of Natural Resources Conservation (DNRC) and the Federal Emergency Management Agency (FEMA). Coordination with the Flathead and Lake County floodplain administrator(s) would be necessary if any improvement options advanced from this study cross or encroach on a regulated flood hazard area (100-year floodplains).

2.7. Wetlands

Wetlands are lands that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The repeated or prolonged presence of water at or near the soil surface is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands can typically be identified by the existence of three environmental parameters: a dominance of hydrophytic vegetation, hydric soils, and prolonged periods of inundation or saturation resulting in sufficient hydrology to support wetland development. Examples of types of wetlands include marshes, bogs, the shallow portions and shorelines of lakes, ponds, and reservoirs, seasonal wet meadows, and the floodplains and shorelines of streams.

The US Fish and Wildlife Service (USFWS) is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands. The USFWS has compiled mapping to show wetlands and deepwater habitats in the US including many parts of Montana and has made this mapping available through access to the National Wetland Inventory (NWI). NWI wetlands are identified in general accordance with USFWS's publication *Classification of Wetlands and Deepwater Habitats of the United States*[25]. NWI maps do not define wetlands for regulatory purposes since the wetlands are identified through aerial photo interpretation. The NWI definition of wetlands requires one or more of the three attributes of wetlands (wetland hydrology, vegetation, or soils) be present to be a wetland.

NWI mapping for the study area is presented in **Figure A.7**. The figure shows the wetlands of Flathead Lake in addition to riverines, freshwater forested/shrub wetlands, freshwater emergent wetlands, and forested/shrub riparian areas along the various streams and drainages in the area.

Field-based wetland delineations would be required if improvement options are forwarded from the corridor study that could potentially affect wetlands. Future projects in the study area would need to incorporate project design features to avoid and minimize adverse impacts on surface waters and wetlands to the maximum extent practicable.

Unavoidable impacts to wetlands, streams, and irrigation features may require compensatory mitigation in accordance with applicable US Army Corps of Engineers and CSKT requirements. Various Tribal, State, and Federal water quality permits may be required to implement construction projects on US 93 including a MPDES General Permit for Storm Water Discharges Associated with Construction Activity; CWA Section 404 permit; Section 401 Water Quality Certification and 318 Authorization; Stream Protection Act (SPA 124) permit; and/or the CSKT Aquatic Lands Conservation Ordinance (ALCO) 87A permit.

2.8. Hazardous Substances

MDEQ works to clean up contaminated properties throughout the State of Montana. MDEQ also regulates underground storage tanks on properties owned by private businesses and public entities, ensuring that the tanks are installed, managed, and monitored in a manner that prevents releases into the environment. Information about the existence of hazardous sites in the study area was obtained from the Montana Natural Resource Information System database and from MDEQ's online interactive website and databases. **Figure A.8** depicts sites identified in the study area.

National Priority List (Superfund) Sites

The National Priority List (NPL) is the list of hazardous waste sites throughout the US eligible for long-term remedial action financed under the Federal Superfund program. A Superfund site is any land that has been contaminated by hazardous waste and identified by the USEPA as a candidate for cleanup because it poses a risk to human health and/or the environment. No Superfund sites exist in or near the study area.

Hazardous Waste Generators

No hazardous waste generators occur in the study area. However, one inactive generator is listed just outside the study area in Somers, east of approximate RP 103.2, named BNSF Somers (EPA ID: MTD053038386). The site is a non-permitted small quantity generator encompassing approximately 80 acres. Contamination at the site is attributable to a railroad tie and wood treatment facility operated by BNSF and its predecessors between 1901 and 1986. The USEPA proposed the site for listing on the Superfund NPL in October 1984, but subsequently withdrew the proposal in 1992.

Hazardous Waste Release Sites

Seven hazardous waste release sites are located in the study area.

- The **BJK Transport** hazardous waste release site is located at approximate RP 80. A 100-gallon diesel spill occurred in 2017, was cleaned, and was delisted later that year.
- The **Red Mountain Truck Lines Inc.** hazardous waste release site is located at approximate RP 82. A 40-gallon diesel spill occurred in 2021, was cleaned, and was delisted later that year.
- The **Mercer Trucking Company** hazardous waste release site is located at approximate RP 82.1. A 40-gallon diesel spill and an 8-gallon motor oil spill occurred in 2014, was cleaned, and was later delisted in 2015.
- The **Janiters World Supply** hazardous waste release site is located at approximate RP 83.3. A 40-gallon diesel spill and used motor oil spill occurred in 2005, was cleaned, and was delisted later that year.
- The **Whitebird Farms** hazardous waste release site is located at approximate RP 95. A 15-gallon diesel spill occurred in 2012. A closure date for the site remediation is not provided.
- The **Lasalle Sand & Gravel LLP** hazardous waste release site is located at approximate RP 101.5. An 85-gallon diesel spill and a 20-gallon automotive fluid spill occurred in 2019, was cleaned, and was delisted later that year.
- The **Big Sky Land Improvement Inc** site was a 50-gallon diesel spill as a result of a crash involving a dump truck near the intersection of US 93 and Somers Road (RP 104.2). The site was listed in 2023 and is still active.

Remediation Response Sites

The State Superfund Unit utilizes the *Comprehensive Environmental Cleanup and Responsibility Act* (CECRA) to investigate and clean up hazardous substances at sites not addressed by Federal Superfund. Historical waste disposal activities at these sites caused contamination of air, surface water, groundwater, sediments, and/or soils with hazardous or deleterious substances. Under CECRA, sites are ranked based on potential risks to human health and the environment. Four remediation response sites were identified within or near the study area.

- The **BNSF Somers Plant** is an active remediation site that was once considered for inclusion on the NPL, as discussed previously. The site is currently a low priority for MDEQ.
- The **Somers Marina** is a medium priority active remediation site located southeast of RP 103. No details pertaining to the cause of contamination are publicly available.
- The **Kalispell Air Force Station** is a closed United States Air Force General Surveillance Radar station located near Lakeside. As of 2023, the site, located west of the study corridor around RP 97.5, appears to have been removed from MDEQ’s priority list.
- The **Microbial Biotechnology Inc** facility is located at the intersection of US 93 and Tower Road outside of Polson (approximate RP 63.5). No information about the cause of contamination is available, however, as of 2023, the site appears to have been removed from MDEQ’s priority list.

Underground Storage Tanks

Underground storage tanks within the study area are listed below, with some still active and others permanently out of use.

- Three active underground storage tanks are in use at the **Jette Store** (RP 66). Two contain gasoline and one contains diesel.
- Two underground storage tanks holding gasoline were installed at the **Big Arm General Store** (RP 73) in 1998 but are now permanently out of use and have subsequently been removed from the ground.
- Three active tanks are located at **Points North Trading Co** in Rollins (RP 88). Two are gasoline tanks and one is a diesel tank.
- Four active underground storage tanks exist at **Aries Gas and Grocery** (RP 98). Two of the active tanks are gasoline tanks, one is a diesel tank, and one contains dyed diesel.
- Two active underground storage tanks are permitted for **Joe Blogz** (RP 98.2). Both are gasoline tanks.
- Four active underground storage tanks exist at the **White Oak Super Stop** (RP 104.2). Two are gasoline tanks and two are diesel tanks.

Petroleum Tank Releases

Several petroleum tank releases have occurred in the past in and near the US 93 corridor. All but two of the following releases have been resolved.

- **Skates Residence** (Site 32475), located outside Big Arm (RP 71.5) was a petroleum release at a private household in 2021. The claim filed with the Petroleum Tank Release Compensation Board was withdrawn and the release was resolved in 2022.
- **Paul Taylor** (Site 23282), located outside Big Arm (RP 71.5), was the site of a petroleum release in 1992 which was also resolved in 1992.
- **Big Arm Marina** (Site 23009), located near RP 73, was identified as the site of a petroleum release in 2004 and was resolved in 2010.
- **Christensen Residence** (Site 30791), located near RP 73, was identified as the site of a petroleum release in 2004 and was resolved in 2006.
- **Big Arm General Store** (Site 23250), located near RP 73, was identified as a petroleum release site in 2005 but has not yet been resolved. The release claim is eligible for compensation by the Petroleum Tank Release Compensation Board.
- **Dennis Talbot #4244** (Site 17147), located in Elmo near RP 77, was the site of a 2001 petroleum release that was resolved in 2011.
- **MDT Elmo Maintenance** (Site 23070), located at the junction of US 93 and MT 28 (RP 77.5), was identified as the site of a petroleum release in 1997 and was resolved in 2004.
- **Harold R Taylor and Egy Hurghada** (Site 21004), located in Lakeside near RP 98, was the site of a petroleum release in 1992 which was resolved in 1993.
- **Aries Gas and Grocery** (Site 21062), located in Lakeside near RP 98, was identified as a petroleum release site in 2000 but has not yet been resolved. The release claim is ineligible for compensation by the Petroleum Tank Release Compensation Board.

- **Lakeside School Somers School Dist 29** (Site 30520), located in Lakeside at approximate RP 98.1, was the site of a 1997 petroleum release that was resolved in 2003.
- **Joe Blogz** (Side 20867), located in Lakeside at approximate RP 98.2, was identified as the site of a petroleum release in 1998 and was resolved in 2000.
- **West Shore Harbor Inc** (Site 20871), located in Lakeside at approximate RP 98.3, was identified as the site of a petroleum release in 2018 and was resolved in 2020.
- **Flathead Salmon Fish Hatchery** (Site 20651), located near RP 101, was identified as the site of a petroleum release in 1992 and was resolved in 2008.
- **Sliters Lumber Co** (Site 30725), located at the US 93 and Somers Road junction (RP 104.2), was the site of a petroleum release in 2002 which was also resolved in 2003.

Mine Sites

No abandoned or inactive mines occur in the study area. The Elmo Mining District is located outside of Elmo, approximately one mile northwest of the US 93 corridor.

Opencut permits are MDEQ permits required for the mining and processing of materials in areas of State jurisdiction as specified in the *Opencut Mining Act* (e.g. sand, gravel, soil, bentonite, clay, scoria, and peat). One permitted opencut mine site exists in the study area. The 40-acre **Doten Pit** (Site 305), located in Somers at RP 103.2, was first permitted in 1974 for the mining of sand and gravel.

One unpermitted mine site is located on the Flathead Reservation near Dayton.

Landfills and Solid Waste Facilities

The Lakeside Landfill is located at approximately RP 97.6, about 0.3 mile from the highway. The site is a drop-off location and accepts only household garbage and recycling. Additionally, MDT is proposing to develop a new roadkill composting facility northeast of Elmo. The site would require appropriate licensing from the MDEQ Solid Waste Program as a Small Composter Waste Management Facility.[26]

2.9. Air Quality

The *Clean Air Act* of 1970, as amended, is the basis for air pollution control programs. In accordance with the Act, the USEPA established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone, carbon monoxide, particulate matter (PM-2.5 and PM-10), lead, sulfur dioxide, or nitrogen dioxide. The NAAQS are health-based standards to protect human health and public welfare and set allowable concentrations and exposure limits for each criteria pollutant.

Montana has also established air quality standards for criteria pollutants, as well as for settleable particulates and visibility. The Montana Ambient Air Quality Standards (MAAQS) – found in the Administrative Rules of Montana 17.8.210-17.8.230 – establish statewide targets for acceptable levels of ambient air pollutants.

The USEPA and MDEQ are charged with regulating air quality and may designate areas as attainment or nonattainment based on their history of meeting the NAAQS or MAAQS for pollutants of concern. Areas where air pollution levels do not exceed the air pollution thresholds established in the NAAQS are designated as “attainment” areas. “Nonattainment areas" are localities where air pollution levels persistently exceed the NAAQS or MAAQS, or that contribute to ambient air quality in a nearby area that fails to meet standards. An area that has been designated as nonattainment in the past, but that now complies with the NAAQS, is classified as a “maintenance” area.

Two non-attainment areas are located near the study corridor including Polson (PM-10) and Kalispell (PM-10). However, the entirety of the study corridor is located outside these non-attainment areas, and therefore proposed transportation projects would likely not be subject to conformity requirements. However, if the area's air quality changes, conformity requirements could be implemented in the future. Any project proposed by MDT would need to examine the current status and determine if the project is subject to conformity requirements.

2.10. Noise

Roadway projects can cause noise levels to increase for affected receivers, during project construction and/or from operation of the traffic facility. Noise impacts can potentially occur due to construction of a roadway on a new location or the physical alteration of an existing roadway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

Residences in the study area are sensitive noise receptors that could be affected by roadway improvements on US 93. Sites protected under 4(f) and 6(f) within the study area may also be considered sensitive noise receptors. Detailed noise analyses are typically conducted when the potential for noise impacts exists due to substantial changes in roadway design or configuration.

Construction activities associated with improvements to US 93 may result in localized and temporary noise impacts in the vicinity of residences. These impacts can be minimized by incorporating measures to control noise sources during construction.

3.0. BIOLOGICAL RESOURCES

3.1. Vegetation

In the US 93 corridor, vegetation consists of forest, shrubland, grassland, wetland, and riparian systems. The coniferous forest community is dominated by a combination of Douglas-fir and western larch, grand fir, ponderosa pine, and lodgepole pine. The most common dominant shrubs in the study area are common ninebark, bittercherry, common chokecherry, rose, smooth sumac, Rocky Mountain maple, serviceberry, and oceanspray. Rough fescue and Idaho fescue are dominant in the grassland system in the project corridor. The riparian community is typically comprised of a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Dominant trees include the black cottonwood, boxelder maple, narrowleaf cottonwood, eastern cottonwood, Douglas-fir, peachleaf willow, or Rocky Mountain juniper. Dominant riparian shrubs include Rocky Mountain maple, thinleaf alder, river birch, redoiser dogwood, hawthorne, chokecherry, skunkbush sumac, willows, rose, silver buffaloberry, or snowberry. Areas of cultivated crop land and developed lands are also present in the study area.

Table 3.1 presents the land cover composition along the US 93 corridor as determined by the Montana National Heritage Program's (MTNHP) *Environmental Summary* prepared for the study area (**Appendix C**). Note that other sub-systems exist but each cover less than 1% of the study area and are not included in the table. Refer to **Appendix C** for more information.

Table 3.1: US 93 Land Cover – 0.25-mile buffer

System/Sub-System	(%)
Forest and Woodland Systems	**24%**
Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	19%
Rocky Mountain Mesic Montane Mixed Conifer Forest	5%
Shrubland, Steppe and Savanna Systems	**2%**
Rocky Mountain Montane-Foothill Deciduous Shrubland	2%
Grassland Systems	**22%**
Rocky Mountain Lower Montane, Foothill, and Valley Grassland	22%
Wetland and Riparian Systems	**30%**
Open Water	29%
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	1%
Human Land Use	**22%**
Developed, Open Space	6%
Other Roads	5%
Low Intensity Residential	4%
Pasture/Hay	3%
Cultivated Crops	2%
Major Roads	1%
Commercial / Industrial	1%

3.1.1. Invasive and Noxious Weeds

Invasive weeds are a growing concern in Flathead and Lake County and throughout Montana. Both Counties use Integrated Weed Management (IWM) to manage their noxious weeds. This method uses a combination of prevention, education, mapping, cultural, mechanical, biological, and chemical noxious weed management.

The State of Montana has listed 40 non-native, invasive plant species as noxious, which means it is unlawful to propagate these or allow them to go to seed because they pose a threat to agriculture and the ecology and economy of Montana. In addition, Lake County has listed 10 species which are problematic in the area or have great potential to cause problems, specifically for aquatic and riparian areas. Because approximately 10% of Lake County is surface water and wetlands, five aquatic weeds were adopted and added to the County's noxious weed list in 2001. Similarly, Flathead County has also identified 10 additional species that are problematic within areas of the County.

The Montana Weed Control Board has identified three prioritization groups to categorize noxious weeds. Priority 1 weeds are not present or have very little presence in Montana. Nine identified Priority 1A and 1B noxious weeds are present in the study area. Priority 2A management includes eradication or containment where less abundant. Priority 2B weeds are abundant in Montana and widespread in many counties. Management of 2A and 2B species is prioritized by local weed districts. Priority 3 are regulated plants, not Montana-listed noxious weeds, but have the potential to generate significant negative impacts.

Table 3.2 summarizes the list of noxious weeds known to be present within the study area, as provided in the MTNHP *Environmental Summary* (**Appendix C**).

Table 3.2: Present Noxious Weeds in Study Area

Priority Level		Noxious Weeds
1A	Very Little/No Presence	Yellow Starthistle, Medusahead, Dyer's Woad
1B	Limited Presence	Purple Loosestrife, Rush Skeletonweed, Scotch Broom, Japanese Knotweed, Blueweed, Bohemian Knotweed
2A	Common in Isolated Areas	Common Buckthorn, Yellowflag Iris, Kingdevil Hawkweed, Flowering-rush, Orange Hawkweed, Tall Buttercup, Meadow Hawkweed, Ventenata, Eurasian Water-milfoil, Tansy Ragwort
2B	Abundant and Widespread	Common St. John's-wort, Common Tansy, Oxeye Daisy, Dalmatian Toadflax, Spotted Knapweed, Common Hound's-tongue, Sulphur Cinquefoil, Whitetop, Yellow Toadflax, Canada Thistle, Curly-leaf Pondweed, Diffuse Knapweed, Russian Knapweed, Field Bindweed, Leafy Spurge, Hoary False-alyssum, Salt Cedar
3	Regulated Plants: Not Montana Listed Noxious Weeds	Cheatgrass, Russian Olive

Additionally, five species of aquatic invasive species are known to be present in lakes, ponds, and streams within the study area including the yellowflag iris, flowering-rush, curly-leaf pondweed, Eurasian water-milfoil, and American water-lily.

3.2. Biological Community

The portion of the US 93 study area that encompasses Flathead Lake provides important aquatic habitat for westslope cutthroat trout, bull trout, and pygmy whitefish. Additionally, the Flathead Lake riparian area provides important wildlife habitat for common species found in the adjacent shrub/woodlands and grasslands and species frequenting riparian areas like bats, porcupines, and fishers. The riparian zone supports ducks, geese, herons, eagles, and other raptors, as well as migratory songbird species found in the adjacent non-riparian areas. Other common riparian species include northern leopard frogs, western painted turtles, and western toads. In addition, the study area provides forested habitat for a variety of Montana wildlife species including large ungulates, carnivores, small mammals, raptors, amphibians, reptiles, and aquatic species.

The Salish mountain range adjacent to Flathead Lake provides suitable habitat for elk, black bears, and deer because of its relatively large size, its relatively diverse and high-quality vegetative communities and elevational relief, its geographic location and connectivity to other habitats, and its relatively low level of human development. In addition to providing habitat for resident wildlife, the Salish Mountains play a role in maintaining habitat connectivity for wide-ranging wildlife species such as wolverine, lynx, and grizzly bear. The study area is in the western reaches within the Northern Continental Divide Ecosystem. Grizzly bears currently occupy the entire northwestern Montana region which encompasses the entire study area.

3.2.1. Mammals

The general and wintering distributions of the larger mammals in the study area including mule and whitetail deer, elk, and bears are depicted in **Figures A.9** and **A.10**. Montana Fish, Wildlife and Parks (MFWP) mapping shows half of the study area which provides general and winter ranges for whitetail and mule deer. The area along the corridor from Somers to the Flathead Reservation border provides both general and winter ranges for elk. General ranges for black bears and grizzlies encompass the entire study corridor and surrounding area and are therefore not shown in the distribution maps.

A review of the MDT Maintenance Animal Incident Database between January 1, 2018, and December 31, 2022, indicates 2,443 animal carcasses were collected and documented along the study corridor. The database contains information on carcasses collected by MDT maintenance personnel; however not all carcass collection is reported consistently or on a regular schedule. This makes the information useful for pattern identification, but it is not statistically valid.

Table 3.3 summarizes the large mammal carcasses collected over the 5-year period. **Figure A.11** shows the locations of large mammal carcasses and clusters of deer carcasses, respectively. Carcass locations do not necessarily correspond to a crash occurrence or crash location.

Table 3.3: Animal Carcasses Collected

Animal	# of Carcasses Collected	(%)
Whitetail Deer	2,130	87.2%
Mule Deer	80	3.3%
Black Bear	29	1.2%
Elk	13	0.5%
Domestic Animal	11	0.5%
Other Wild Animal	174	7.1%
Unknown	6	0.2%
TOTAL	**2,443**	**100%**

Deer accounted for the vast majority (90.5%) of the carcasses collected along this section of US 93, with whitetail deer being the most common species involved. As shown in **Figure A.11**, the following trends were seen with the locations of carcasses collected.

- **Whitetail Deer:** Collected throughout study area, but carcass collection was concentrated north of the Flathead and Lake County line between RP 95 and 105.
- **Mule Deer:** Carcasses collected throughout the entire study area but were concentrated in the Lake County section of the corridor.
- **Elk:** Concentrated between RP 84 to 90 at the north end of the Flathead Reservation and near the community of Rollins.
- **Black Bear:** Collected throughout study area but carcasses were concentrated in three locations: RP 80 to 82, RP 88 to 90, and RP 95 to 98.
- **Other/Unknown Mammals:** Collected throughout study area. When provided, "other" types primarily include turkeys (24), skunks (22), fox (8), coyote (3), and racoons (3).

Figure 3.1 shows the number of carcasses collected by month and by year. As shown in the graphs, animal mortality appears to be greater in fall months (August through November), with the most carcasses collected in September. Based on the relatively few carcasses collected of individual species besides deer and smaller mammals, it is difficult to identify distinct trends in seasonal variation. The number of carcasses collected each year has been increasing significantly from year to year. In 2021 and 2022 there was a 53% and 82% increase from 2020, respectively. Yearly differences could be attributable to differences in staffing availability, frequency of reporting/pick up, or any other number of outside factors and does not necessarily indicate an increase in wildlife activity or mortality. Any improvement projects brought forward should utilize the most relevant and recently available data (e.g. salvage permits, MFWP databases) to investigate carcass retrieval and animal mortality in the corridor.

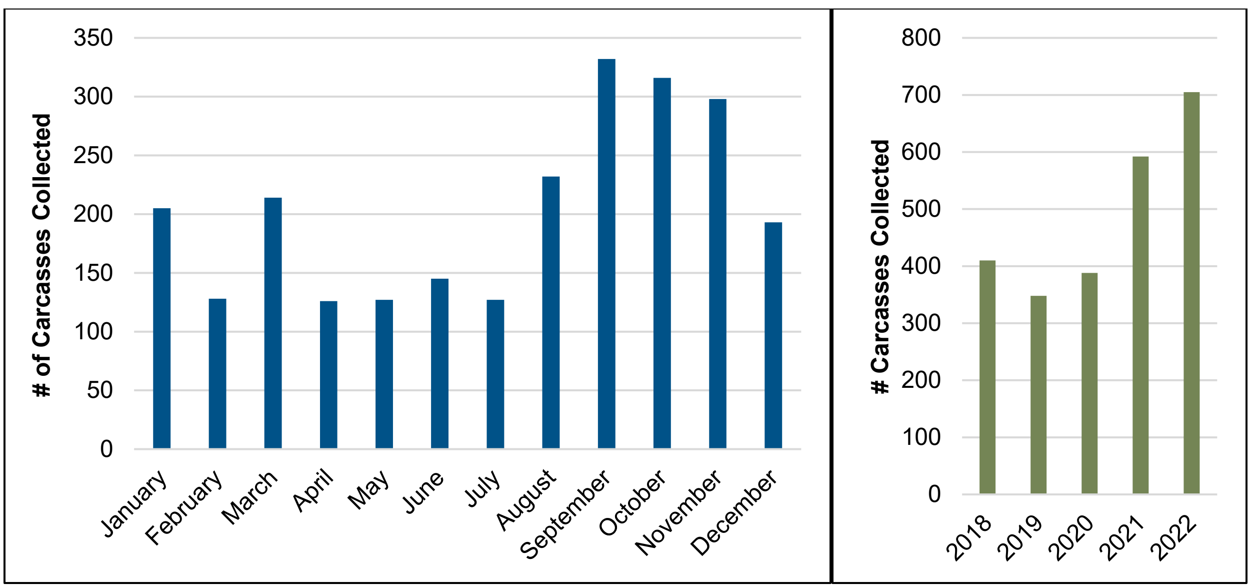

Figure 3.1: Seasonal and Yearly Distribution of Carcasses Collected

If any improvement projects are advanced from the corridor study, project planners should coordinate with fish and wildlife biologists from State, Tribal, and Federal agencies to gain further insight into issues related to the management of these species, as well as measures for avoiding, minimizing, or mitigating adverse effects on species and habitat. Since the Tribes do not always share wildlife or fish data with other agencies, CSKT Wildlife or Fisheries Programs should also be contacted. The needs and feasibility of wildlife accommodations will need to be considered in projects forwarded from this study in accordance with MDT's Wildlife Accommodation Process.

3.2.2. Birds

According to the MTNHP database, more than 200 species of birds have been documented in Flathead and Lake Counties, with the potential for many of these birds to occur or reside in the study area. These species include a wide variety of songbirds, birds of prey, waterfowl, owls, and shorebirds, including several listed as Species of Concern (SOC). Most avian observations occur in the riparian areas, open lands, and forest lands along the study area.

Many of the bird species are protected under or included in the USFWS *Migratory Bird Treaty Act* (MBTA), *Birds of Conservation Concern 2008* (BCC), or *Bald and Golden Eagle Protection Act of 1940* (16 U.S.C. 668-668c) (BGEPA) listings. Any improvements forwarded from this study should consider potential constraints that may result from nesting times of migratory birds and/or the presence of bald and golden eagle nests.

Migratory birds are protected under the MBTA. Under the MBTA, it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Direct disturbance of an occupied (with birds or eggs) nest is prohibited under the law. The destruction of unoccupied nests of eagles; colonial nesters such as cormorants, herons, and pelicans; and some ground/cavity nesters such as burrowing owls or bank swallows may be prohibited under the MBTA.

The BCC includes birds identified by USFWS as "species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the *Endangered Species Act* (ESA)." The study area is located in Bird Conservation Region 10. Seventeen species included under BCC are documented as having a sustained presence in or are known to occur in the study area: evening grosbeak, Clark's nutcracker, great gray owl, Cassin's finch, long-billed curlew, trumpeter swan, common tern, pileated woodpecker, brown creeper, varied thrush, bobolink, yellow-billed cuckoo, bald eagle, Lewis's woodpecker, great blue heron, veery, and Brewer's sparrow.

Bald eagles and golden eagles are known to occur in the study area. There are 78 confirmed bald eagle occurrences within the vicinity of the study area. The bald eagle is a Montana special status species (SSS) which has some legal protections in place but is otherwise not a SOC. Bald and golden eagles are both protected by the MBTA and managed under the BGEPA. The BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle or golden eagle, alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

3.2.3. Fisheries

Bull trout and westslope cutthroat trout migrate as adults from Flathead Lake to natal streams in the Flathead National Forest to spawn. Thus, Flathead Lake and the forest are closely connected. Although complex food web dynamics within Flathead Lake have led to declines in the numbers of these native fish, local populations in the forest have not been lost.[27]

Flathead Lake is the major water body that parallels US 93 and has several small streams and drainages crossing under the highway within the study area. Flathead Lake and its tributaries support a variety of Montana native and game fish. MFWP operates the Flathead Lake Salmon Hatchery south of Somers at approximate RP 101, which has historically raised over a million fingerling salmon and grayling per year beginning in 1913.[28]

Table 3.4 depicts the streams crossed by the highway and fish distribution information currently available from the MFWP's FishMT database.[29] One species of aquatic invasive species, the virile crayfish, has also been observed within the study area. Many of the waterbodies crossed by the highway are intermittent streams, which do not hold water year-round and likely do not support aquatic life.

Table 3.4: Fish Distribution Data for US 93 Stream and River Crossings

Name	Location (RP)	Existing Structure	Fish Species Present
Stoner Creek	97.85	Culvert	Brook Trout, Slimy Sculpin
Forrey Creek	91.45	Culvert	No Data
Big Lodge Creek	88.18	Culvert	No Data
Birch Creek	87.65	Culvert	No Data
Spring Creek	82.84	Culvert	No Data
Proctor Creek	82.46	Culvert	Brook Trout
Dayton Creek	82.23	Bridge	Brook Trout, Bull Trout

Fish passage and/or barrier removal opportunities may need to be considered at affected drainages if a project is forwarded from this study. Permit conditions from regulatory and resource agencies may also require incorporation of design measures to facilitate aquatic species passage.

3.2.4. Amphibians, Reptiles, and Invertebrates

According to the MTNHP *Environmental Summary* (**Appendix C**), amphibian and reptile species known or expected to occur in the study area include but are not limited to the western toad, northern leopard frog, western skink, northern alligator lizard, and western painted turtle. Seven invertebrate species, many of them listed as Montana SOC, have also been observed or are expected to occur in the study area.

3.3. Threatened and Endangered Species

Section 7(a)(2) of the ESA of 1973, as amended, requires Federal agencies to review actions they authorize, fund, or carry out, and to ensure such actions do not jeopardize the continued existence of Federally listed species, or result in the destruction or adverse modification of designated critical habitat. **Table 3.5** shows the ESA listed species that could potentially be affected by activities within the study area (as of June 12, 2024) as defined by the USFWS Information for Planning and Consultation (IPaC) tool.[30]

Table 3.5: Threatened and Endangered Species

Group	Species	Federal Status	Typical Habitat
Mammals	**Canada Lynx** (*Lynx canadensis*)	**Listed as Threatened**	The Canada lynx is an elusive forest-dwelling cat of northern latitudes. The Canada lynx are closely associated with moist, cool, boreal spruce-fir forests, and landscapes with high densities of snowshoe hares. Suitable habitat includes subalpine forests at elevations ranging between 4,000 and 7,000 feet above sea level. Lynx also need persistent deep, powdery snow, which limits competition from other predators.

Group	Species	Federal Status	Typical Habitat
Mammals	**Grizzly Bear** (*Ursus arctos*)	**Listed as Threatened**	In Montana, grizzly bears primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals. The study area lies within the area occupied by the Northern Continental Divide Ecosystem Grizzly Bear Population. The entire study area is in Zone 1 just outside of the Primary Conservation Area.
Mammals	**North American Wolverine** *(Gulo gulo luscus)*	**Listed as Threatened**	In North America, wolverines occur within a wide variety of habitats, primarily high elevation boreal forests, tundra, and western mountains throughout Alaska and Canada; however, the southern portion of the range extends into the contiguous United States, including Montana. South of the Canadian border, wolverines are restricted to areas in high mountains, near the treeline, where conditions are cold year-round and snow cover persists well into the month of May. When inactive, wolverines occupy dens in caves, rock crevices, under fallen trees, in thickets, or similar sites.
Fish	**Bull Trout** *(Salvelinus confluentus)*	**Listed as Threatened**	Bull trout are most common in high mountainous areas where snowfields and glaciers are present. They mainly occur in deep pools of large, cold, rivers and lakes.
Insects	**Monarch Butterfly** (*Danaus plexippus*)	**Candidate**	In western North America, nectar and milkweed resources are often associated with riparian corridors, and milkweed may function as the principal nectar source for monarchs in more arid regions. Additionally, many monarchs use a variety of roosting trees.
Plants	**Spalding's Catchfly** (*Silene spaldingii*)	**Listed as Threatened**	Open, mesic grasslands in the valleys and foothills usually with rough fescue, Nelson's needlegrass, Richardson's needlegrass and Idaho fescue. Occasionally with scattered ponderosa pine or broadleaf shrubs. Soils are usually deep and loamy. S. spaldingii typically occurs on northerly aspects and along draws and swales.

Grizzly bears have been observed throughout the study area. Flathead Lake provides critical habitat for bull trout. The Yellow-billed cuckoo, a threatened bird species, is also noted as potentially occurring within the study area near RP 63.0 based on mapping from the MTNHP. **Figure A.12** shows the occurrences of threatened and endangered species within a 0.25-mile area surrounding US 93, as mapped by MTNHP.

Any improvements forwarded from the corridor study would need to undergo review for compliance with the provisions of the ESA. The listing status of species and critical habitat can change over time; therefore, an up-to-date list of potentially affected species and designated critical habitat should be reviewed for each project.

3.4. Other Species of Concern

MTNHP maintains a database of SOC in Montana. SOC are native animals or plants that are at-risk due to declining population trends, threats to their habitats, and restricted distribution, among other factors. Designation as a SOC is based on the Montana Status Rank and is not a statutory or regulatory classification. Rather, these designations provide information that helps resource managers make proactive decisions regarding species conservation and data collection priorities.

Federal status is designated by three entities: USFWS, United States Bureau of Land Management (USBLM), and the United States Forest Service (USFS). USFWS status reflected the ESA listings as well as those species protected under or included in the MBTA, BCC, or BGEPA listings. The USBLM designates species listed in three ways, as threatened or endangered under the ESA, or as Sensitive on USBLM lands. The USFS has six designations: endangered, threatened, proposed, or candidate on the ESA, sensitive species on USFS lands, or a Species of Conservation Concern (SCC). A SCC is a species that is not recognized by the ESA, but available data indicates substantial concern about the species' capability to persist over the long-term in the area.

Montana employs a standardized ranking system to denote State status. Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based upon available information.

Table 3.6 presents all of the species occurrence records within 0.25 mile of US 93 and their Federal status, State rank (SOC, SSS, and potential species of concern [PSOC]), and State status. A species occurrence is an area of land or water in which a species is, or was, present. Species observations are reviewed by MTNHP for evidence of sustained presence (for example, breeding evidence) and species occurrences are created from those that meet established criteria for species. Note that other species have been observed in the US 93 study area (see **Appendix C**) but have not been documented as a species occurrence within the study area. **Figures A.13** through **A.15** show the locations of the SOC species occurrences within a one-mile buffer around the study corridor.

Table 3.6: Montana Species of Concern – Species Occurrence in Study Area

Species		USFWS Status	USBLM Status	USFS Status	State Status/Rank
Mammals	**Little Brown Myotis** *(Myotis lucifugus)*	None	None	Sensitive	SOC / 3
	Grizzly Bear (*Ursus arctos*)	Listed Threatened	Threatened	None	SOC / 2-3
	Hoary Bat *(Lasiurus cinereus)*	None	Sensitive	None	SOC / 3B
	Townsend's Big-eared Bat *(Corynorhinus townsendii)*	None	Sensitive	Sensitive	SOC / 3
	Long-legged Myotis *(Myotis Volans)*	None	None	None	SOC / 3
	Long-eared Myotis *(Myotis evotis)*	None	None	None	SOC / 3
	Fisher *(Pekania pennanti)*	None	Sensitive	Sensitive	SOC / 3
	Fringed Myotis *(Myotis thysanodes)*	None	Sensitive	None	SOC / 3
Birds	**Evening Grosbeak** *(Coccothraustes vespertinus)*	MBTA/ BCC10	None	None	SOC / 3
	Clark's Nutcracker *(Nucifraga Columbiana)*	MBTA	None	SCC	SOC / 3
	Great Gray Owl *(Strix nebulosa)*	MBTA	Sensitive	None	SOC / 3
	Cassin's Finch *(Haemorhous cassinii)*	MBTA/ BCC10	None	None	SOC / 3
	Long-billed Curlew *(Numenius americanus)*	MBTA/ BCC11	Sensitive	Sensitive	SOC / 3B
	Trumpeter Swan *(Cygnus buccinator)*	MBTA	Sensitive	None	SOC / 3
	Common Tern *(Sterna hirundo)*	MBTA	Sensitive	Sensitive	SOC / 3B
	Pileated Woodpecker *(Dryocopus pileatus)*	MBTA	None	None	SOC / 3

Species		USFWS Status	USBLM Status	USFS Status	State Status/Rank
Birds, Continued	**Brown Creeper** *(Certhia americana)*	MBTA	None	None	SOC / 3
	Varied Thrush *(Ixoreus naevius)*	MBTA	None	None	SOC / 3B
	Bobolink *(Dolichonyx oryzivorus)*	MBTA/ BCC10/ BCC11/ BCC17	None	None	SOC / 3B
	Yellow-billed Cuckoo *(Coccyzus americanus)*	PS: LT/ MBTA	Threatened	None	SOC / 3B
	Bald Eagle *(Haliaeetus leucocephalus)*	BGEPA/ MBTA	Sensitive	Sensitive	SOC / 4
	Lewis's Woodpecker *(Melanerpes lewis)*	MBTA/ BCC10/ BCC17	Sensitive	SCC	SOC / 2B
	Great Blue Heron *(Ardea herodias)*	MBTA	None	None	SOC / 3
	Veery *(Catharus fuscescens)*	MBTA	Sensitive	None	SOC / 3B
	Brewer's Sparrow *(Spizella breweri)*	MBTA	Sensitive	None	SOC / 3B
Fish	**Pygmy Whitefish** *(Prosopium coulterii)*	None	None	None	SOC / 3
	Bull Trout *(Salvelinus confluentus)*	LT/CH	Threatened	None	SOC / 2
	Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)*	None	Sensitive	Sensitive	SOC / 2
Amphibians	**Western Toad** *(Anaxyrus boreas)*	None	Sensitive	Sensitive	SOC / 2
Vascular Plants	**Small Yellow Lady's-slipper** *(Cypripedium parviflorum)*	None	None	Sensitive	SOC / 3-4
	Diamond Clarkia *(Clarkia rhomboidea)*	None	None	Sensitive	SOC / 3
	Slender Wedgegrass *(Sphenopholis intermedia)*	None	None	None	SOC / 3-4
	Wedge-leaf Saltbush *(Atriplex truncata)*	None	None	None	SOC / 3
	Columbia Locoweed *(Oxytropis campestris var. columbiana)*	None	None	None	SOC / 1
Invertebrates	**Sheathed Slug** *(Zacoleus idahoensis)*	None	None	None	SOC / 2-3
	Oblique Ambersnail *(Oxyloma nuttallianum)*	None	None	None	SOC / 2
Reptiles	**Western Skink** *(Plestiodon skiltonianus)*	None	None	None	SOC / 3
	Northern Alligator Lizard *(Elgaria coerulea)*	None	None	None	SOC / 3
Other	**Bat Roost (Cave)**	N/A	None	None	Not Yet Ranked

If any projects are advanced from the corridor study, a thorough review of wildlife occurrence databases should be conducted, and habitats near any proposed project sites should be evaluated to determine their suitability for any SOC. Measures to avoid or minimize disturbance of these species or their habitat should be incorporated into project design and implementation.

4.0. SOCIAL AND CULTURAL RESOURCES

4.1. Environmental Justice

Title VI of the *United States Civil Rights Act of 1964* prohibits recipients of Federal financial assistance (states, grantees, etc.) from discriminating based on race, color, or national origin in any program or activity. In 1994, EO 12898 was issued to direct Federal agencies to incorporate achieving environmental justice into their mission. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

In order to better meet USEPA responsibilities related to the protection of public health and the environment, the USEPA offers an environmental justice mapping and screening tool called EJSCREEN. It is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports.

If improvement options are forwarded from this study into project development, environmental justice would be evaluated during the project development process. However, the EJSCREEN report (**Appendix D**) indicates that disadvantaged populations are present in the study corridor to a greater degree than elsewhere in Montana. This conclusion is supported by the fact that some EJSCREEN environmental and demographic indicator values for the US 93 corridor are higher than comparable values for the State of Montana, including categories for particulate matter, air toxics cancer risk, air toxics respiratory hazard index, people of color, less than high school education, under age 5, and over age 64. All indicator values for the corridor are equal to or lower than the United States, with the exception of the over age 64 category. Additional information about population demographics, economic conditions, and income characteristics is provided in the *Existing and Projected Conditions Report* for this study.

4.2. Recreational Resources

Within the study corridor, US 93 provides direct access to Flathead Lake. The area is highly used by recreationists for fishing, boating, sailing, canoeing, kayaking, swimming, water skiing, wildlife viewing and bird watching, camping, hiking, photography, and more. The route is also used to access Glacier National Park and the Flathead National Forest, Lolo National Forest, and Kootenai National Forest, as well as several private recreational sites accessible via the study corridor. The use of lands accessed by US 93 provides substantial tourism traffic and economic activity for the local communities along the corridor. A map of the recreation facilities within the study area is provided in **Figure A.16**.

Multiple parks, fishing access sites (FAS), and other recreation areas maintained by MFWP, the Montana Department of Natural Resources and Conservation (DNRC), Flathead County, Lake County, and the CSKT are located along the US 93 corridor, as listed in **Table 4.1**. Additionally, the USFWS Flathead Waterfowl Production Area is located along the northern shore of Flathead Lake near Somers.

Table 4.1: Public Recreational Properties

Site Name	RP	Site Description	Owner
Adjacent to US 93 – Within Study Area Buffer			
Walstad Fishing Access Site	72.0	State FAS on US 93 approximately 10 miles north of Polson with boating and fishing opportunities.	MFWP
Big Arm State Park	74.5	Developed State park located approximately 15 miles north of Polson on Big Arm Bay along the west side of Flathead Lake. The park provides camping, hiking, swimming, fishing, picnicking, and boating opportunities, along with an archery range located on the west side of the US 93 across from the park's main entrance.	MFWP
Elmo Tribal Park	76.4	Tribal day-use park reserved for exclusive use by enrolled CSKT Tribal members.	CSKT
Elmo Fishing Access Site and Boat Launch	78.1	Public FAS and boat launch offering a concrete ramp accessing Flathead Lake and restrooms.	Lake County/ DNRC
Elmo Events Center	78.3	Public site north of Elmo offering RV and tent campsites and direct access to Flathead Lake for fishing, swimming, and paddle boarding.	DNRC
Conclow Fishing Access Site	84.0	State FAS under development at the time of this report.	MFWP
West Shore State Park	92.7	Developed State park located approximately 6 miles south of Lakeside on west side of Flathead Lake. Camping, hiking, picnicking, and swimming opportunities provided.	MFWP
Volunteer Park	98.1	Neighborhood park located in Lakeside at 7225 Highway 93 S offering picnic, gazebo/pavillion, boat access, and restroom facilities. The park's beach supports boating, fishing, and swimming.	Flathead County
Lakeside Boat Ramp	98.3	A public boat launch located at the intersection of US 93 and Bierney Creek Road.	Flathead County
Lakeside Community Park	98.4	Public open space in the 400 block of Lakeside Blvd offering picnic, restroom, and floating dock facilities.	Flathead County
Somers Fishing Access Site	102.5	State FAS on US 93 approximately 1 mile south of Somers with boating and fishing opportunities.	MFWP
Somers Beach State Park	103.1	State park located on the northwest shore of Flathead Lake. Provides walk-in access to half-mile of shoreline. Bordered by USFWS Flathead Waterfowl Production Area to the east.	MFWP
Accessed Via US 93 – Outside Study Area			
Salish Point Park	60.8	Located in Polson on the southern shore of Flathead Lake. Cooperatively developed by the City and CSKT, Salish Point offers a boat dock, developed parking area, fishing pier, swimming area, picnic facilities, and connections to Polson's pedestrian/bike path.	CSKT/ City of Polson
Polson City Parks	61.0	Riverside Park and Sacajawea Park are located in Polson on the southern shore of Flathead Lake. The parks offer picnicking, swimming, fishing, boating, and walking/biking, with connections to Polson's pedestrian/bike path.	City of Polson
Wild Horse Island State Park	81.0	Pack-in/pack-out State park accessible only by boat. Located east of Dayton. Hiking and wildlife viewing opportunities.	MFWP
Dayton Yacht Harbor Public Boat Launch	83.0	Public boat launch facility located within the community of Dayton outside the study area offering a concrete ramp accessing Flathead Lake.	Lake County
Lake Mary Ronan State Park	82.5	Developed State park located 7 miles west of Flathead Lake, accessed via Lake Mary Ronan Road, which intersects US 93 at Dayton. Fishing, camping, boating, picnicking, swimming, and hiking opportunities provided.	MFWP

Site Name	RP	Site Description	Owner
Ben Williams Park	97.7	Neighborhood park located immediately outside study area on Soren Lane in the community of Lakeside offering picnic, shelter, restroom, playground, and tennis facilities.	Flathead County

4.3. Cultural and Historic Resources

Section 106 of the *National Historic Preservation Act* (36 CFR 800) establishes requirements for taking into account the effects of proposed Federal, Federally assisted, or Federally licensed undertakings on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). The implementing regulations of Section 106 require agencies to seek ways of avoiding, minimizing, or mitigating any adverse effects on historic and archaeological properties. Additionally, Section 106 requires consultations with the Indian Tribes that may have current or traditional interests in the project area.

Other Federal and State of Montana directives impose additional requirements that must be addressed regarding effects of proposed undertakings on historic and archaeological resources and paleontological sites. Federal directives addressing historic and archaeological resource issues include Section 4(f) of the *US Department of Transportation Act*, the *Archaeological Resources Protection Act* and the *Native American Graves Protection and Repatriation Act*. State of Montana directives addressing historic and archaeological resource issues include the *Montana Antiquities Act* (which also addresses paleontological resources) and the *Montana Human Skeletal Remains and Burial Site Protection Act*. MDT consults with the Montana State Historic Preservation Office (SHPO) or the appropriate Tribal Historic Preservation Office (THPO) to ensure compliance with Section 106 and other directives regarding cultural resources.

A review of 25 reports catalogued in the SHPO Cultural Resource Information System (CRIS) was conducted, including 21 reports documenting intensive field survey or testing projects. Based on available reporting, a total of 34 cultural resource sites have been previously documented within the study corridor, including 23 historic properties and 11 prehistoric sites. Of these, 11 are not eligible for listing in the NRHP, 7 are eligible, 3 are potentially eligible, 2 are already listed, and 11 are of unknown status indicating they were not evaluated for NRHP eligibility at the time of original documentation. Some sites categorized as unknown eligibility may represent highly sensitive Tribal heritage properties with potential for buried archaeological deposits, regardless of eligibility status.

Aerial imagery indicates several of the sites recorded in the SHPO database may have been removed or damaged since the time of their original documentation. Field reconnaissance would be necessary to determine the current condition of all recorded sites.

Table 4.2: Previously Recorded Sites in the Study Area

Site #		Township, Range, Section	Site Name	Site Type	NRHP Status
1	24LA0014	24N-21W-19	Elmo Occupation	Prehistoric Occupation	Unknown
2	24LA0104	24N-21W-34	Thompkins House	Homestead	Not Eligible
3	24LA0105	24N-21W-33	Hallgren Summer Home	Residential	Not Eligible
4	24LA0106	24N-21W-33	Shadle Property	Residential-Recreation	Not Eligible
5	24LA0107	24N-21W-33	Pit Stop Bar	Residential-Commerce	Not Eligible
6	24LA0108	24N-21W-29	Big Arm Alignment	Rock Alignment-Fenceline	Not Eligible
7	24LA0273	24N-21W-33	Big Arm School	Education	Listed

Site #		Township, Range, Section	Site Name	Site Type	NRHP Status
8	24LA0331	22N-21W-11	Kalispell-Kerr Trans. Line	Powerline	Eligible
9	24LA1244	24N-21W- 29, 30, 32, 33 23N-21W- 13, 24, 14	Hungry Horse Kerr Trans. Line	Powerline	Eligible
10	24LA0011	24N-21W-10	Meeker Burial	Burial	Unknown
11	24LA0061	25N-20W-9	Linderman House, Frank Bird	Historic Person Residence	Listed
12	24LA0093	25N-20W-30	Flathead Museum	Historic Settlement	Eligible
13	24LA0094	25N-20W-30	Mongrain Cabin	1880s Era Settlement	Potentially Eligible
14	24LA0095	25N-20W-20	Lewis Cabins	Commerce-Recreation	Not Eligible
15	24LA0096	25N-20W-20	Rollins Post Office	Commerce-Residential	Not Eligible
16	24LA0097	25N-20W-20	Rollins Area Homestead	Residential	Not Eligible
17	24LA0098	25N-20W-9	Goose Bay Logging Chute	Logging	Not Eligible
18	24LA0136	25N-20W-16 & 21	Two Track Dump	Historic Dump	Unknown
19	24LA0253	25N-20W-5, 8, 9, 16,19-21, 30-32	Demersville Road	Historic Road	Potentially Eligible
20	24LA0356	24N-21W-2	Montebello Homestead	Homestead	Not Eligible
21	24LA0362	24N-21W-3	Dayton School	Education	Eligible
22	24LA0371	25N-20W-2	Rollins School	Education	Eligible
23	24LA1001	24N-21W-10, 3	Dayton Occupation Site	Prehistoric Occupation	Unknown
24	24LA1002	24N-21W-4	Dayton Occupation Site 2	Prehistoric Occupation	Unknown
25	24LA1003	24N-21W-4	Dayton Occupation Site 3	Prehistoric Occupation	Unknown
26	24LA1006	24N-21W-1	Dayton Area Pictographs	Prehistoric Art	Eligible
27	24LA1007	24N-20W-1	Dayton Area Rockshelter	Prehistoric Occupation	Unknown
28	24LA1004	14N-21W-15	Dayton Burial	Burial	Unknown
29	24LA1005	24N-21W-10	Smith Burial	Burial	Unknown
30	24LA1051	25N-20W-21	Canal Bay Occupation	Prehistoric Occupation	Unknown
31	24FH1004	26N-20W-18	Lakeside Occupation Site	Prehistoric occupation	Unknown
32	24FH0350	27N-21W-26	Northern Pacific Railroad	Railroad	Eligible
33	24FH0355	27N-21W-26	O'Brien Mansion: Somers Mansion	Settlement	Potentially Eligible
34	24FH0405	27N-21W-23	Mathius Walter Homestead	Homestead	Not Eligible

Eligible/Potentially Eligible/Not Eligible: *Recommendations provided in SHPO CRIS reports based on evaluation of NRHP eligibility criteria.* ***NR Listed:*** *Currently listed in the NRHP.* ***Unknown:*** *Not previously evaluated for NRHP eligibility; some sites may represent highly sensitive Tribal heritage properties with potential for buried archaeological deposits regardless of eligibility status.*

In addition to sensitive Tribal heritage sites including prehistoric occupation sites and burials, three areas of heightened sensitivity for cultural resources were identified, including the stretch of highway that runs through Elmo (approximately RP 76 to RP 78), the Dayton area (approximately RP 80 to RP 84), and the Rollins area (approximately RP 87.5 to RP 90). Historical documentation suggests these areas have special cultural sensitivity for the CSKT.

Most of the inventory and site documentation completed within the study corridor is over 30 years old. According to modern Section 106 standards, updated surveys and site updates would be required for any new ground-disturbing construction projects proposed for the study corridor. If any MDT-initiated projects are forwarded from the planning study, a cultural resource survey for unrecorded historic and archaeological properties would be completed within the Area of Potential Effect defined for each project. Direct and indirect impacts (such as visual, noise, and access impacts) to NRHP listed or eligible properties may be considered if improvements options are carried forward. On the Flathead Reservation, the CSKT Preservation Department has primary review and compliance authority under the Section 106 process. Early consultation and involvement with the CSKT would be necessary to address potential impacts for highway improvements both on and off the Flathead Reservation. Accordingly, consultation with the Montana State and Tribal Historic Preservation Offices (SHPO/THPO) would be conducted to identify any mitigation required for project impacts. Flexibility in design would be ideal in avoiding and/or minimizing impacts to historically or culturally significant sites in the study corridor.

4.4. Section 4(f) Resources

Projects that receive Federal funding and/or discretionary approvals from the FHWA must demonstrate compliance with Section 4(f) of the *Department of Transportation Act* of 1966 (23 U.S.C. § 138 and 49 U.S.C. § 303). Section 4(f) protects publicly owned public parks, recreation areas, and wildlife/ waterfowl refuges. Section 4(f) also protects historic sites of national, state, or local significance on public or private land that are potentially eligible for listing or are listed on the NRHP. The regulations require coordination with the official(s) with jurisdiction when making determinations about the use of protected properties or resources.

If a project uses a Section 4(f) property and a finding of *de minimis* impact is not made, FHWA can approve the use of that property only if the agency finds that (1) there is no feasible and prudent avoidance alternative to the use of the Section 4(f) property, and (2) all possible planning to minimize harm to the Section 4(f) property has been incorporated into the alternative.

Recreation facilities qualify as Section 4(f) properties if they are publicly owned, open to the public during normal hours of operation, and serve recreation activities as a major purpose as stated in adopted planning documents. National Forest lands are generally not subject to Section 4(f) unless portions of the public multiple use property are specifically designated by statute or identified in an official management plan as being primarily for public park, recreation, or wildlife and waterfowl refuge purposes, and are determined to be significant for such purposes. Section 4(f) also applies to historic sites on National Forest lands that are on or eligible for the NRHP.

If improvement options are forwarded from the corridor study, potential effects on recreational use including sites listed in **Table 4.2** should be investigated and appropriately considered in accordance with Section 4(f).

4.5. Section 6(f) Resources

Projects may be subject to Section 6(f) of the *Land and Water Conservation Fund (LWCF) Act* which was enacted to preserve, develop, and ensure the quality and quantity of outdoor recreation resources. Section 6(f) protection applies to public recreational sites purchased or improved with LWCF funds. Section 6(f)(3) of the Act prevents conversion of lands purchased or developed with LWCF funds to non-recreation uses, unless the Secretary of the Department of the Interior, through the National Park Service, approves the conversion. Conversion may only be approved if it is consistent with the comprehensive statewide outdoor recreation plan in force when the approval occurs, and the converted property is replaced with other recreation property of at least equal fair market value and of reasonably equivalent usefulness and location.

The list of all projects funded by LWCF grants within Lake and Flathead Counties was reviewed to identify Section 6(f) encumbered lands in the study area.[31] Projects listed in **Table 4.3** were implemented in the vicinity of the study area and qualify for protection under Section 6(f).

Table 4.3: Section 6(f) Resources

Site Name	Project Number	County	Project Sponsor
Big Arm State Park	30-00002, 30-00125	Lake	MFWP
Somers Beach State Park	Unknown	Flathead	MFWP
West Shore State Park	30-00002, 30-00003, 30-00125, 30-00177	Lake	MFWP
Wild Horse Island State Park	30-00423, 30-00470, 30-00503, 30-00535, 30-00536	Lake	MFWP

4.6. Visual Resources

The visual resources of an area include the features of its landforms, vegetation, water surfaces, and cultural modifications (physical changes caused by human activities) that give the landscape its visual character and aesthetic qualities. Landscape features, natural appearing or otherwise, form the overall impression of an area. Visual resources are typically assessed based on landscape character (what is seen), visual sensitivity (human preferences and values regarding what is seen), scenic integrity (degree of intactness and wholeness in landscape character), and landscape visibility (relative distance of seen areas) of a geographically defined view shed.

The study area encompasses a wide variety of settings including the US 93 roadway corridor and County roads, highway commercial developments, scattered rural residences, forested and agricultural lands, hilly and mountainous terrain, lakefront views, riparian areas, and wetlands. Actions that may have visual impacts include projects on new locations or that involve expansion, realignment or other changes that could alter the character of an existing landscape or move the roadway closer to residential areas, parks and recreation areas, historic or other culturally important resources.

5.0. SUMMARY

This *Environmental Scan* identifies physical, biological, social, and cultural resources within the study area that may be affected by potential future improvements arising from the *US 93 Polson-Somers Corridor Study*. Project-level environmental analysis would be required for any improvements forwarded from this study. Information contained in this report may be used to support future environmental documentation for compliance with NEPA/MEPA. Environmental condition findings that may affect development of future projects are listed below.

Physical Environment

- The lands within the several small communities adjacent to the study corridor are primarily used for residential and commercial uses, while the lands outside the community boundaries are primarily used for crop production, grazing, timber activity, mineral production, and recreation. The US 93 corridor is designated as a scenic corridor within Flathead County.
- Some lands adjacent to the US 93 corridor are publicly held by CSKT, Flathead County, Lake County, and various other State agencies. About 23 miles of the study corridor traverse the Flathead Reservation. Several conservation easements held by Montana Land Reliance exist near or adjacent to the study corridor.

- The study area contains some soils classified as prime farmland, prime farmland if irrigated, and farmland of local or statewide importance that may be subject to protections under FPPA.
- The US 93 study area is in a moderate to high seismic risk zone. Seismic history suggests that larger earthquakes of higher magnitudes occur infrequently, at an average frequency of 10 to 15 years.
- US 93 generally follows the western shore of Flathead Lake throughout the study area and crosses several perennial, fish-bearing streams, additional unnamed streams, and wetlands. All of the water features crossed by the study corridor are tributaries or artificial reaches of Flathead Lake.
- Flathead Lake is one of the largest natural freshwater lakes in the world and is renowned for its water transparency and purity. The lake is listed as "impaired" due to mercury and PCB contamination from various municipal sources, dam impacts, and atmospheric deposition.
- Groundwater is a plentiful and vital resource throughout the Flathead Lake area. High groundwater may be locally present near drainages, however, elevated groundwater is not anticipated to be a widespread problem within the study corridor. There are 32 public water supply wells and six water and sewer districts within the study area.
- While flooding has occurred in the Flathead Watershed in the past, the flooding is generally constrained to the rivers and streams in the watershed since Flathead Lake water levels are regulated through the use of dams.
- There are 2 unresolved hazardous waste release sites, 2 priority remediation response sites, 16 active underground storage tanks, 2 unresolved petroleum tank release sites, no abandoned mine sites, 1 permitted opencut mine, and 1 landfill drop off site within or near the study corridor.
- The study corridor is currently outside the Kalispell and Polson non-attainment air quality areas.
- Residences and Section 4(f)/Section 6(f) properties in the study area are sensitive noise receptors, which could be affected by future roadway improvements.

Biological Resources

- Nearly 40 species of invasive and noxious weeds are present within the study area.
- Flathead Lake and the lands surrounding the US 93 corridor provide forested and riverine habitat for a variety of wildlife species including large ungulates, carnivores, small mammals, raptors, amphibians, reptiles, and aquatic species.
- The Salish Mountains adjacent to Flathead Lake provide suitable habitat for elk, black bear, and deer while also playing a role in maintaining habitat connectivity for wide-ranging wildlife species such as wolverine, lynx, and grizzly bear.
- There is concern for wildlife-vehicle conflicts due to wildlife habitats in proximity to US 93 and the increasing number of carcasses collected along the highway.
- Canada lynx, grizzly bear, wolverine, bull trout, monarch butterfly, and Spalding's catchfly are listed species, or candidates to be listed, under the ESA. Grizzly bears have been observed throughout the study area. Flathead Lake provides critical habitat for bull trout. Several other mammal, bird, fish, and plant SOC have also been observed in the study area.

Social and Cultural Resources

- Demographic data obtained for this study indicates that disadvantaged populations are present in the study corridor to a greater degree than elsewhere in Montana.

- The US 93 corridor provides direct access to Flathead Lake, multiple parks, and many other recreation areas, which may be subject to Section 4(f) protections. The area surrounding the study corridor is highly used by recreationists for fishing, boating, sailing, canoeing, kayaking, swimming, water skiing, wildlife viewing and bird watching, camping, hiking, and photography.
- The Big Arm, Somers Beach, West Shore, and Wild Horse Island State Parks are located adjacent to the study corridor or are readily accessible via the highway. All four State parks are subject to projections under Section 6(f).
- A total of 34 cultural resource sites have been previously documented within the study corridor, including 23 historic properties and 11 prehistoric sites. Of these, 11 are not eligible for listing in the NRHP, 7 are eligible, 3 are potentially eligible, 2 are already listed, and 11 are of unknown status, indicating they were not evaluated for NRHP eligibility at the time of original documentation. Some sites categorized as unknown eligibility may represent highly sensitive Tribal heritage properties with potential for buried archaeological deposits, regardless of eligibility status.
- In addition to sensitive Tribal heritage sites including prehistoric occupation sites and burials, three areas of heightened sensitivity for cultural resources were identified, including the stretch of highway that runs through Elmo (approximately RP 76 to RP 78), the Dayton area (approximately RP 80 to RP 84), and the Rollins area (approximately RP 87.5 to RP 90). Historical documentation suggests these areas have special cultural sensitivity for the CSKT.

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US 93
POLSON-SOMERS
CORRIDOR STUDY

ENVIRONMENTAL SCAN

Appendix A

Figures

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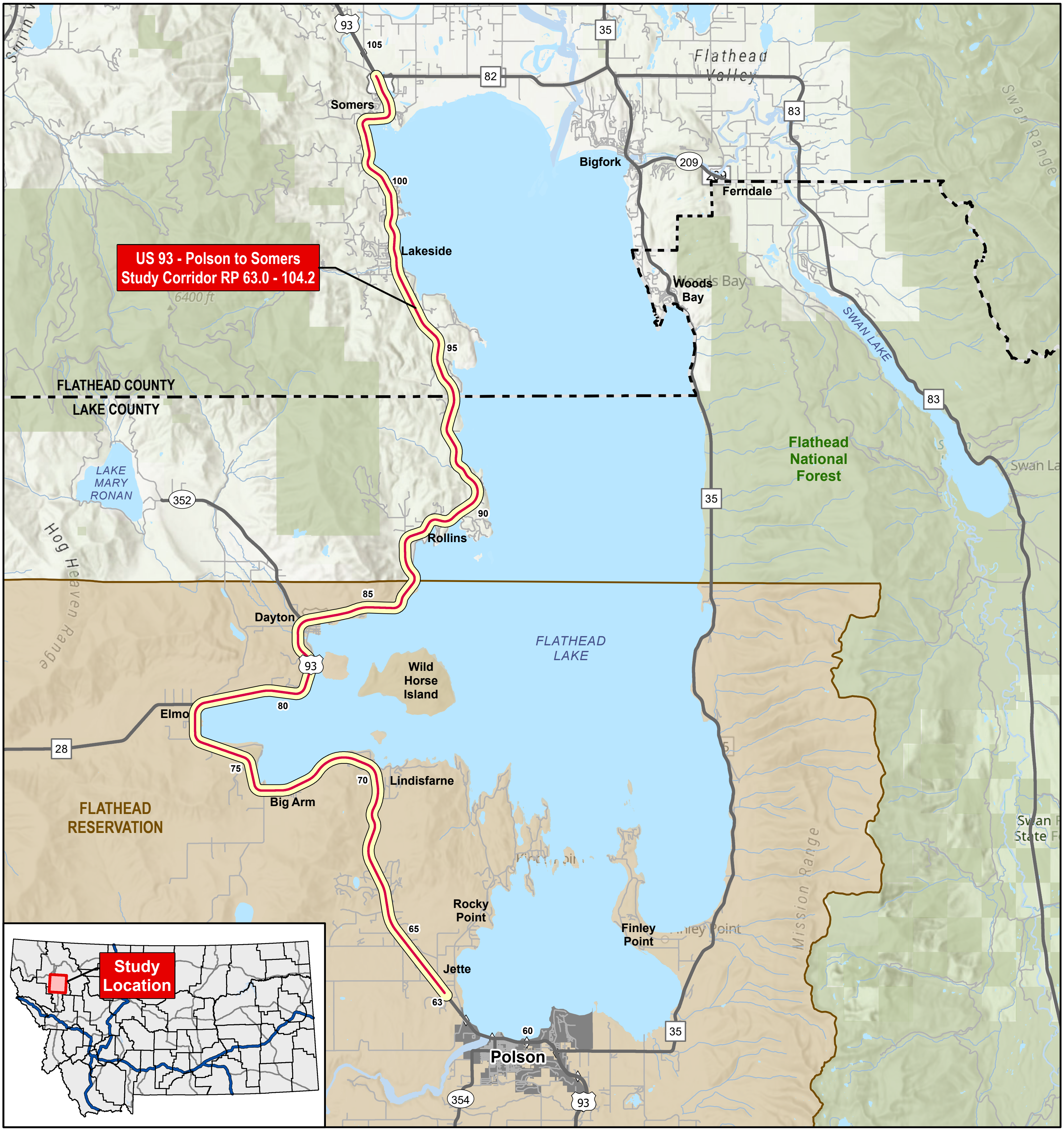


Legend

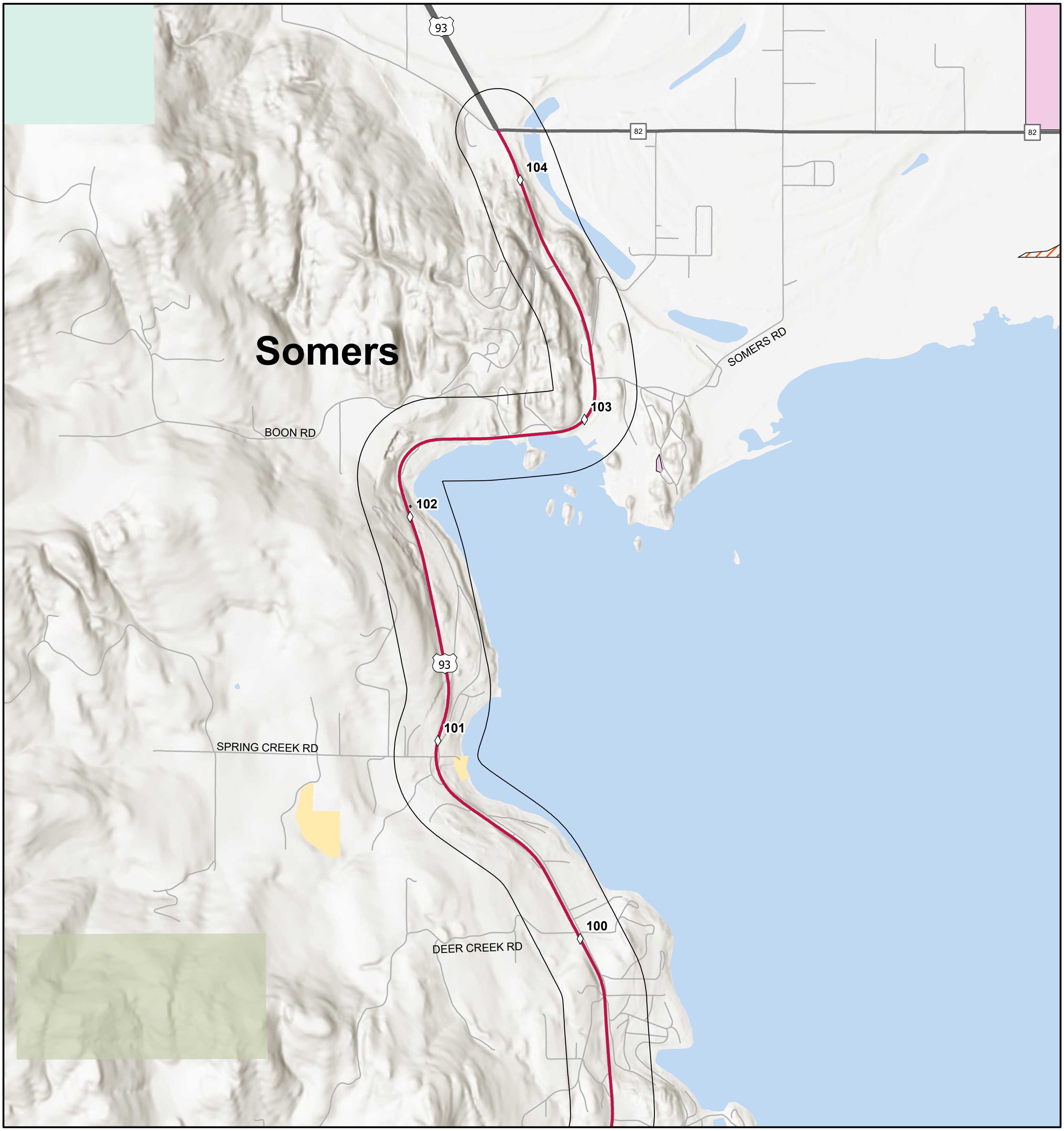
- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- On System Route
- Off System Route
- City Boundary
- County Boundary
- Forest Boundary
- Reservation Boundary

0 2.5 5 10 15 Miles

N

Figure A.1: Study Area

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Conservation Easements
- Flathead Reservation
- Fee (Privately Owned Within Flathead Reservation)
- Tribal Allotment
- Flathead Reservation Trust Land
- Restricted - Tribal Member Only
- State of Montana
- Montana Fish, Wildlife, and Parks
- Montana State Trust Lands
- Montana Dept of Transportation
- County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

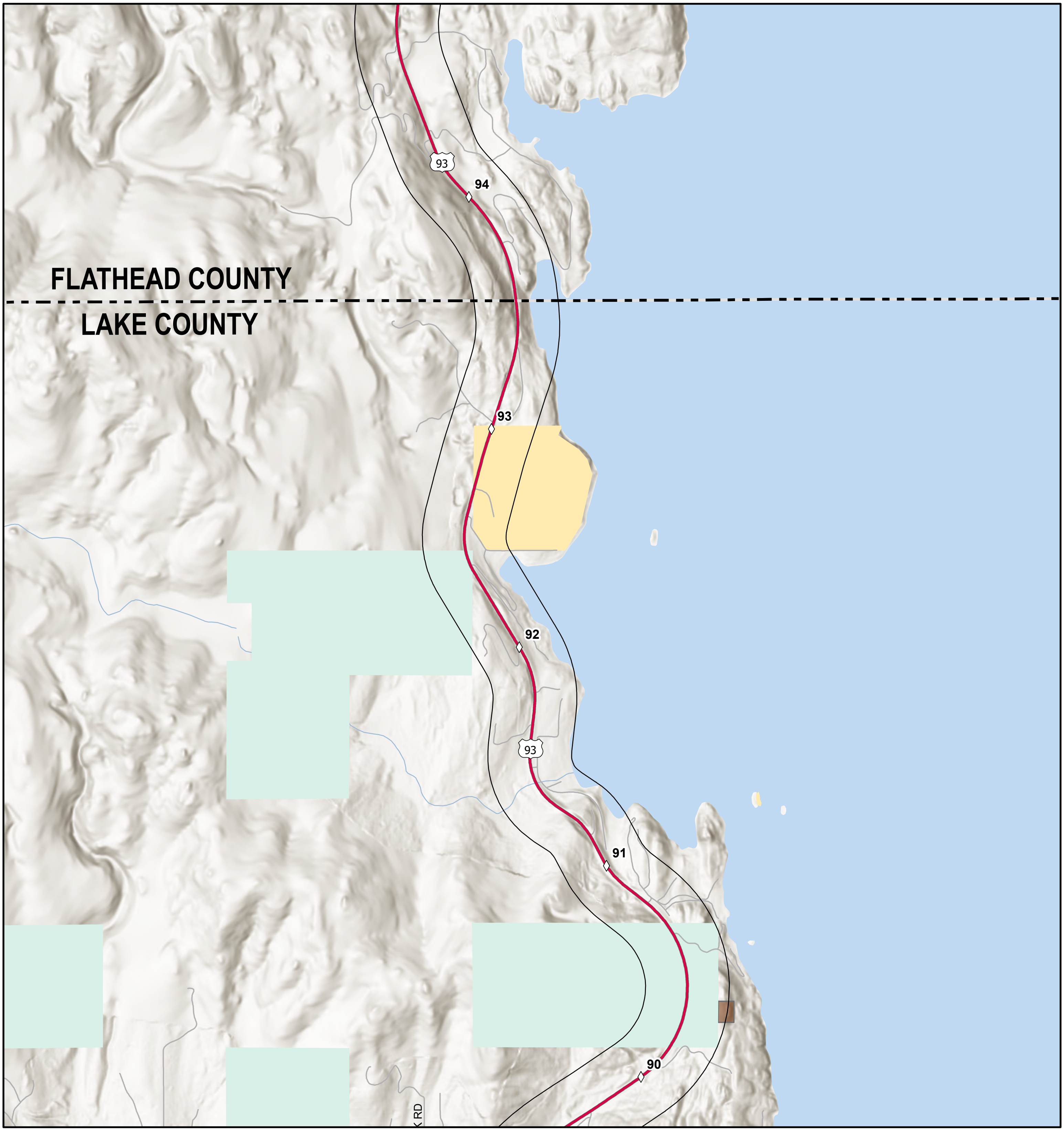
Reference Post	Fee (Privately Owned Within Flathead Reservation)	State of Montana
Study Corridor	Tribal Allotment	Montana Fish, Wildlife, and Parks
0.25 Mile Buffer	Flathead Reservation Trust Land	Montana State Trust Lands
Conservation Easements	Restricted - Tribal Member Only	Montana Dept of Transportation
Flathead Reservation		County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Conservation Easements
- Flathead Reservation
- Fee (Privately Owned Within Flathead Reservation)
- Tribal Allotment
- Flathead Reservation Trust Land
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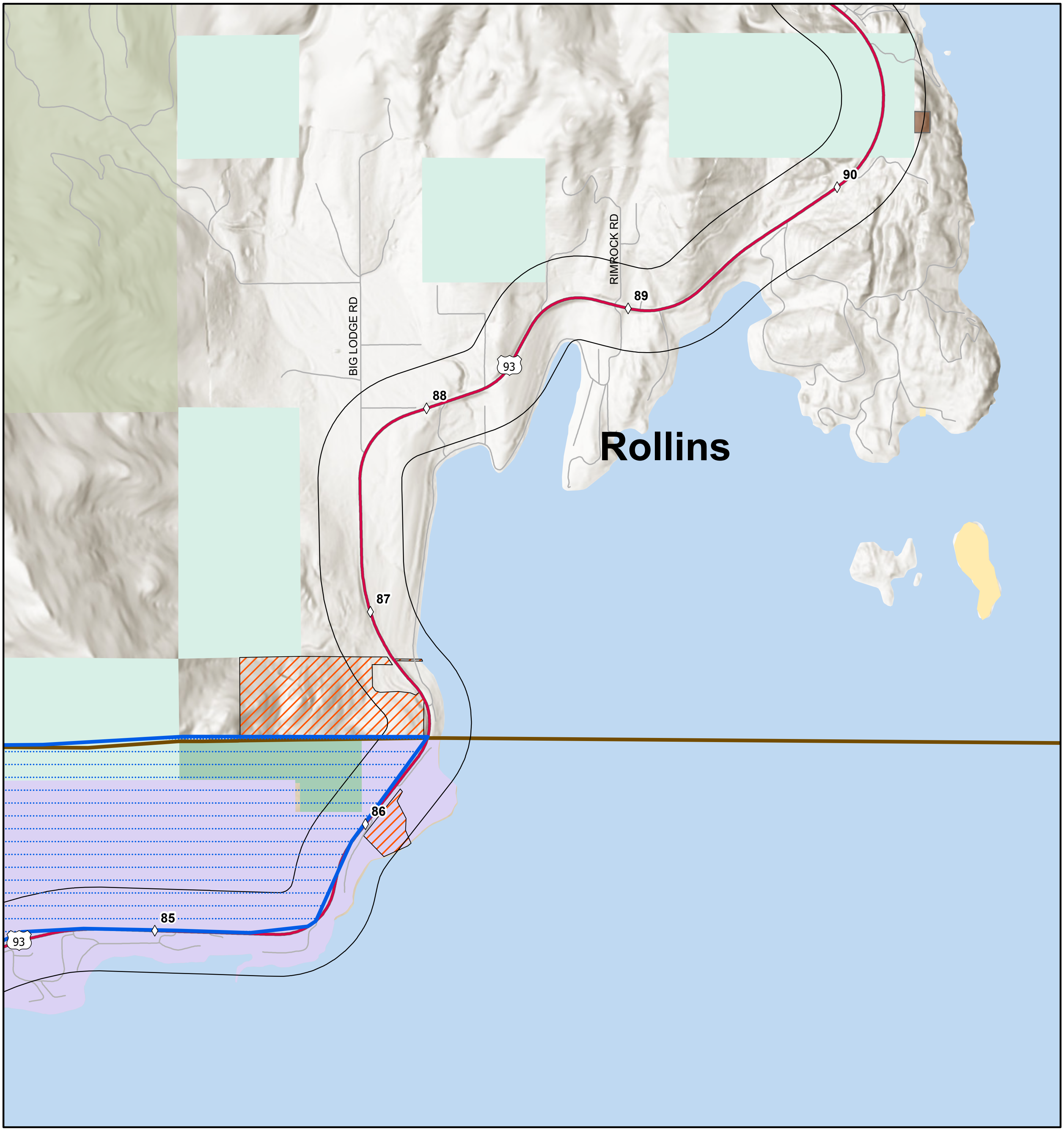
- Montana State Trust Lands
- Montana Dept of Transportation
- County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

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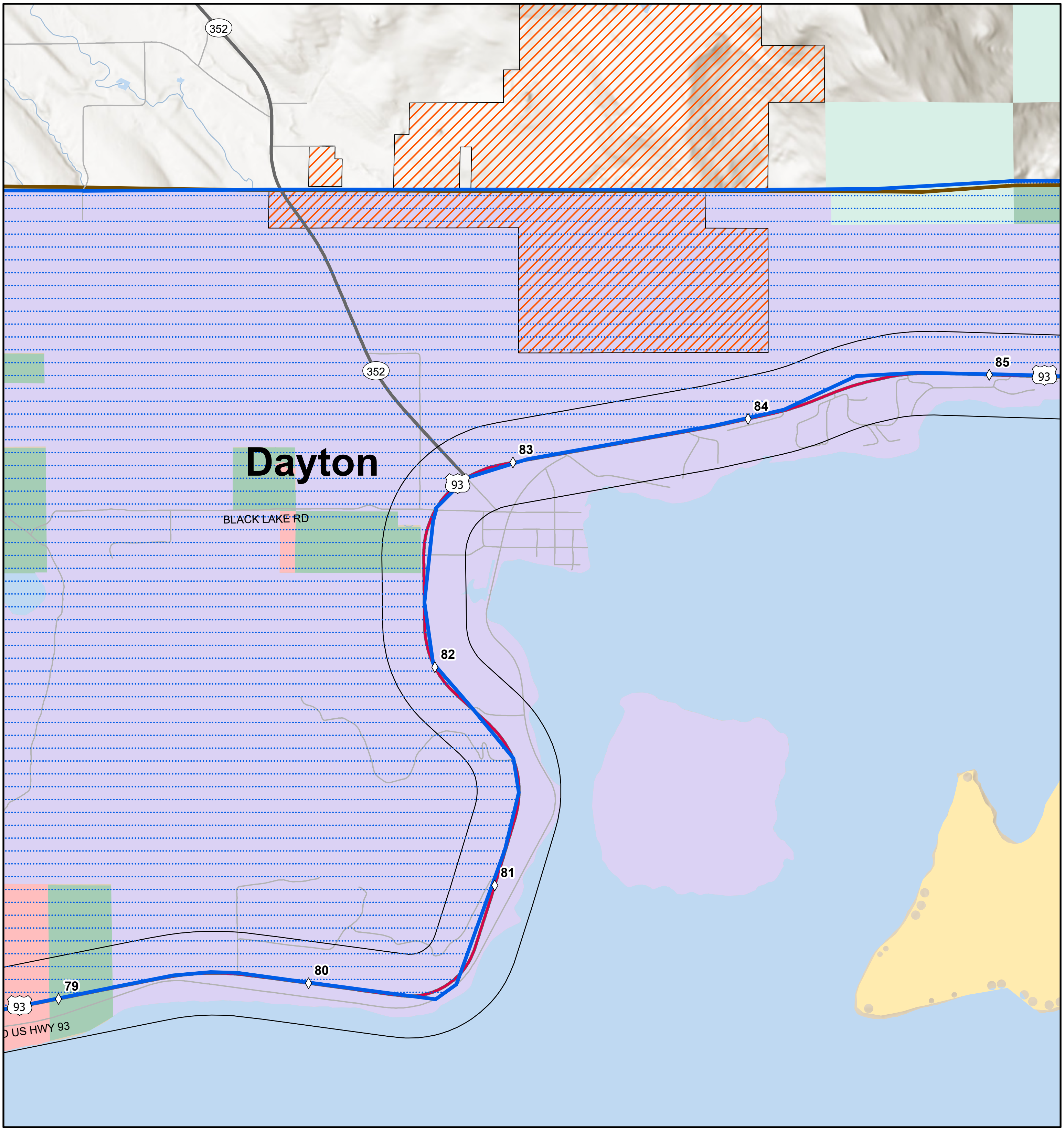
- Montana Dept of Transportation
- County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

93 US 93 POLSON-SOMERS CORRIDOR STUDY



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- Study Corridor
- 0.25 Mile Buffer
- Conservation Easements
- Flathead Reservation
- Fee (Privately Owned Within Flathead Reservation)
- Tribal Allotment
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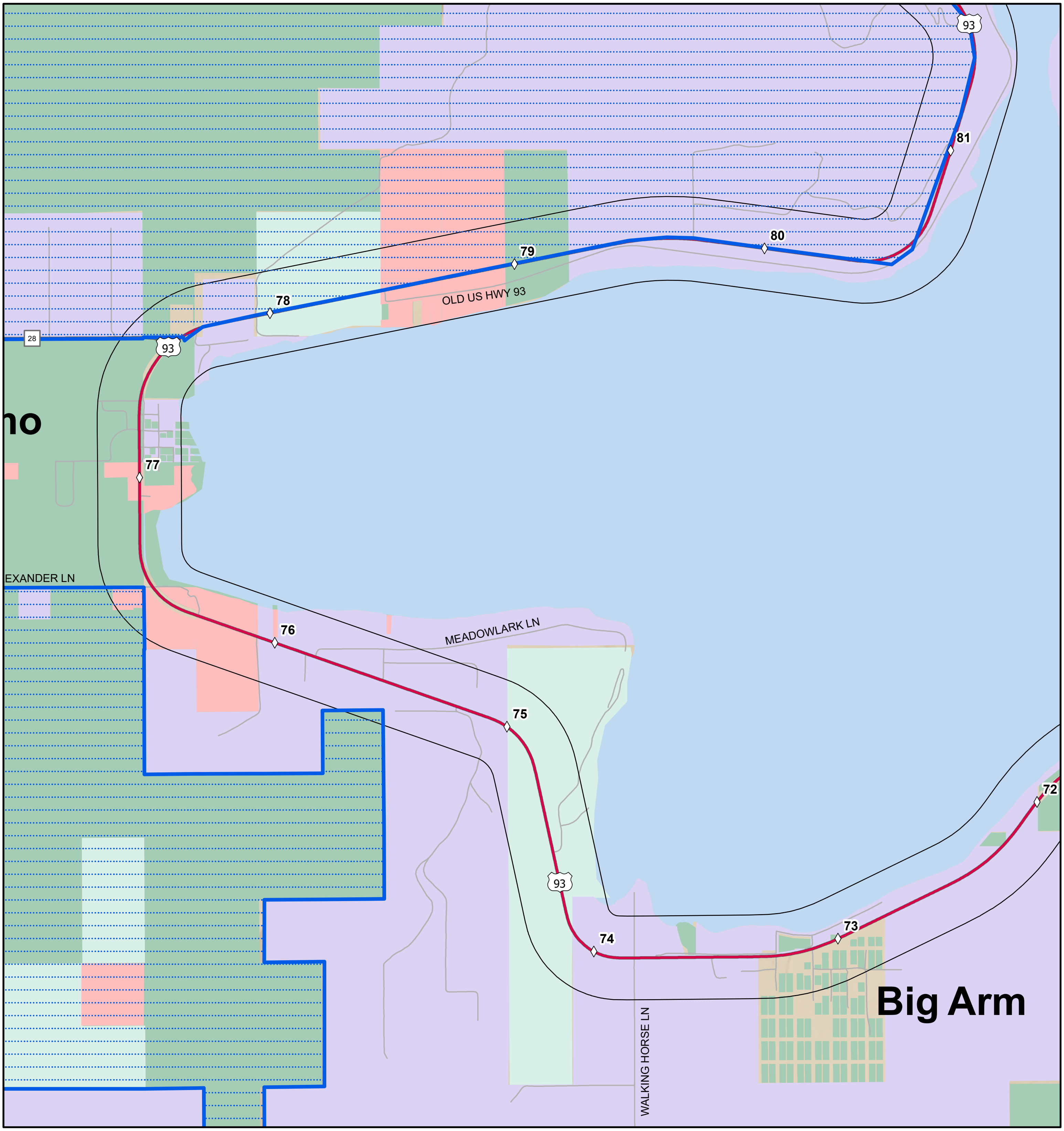
- Restricted - Tribal Member Only
- State of Montana
- Montana Fish, Wildlife, and Parks
- Montana State Trust Lands
- Montana Dept of Transportation
- County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



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- Study Corridor
- 0.25 Mile Buffer
- Conservation Easements
- Flathead Reservation
- Fee (Privately Owned Within Flathead Reservation)
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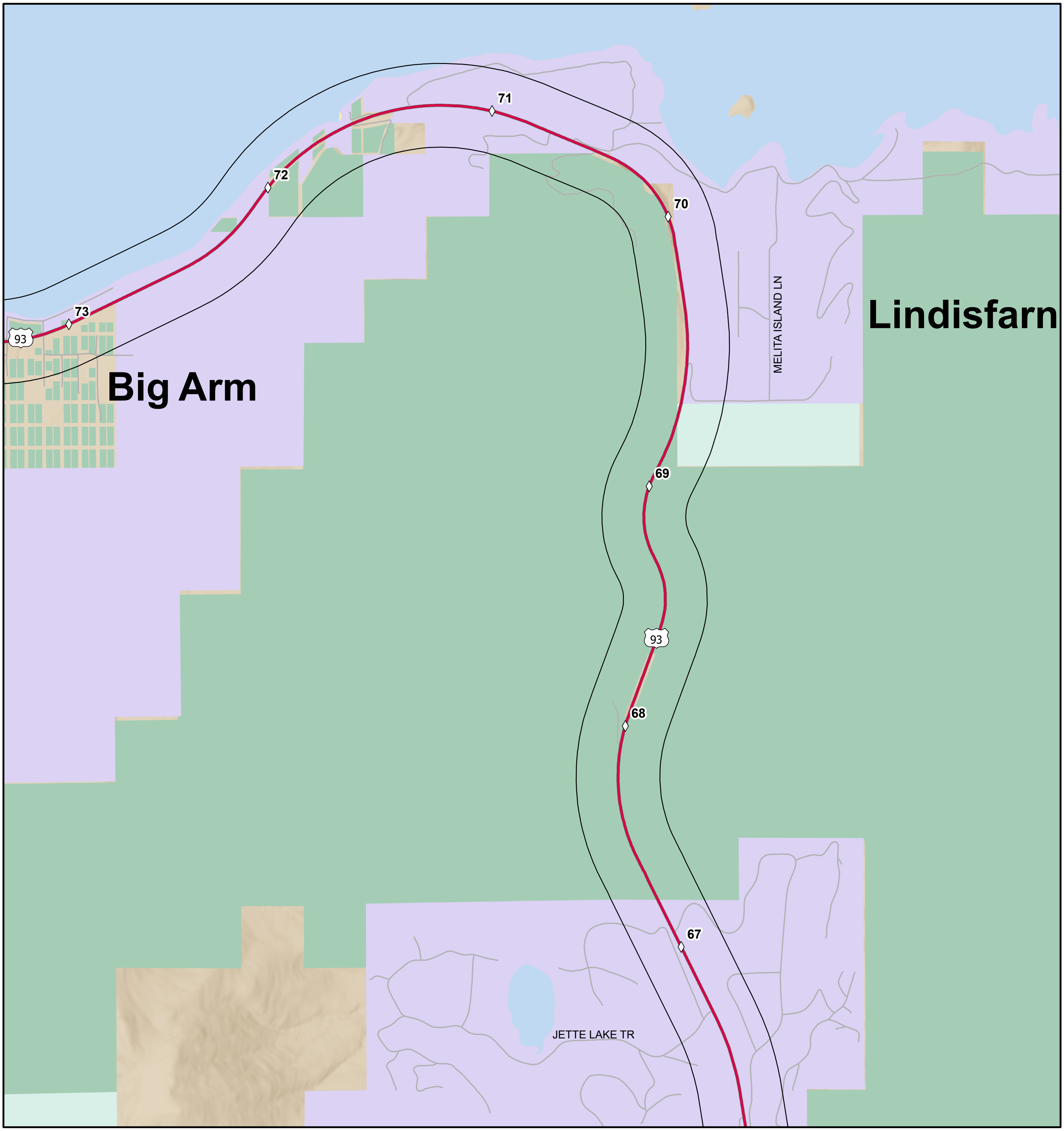
- State of Montana
- Montana Fish, Wildlife, and Parks
- Montana State Trust Lands
- Montana Dept of Transportation
- County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



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- ◊ Reference Post
- Study Corridor
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- Conservation Easements
- Flathead Reservation
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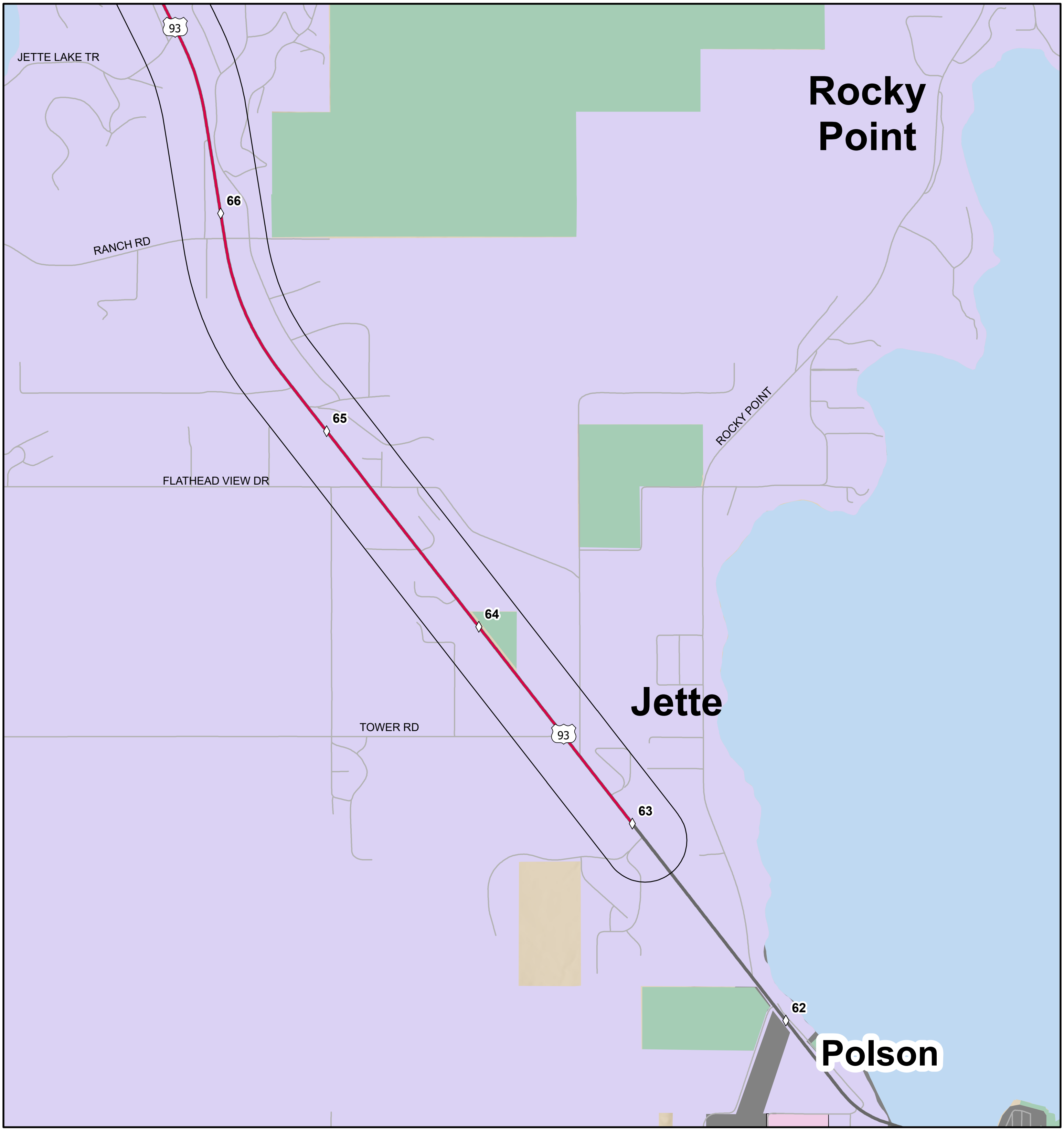
0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



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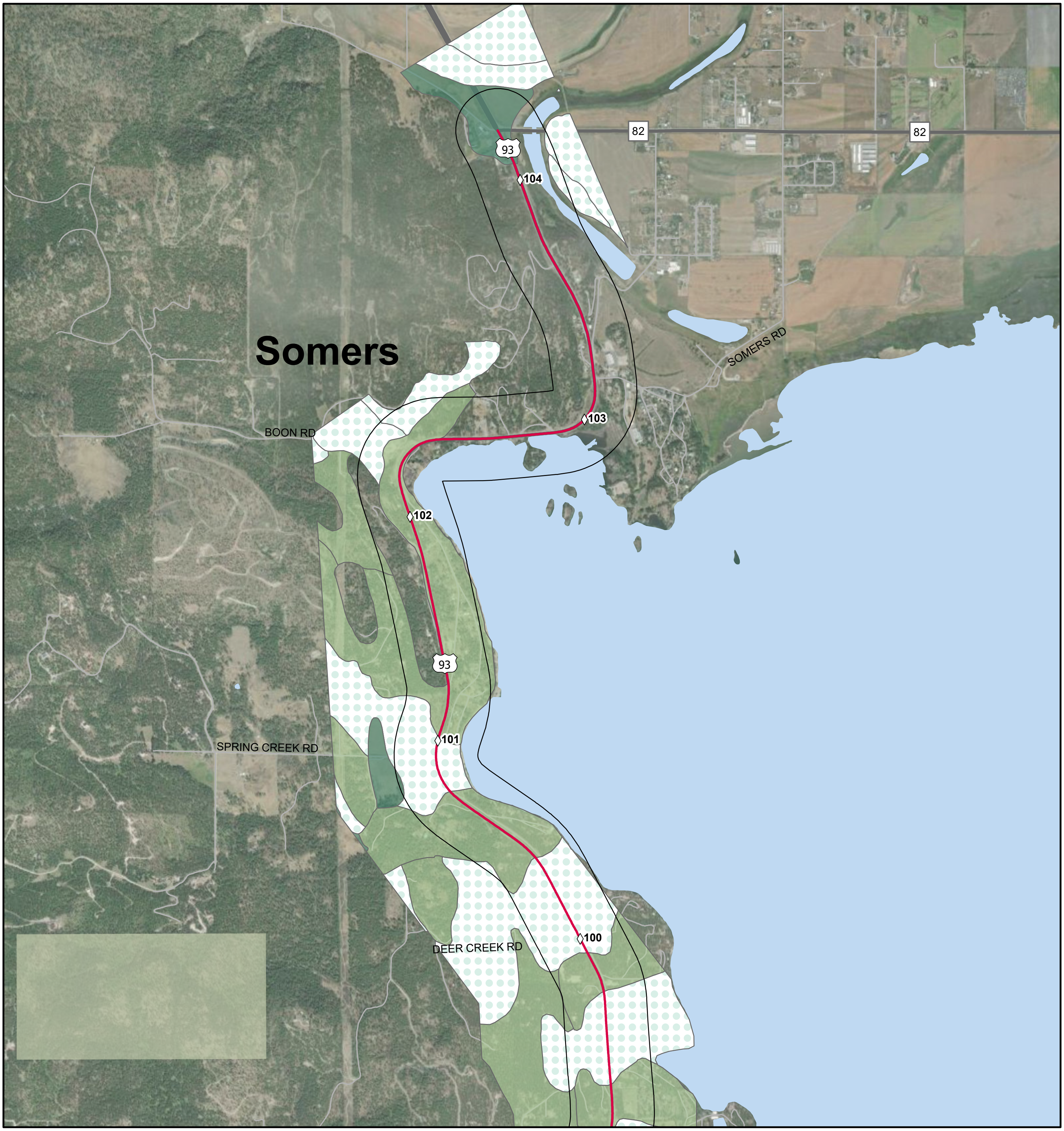
Reference Post	Fee (Privately Owned Within Flathead Reservation)	State of Montana
Study Corridor	Tribal Allotment	Montana Fish, Wildlife, and Parks
0.25 Mile Buffer	Flathead Reservation Trust Land	Montana State Trust Lands
Conservation Easements	Restricted - Tribal Member Only	Montana Dept of Transportation
Flathead Reservation		County Government

0 0.25 0.5 1 1.5 Miles

N

Figure A.2: Land Ownership

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Farmland

Prime Farmland
Prime Farmland if Irrigated
Farmland of Statewide Importance
Farmland of Local Importance
Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

Farmland

Prime Farmland

Prime Farmland if Irrigated

Farmland of Statewide Importance

Farmland of Local Importance

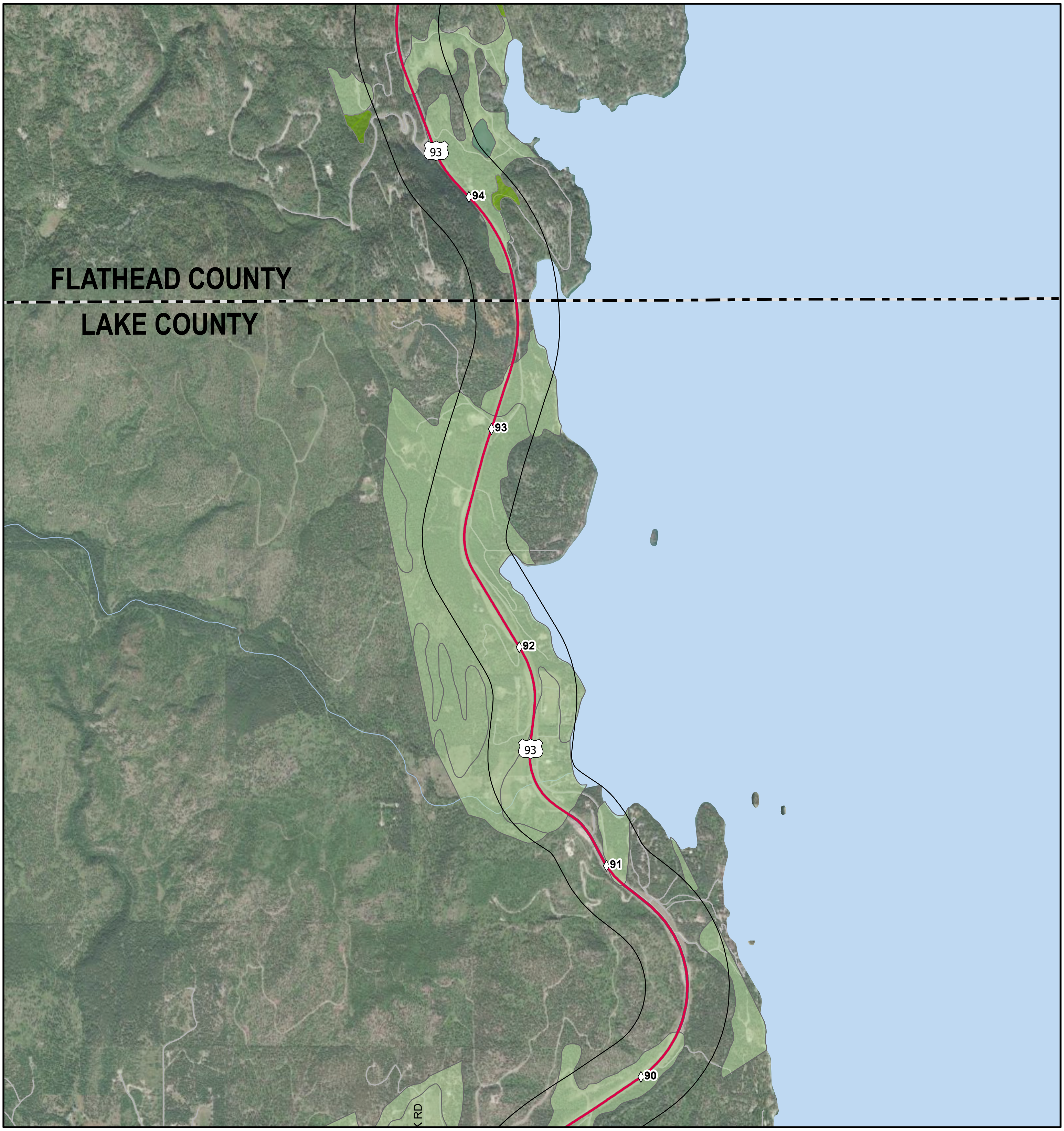
Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Farmland

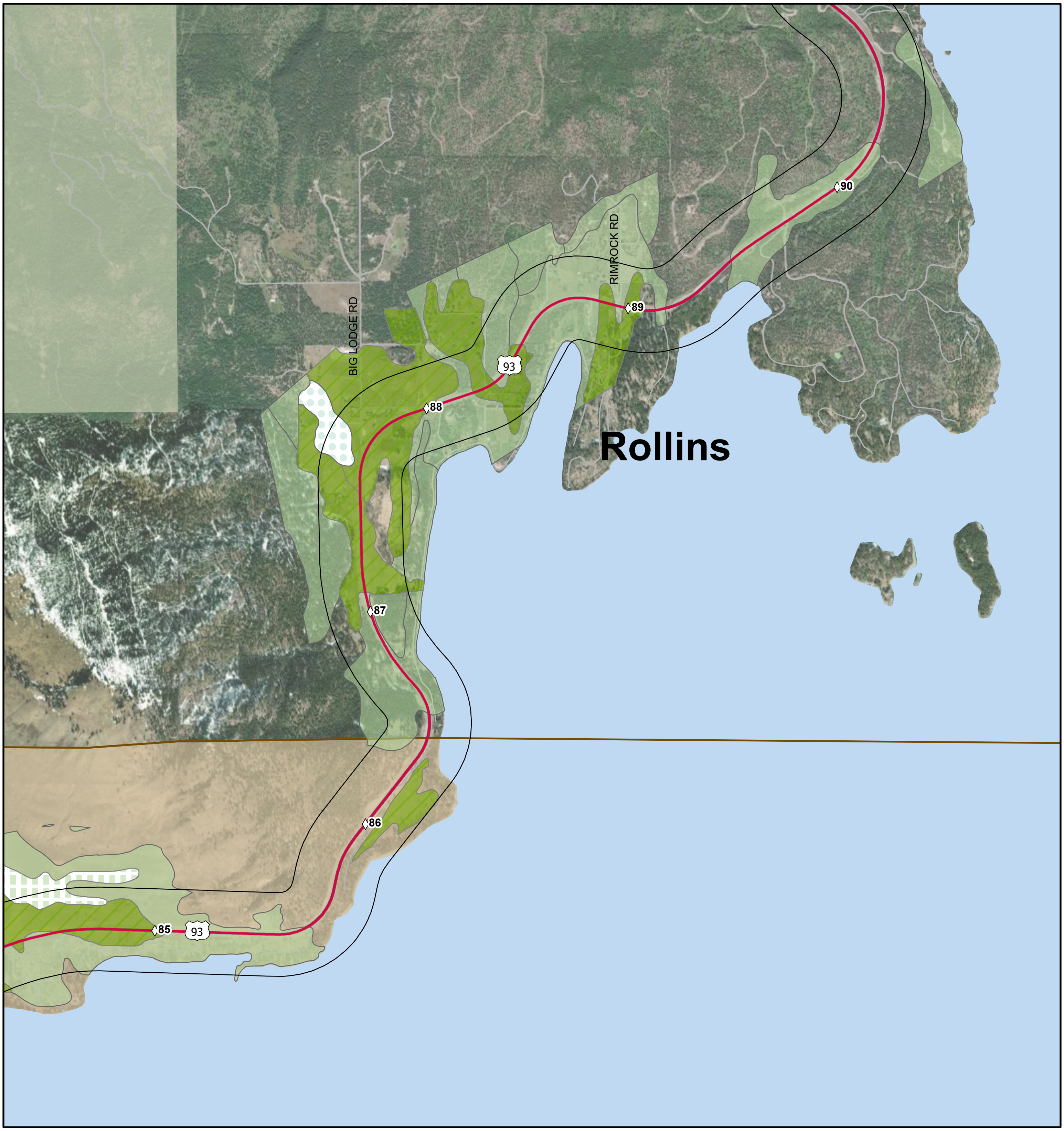
- Prime Farmland
- Prime Farmland if Irrigated
- Farmland of Statewide Importance
- Farmland of Local Importance
- Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Farmland

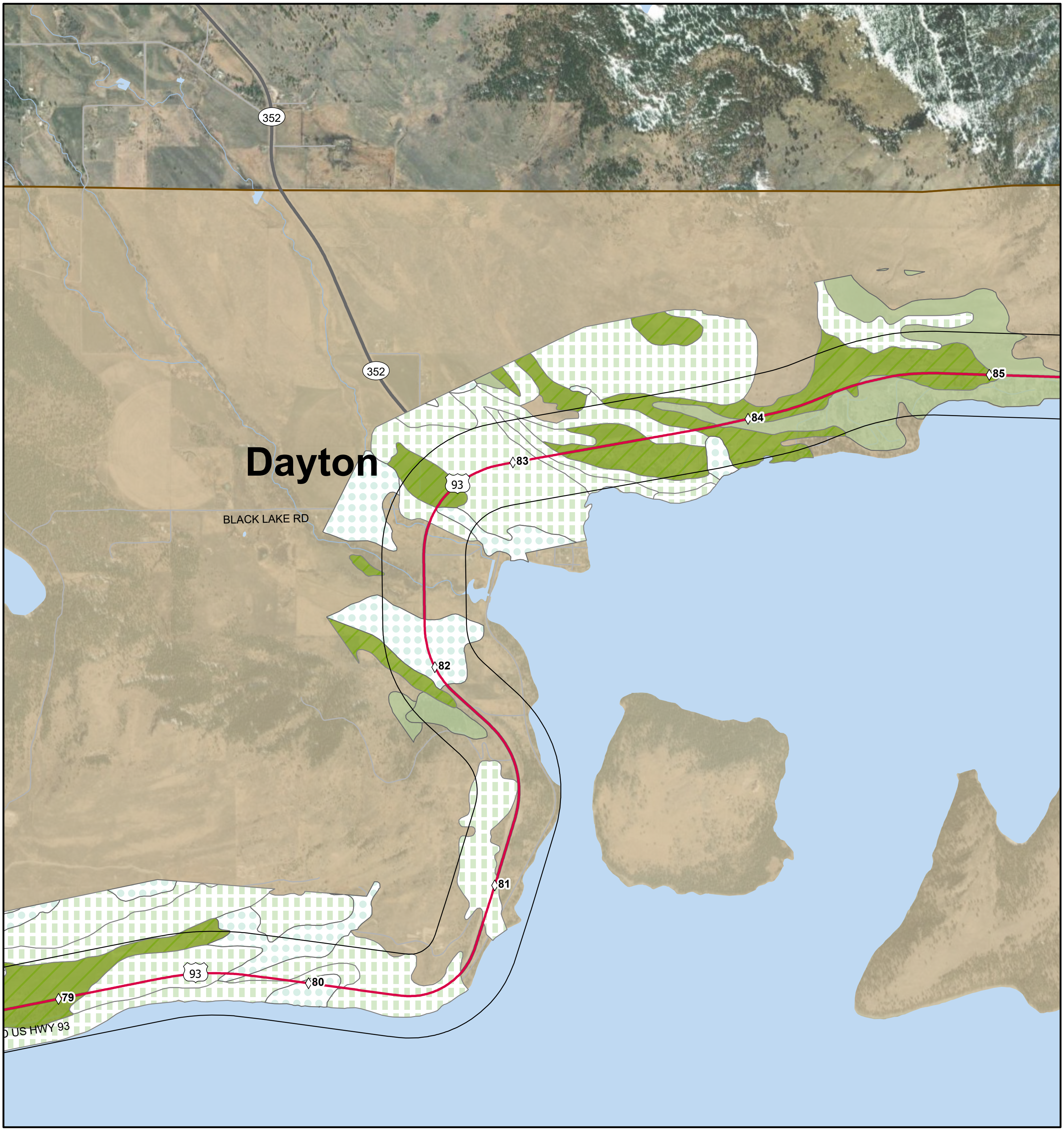
- Prime Farmland
- Prime Farmland if Irrigated
- Farmland of Statewide Importance
- Farmland of Local Importance
- Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Farmland

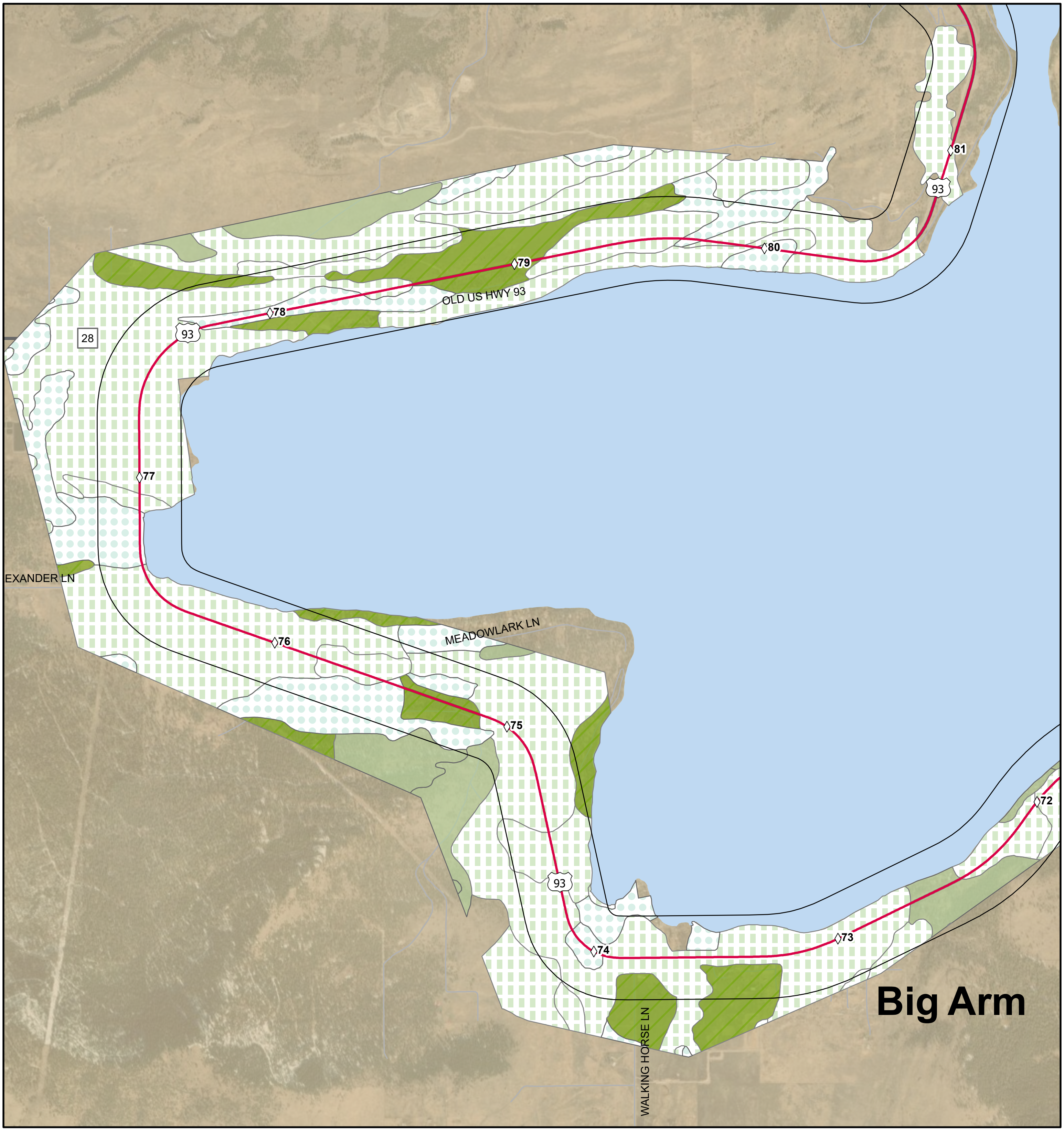
Prime Farmland
Prime Farmland if Irrigated
Farmland of Statewide Importance
Farmland of Local Importance
Farmland of Unique Importance

N

0 0.25 0.5 1 1.5 Miles

Figure A.3: Farmland Classification

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Farmland

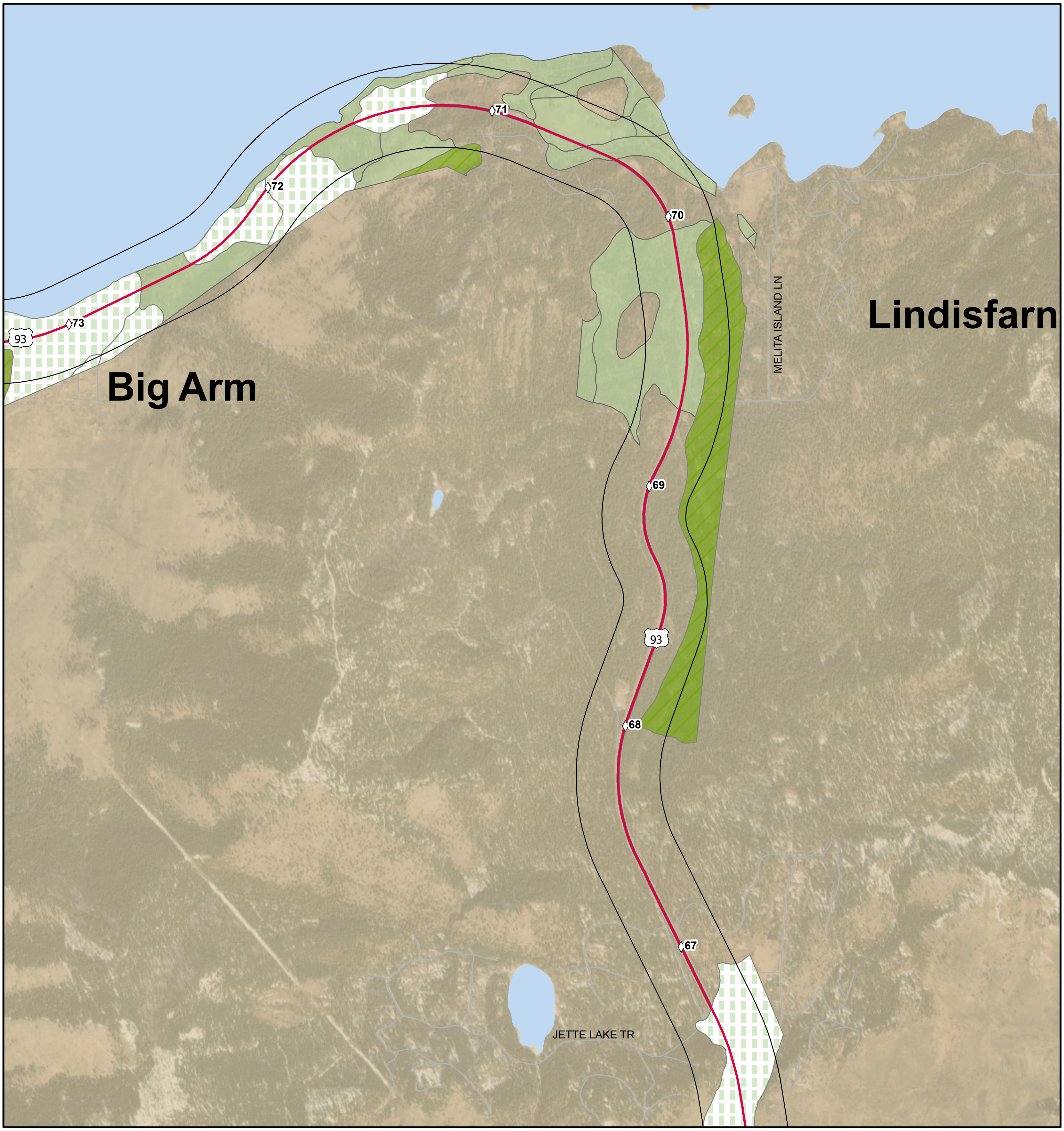
- Prime Farmland
- Prime Farmland if Irrigated
- Farmland of Statewide Importance
- Farmland of Local Importance
- Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Farmland

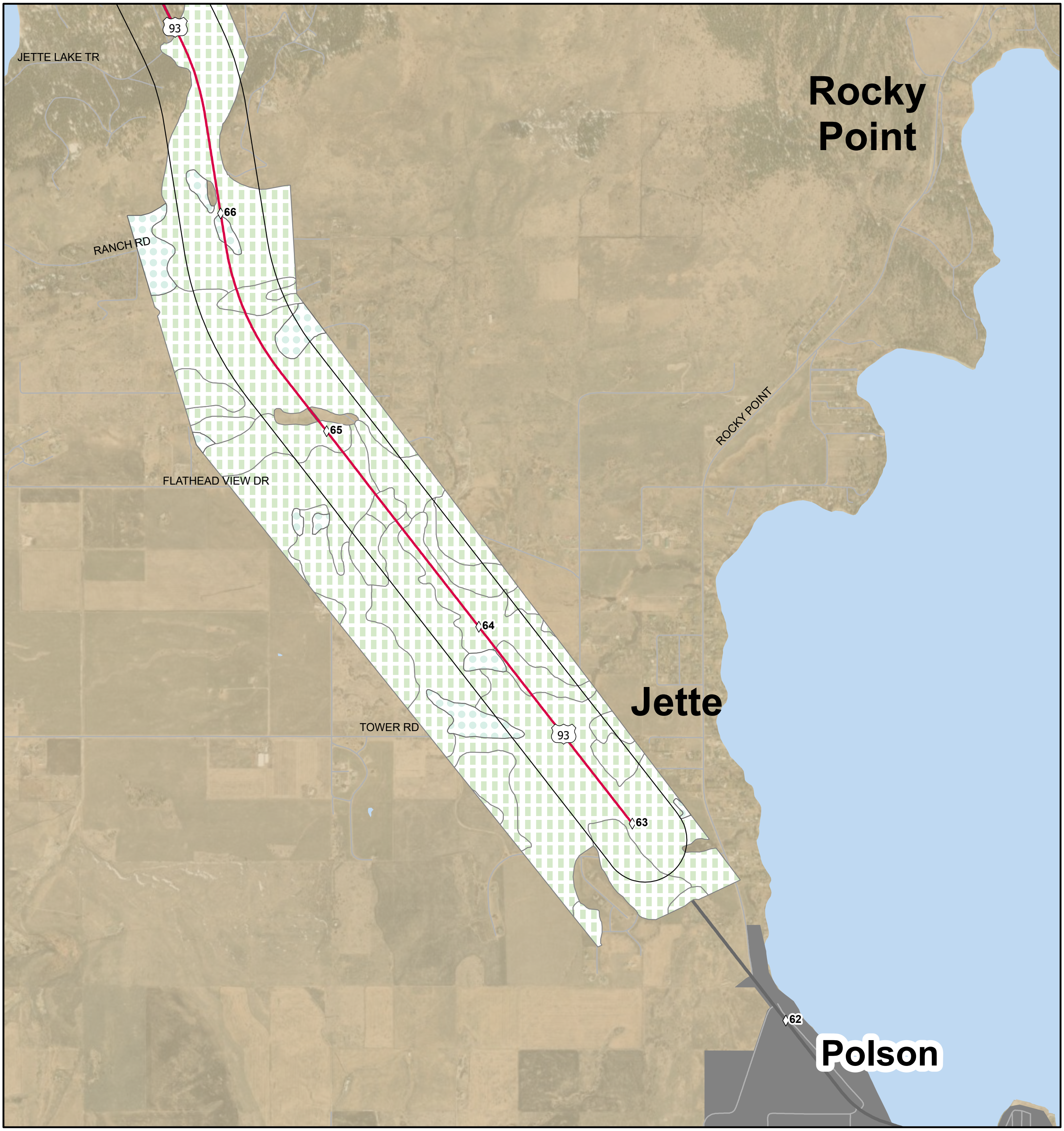
Prime Farmland
Prime Farmland if Irrigated
Farmland of Statewide Importance
Farmland of Local Importance
Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Farmland

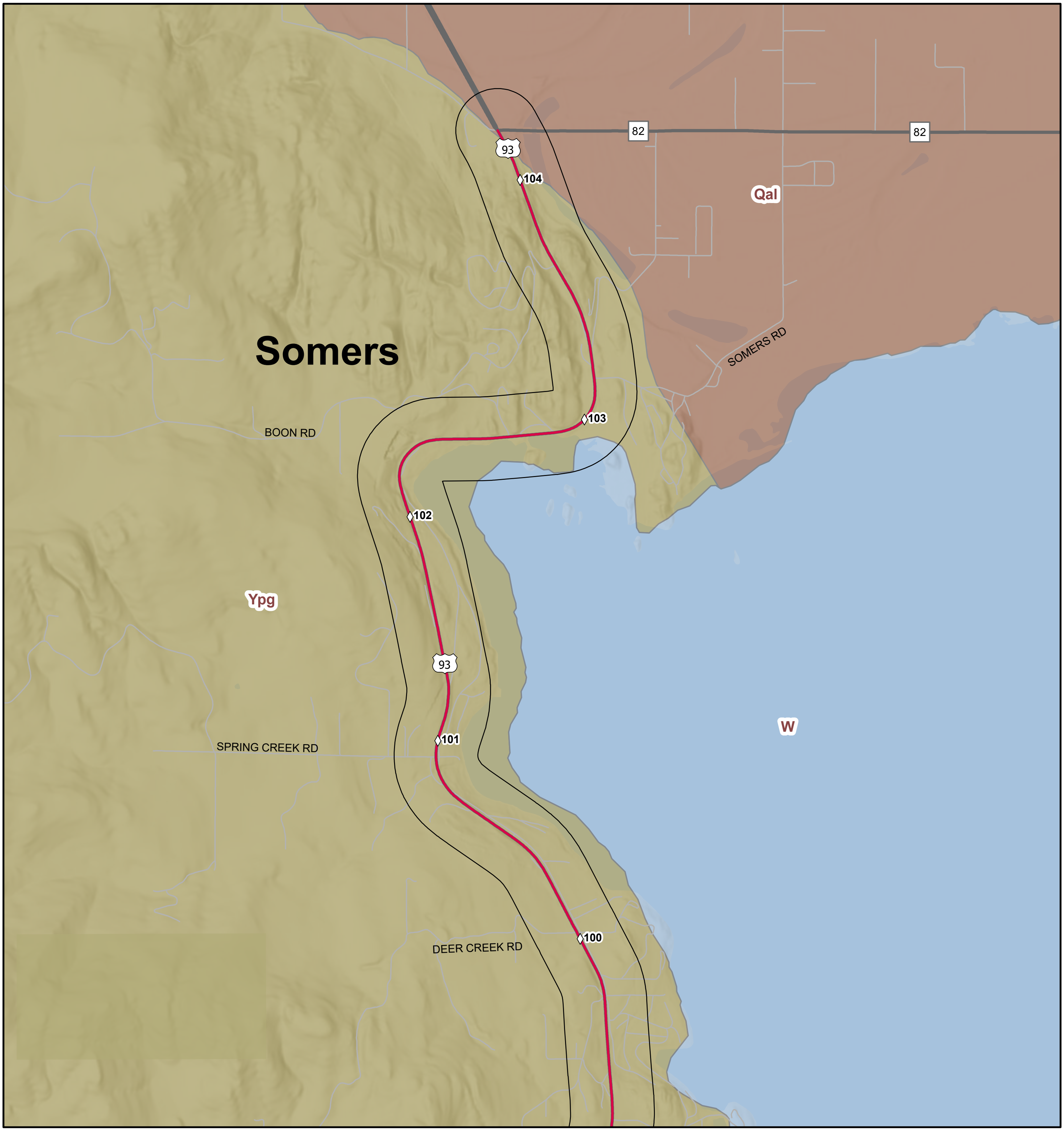
Prime Farmland
Prime Farmland if Irrigated
Farmland of Statewide Importance
Farmland of Local Importance
Farmland of Unique Importance

0 0.25 0.5 1 1.5 Miles

N

Figure A.3: Farmland Classification

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post
	Study Corridor
	0.25 Mile Buffer
	Flathead Reservation Boundary

Geologic Unit

- Qal: Alluvium
- Qgl: Glacial Lake Deposit
- Qgt: Glacial Deposit
- Ypg: Helena and Wallace Formations
- Yr: Ravalli Group
- W: Water

0 0.25 0.5 1 1.5 Miles

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Geologic Unit

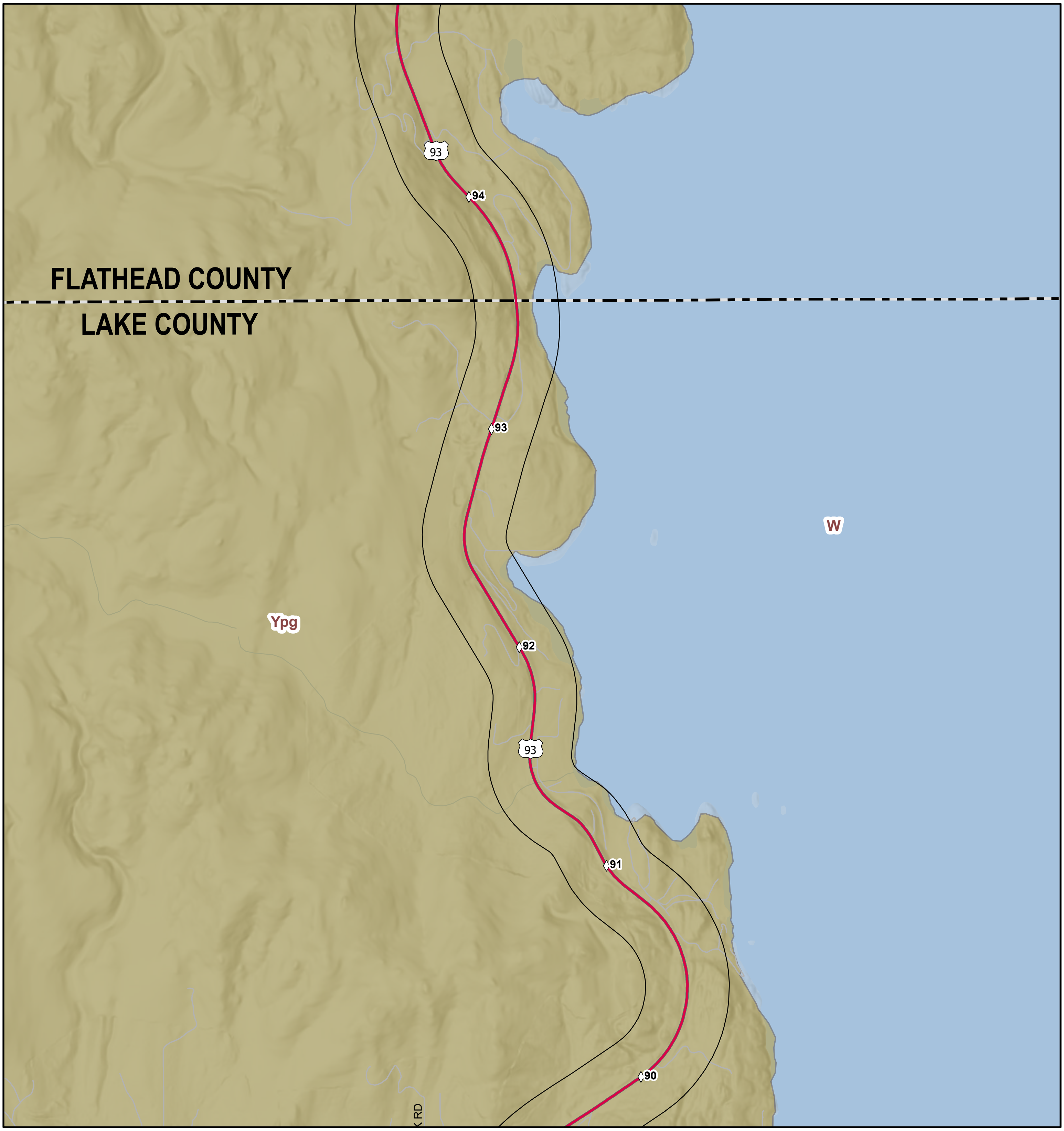
Qal: Alluvium
Qgl: Glacial Lake Deposit
Qgt: Glacial Deposit
Ypg: Helena and Wallace Formations
Yr: Ravalli Group
W: Water

0 0.25 0.5 1 1.5 Miles

N

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Geologic Unit

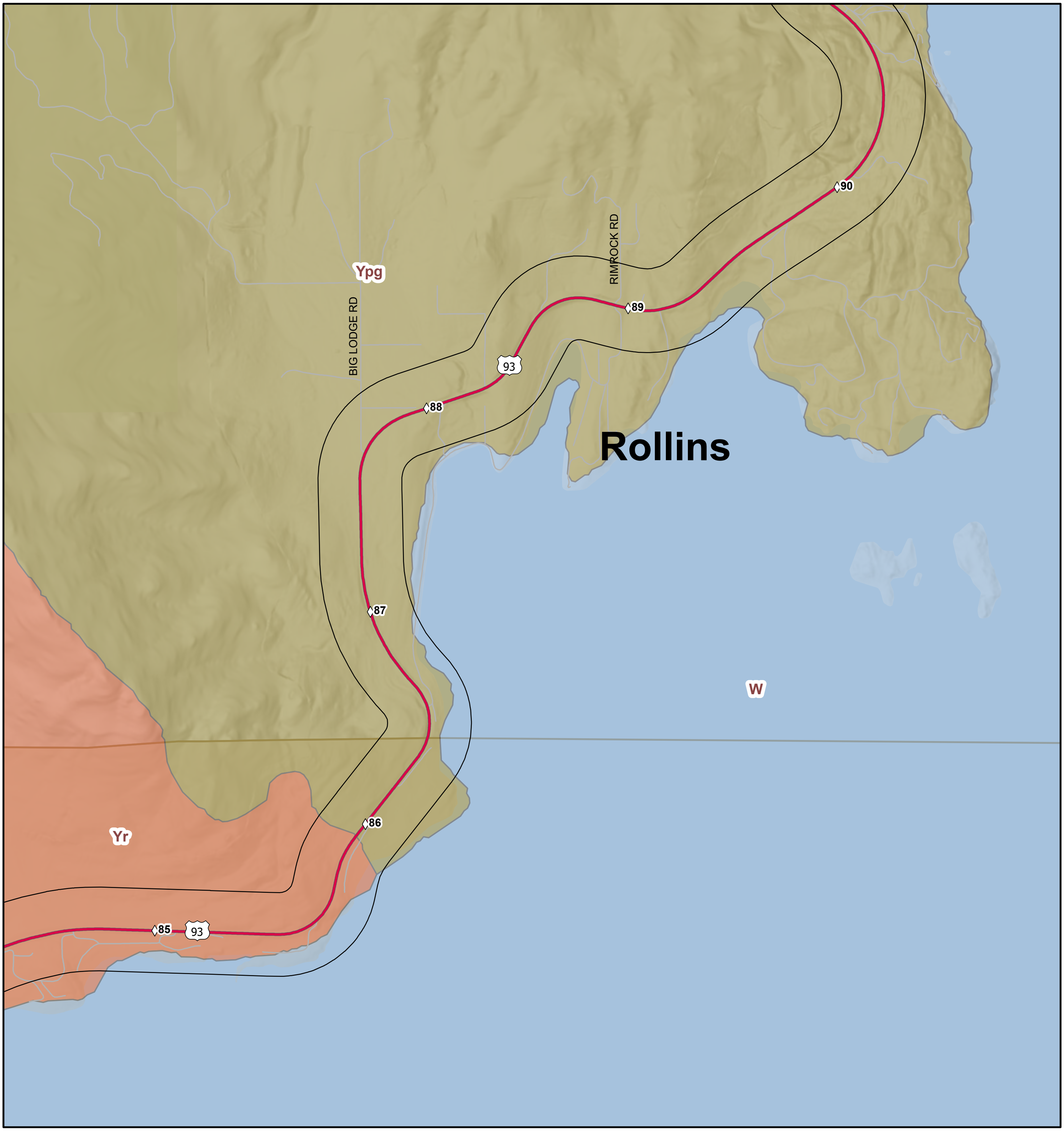
Qal: Alluvium
Qgl: Glacial Lake Deposit
Qgt: Glacial Deposit
Ypg: Helena and Wallace Formations
Yr: Ravalli Group
W: Water

0 0.25 0.5 1 1.5 Miles

N

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post		
	Study Corridor		
	0.25 Mile Buffer		
	Flathead Reservation Boundary		

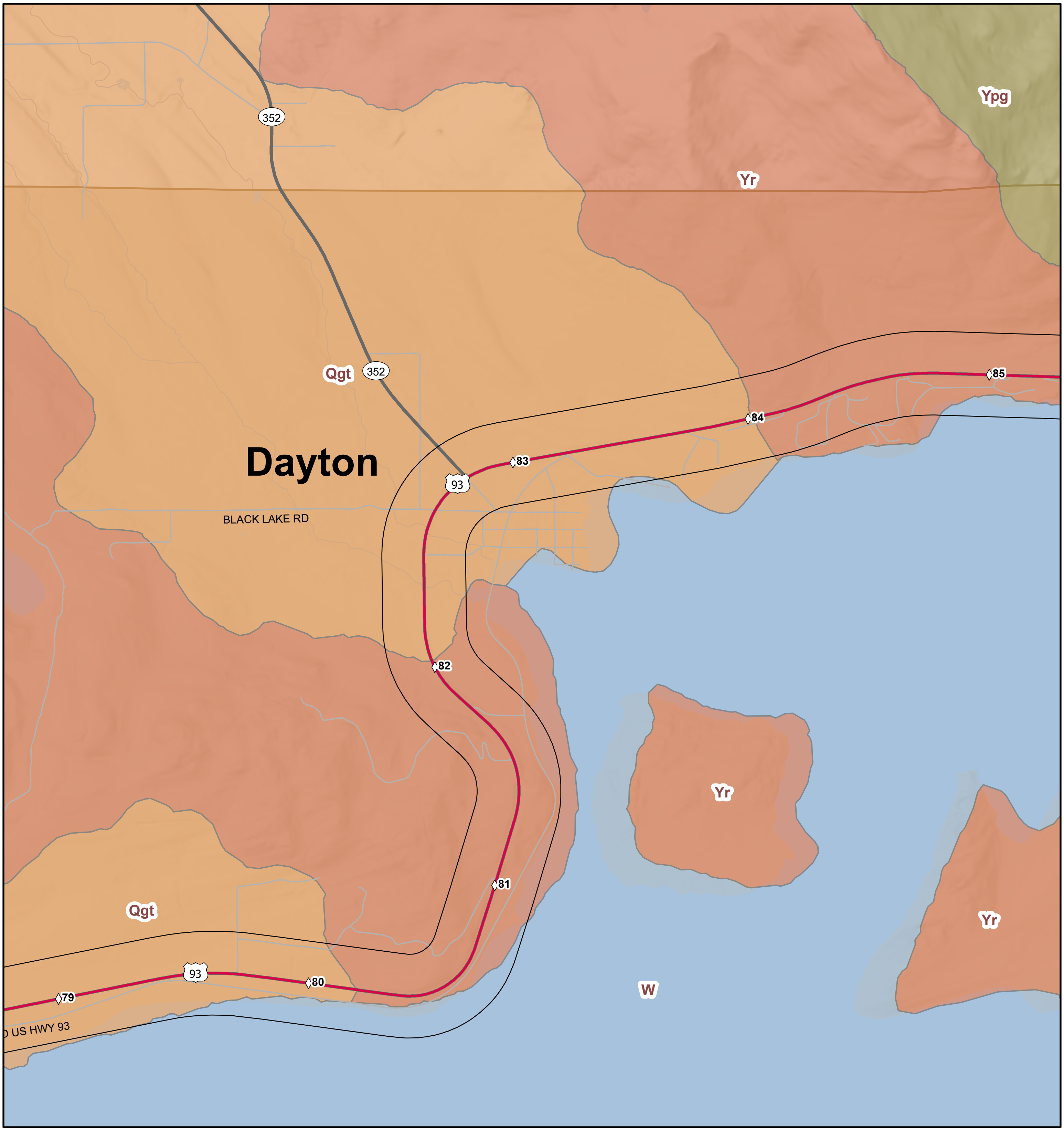
Geologic Unit

- Qal: Alluvium
- Qgl: Glacial Lake Deposit
- Qgt: Glacial Deposit
- Ypg: Helena and Wallace Formations
- Yr: Ravalli Group
- W: Water

0 0.25 0.5 1 1.5 Miles

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Geologic Unit

Qal: Alluvium
Qgl: Glacial Lake Deposit
Qgt: Glacial Deposit
Ypg: Helena and Wallace Formations
Yr: Ravalli Group
W: Water

0 0.25 0.5 1 1.5 Miles

N

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

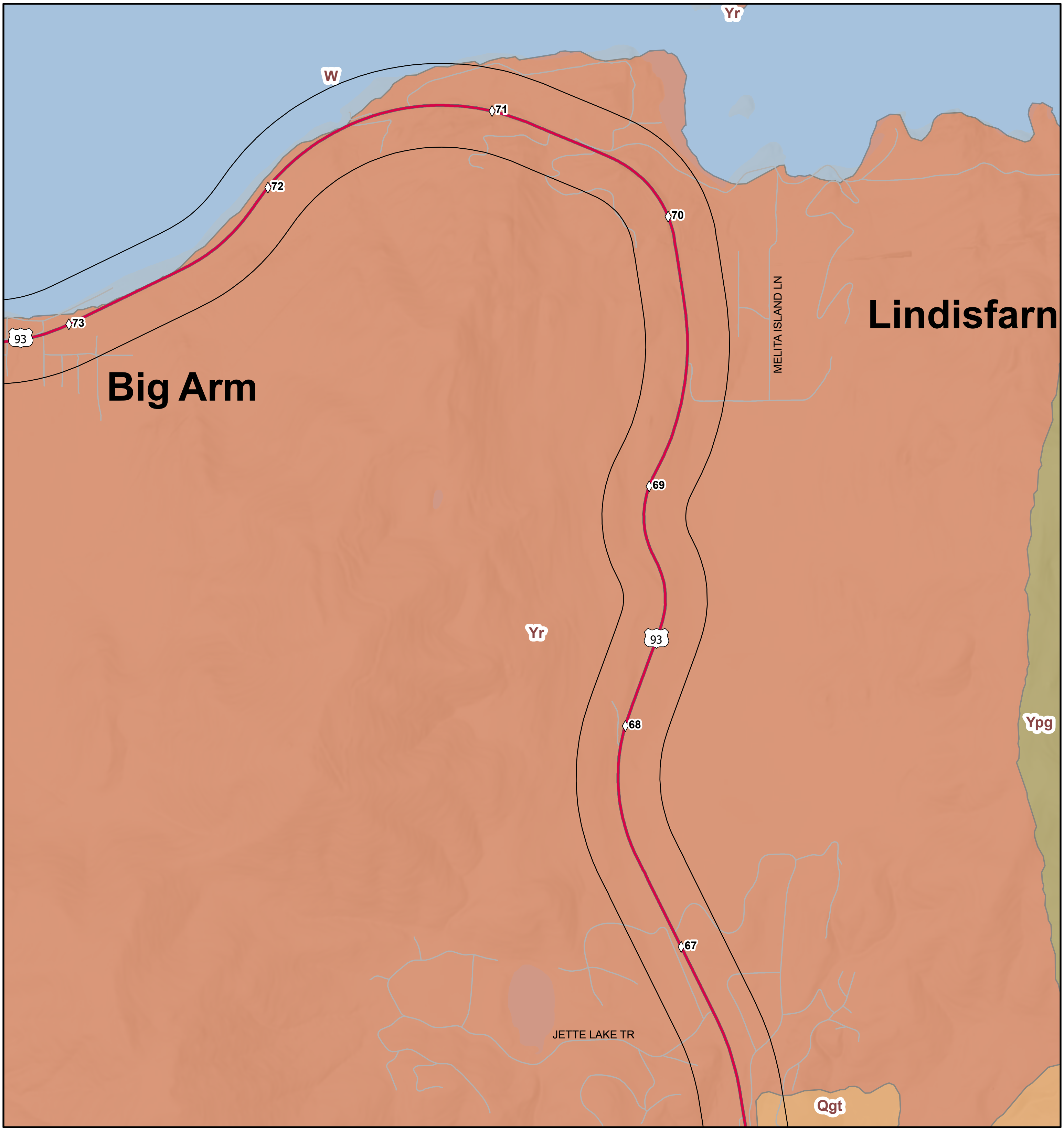
◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Geologic Unit

Qal: Alluvium
Qgl: Glacial Lake Deposit
Qgt: Glacial Deposit
Ypg: Helena and Wallace Formations
Yr: Ravalli Group
W: Water

0 0.25 0.5 1 1.5 Miles

Figure A.4: Geologic Features



Legend

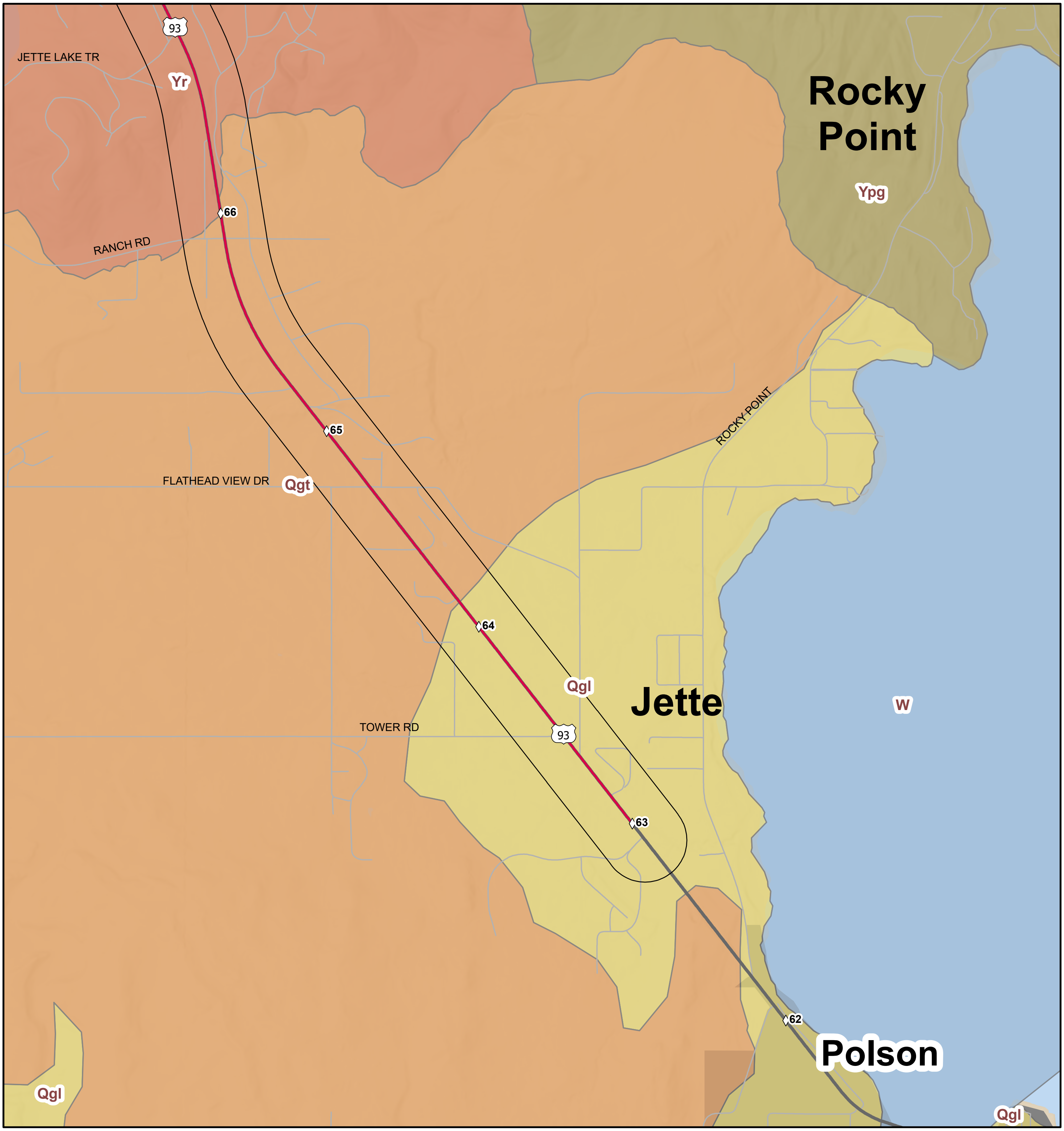
Reference Post	Geologic Unit		Ypg: Helena and Wallace Formations
Study Corridor	Qal: Alluvium		Yr: Ravalli Group
0.25 Mile Buffer	Qgl: Glacial Lake Deposit		W: Water
Flathead Reservation Boundary	Qgt: Glacial Deposit		

0 0.25 0.5 1 1.5 Miles

N

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

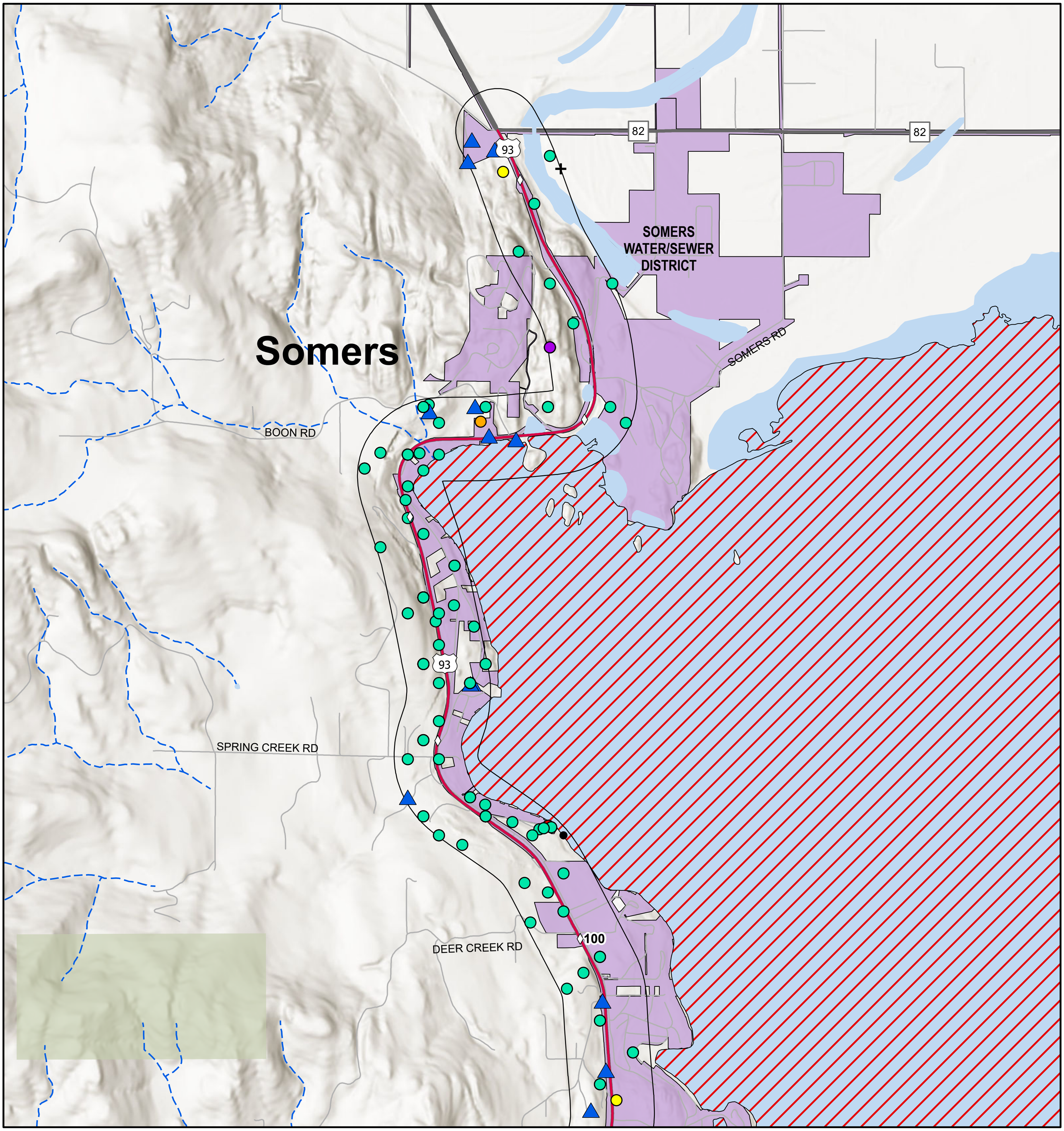
Geologic Unit

- Qal: Alluvium
- Qgl: Glacial Lake Deposit
- Qgt: Glacial Deposit
- Ypg: Helena and Wallace Formations
- Yr: Ravalli Group
- W: Water

0 0.25 0.5 1 1.5 Miles

Figure A.4: Geologic Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts
- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

Primary Well Use

- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- Unused

0 0.25 0.5 1 1.5 Miles

N

Figure A.5: Water Features

Page 1 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY

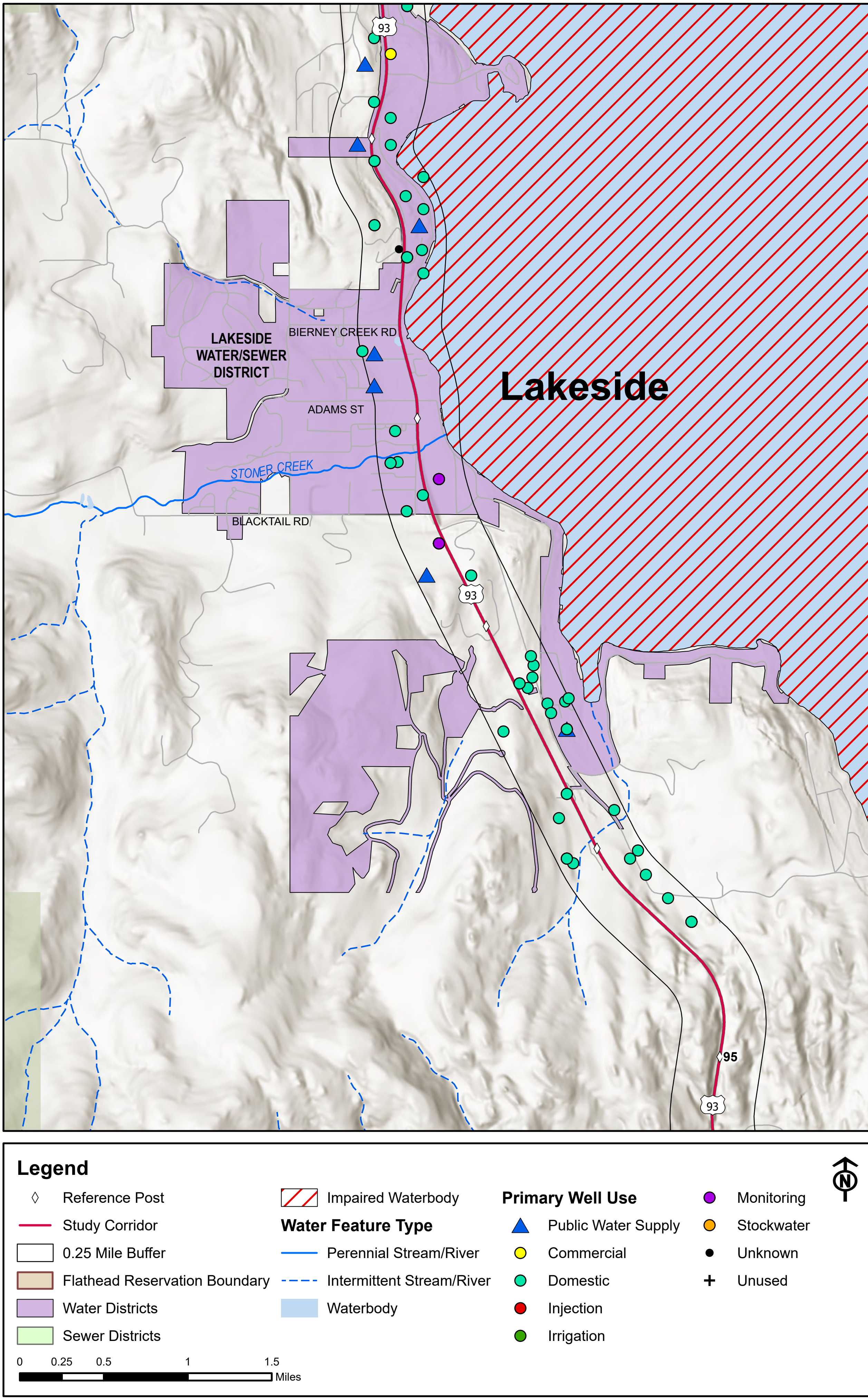
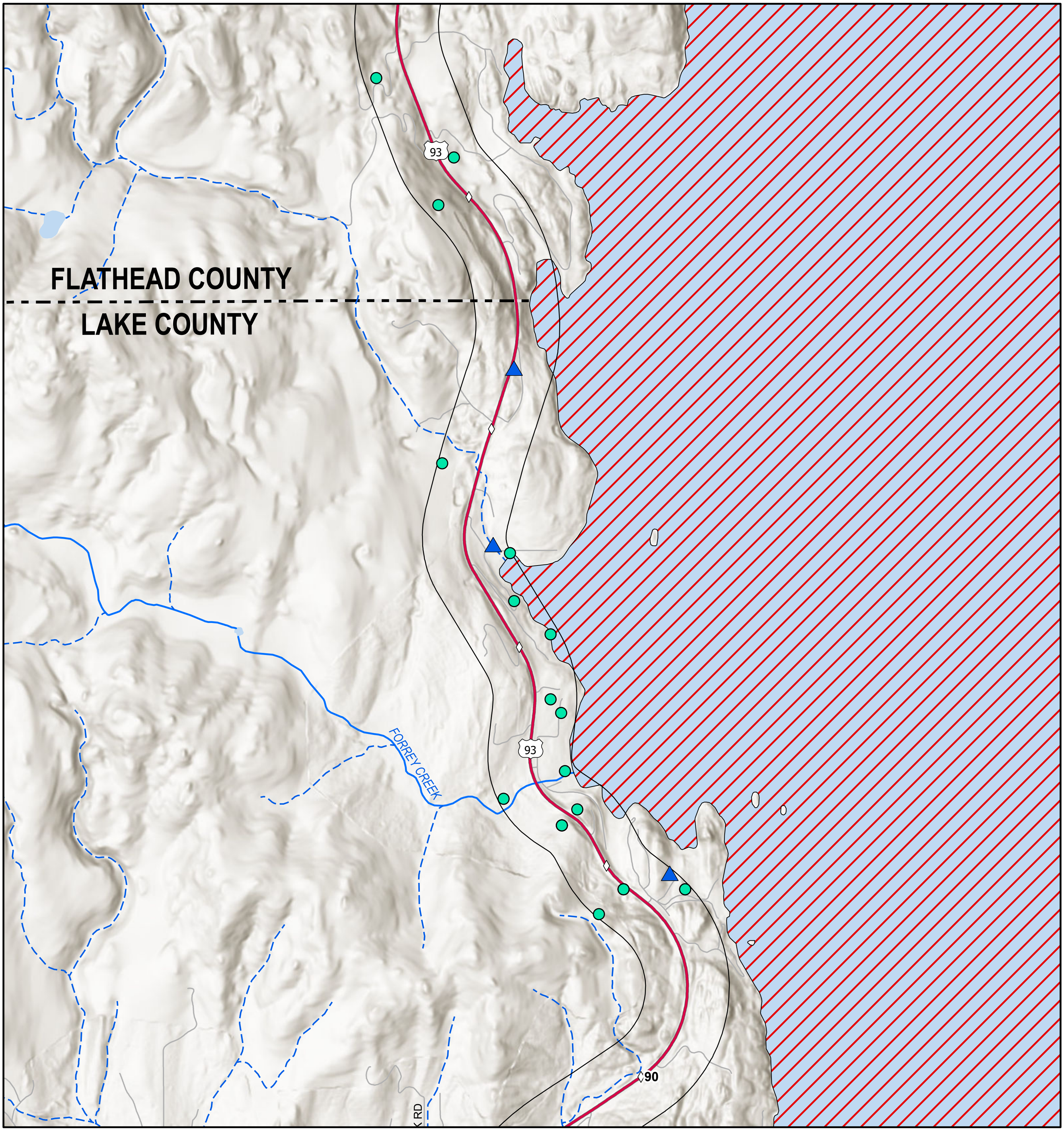


Figure A.5: Water Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts
- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

Primary Well Use

- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- Unused

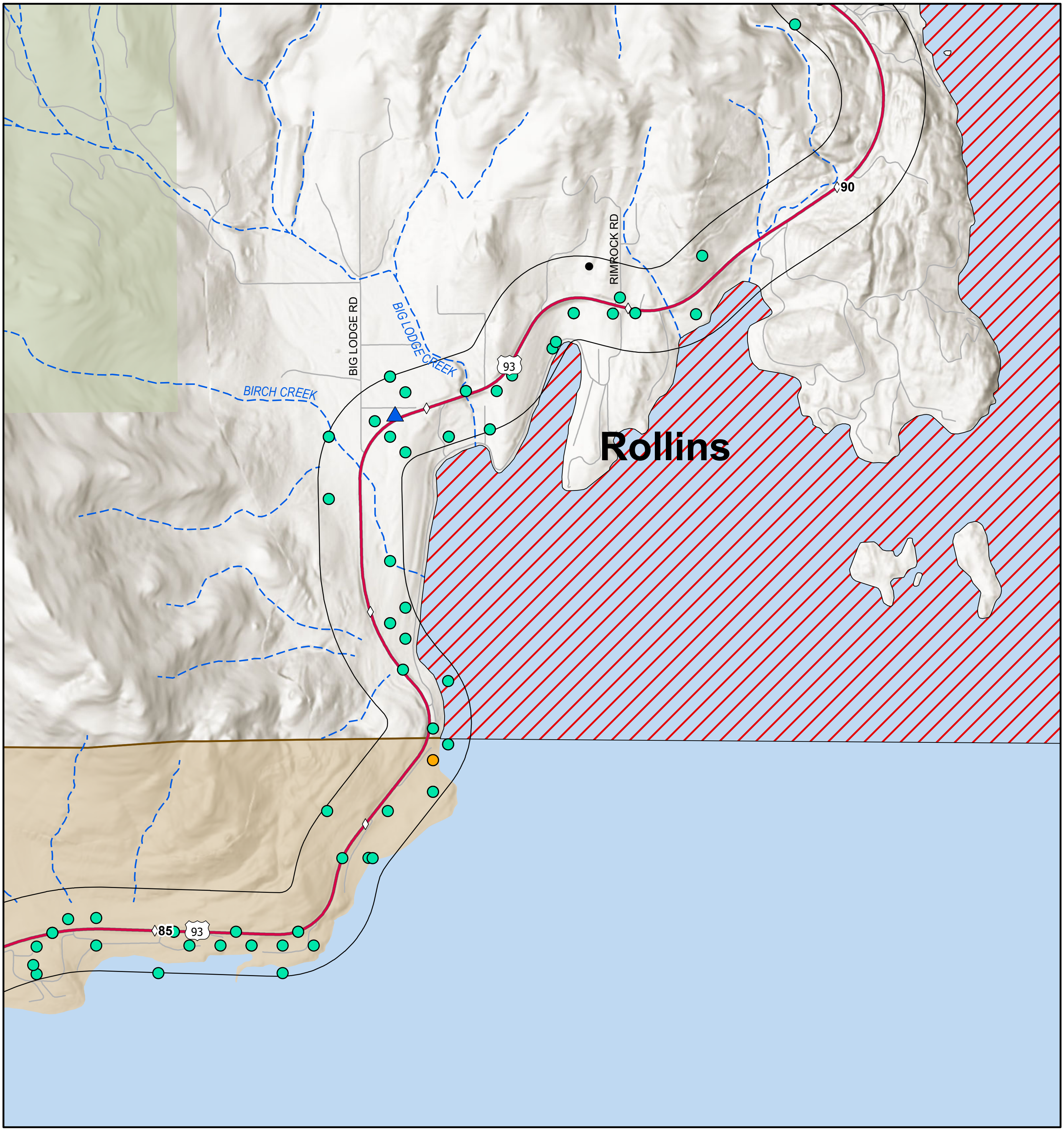
0 0.25 0.5 1 1.5 Miles

N

Figure A.5: Water Features

Page 3 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts
- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

Primary Well Use

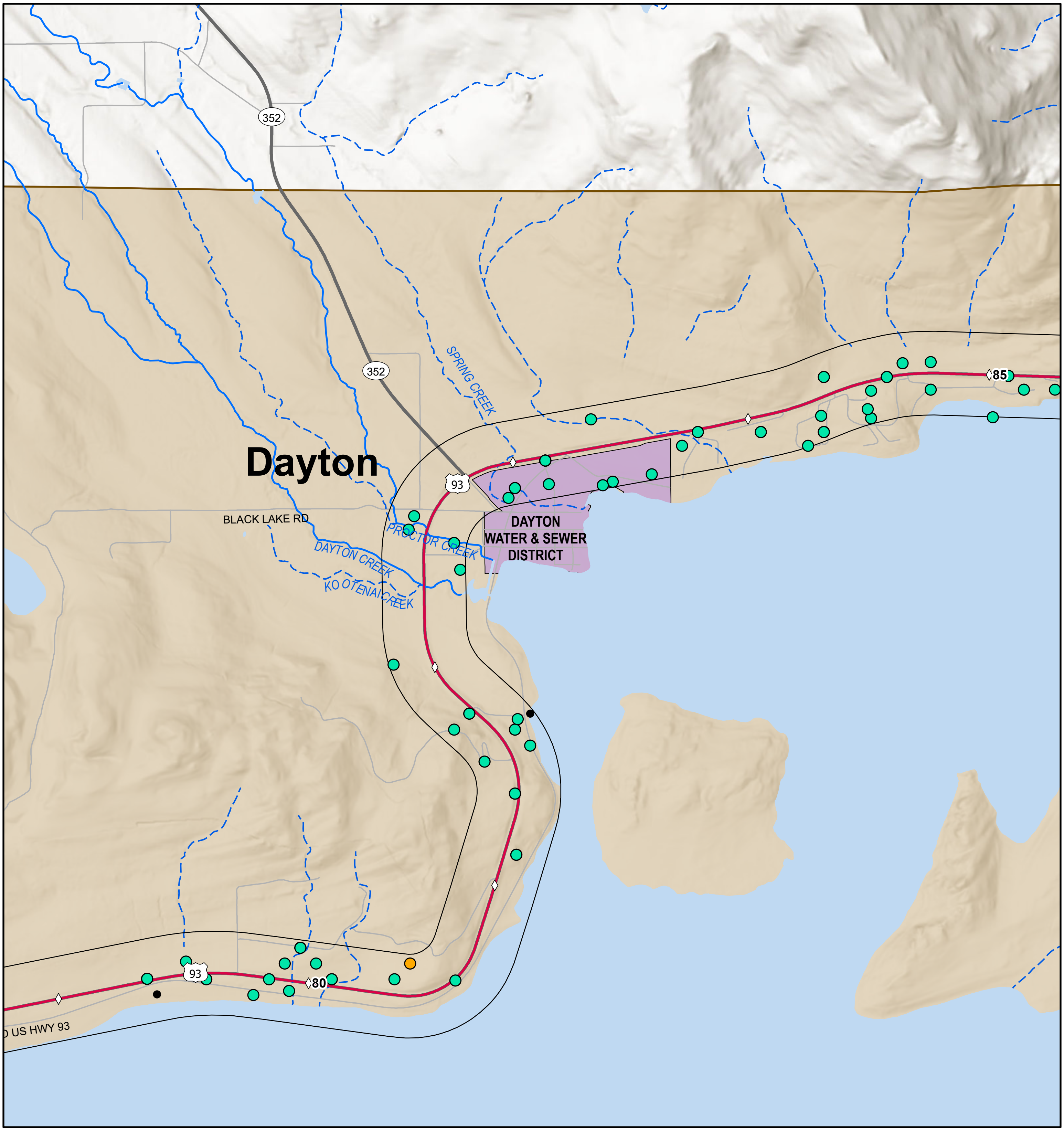
- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- Unused

0 0.25 0.5 1 1.5 Miles

N

Figure A.5: Water Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts
- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

Primary Well Use

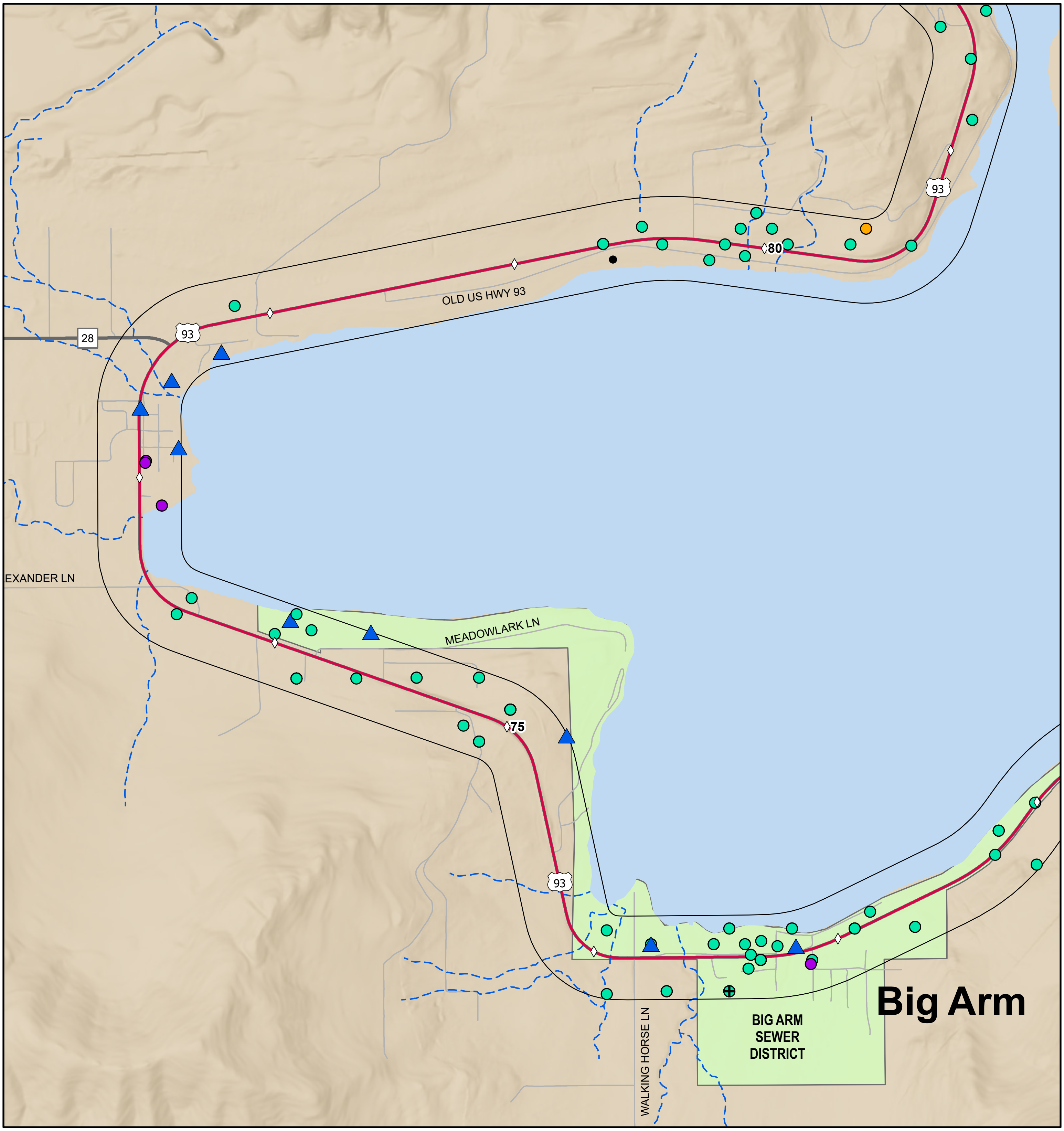
- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- Unused

0 0.25 0.5 1 1.5 Miles

N

Figure A.5: Water Features

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts
- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

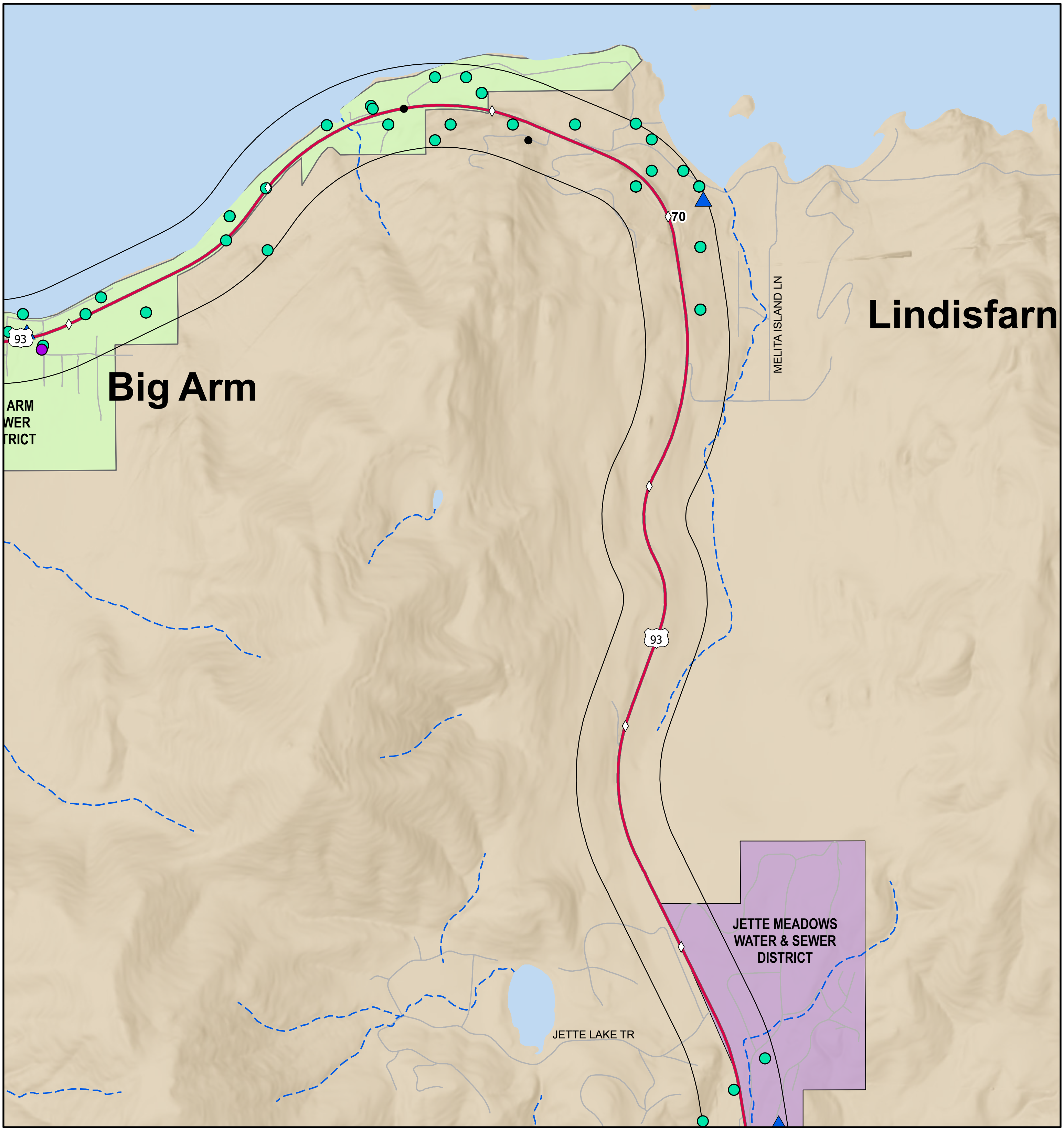
Primary Well Use

- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- Unused

0 0.25 0.5 1 1.5 Miles

Figure A.5: Water Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary
- Water Districts
- Sewer Districts

- Impaired Waterbody

Water Feature Type

- Perennial Stream/River
- Intermittent Stream/River
- Waterbody

Primary Well Use

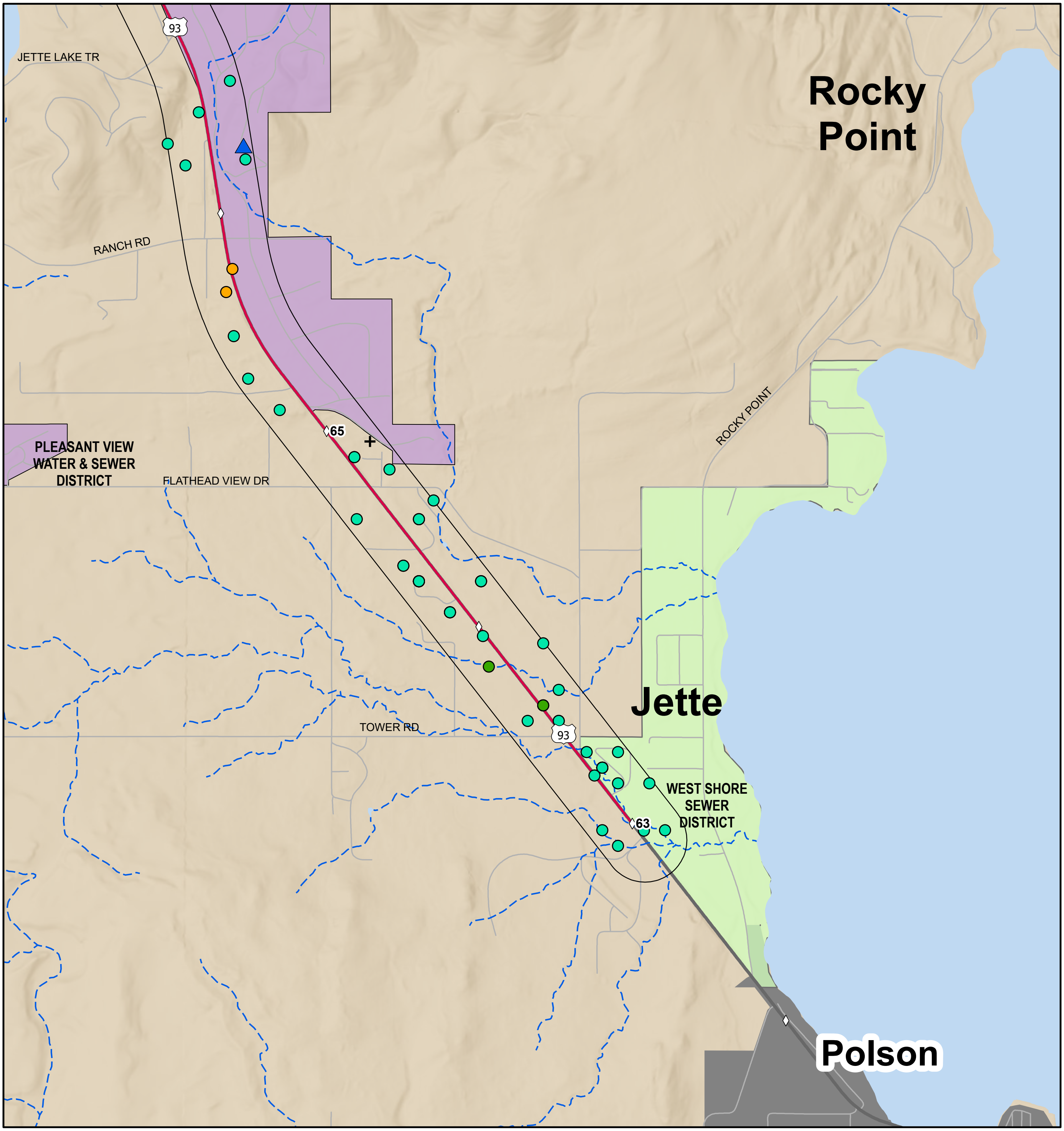
- Public Water Supply
- Commercial
- Domestic
- Injection
- Irrigation
- Monitoring
- Stockwater
- Unknown
- \+ Unused

0 0.25 0.5 1 1.5 Miles

N

Figure A.5: Water Features

93 US 93 POLSON-SOMERS CORRIDOR STUDY



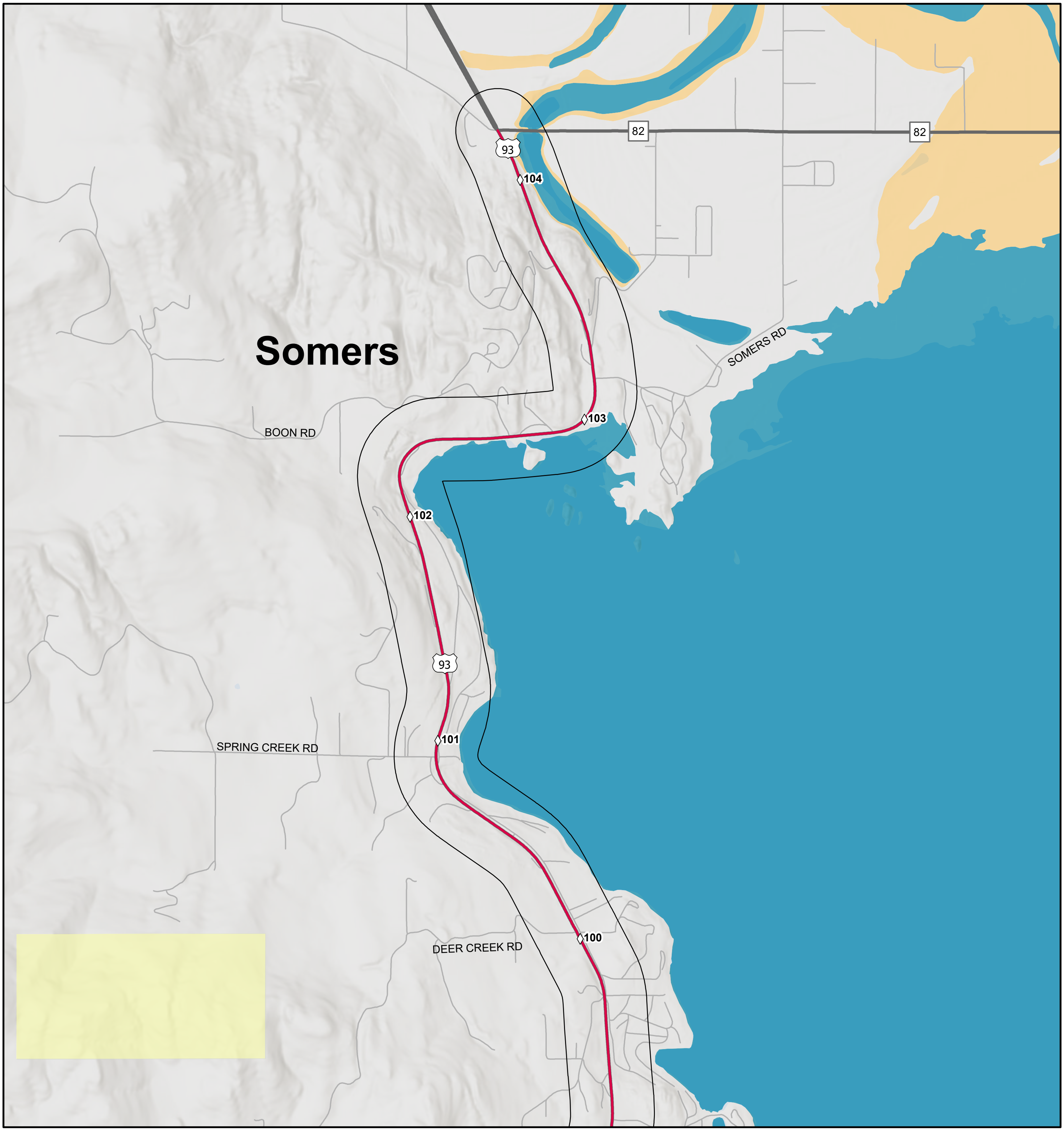
Legend

◊ Reference Post	Impaired Waterbody	**Primary Well Use**	Monitoring
Study Corridor	**Water Feature Type**	Public Water Supply	Stockwater
0.25 Mile Buffer	Perennial Stream/River	Commercial	Unknown
Flathead Reservation Boundary	Intermittent Stream/River	Domestic	+ Unused
Water Districts	Waterbody	Injection	
Sewer Districts		Irrigation	

0 0.25 0.5 1 1.5 Miles

Figure A.5: Water Features

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

FEMA Flood Zones

- Zone A, 1% Annual Chance Flood Hazard
- Zone AE, Regulatory Floodway
- Zone X, 0.2% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard
- Zone D, Undetermined Flood Risk
- Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

FEMA Flood Zones

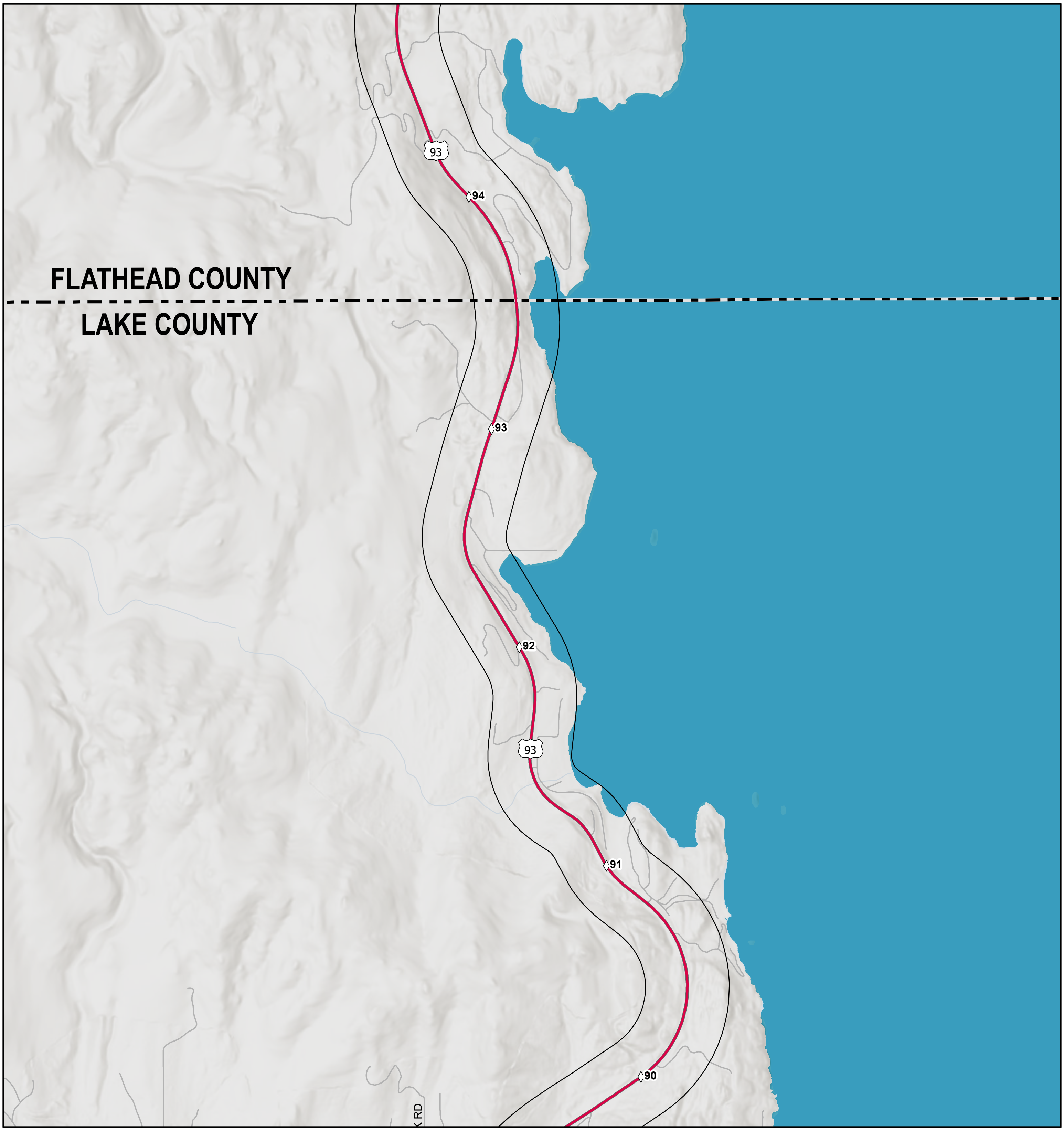
- Zone A, 1% Annual Chance Flood Hazard
- Zone AE, Regulatory Floodway
- Zone X, 0.2% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard
- Zone D, Undetermined Flood Risk
- Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

FEMA Flood Zones

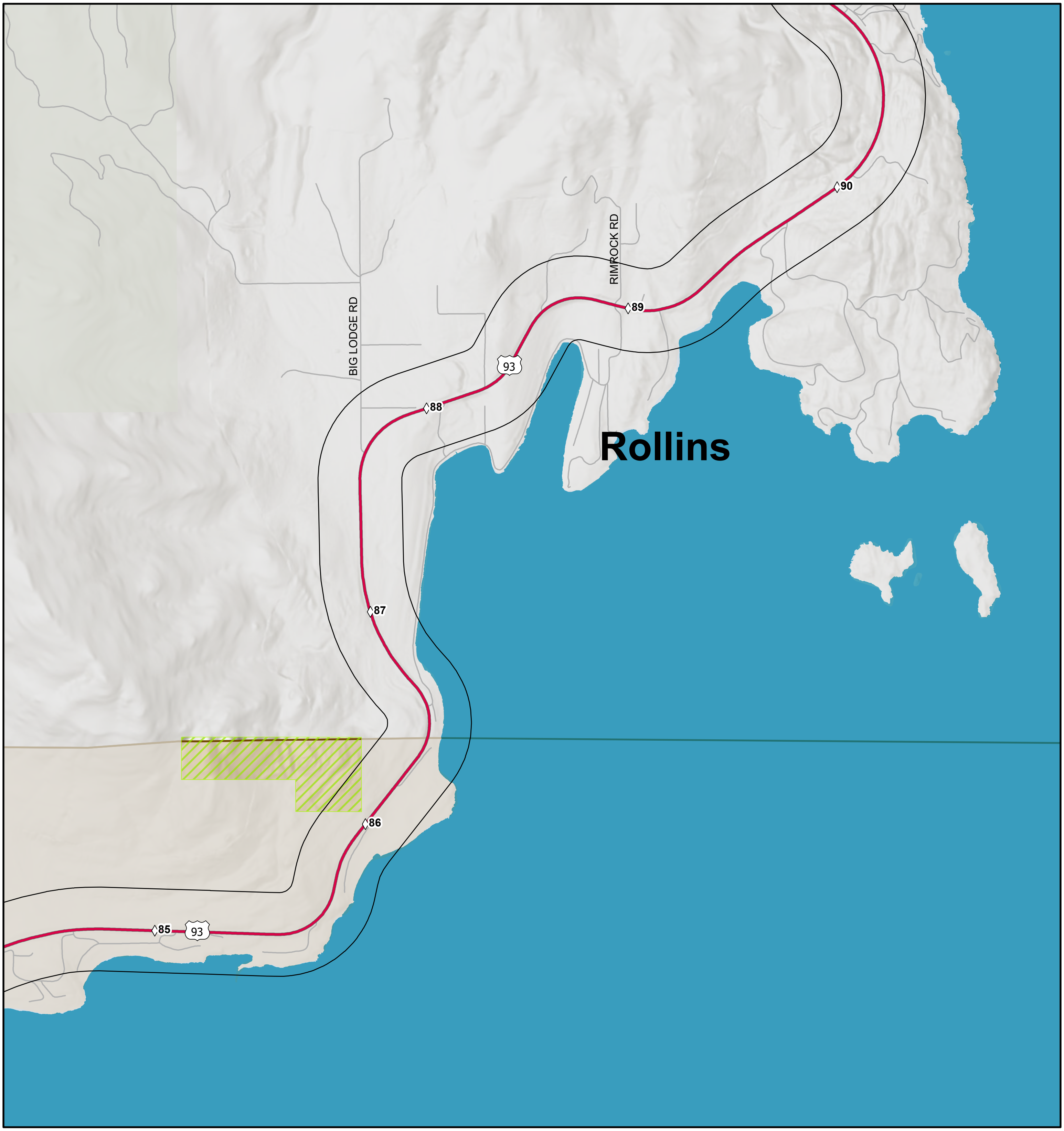
Zone A, 1% Annual Chance Flood Hazard
Zone AE, Regulatory Floodway
Zone X, 0.2% Annual Chance Flood Hazard
Zone X, Area of Minimal Flood Hazard
Zone D, Undetermined Flood Risk
Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

FEMA Flood Zones

Zone A, 1% Annual Chance Flood Hazard

Zone AE, Regulatory Floodway

Zone X, 0.2% Annual Chance Flood Hazard

Zone X, Area of Minimal Flood Hazard

Zone D, Undetermined Flood Risk

Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

FEMA Flood Zones

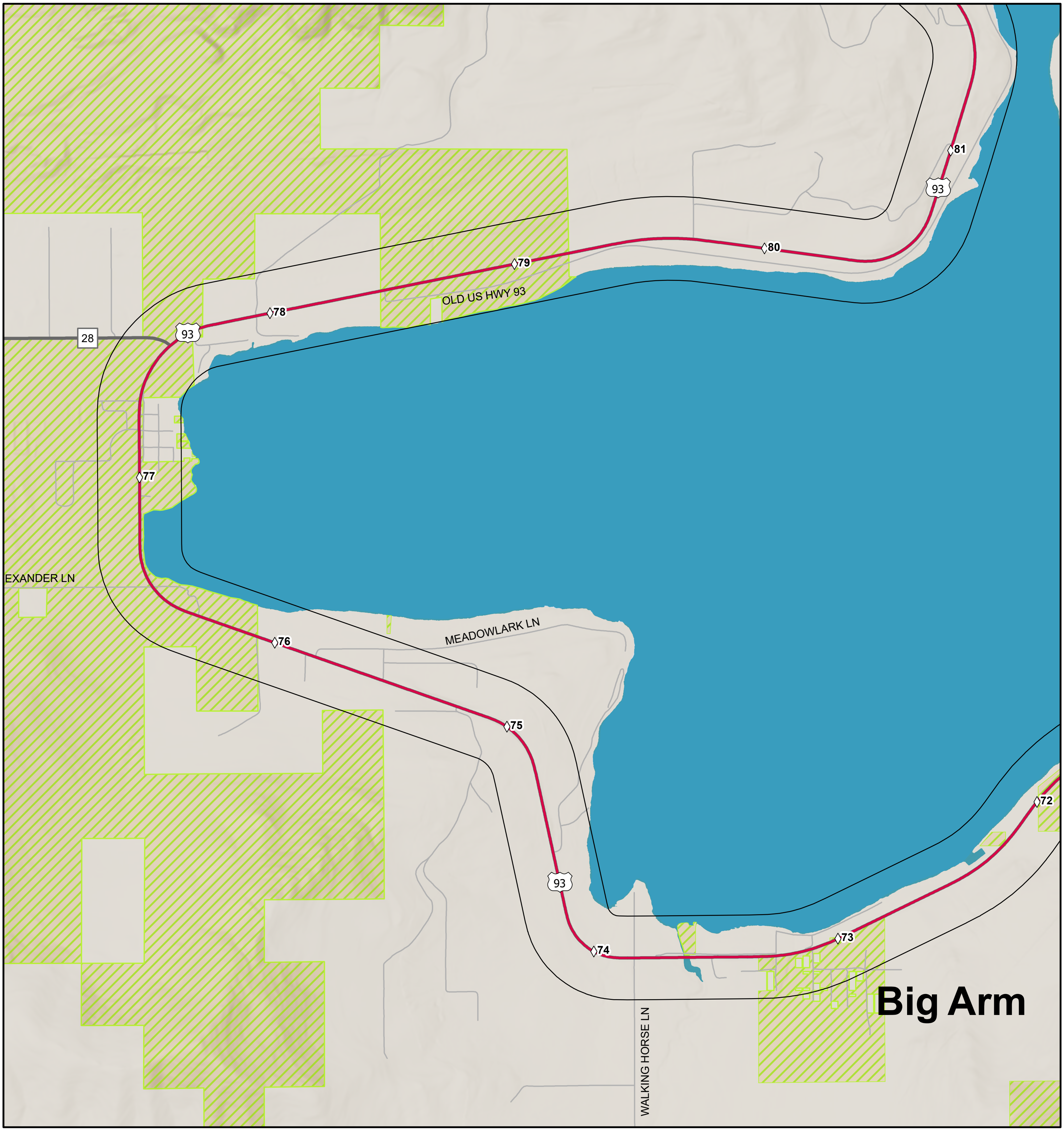
- Zone A, 1% Annual Chance Flood Hazard
- Zone AE, Regulatory Floodway
- Zone X, 0.2% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard
- Zone D, Undetermined Flood Risk
- Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

FEMA Flood Zones

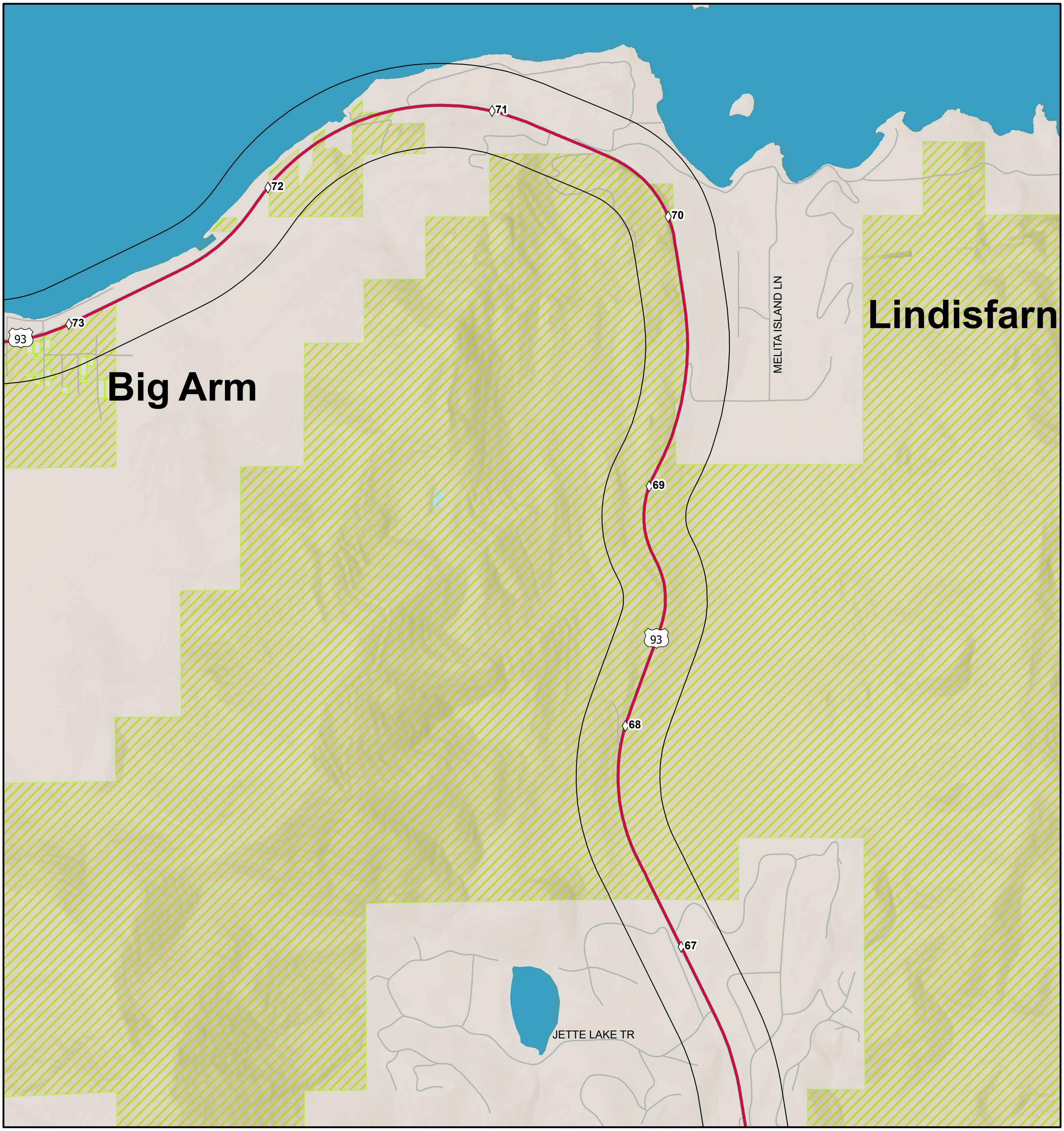
- Zone A, 1% Annual Chance Flood Hazard
- Zone AE, Regulatory Floodway
- Zone X, 0.2% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard
- Zone D, Undetermined Flood Risk
- Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

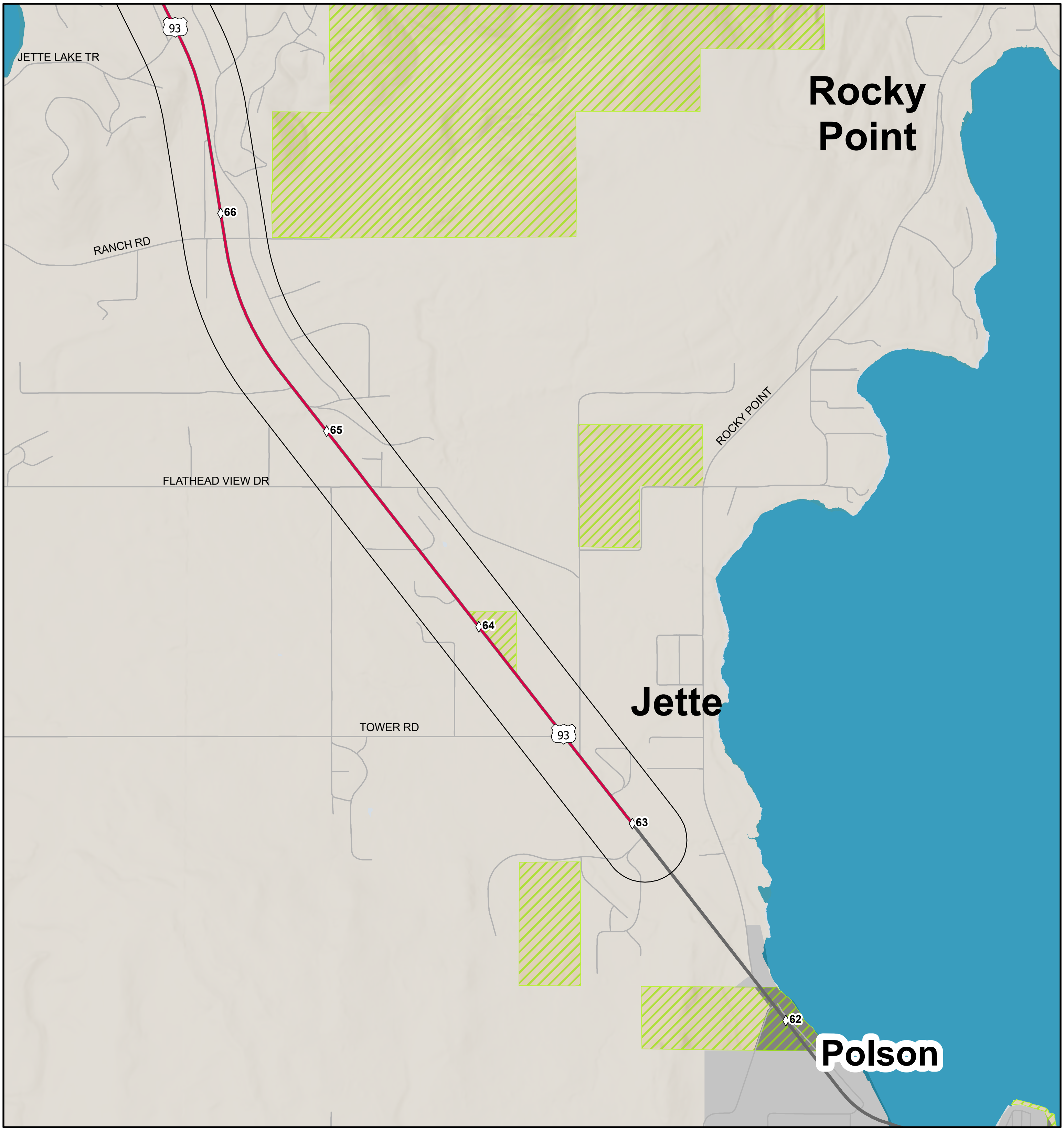
FEMA Flood Zones

Zone A, 1% Annual Chance Flood Hazard
Zone AE, Regulatory Floodway
Zone X, 0.2% Annual Chance Flood Hazard
Zone X, Area of Minimal Flood Hazard
Zone D, Undetermined Flood Risk
Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

FEMA Flood Zones

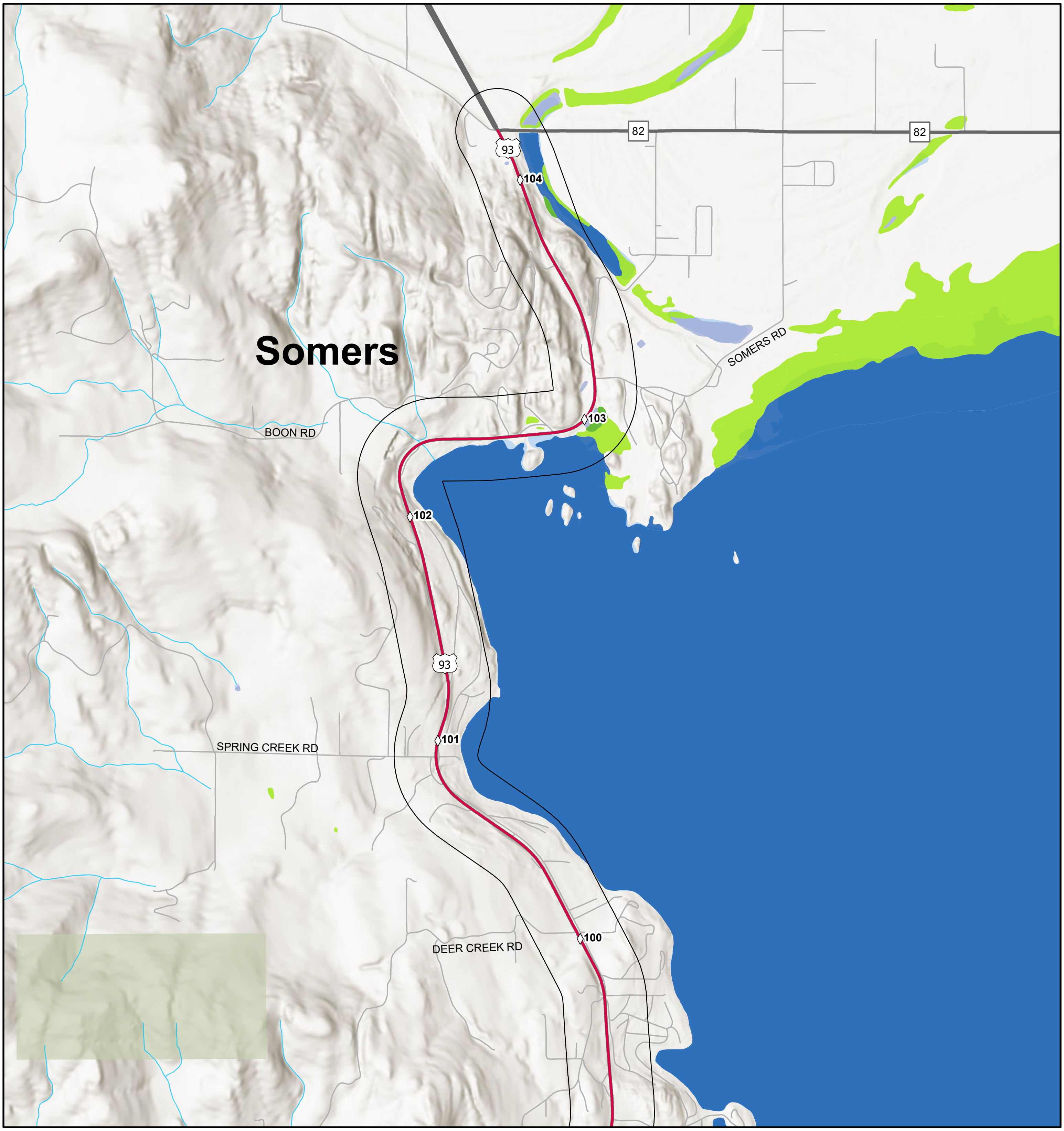
- Zone A, 1% Annual Chance Flood Hazard
- Zone AE, Regulatory Floodway
- Zone X, 0.2% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard
- Zone D, Undetermined Flood Risk
- Area Not Mapped

0 0.25 0.5 1 1.5 Miles

N

Figure A.6: Floodplain Boundaries

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

NWI Wetlands

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Riverine
Herbaceous Riparian
Forested/Shrub Riparian

0 0.25 0.5 1 1.5 Miles

Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Herbaceous Riparian
- Forested/Shrub Riparian

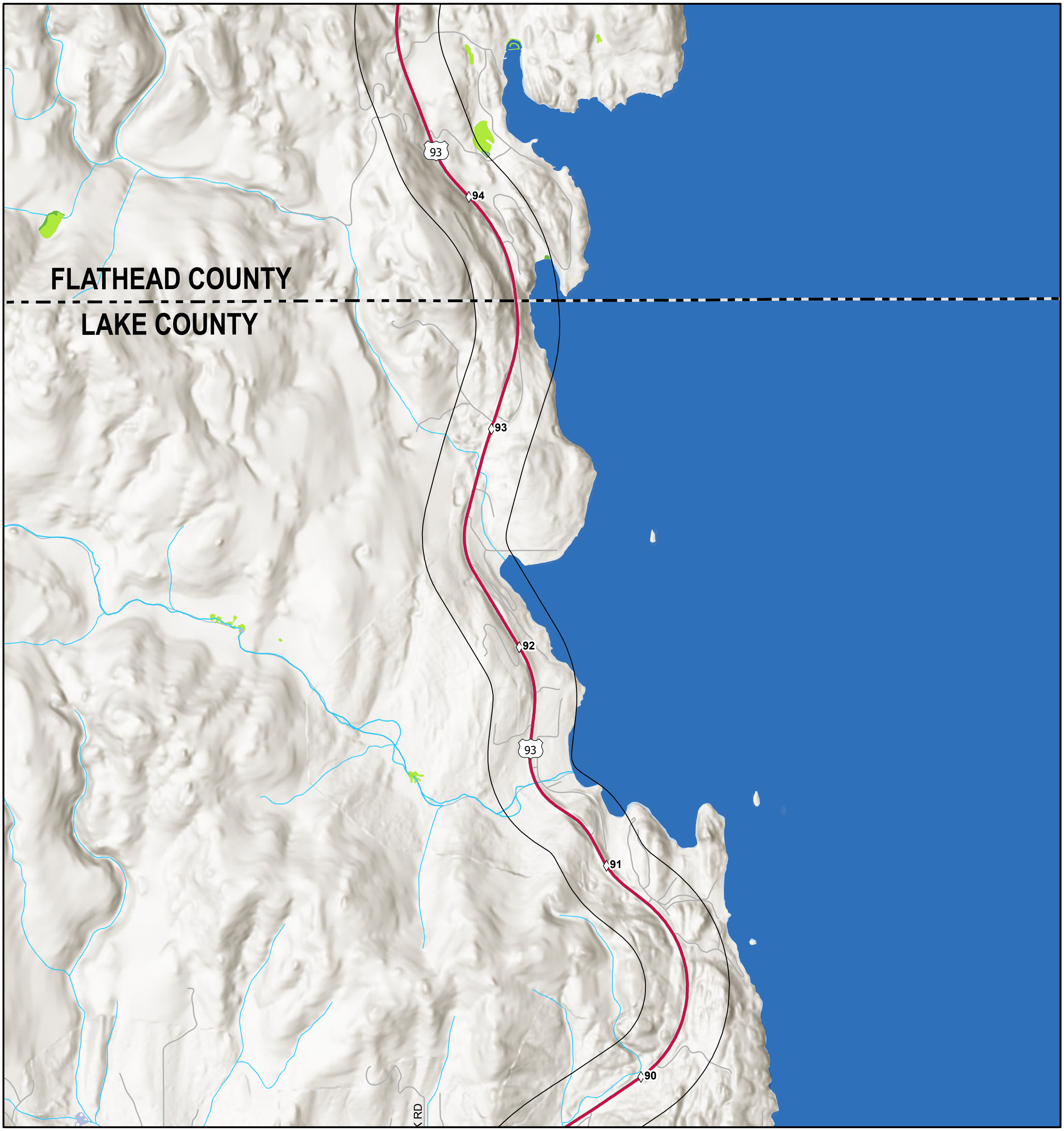
0 0.25 0.5 1 1.5 Miles

N

Figure A.7: Wetlands

Page 2 of 8

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

NWI Wetlands

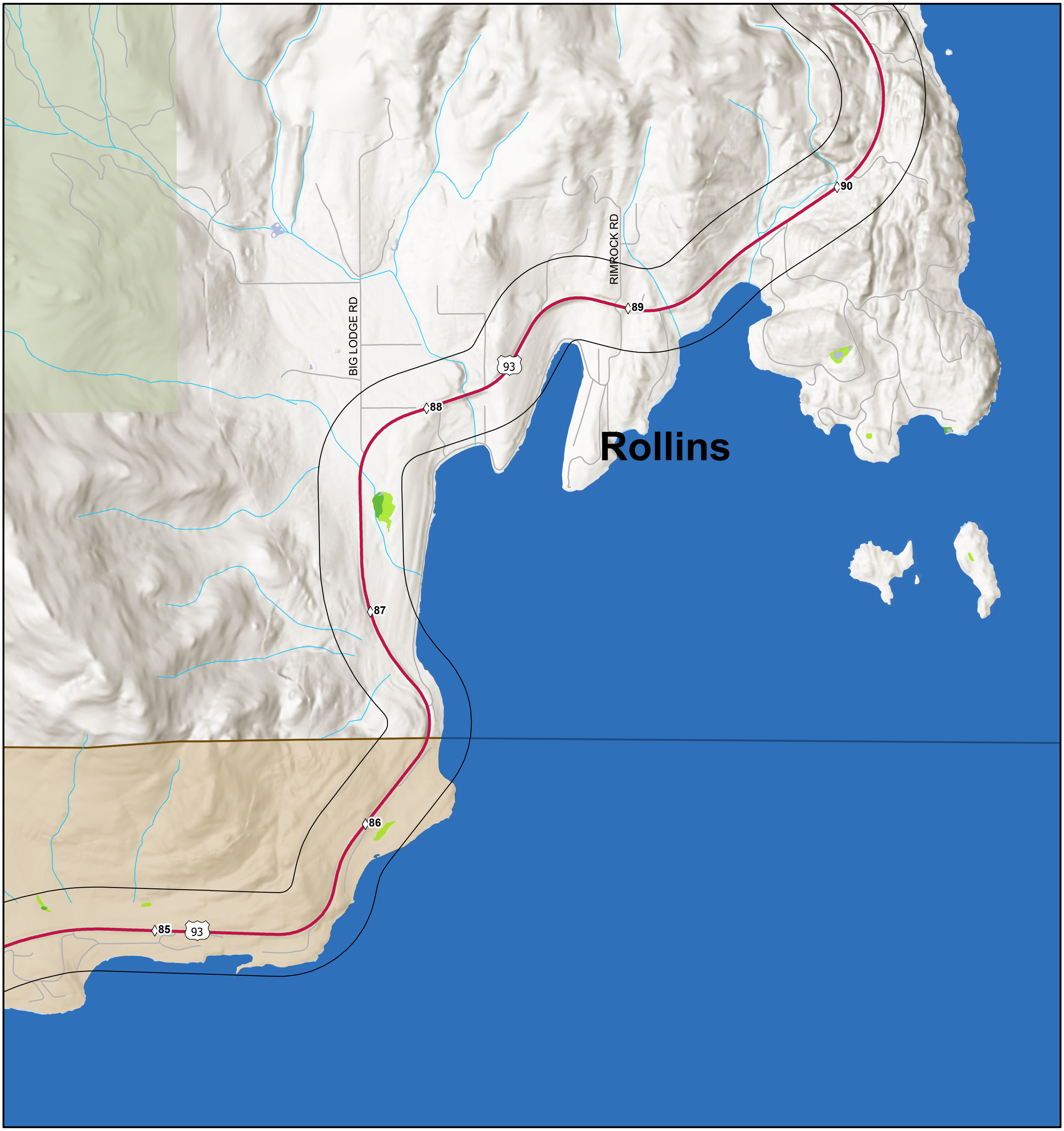
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Herbaceous Riparian
- Forested/Shrub Riparian

0 0.25 0.5 1 1.5 Miles

N

Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

NWI Wetlands

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond

Lake
Riverine
Herbaceous Riparian
Forested/Shrub Riparian

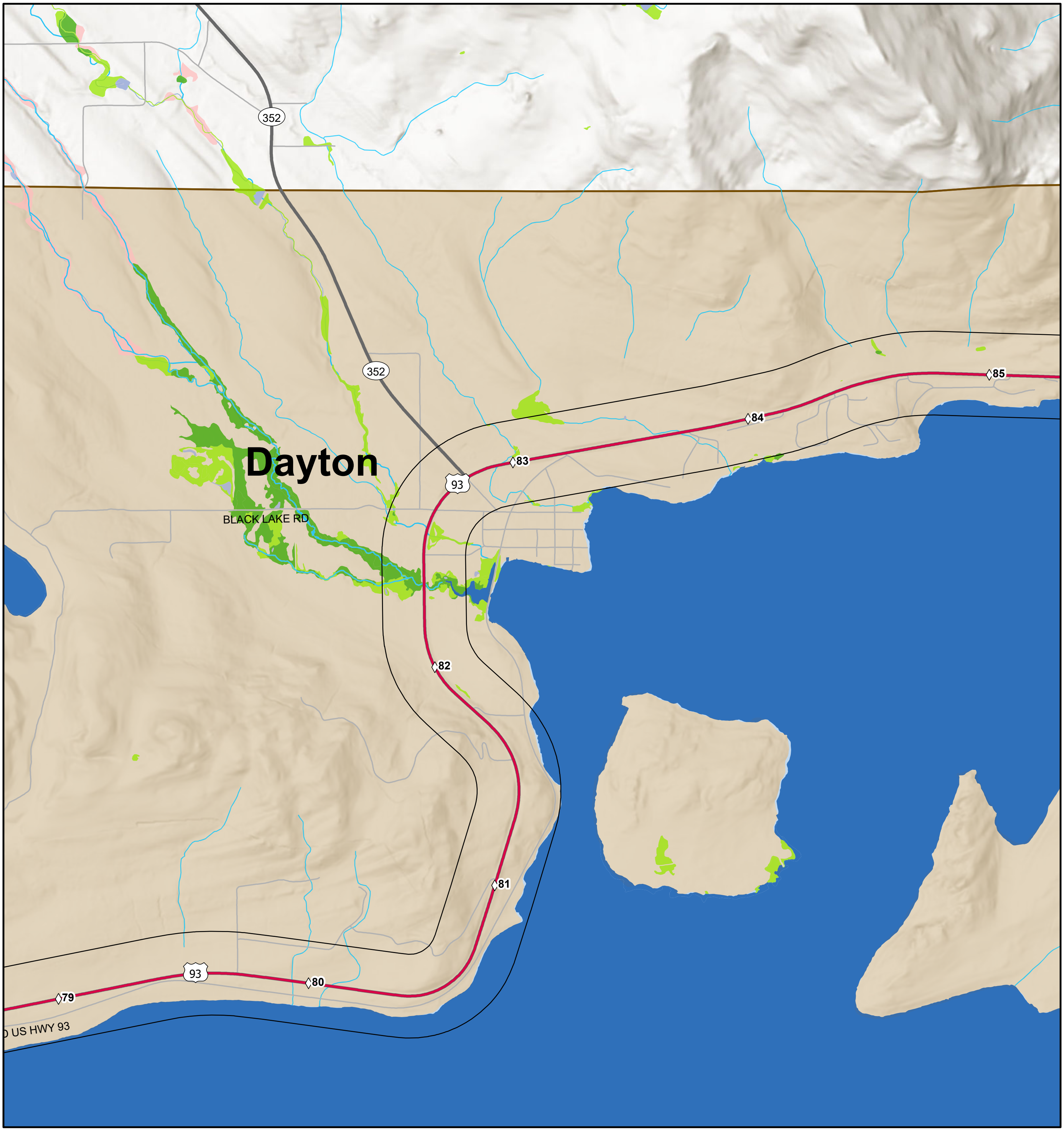
0 0.25 0.5 1 1.5 Miles

N

Figure A.7: Wetlands

Page 4 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

NWI Wetlands
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond

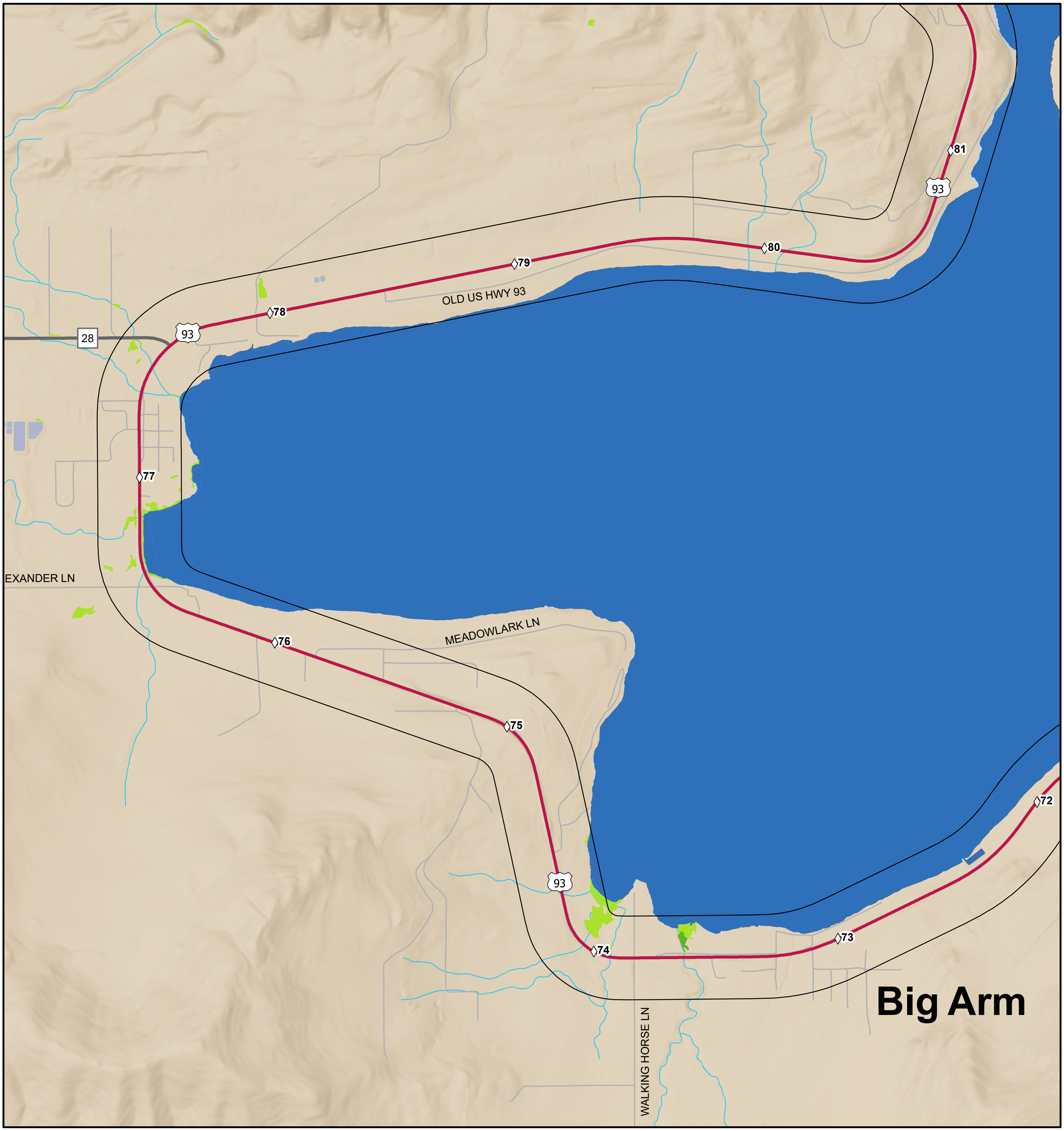
Lake
Riverine
Herbaceous Riparian
Forested/Shrub Riparian

0 0.25 0.5 1 1.5 Miles

N

Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

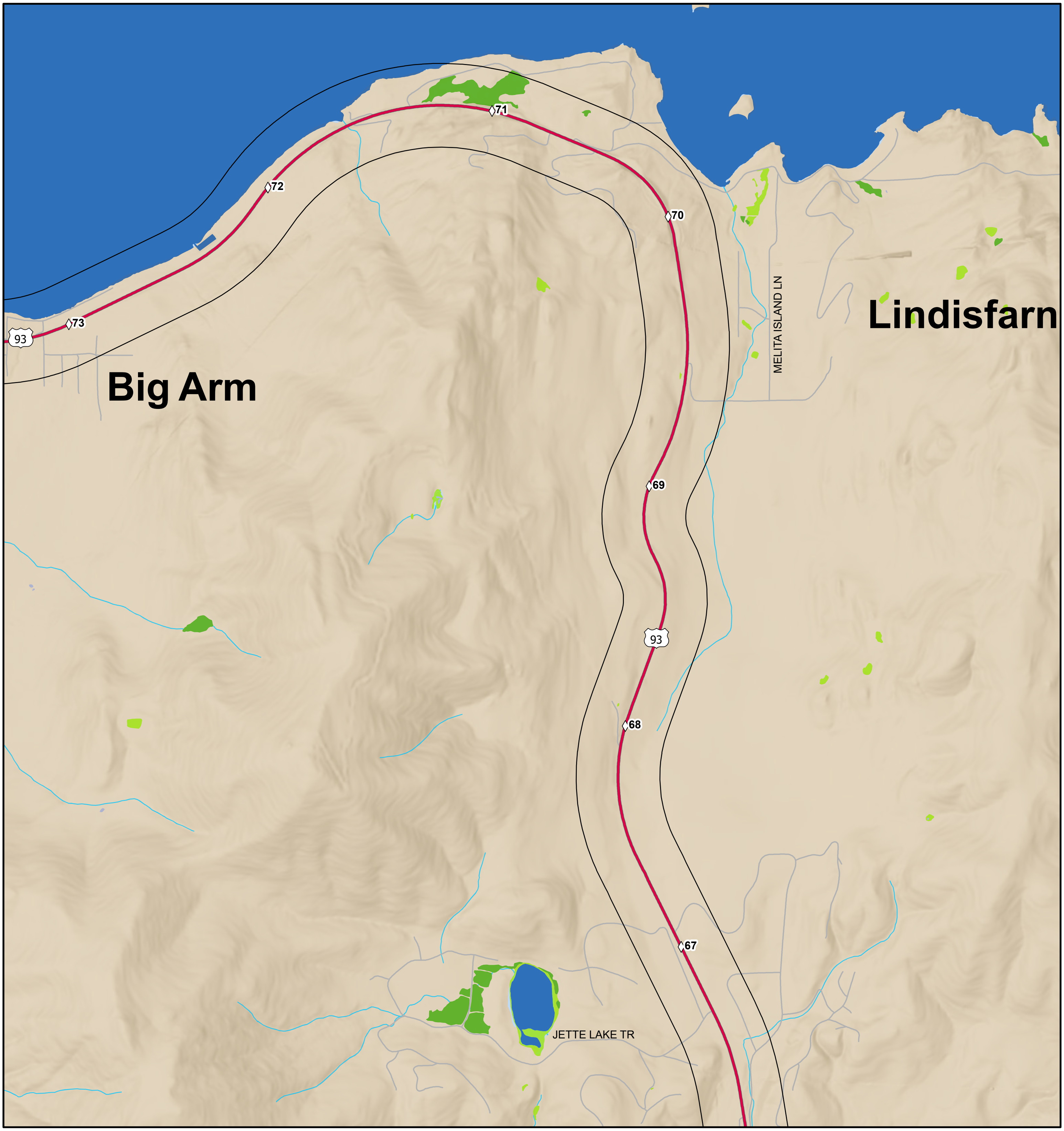
◊ Reference Post	**NWI Wetlands**	Lake
Study Corridor	Freshwater Emergent Wetland	Riverine
0.25 Mile Buffer	Freshwater Forested/Shrub Wetland	Herbaceous Riparian
Flathead Reservation Boundary	Freshwater Pond	Forested/Shrub Riparian

0 0.25 0.5 1 1.5 Miles

N

Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

NWI Wetlands

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Riverine
Herbaceous Riparian
Forested/Shrub Riparian

0 0.25 0.5 1 1.5 Miles

Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY

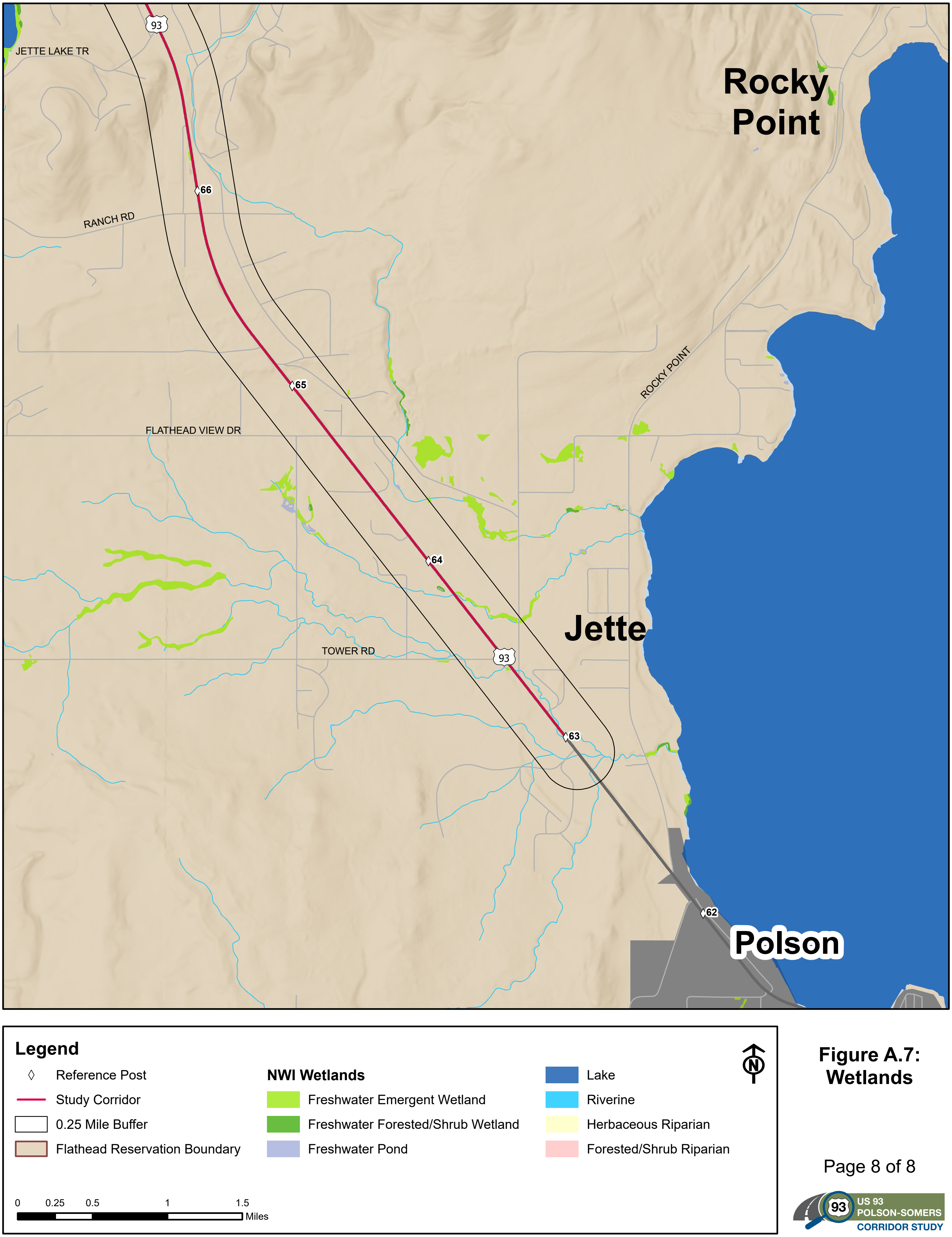
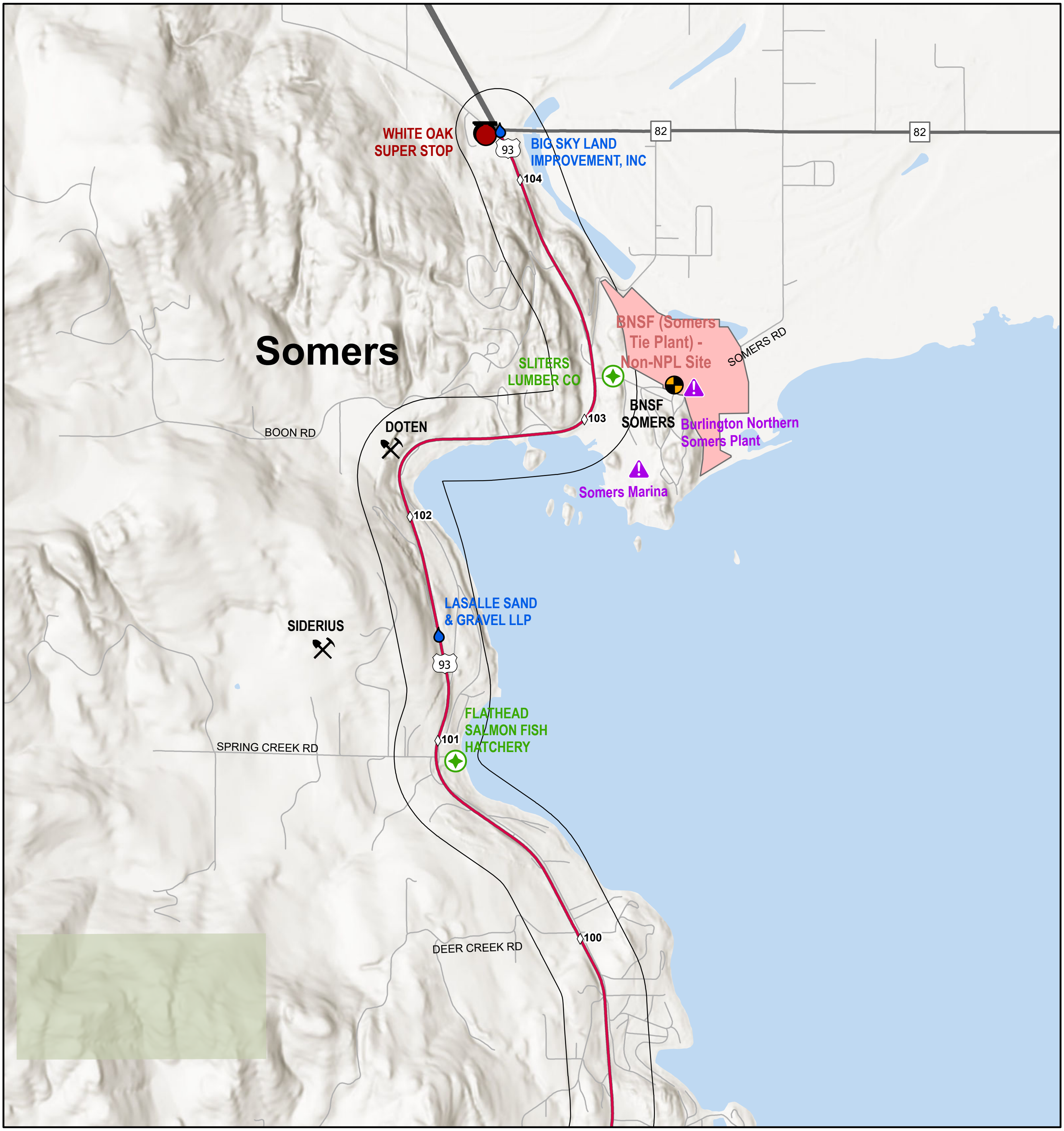


Figure A.7: Wetlands

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Hazardous Substance Sites

- Opencut Mining Site
- Remediation Response Site
- Underground Storage Tank
- Petroleum Release Site
- Hazardous Waste Release Site
- Hazardous Waste Generator
- Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Hazardous Substance Sites

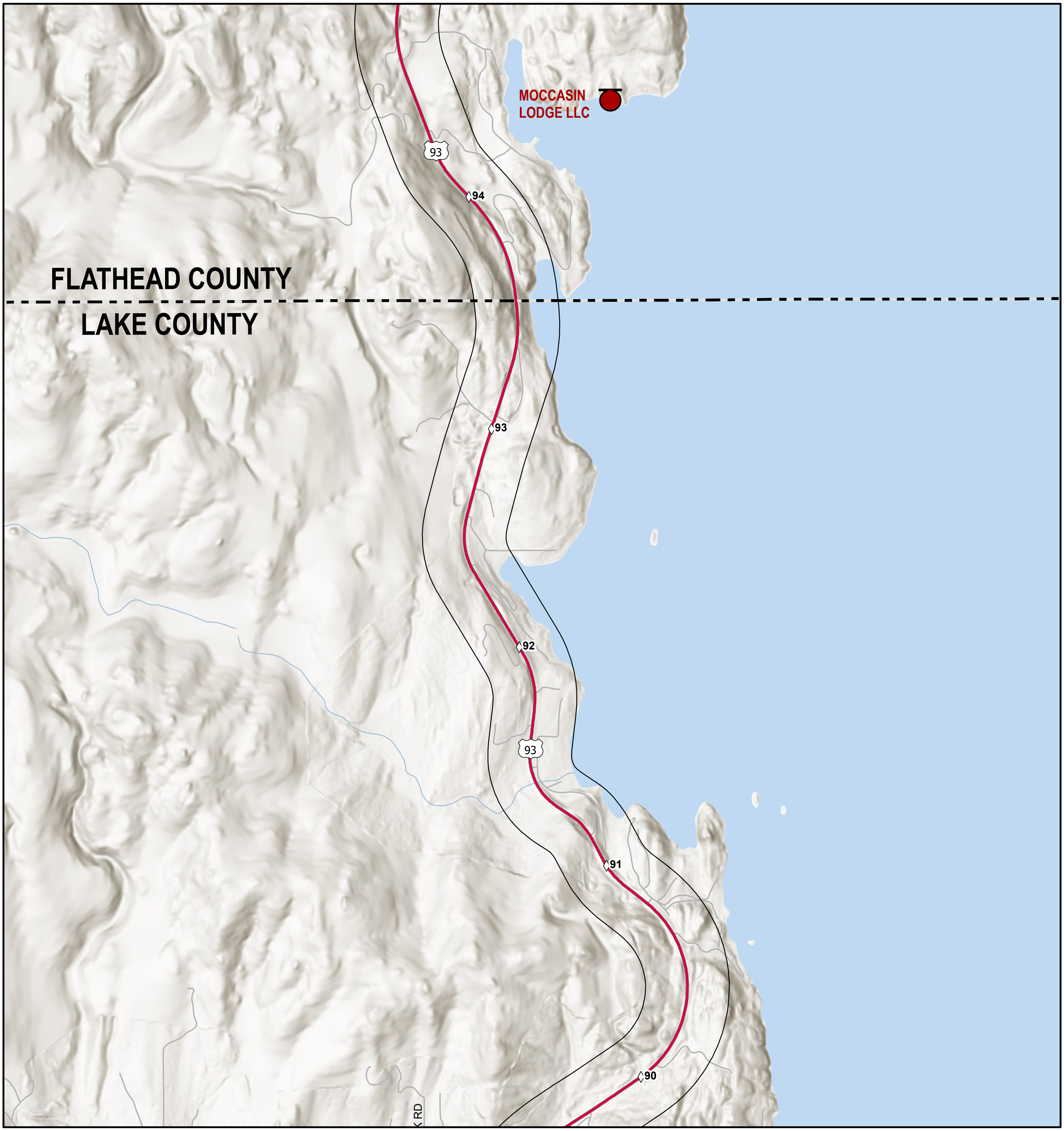
Opencut Mining Site
Remediation Response Site
Underground Storage Tank
Petroleum Release Site
Hazardous Waste Release Site
Hazardous Waste Generator
Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Hazardous Substance Sites

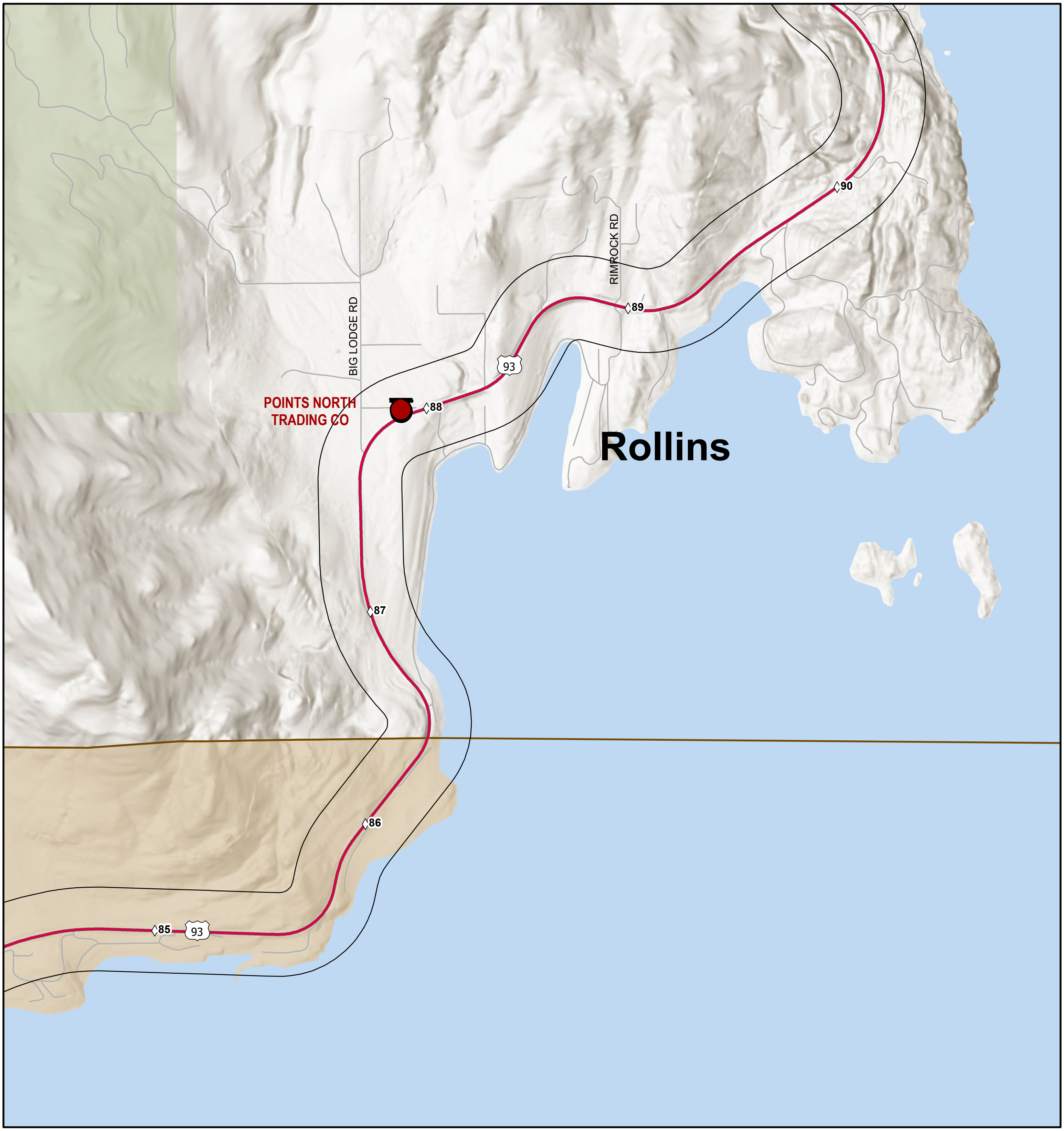
Opencut Mining Site
Remediation Response Site
Underground Storage Tank
Petroleum Release Site
Hazardous Waste Release Site
Hazardous Waste Generator
Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Hazardous Substance Sites

- Opencut Mining Site
- Remediation Response Site
- Underground Storage Tank
- Petroleum Release Site
- Hazardous Waste Release Site
- Hazardous Waste Generator
- Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Hazardous Substance Sites
Opencut Mining Site
Remediation Response Site
Underground Storage Tank
Petroleum Release Site
Hazardous Waste Release Site
Hazardous Waste Generator
Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

Hazardous Substance Sites

Opencut Mining Site

Remediation Response Site

Underground Storage Tank

Petroleum Release Site

Hazardous Waste Release Site

Hazardous Waste Generator

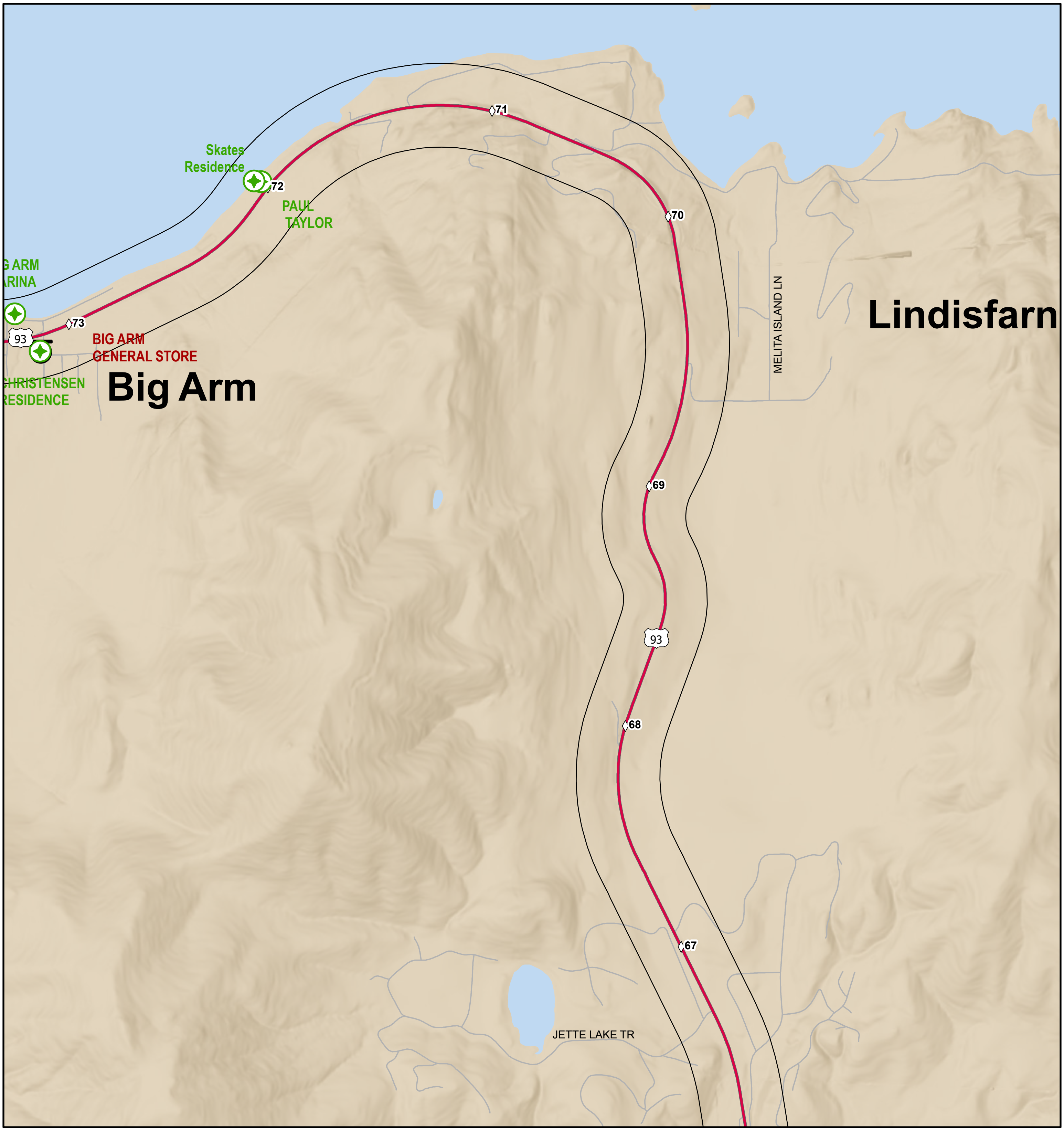
Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Hazardous Substance Sites

- Opencut Mining Site
- Remediation Response Site
- Underground Storage Tank
- Petroleum Release Site
- Hazardous Waste Release Site
- Hazardous Waste Generator
- Non-NPL Superfund Site Boundary

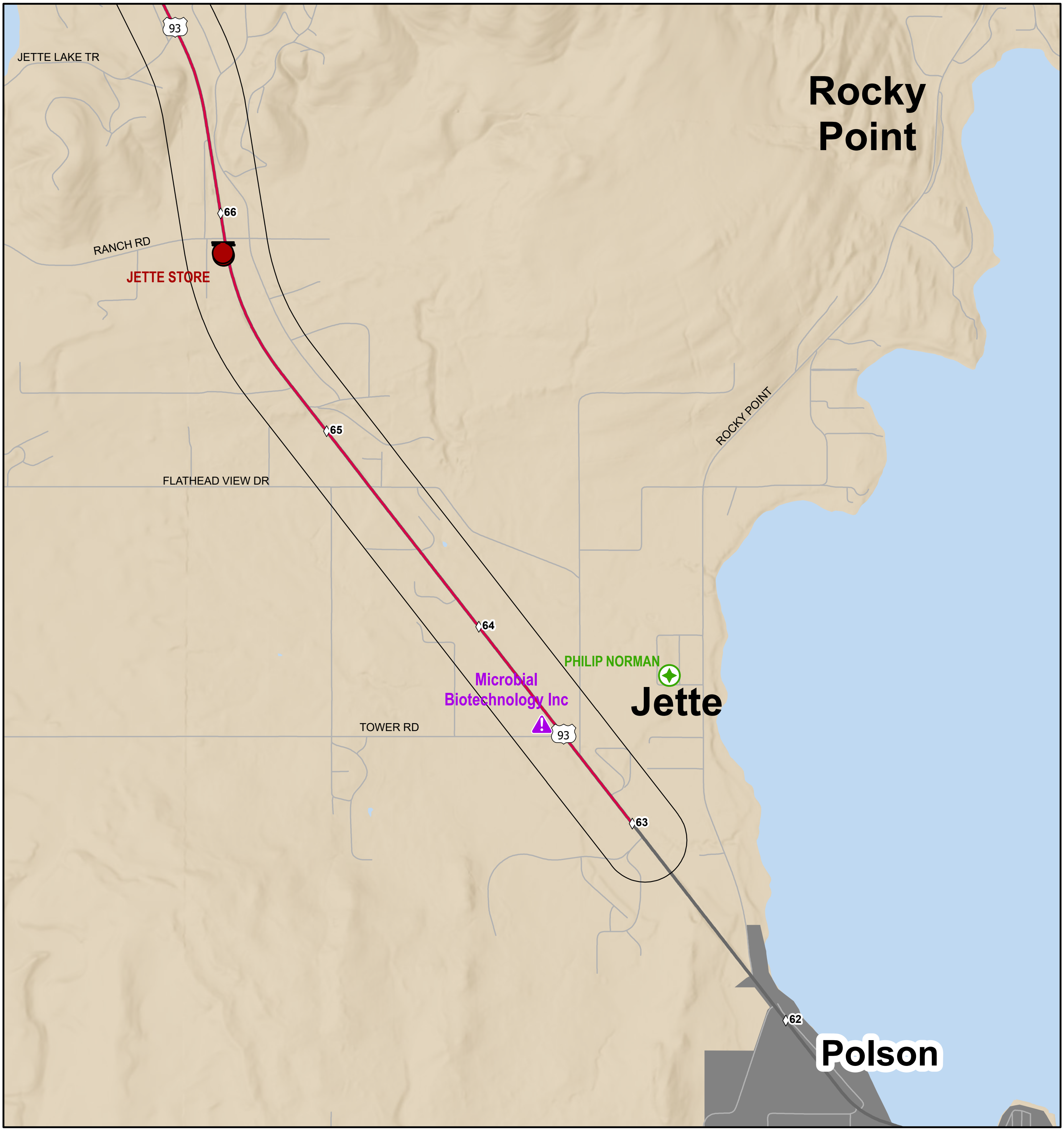
0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

Page 7 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post
	Study Corridor
	0.25 Mile Buffer
	Flathead Reservation Boundary

Hazardous Substance Sites

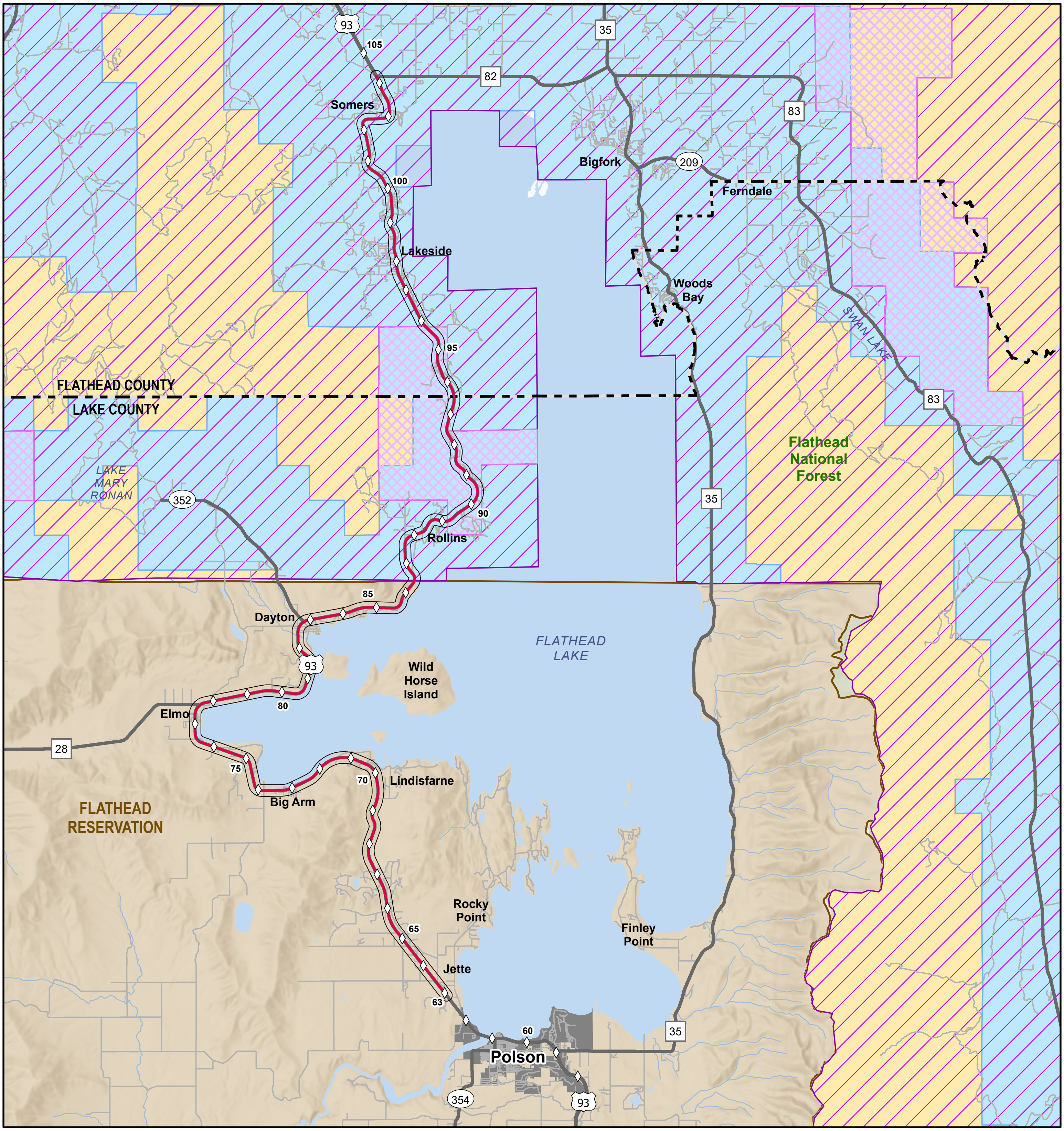
- Opencut Mining Site
- Remediation Response Site
- Underground Storage Tank
- Petroleum Release Site
- Hazardous Waste Release Site
- Hazardous Waste Generator
- Non-NPL Superfund Site Boundary

0 0.25 0.5 1 1.5 Miles

N

Figure A.8: Hazardous Substances

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Reservation Boundary

Mule Deer Distribution

- General Distribution
- Winter Distribution

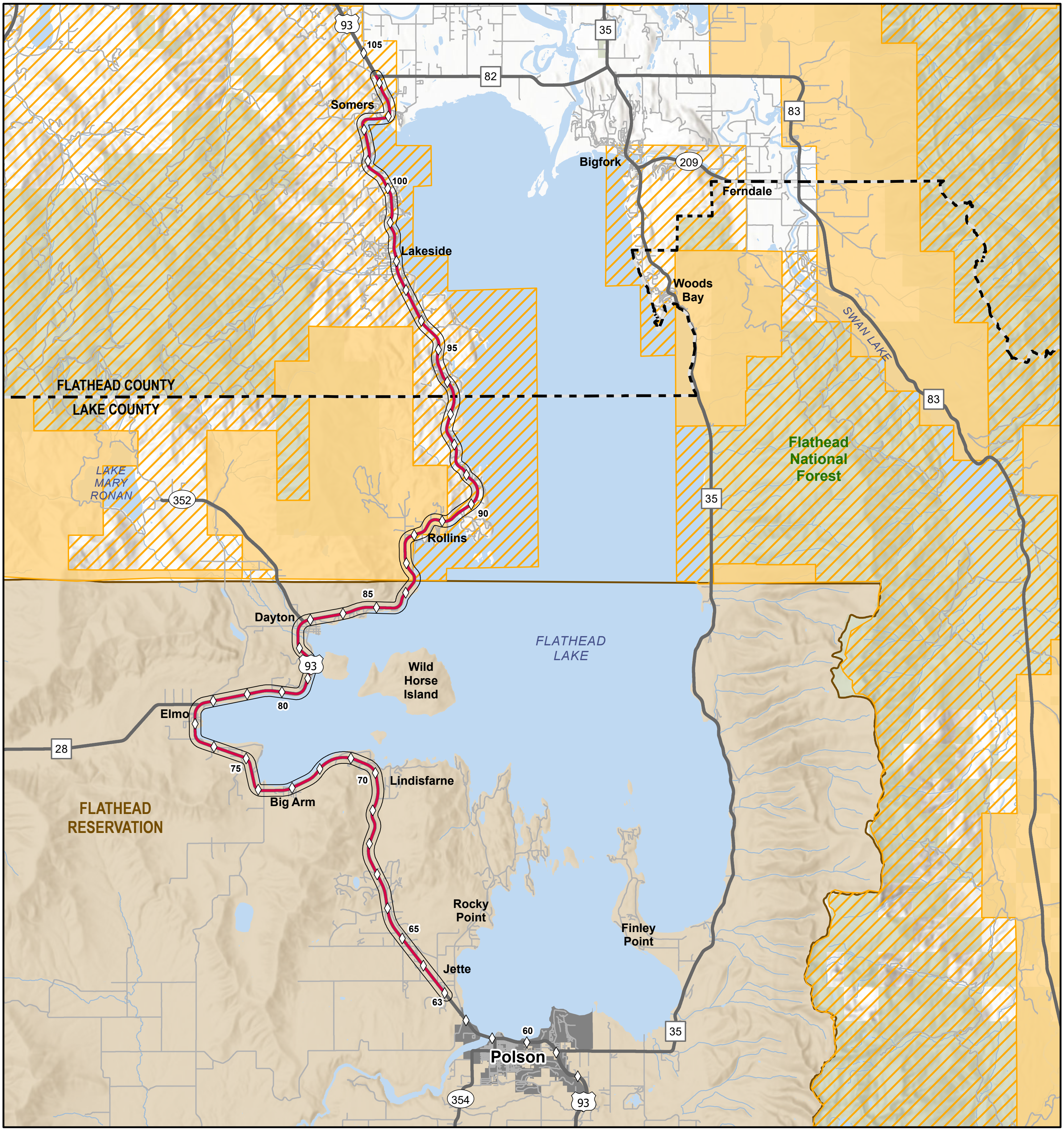
Whitetail Deer Distribution

- General Distribution
- Winter Distribution

0 2.5 5 10 15 Miles

Figure A.9: Deer Distributions

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Reservation Boundary

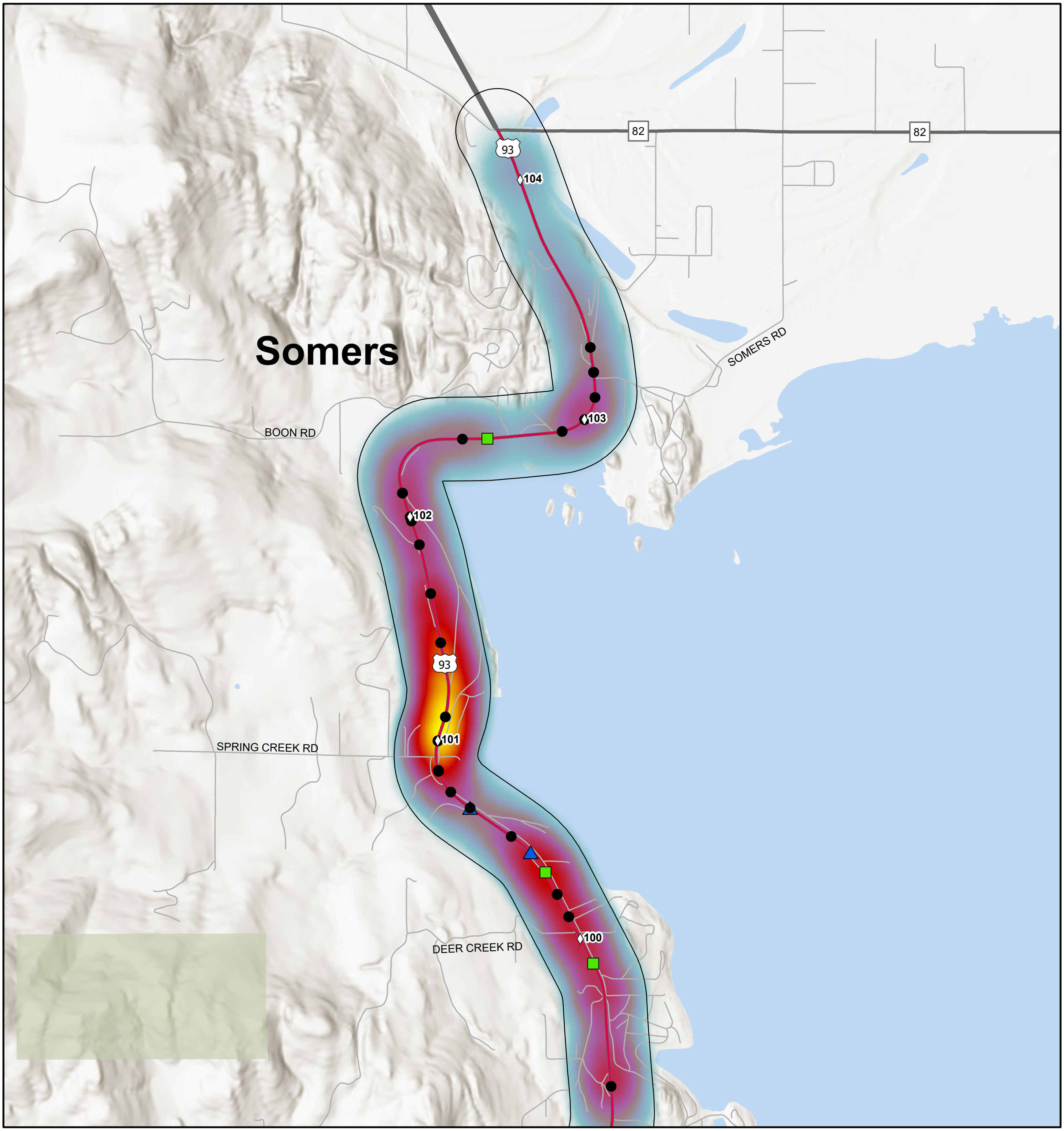
Elk Distribution

General
Winter

0 2.5 5 10 15 Miles

Figure A.10: Elk Distributions

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

Animal Type

Elk

Black Bear

Domestic Animal

Other/Unknown

Quantity

Sparse

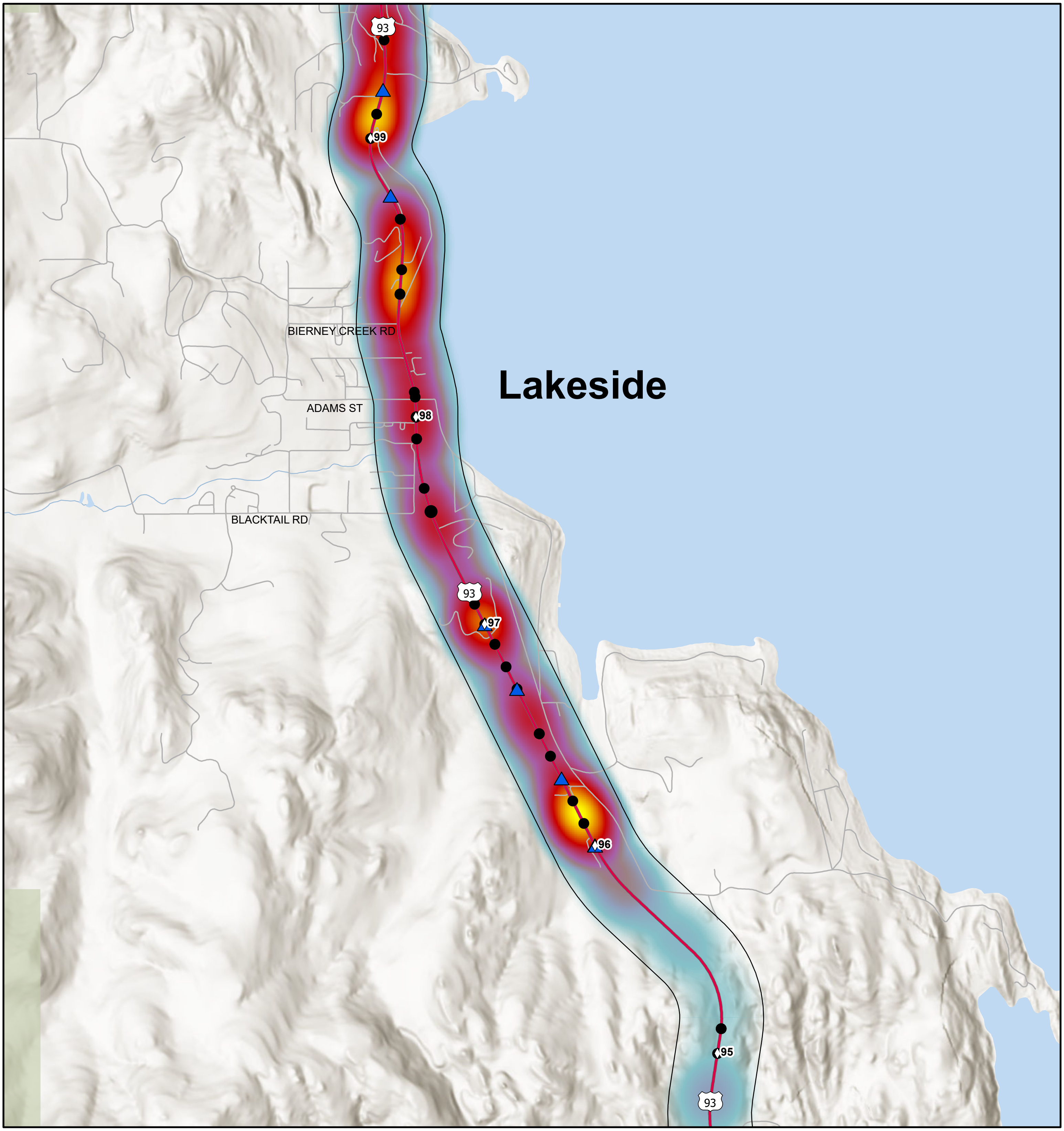
Dense

*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

Figure A.11: Animal Carcasses

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post	**Animal Type**	● Other/Unknown
Study Corridor	Elk	**Quantity**
0.25 Mile Buffer	Black Bear	Sparse
Flathead Reservation Boundary	Domestic Animal	Dense

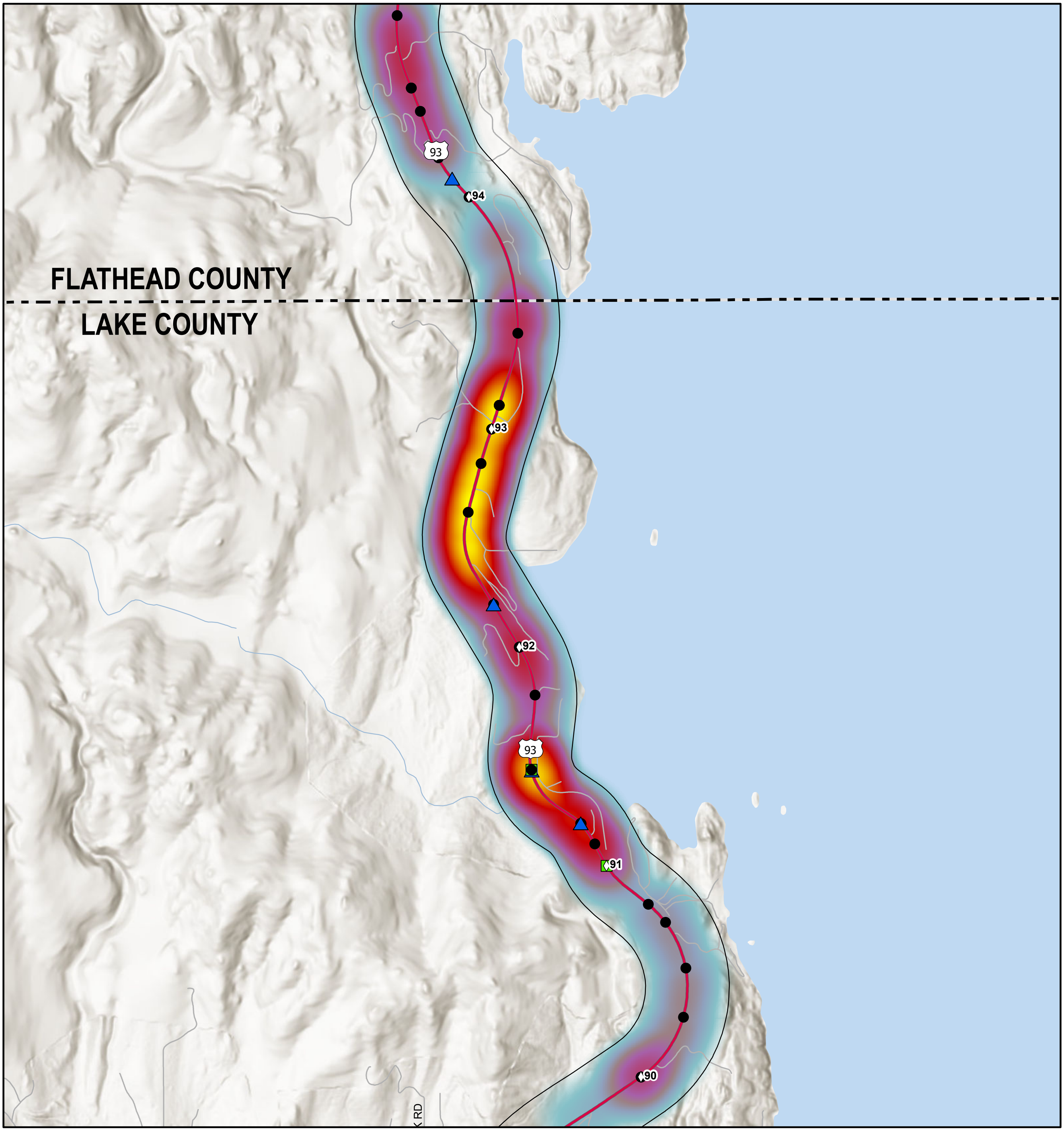
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post	**Animal Type**	● Other/Unknown
Study Corridor	Elk	**Quantity**
0.25 Mile Buffer	Black Bear	Sparse
Flathead Reservation Boundary	Domestic Animal	Dense

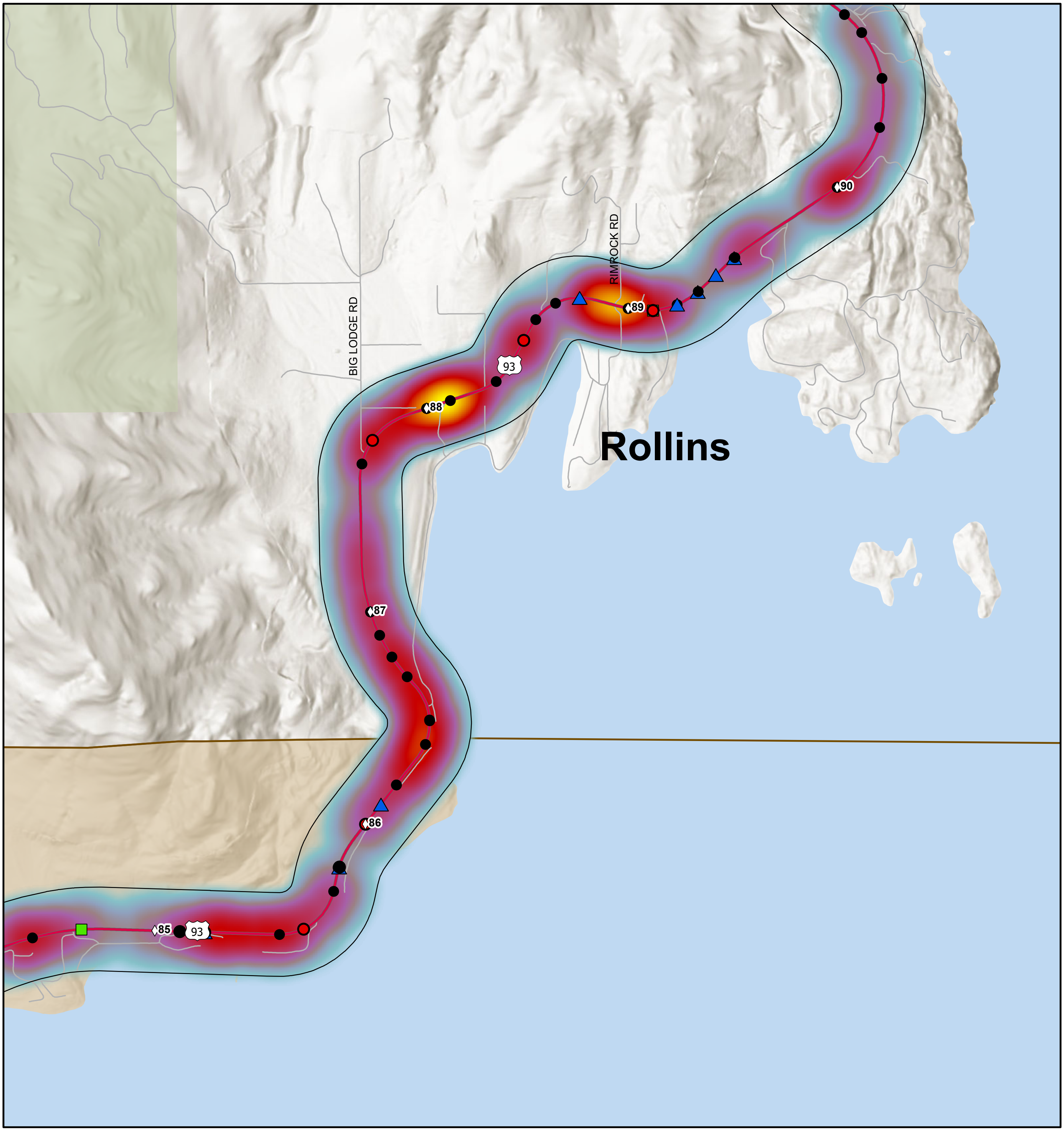
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post
	Study Corridor
	0.25 Mile Buffer
	Flathead Reservation Boundary

Animal Type

- Elk
- Black Bear
- Domestic Animal
- Other/Unknown

Quantity

Sparse

Dense

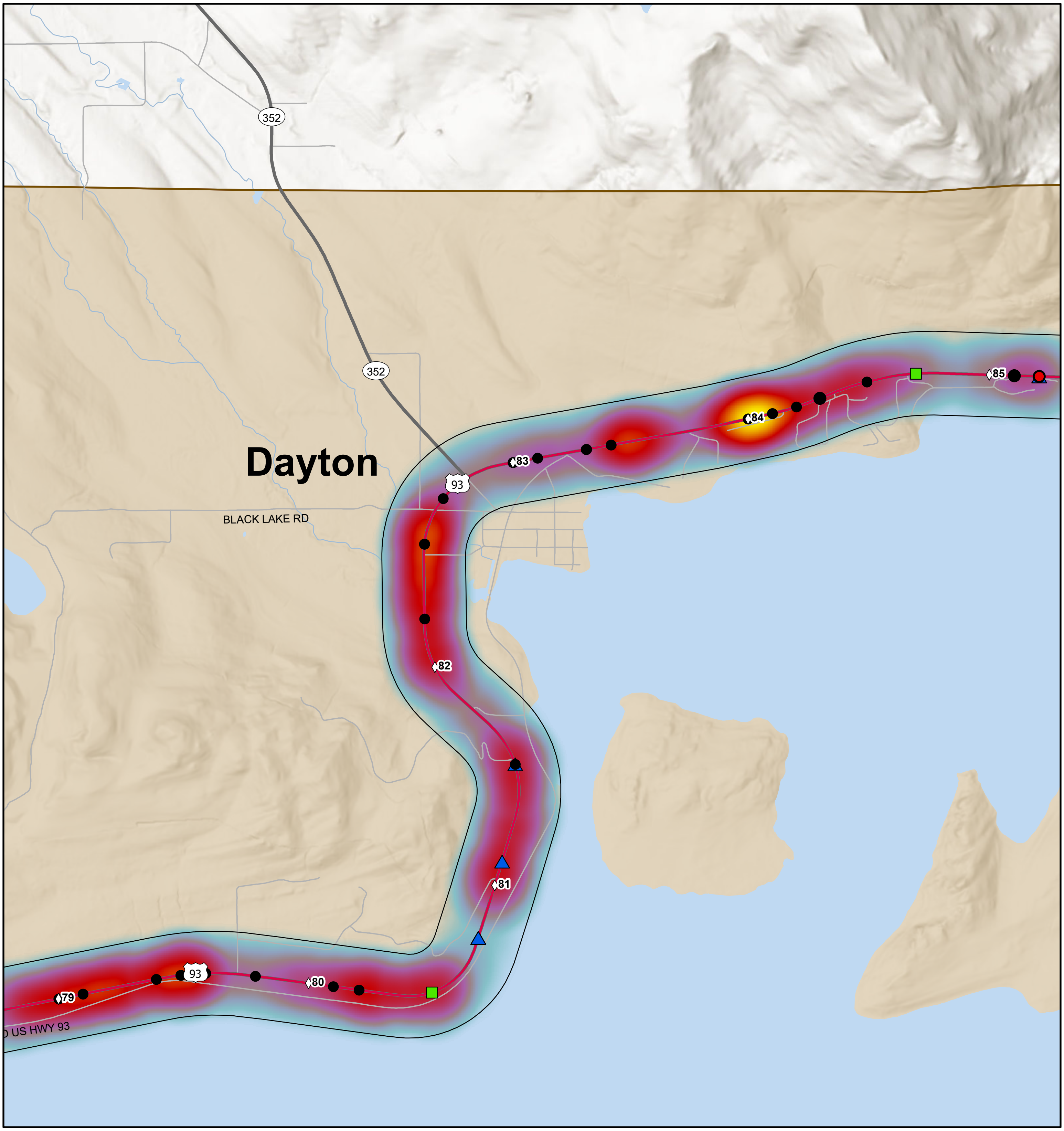
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Animal Type

- Elk
- Black Bear
- Domestic Animal
- Other/Unknown

Quantity

- Sparse
- Dense

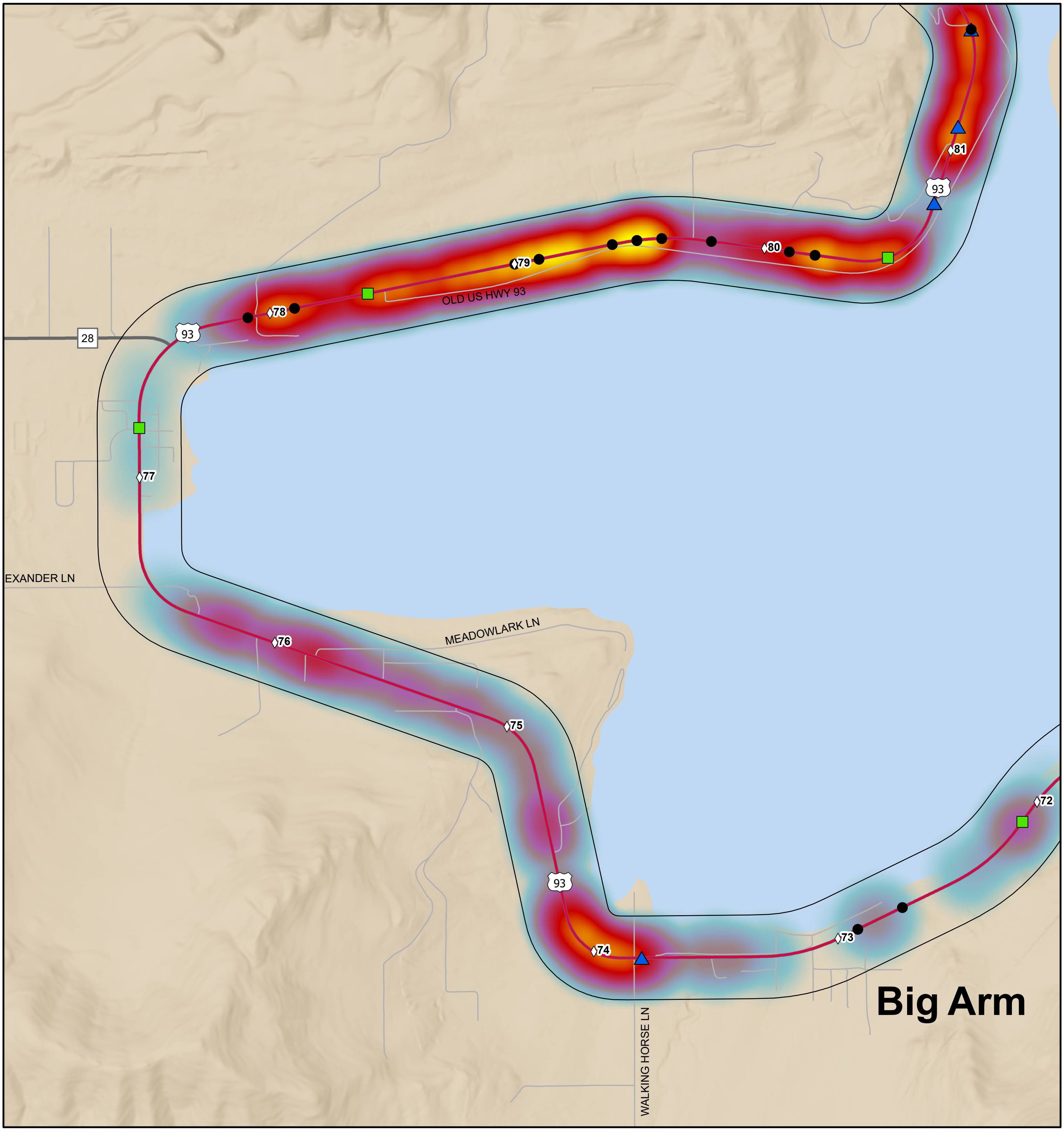
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

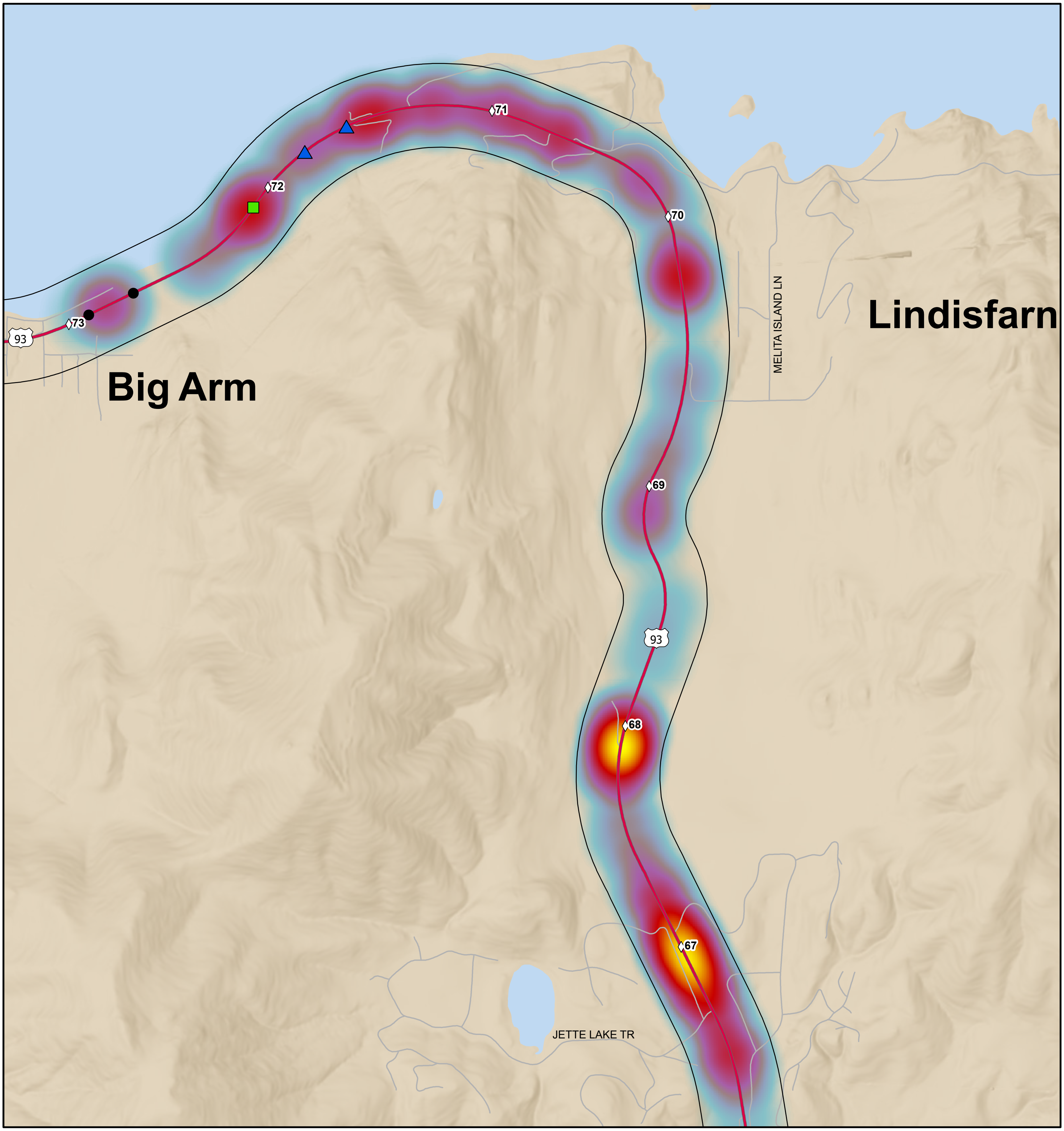
Reference Post	**Animal Type**	Other/Unknown
Study Corridor	Elk	**Quantity**
0.25 Mile Buffer	Black Bear	Sparse
Flathead Reservation Boundary	Domestic Animal	Dense

*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Animal Type
Elk
Black Bear
Domestic Animal
Other/Unknown

Quantity
Sparse
Dense

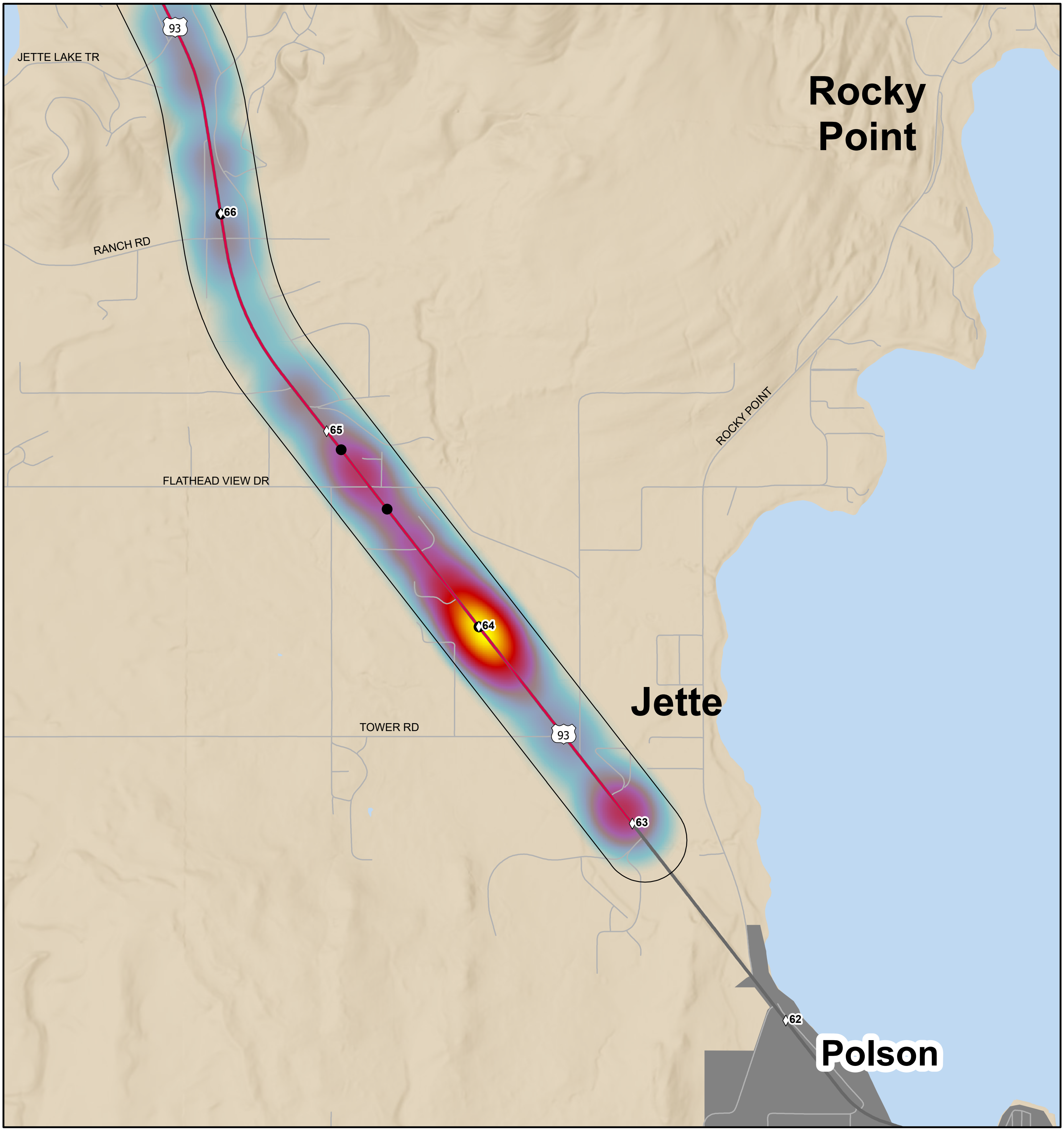
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Animal Type

- Elk
- Black Bear
- Domestic Animal
- Other/Unknown

Quantity

Sparse

Dense

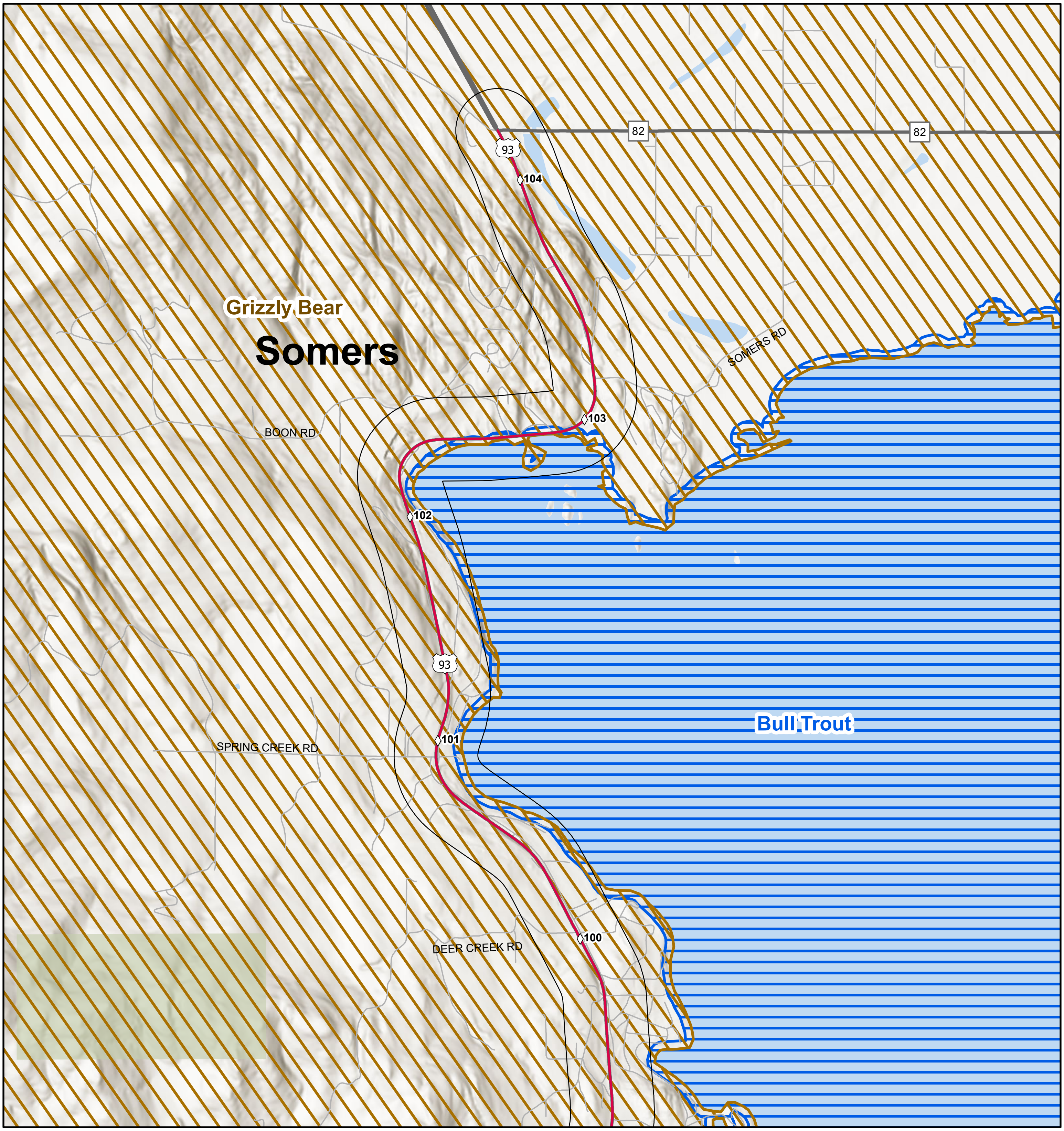
*Carcass data collected by MDT maintenance personnel. Not all carcass collection is reported consistently. Carcass location does not necessarily correspond to a crash/crash location. Data collected January 1, 2018 - December 31, 2022

0 0.25 0.5 1 1.5 Miles

N

Figure A.11: Carcasses Collected

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post
	Study Corridor
	0.25 Mile Buffer
	Flathead Reservation Boundary

Threatened and Endangered Species

- Birds
- Fish
- Mammals

0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species

Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Threatened and Endangered Species

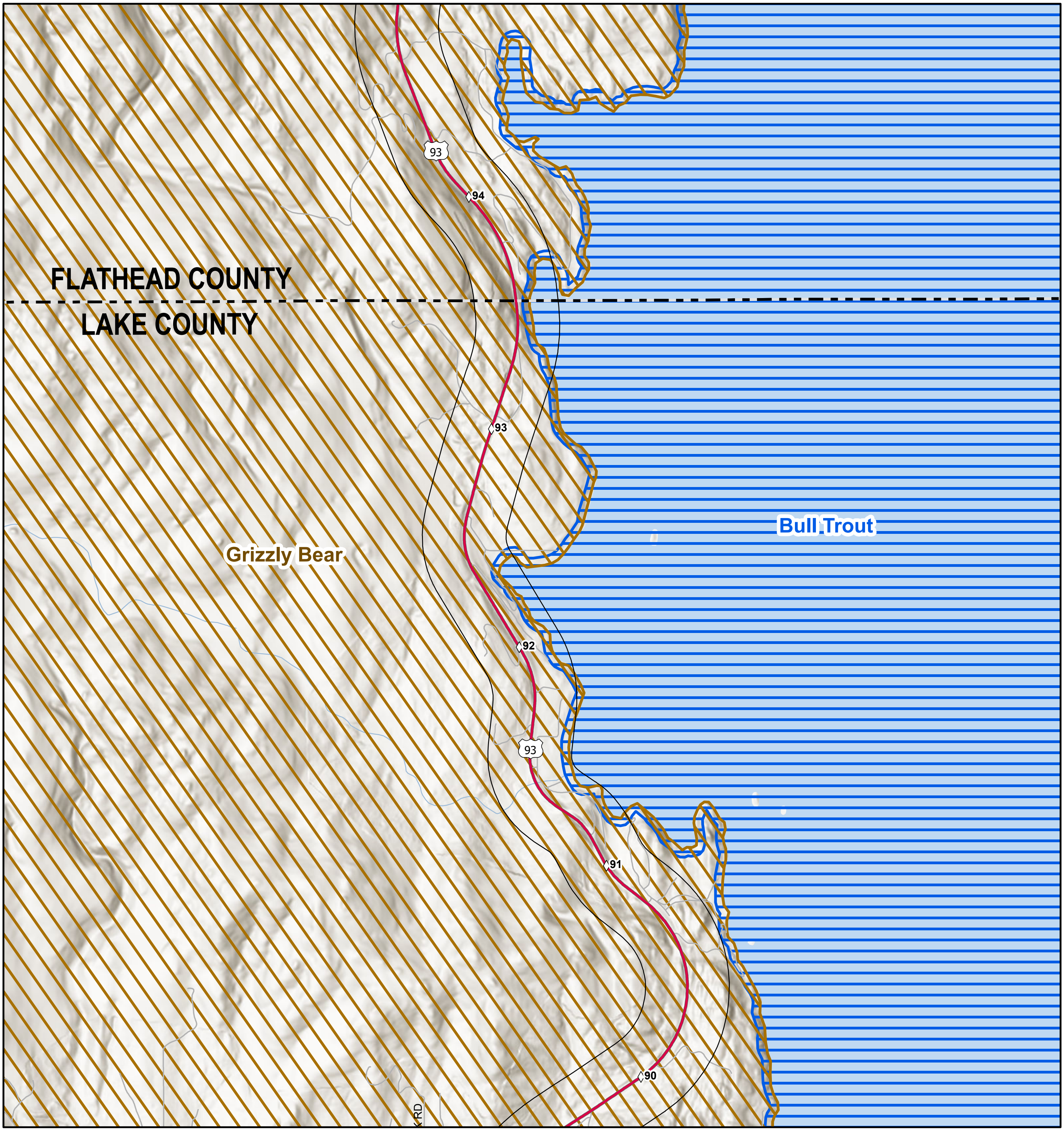
- Birds
- Fish
- Mammals

0 0.25 0.5 1 1.5 Miles

Figure A.12: Threatened and Endangered Species

Page 2 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



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- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Threatened and Endangered Species

- Birds
- Fish
- Mammals

0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Threatened and Endangered Species
Birds
Fish
Mammals

0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species

Page 4 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY

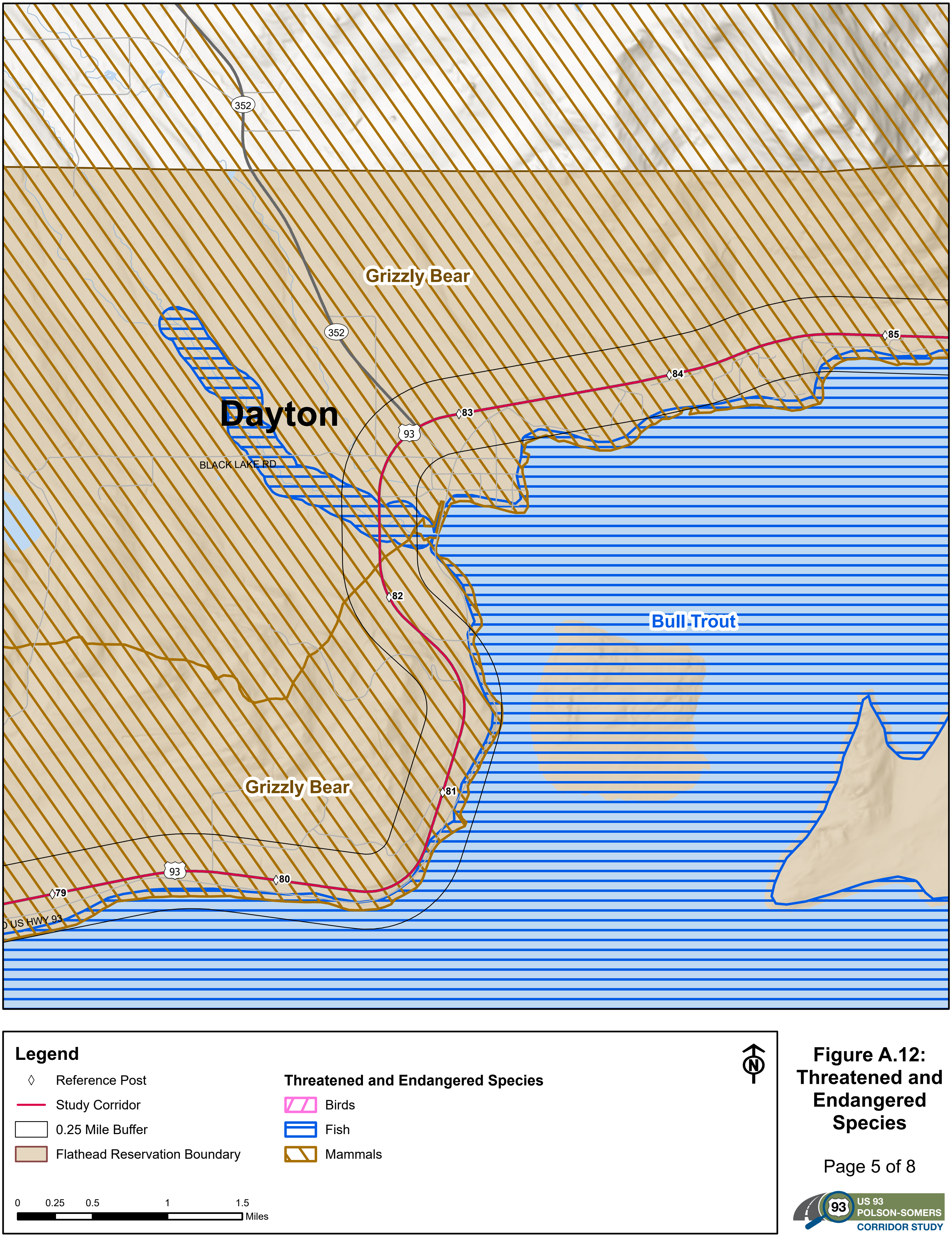
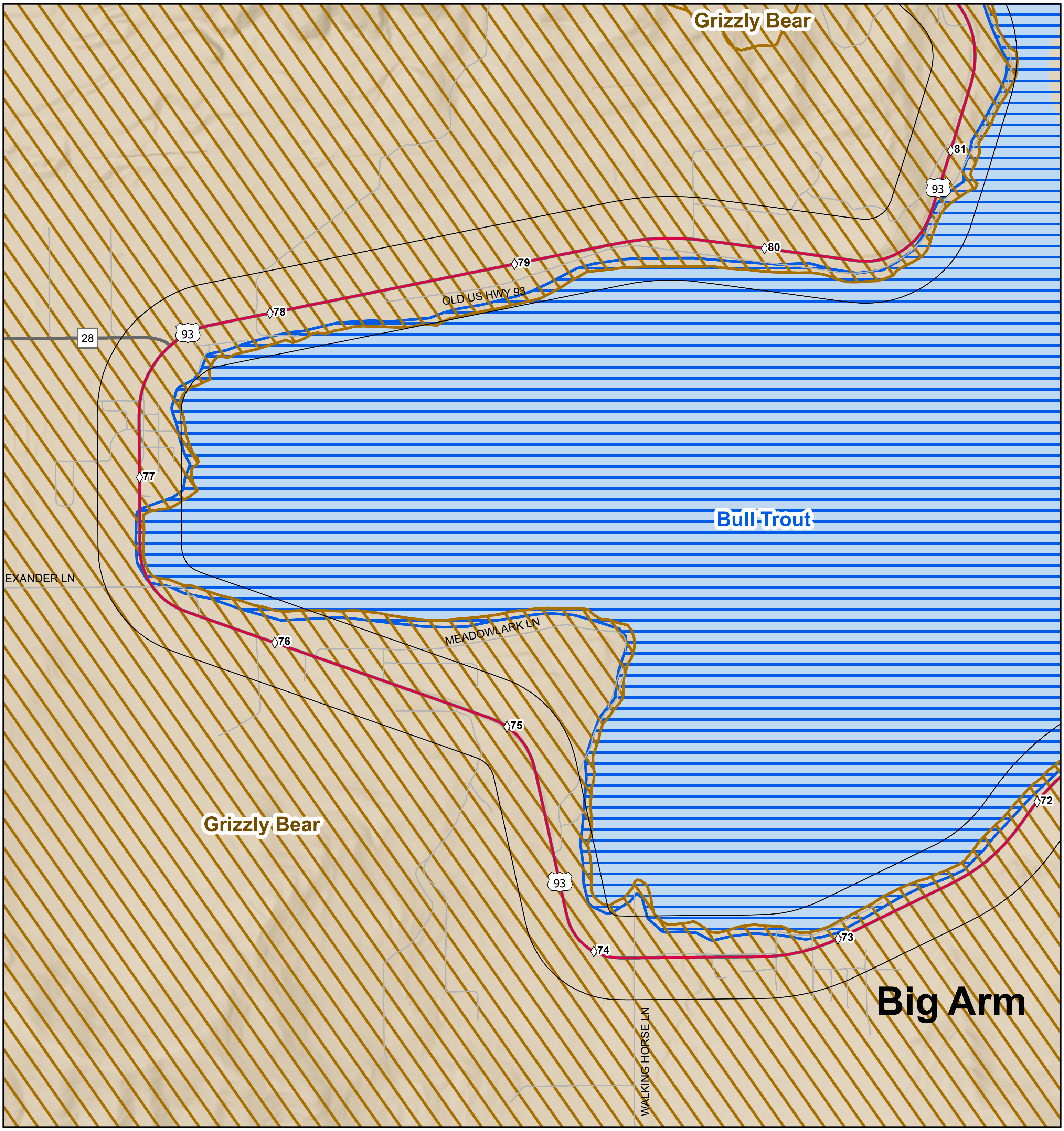


Figure A.12: Threatened and Endangered Species

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

Threatened and Endangered Species

Birds

Fish

Mammals

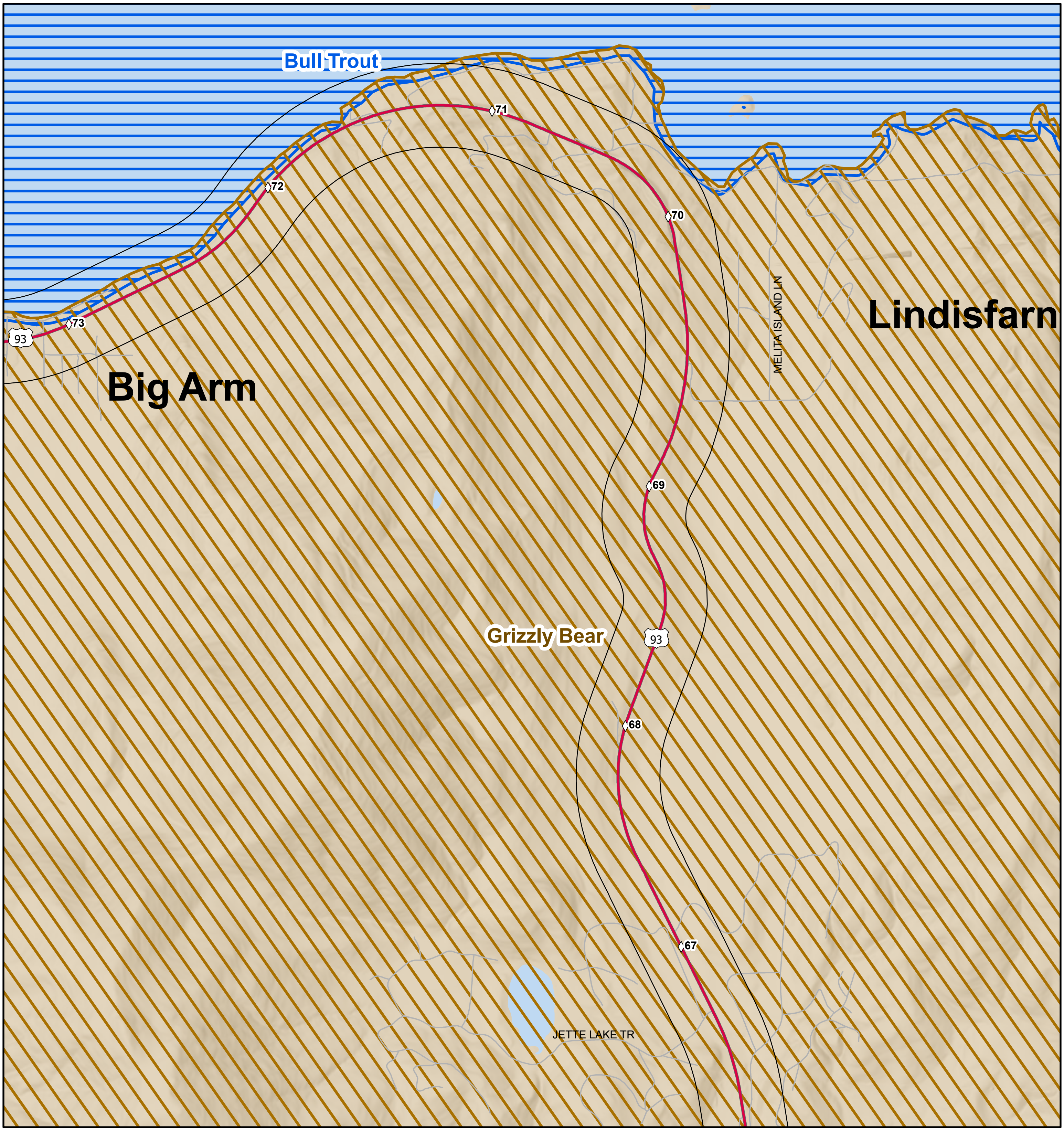
0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species

Page 6 of 8

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

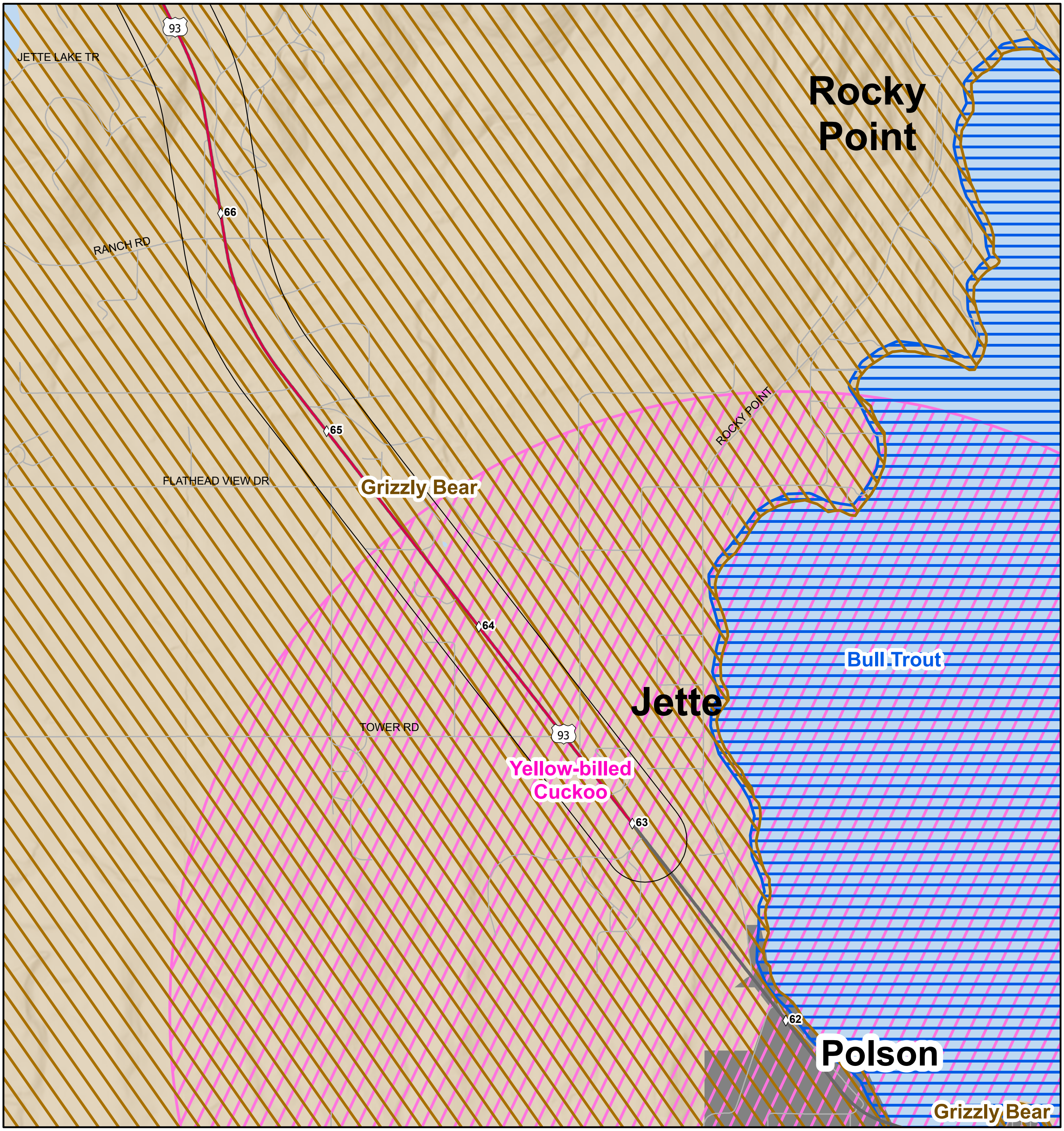
Threatened and Endangered Species

Birds
Fish
Mammals

0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Threatened and Endangered Species
Birds
Fish
Mammals

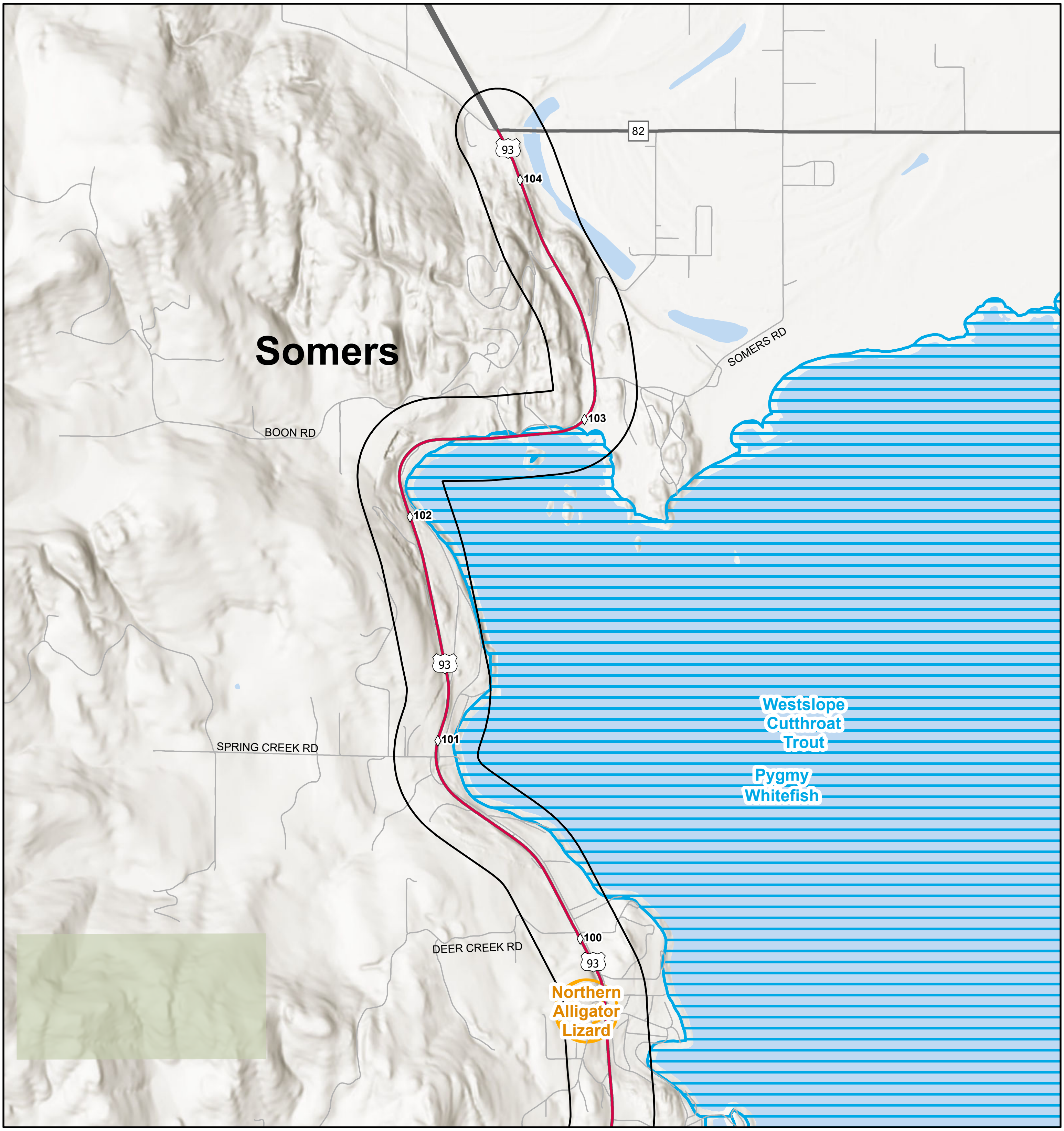
0 0.25 0.5 1 1.5 Miles

N

Figure A.12: Threatened and Endangered Species

Page 8 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Species of Concern

- Fish
- Reptiles
- Other
- Vascular Plants

0 0.25 0.5 1 1.5 Miles

N

Figure A.13: Species of Concern Occurrences

Page 1 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Species of Concern

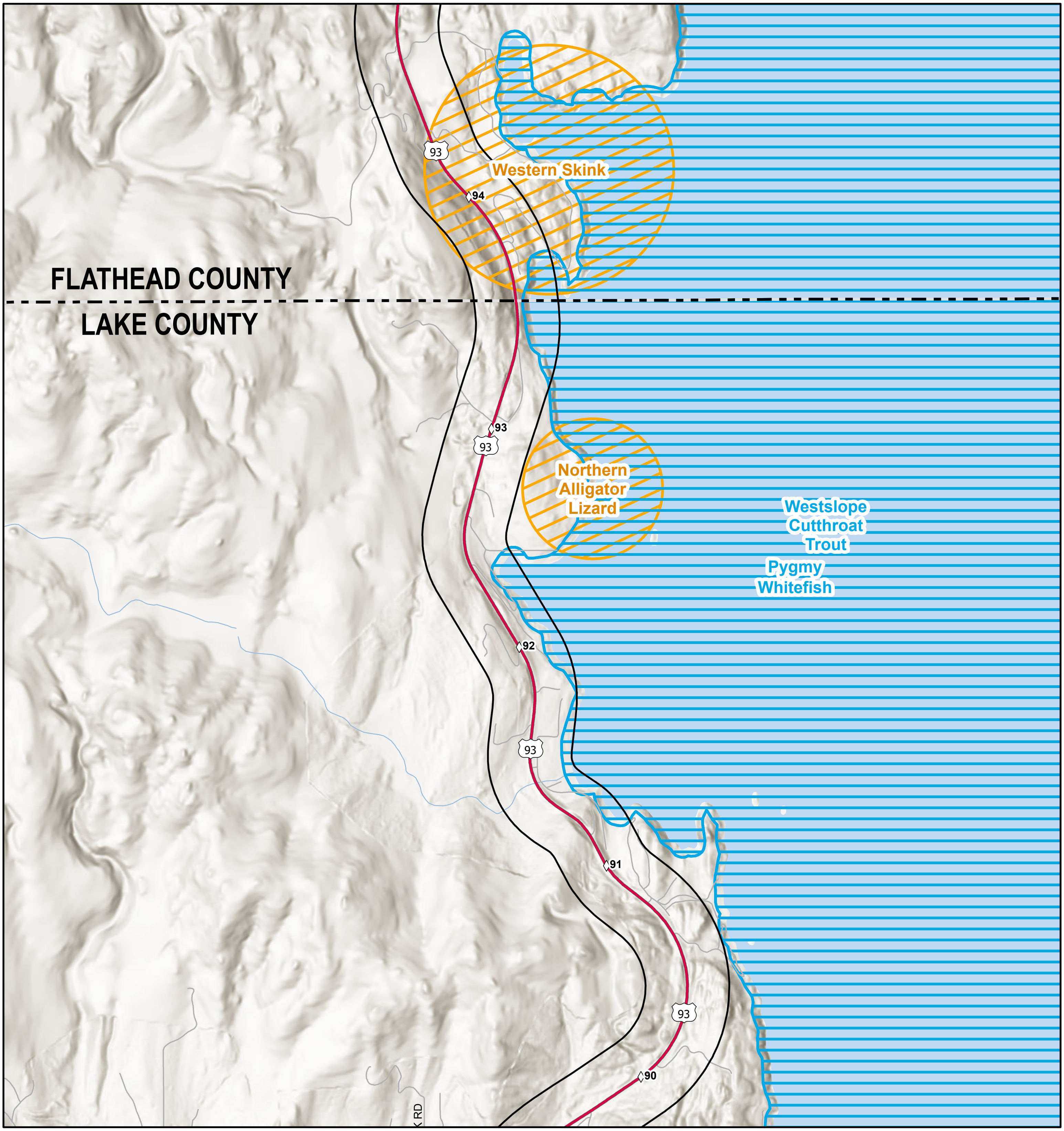
Fish
Reptiles
Other
Vascular Plants

0 0.25 0.5 1 1.5 Miles

N

Figure A.13: Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Species of Concern

- Fish
- Reptiles
- Other
- Vascular Plants

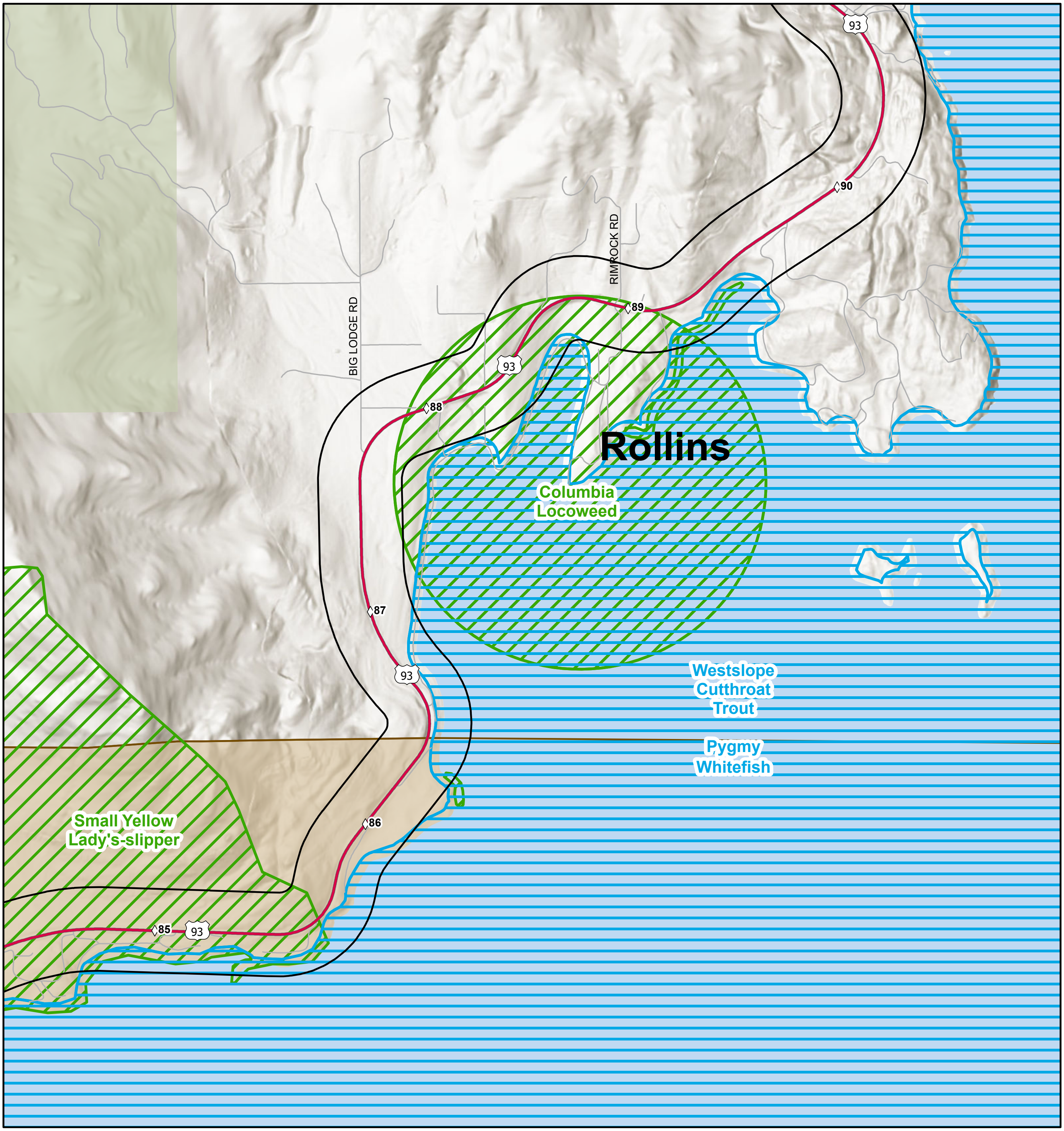
0 0.25 0.5 1 1.5 Miles

N

Figure A.13: Species of Concern Occurrences

Page 3 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Species of Concern

Fish
Reptiles
Other
Vascular Plants

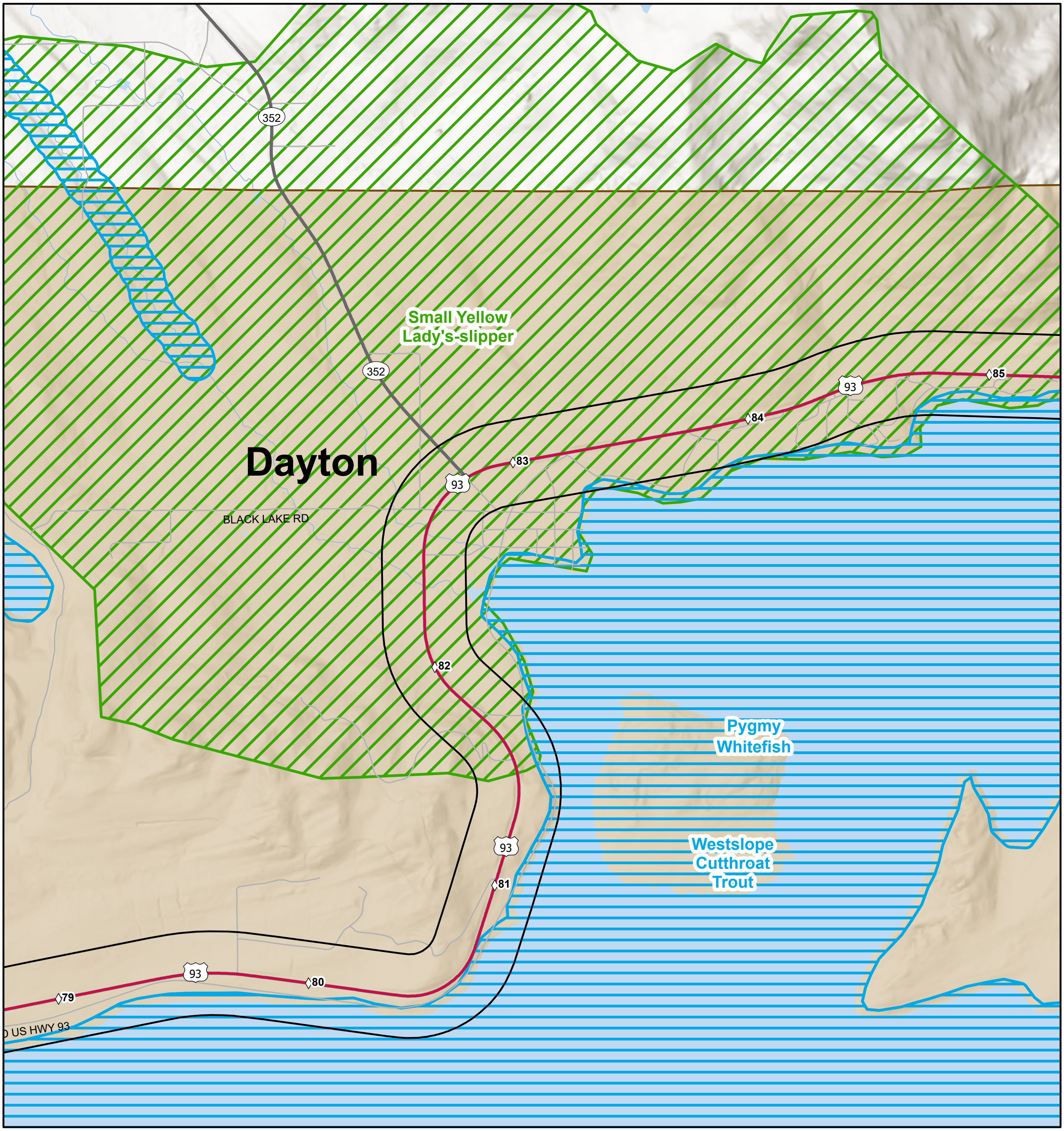
0 0.25 0.5 1 1.5 Miles

N

Figure A.13: Species of Concern Occurrences

Page 4 of 8

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Species of Concern

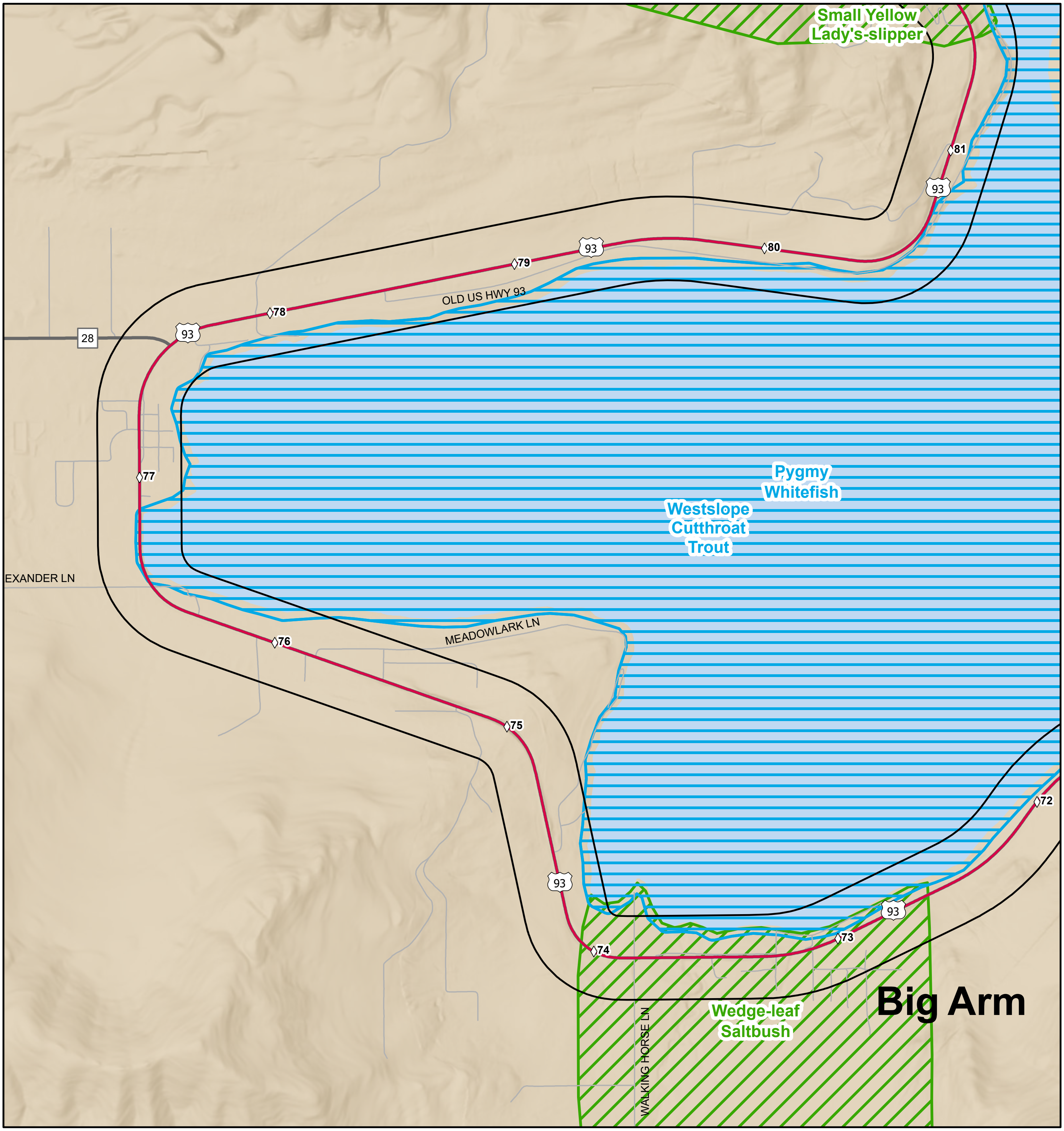
- Fish
- Reptiles
- Other
- Vascular Plants

0 0.25 0.5 1 1.5 Miles

N

Figure A.13: Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Species of Concern

- Fish
- Reptiles
- Other
- Vascular Plants

0 0.25 0.5 1 1.5 Miles

Figure A.13: Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY

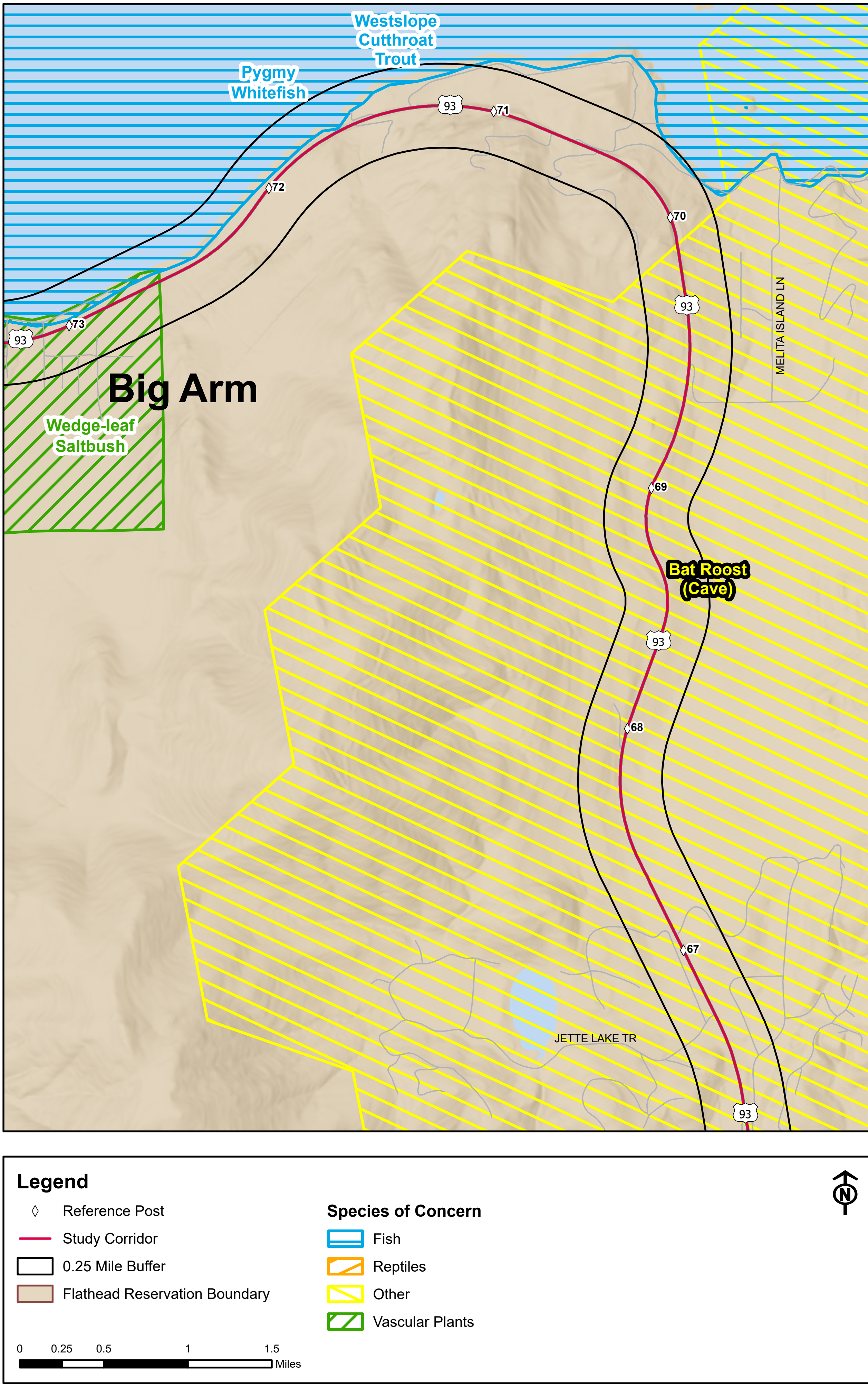
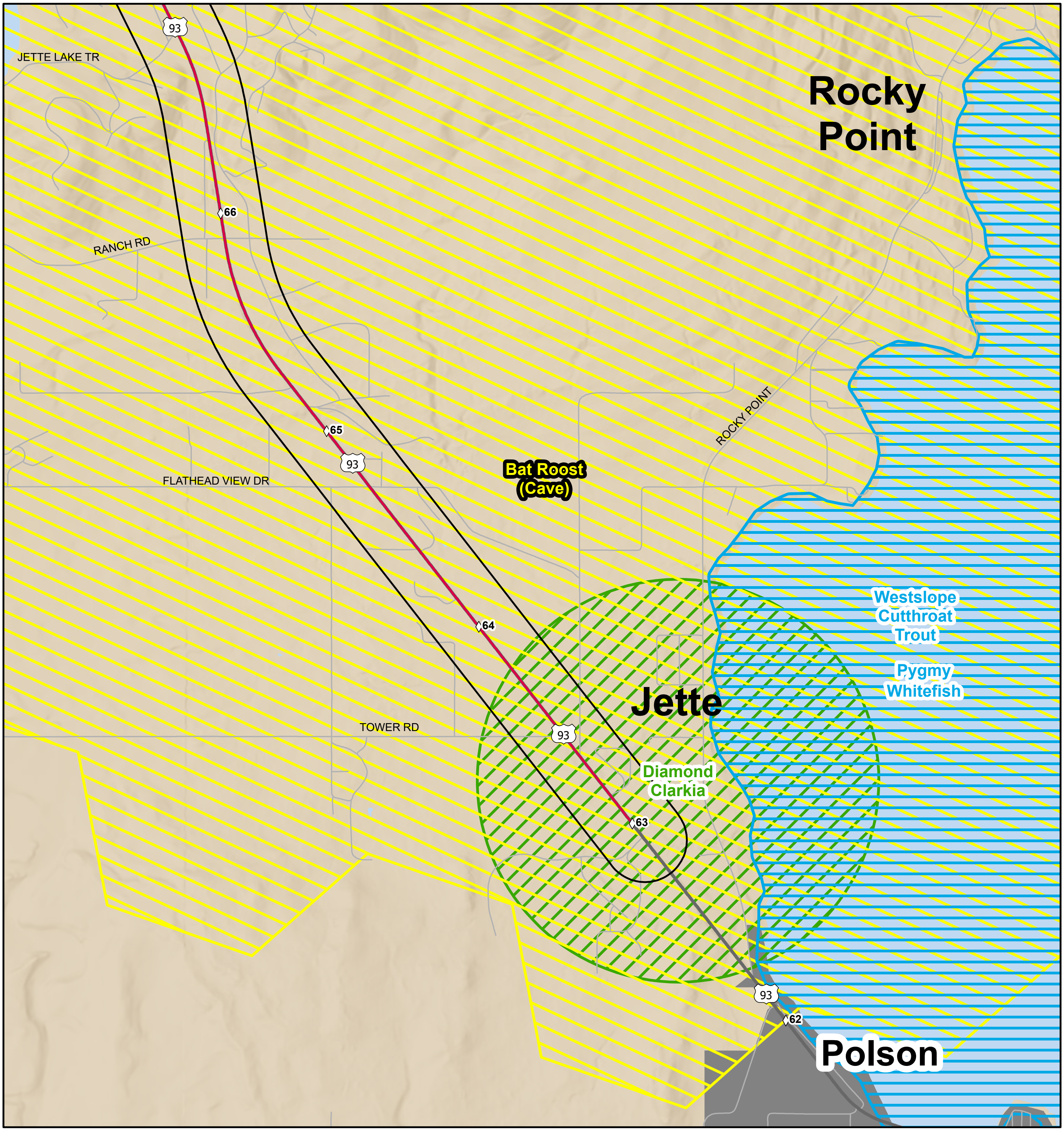


Figure A.13: Species of Concern Occurrences

Page 7 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



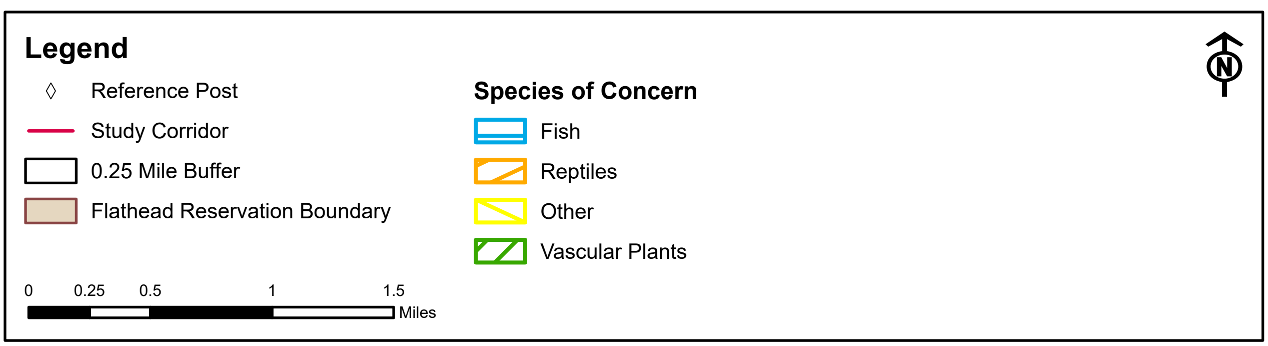
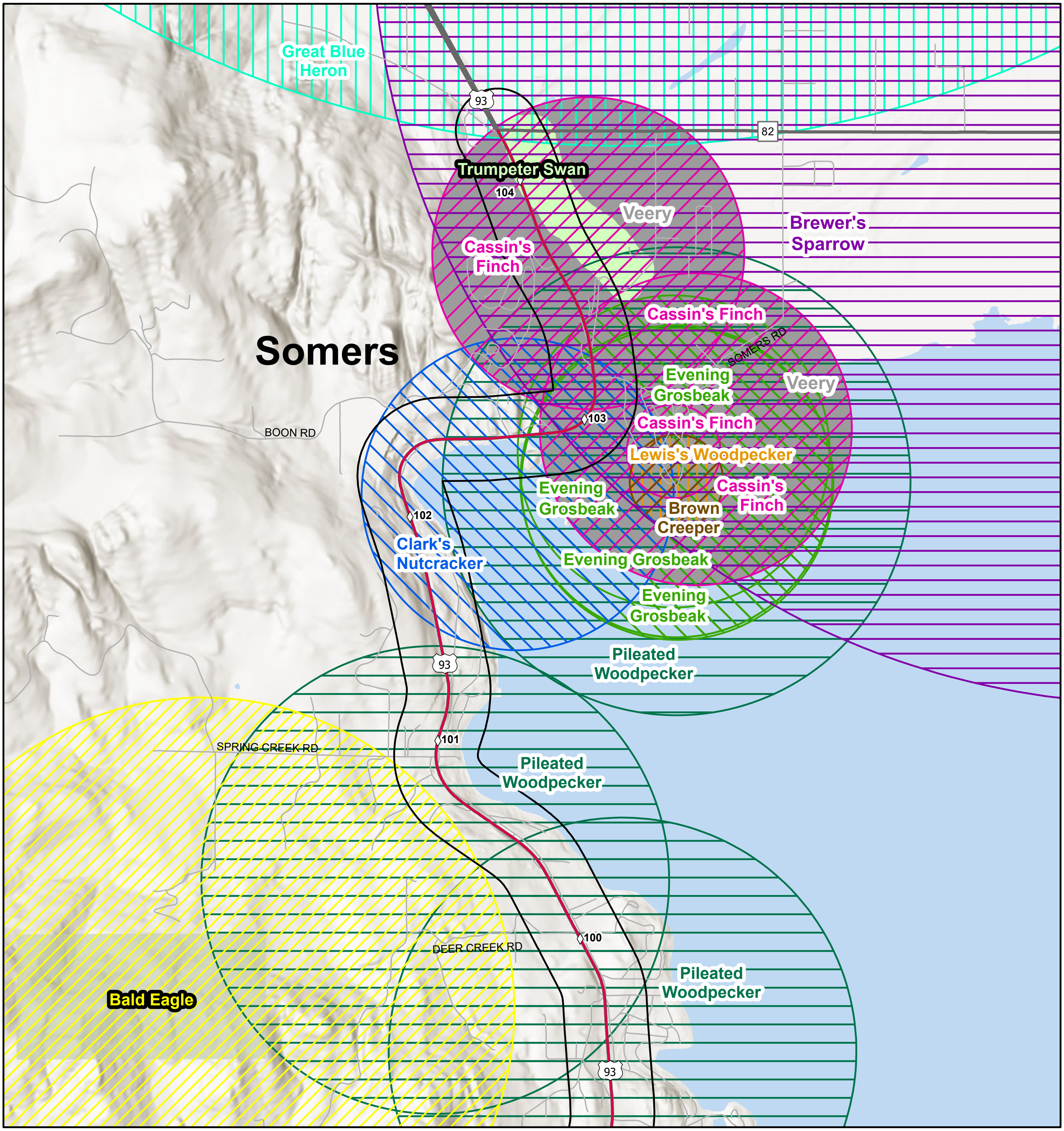


Figure A.13: Species of Concern Occurrences



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Bird Species of Concern

- Bald Eagle
- Brewer's Sparrow
- Great Gray Owl
- Brown Creeper
- Cassin's Finch
- Clark's Nutcracker
- Evening Grosbeak
- Great Blue Heron
- Lewis's Woodpecker
- Long-billed Curlew
- Pileated Woodpecker
- Trumpeter Swan
- Varied Thrush
- Veery

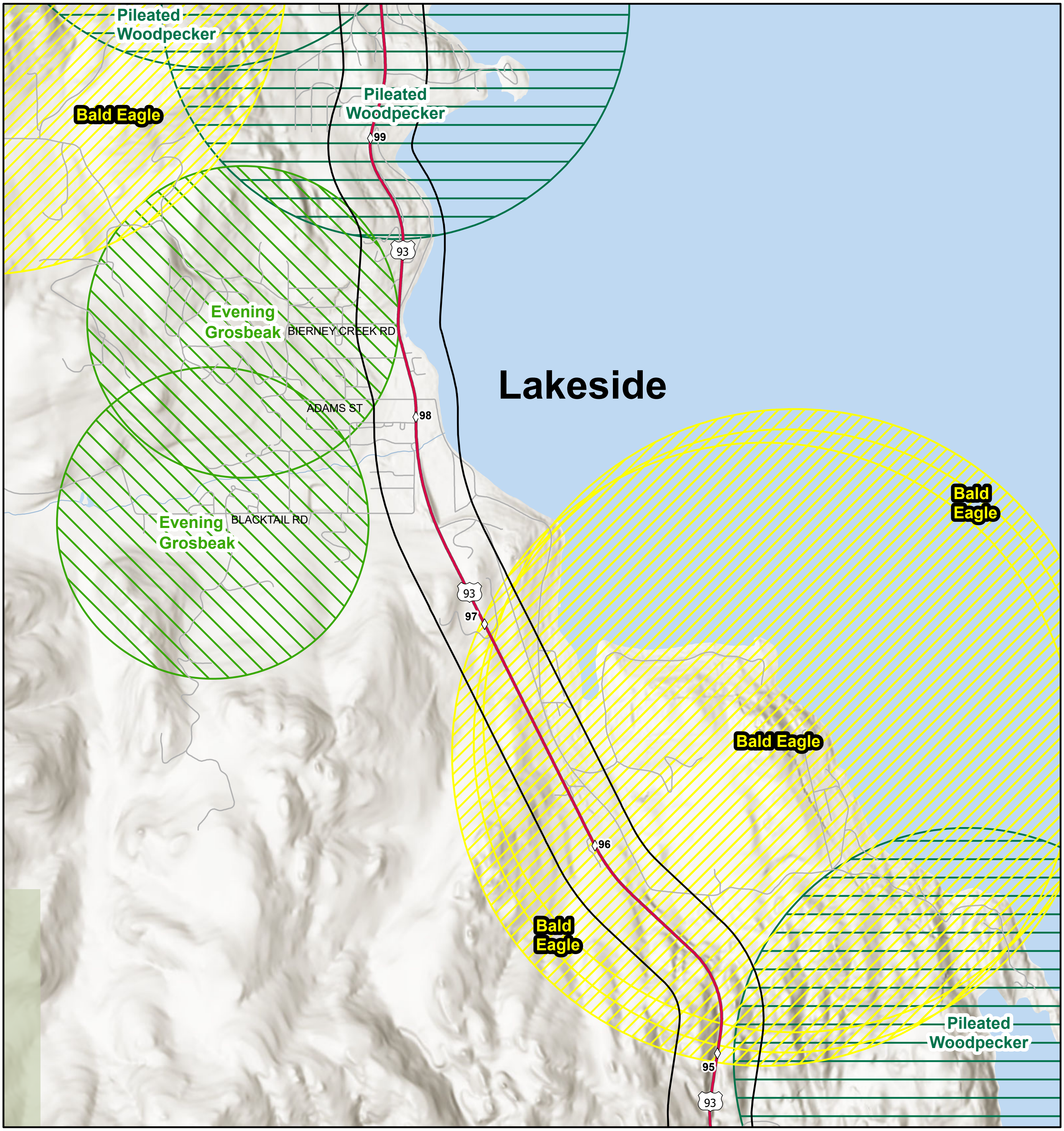
0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

Page 1 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Bird Species of Concern

- Bald Eagle
- Brewer's Sparrow
- Great Gray Owl
- Brown Creeper
- Cassin's Finch
- Clark's Nutcracker
- Evening Grosbeak
- Great Blue Heron
- Lewis's Woodpecker
- Long-billed Curlew
- Pileated Woodpecker
- Trumpeter Swan
- Varied Thrush
- Veery

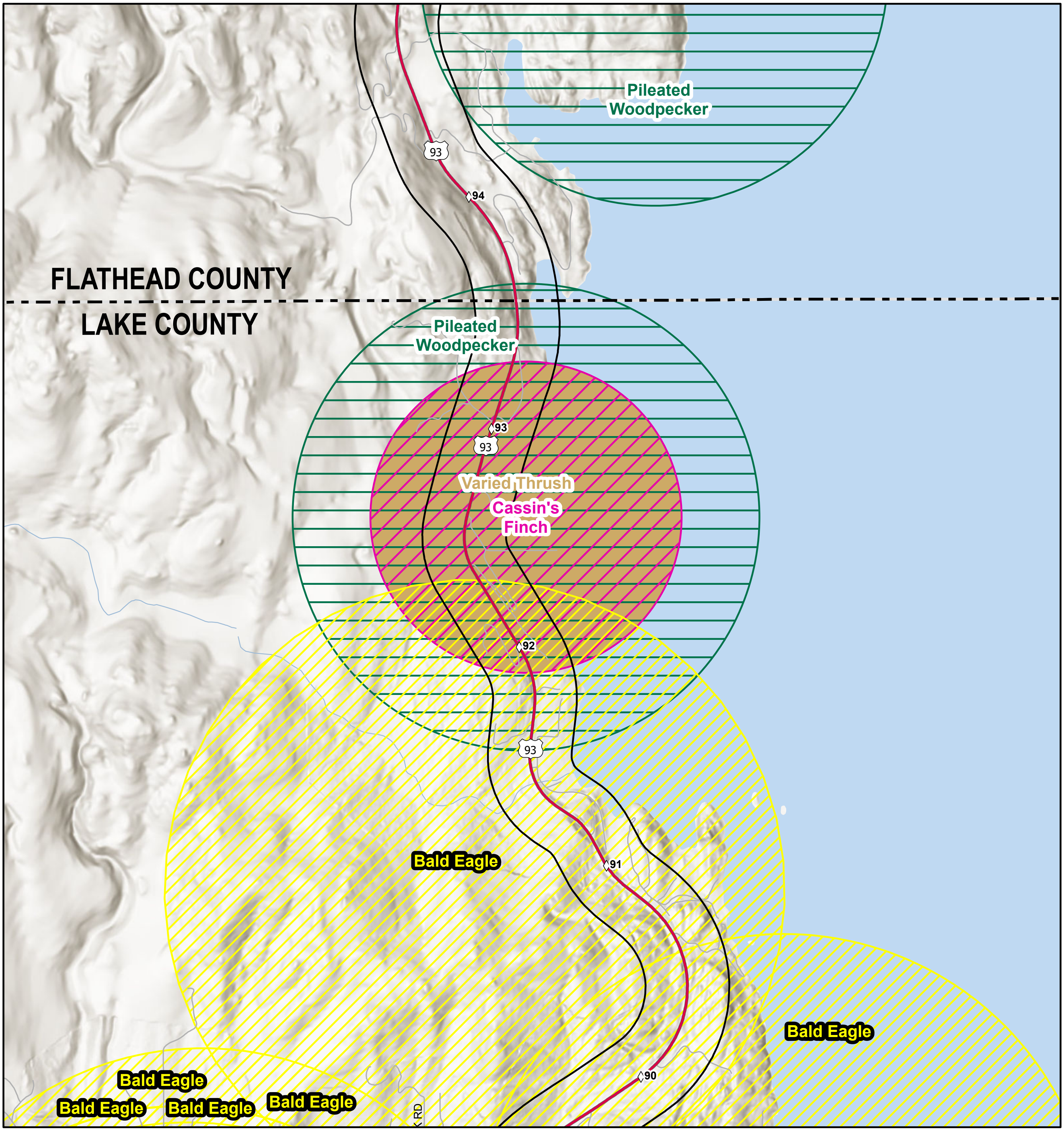
0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

Page 2 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Bird Species of Concern

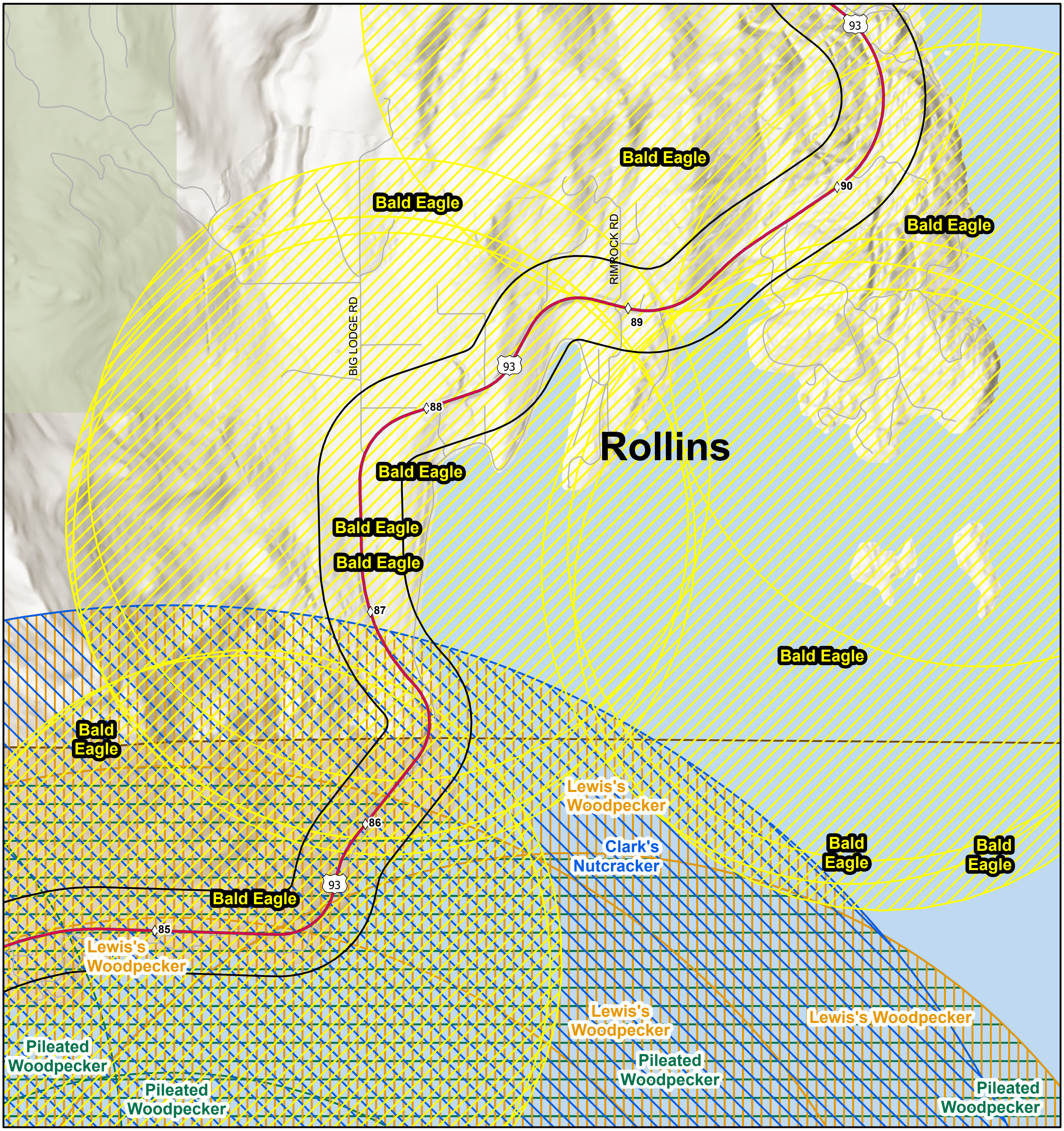
- Bald Eagle
- Brewer's Sparrow
- Great Gray Owl
- Brown Creeper
- Cassin's Finch
- Clark's Nutcracker
- Evening Grosbeak
- Great Blue Heron
- Lewis's Woodpecker
- Long-billed Curlew
- Pileated Woodpecker
- Trumpeter Swan
- Varied Thrush
- Veery

N

0 0.25 0.5 1 1.5 Miles

Figure A.14: Bird Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Bird Species of Concern

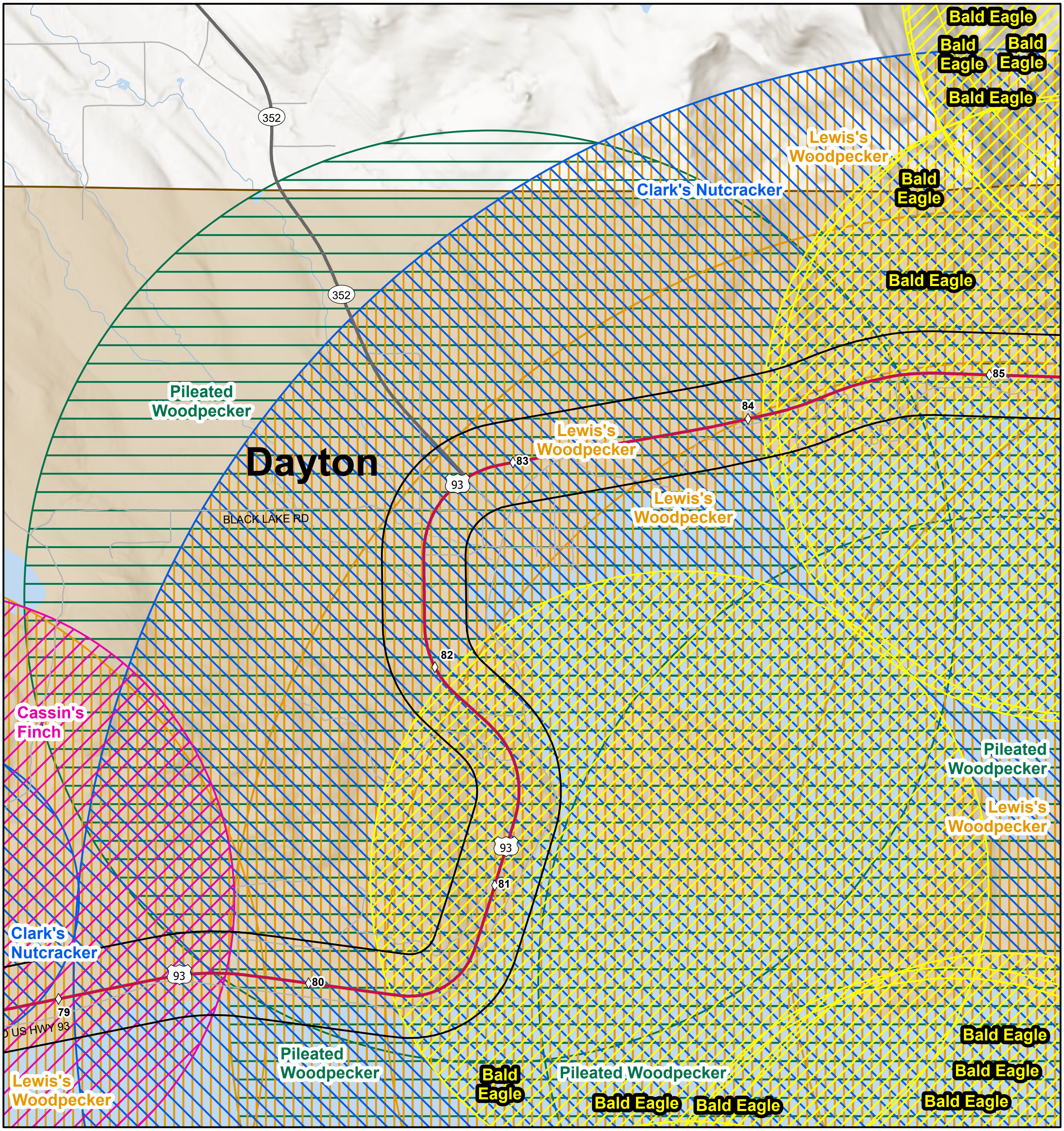
Bald Eagle
Brewer's Sparrow
Great Gray Owl
Brown Creeper
Cassin's Finch
Clark's Nutcracker
Evening Grosbeak
Great Blue Heron
Lewis's Woodpecker
Long-billed Curlew
Pileated Woodpecker
Trumpeter Swan
Varied Thrush
Veery

0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

Reference Post

Study Corridor

0.25 Mile Buffer

Flathead Reservation Boundary

Bird Species of Concern

- Bald Eagle
- Brewer's Sparrow
- Great Gray Owl
- Brown Creeper
- Cassin's Finch
- Clark's Nutcracker
- Evening Grosbeak
- Great Blue Heron
- Lewis's Woodpecker
- Long-billed Curlew
- Pileated Woodpecker
- Trumpeter Swan
- Varied Thrush
- Veery

0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

Page 5 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY

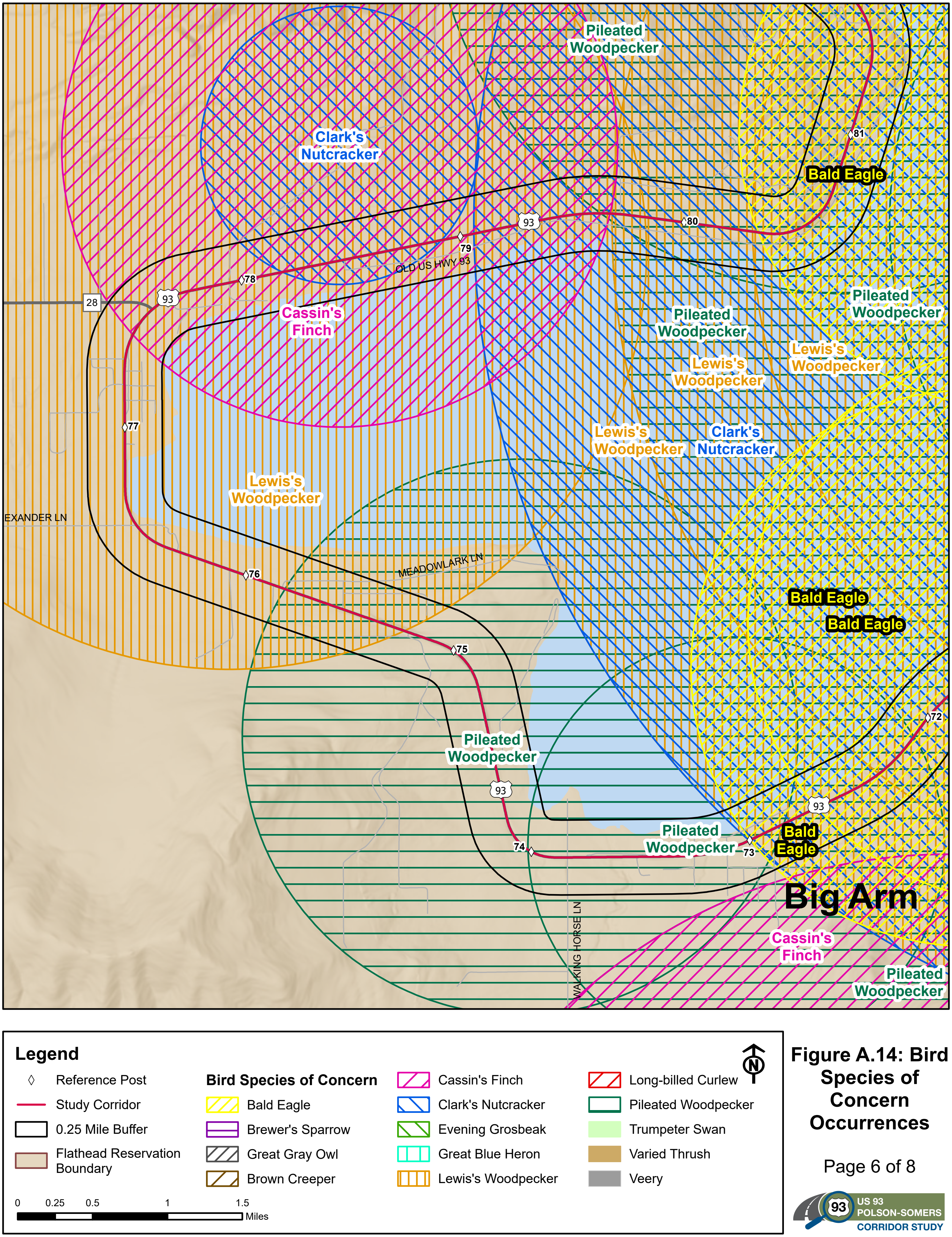
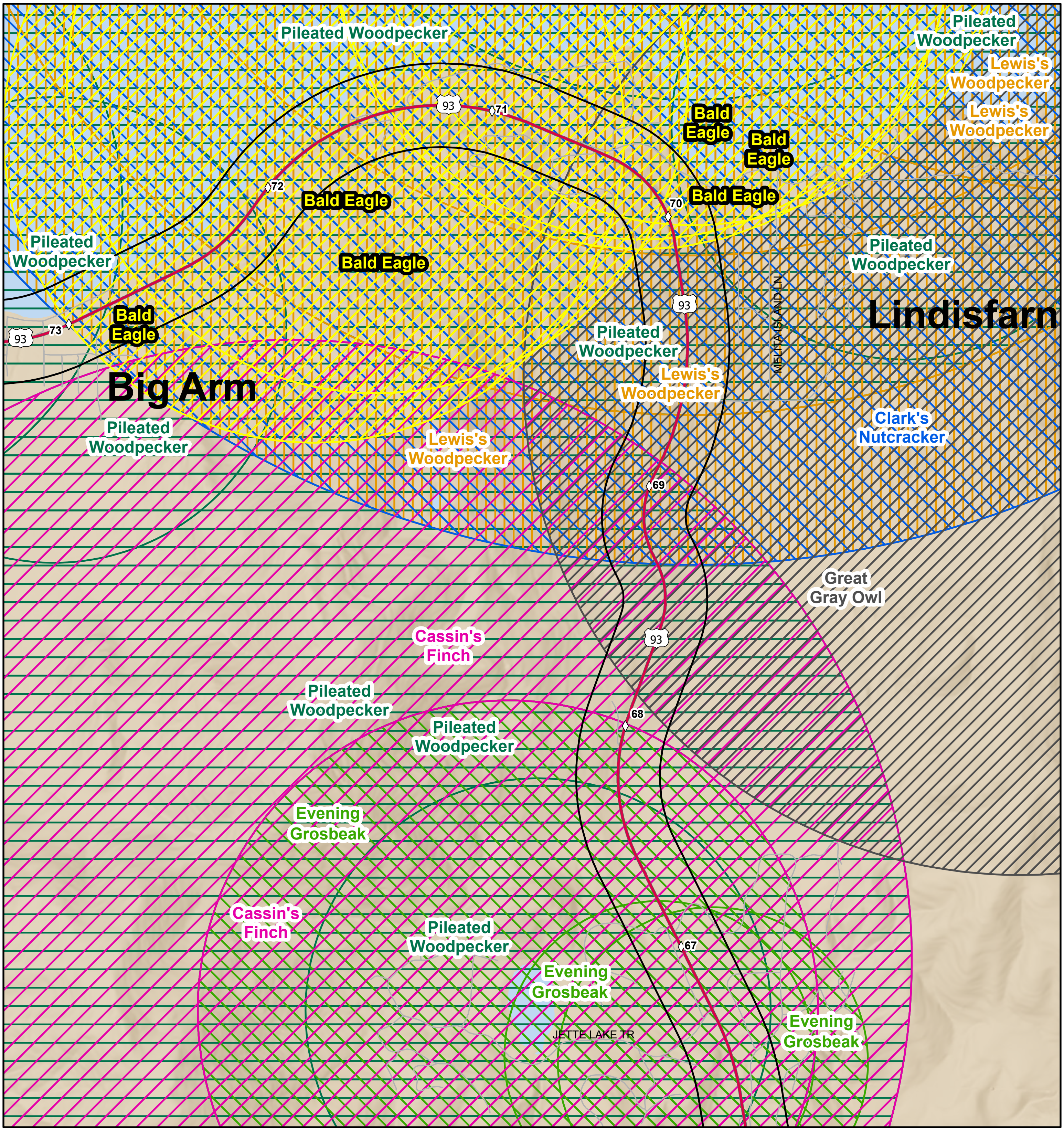


Figure A.14: Bird Species of Concern Occurrences

Page 6 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Bird Species of Concern

Bald Eagle	Cassin's Finch	Long-billed Curlew
Brewer's Sparrow	Clark's Nutcracker	Pileated Woodpecker
Great Gray Owl	Evening Grosbeak	Trumpeter Swan
Brown Creeper	Great Blue Heron	Varied Thrush
	Lewis's Woodpecker	Veery

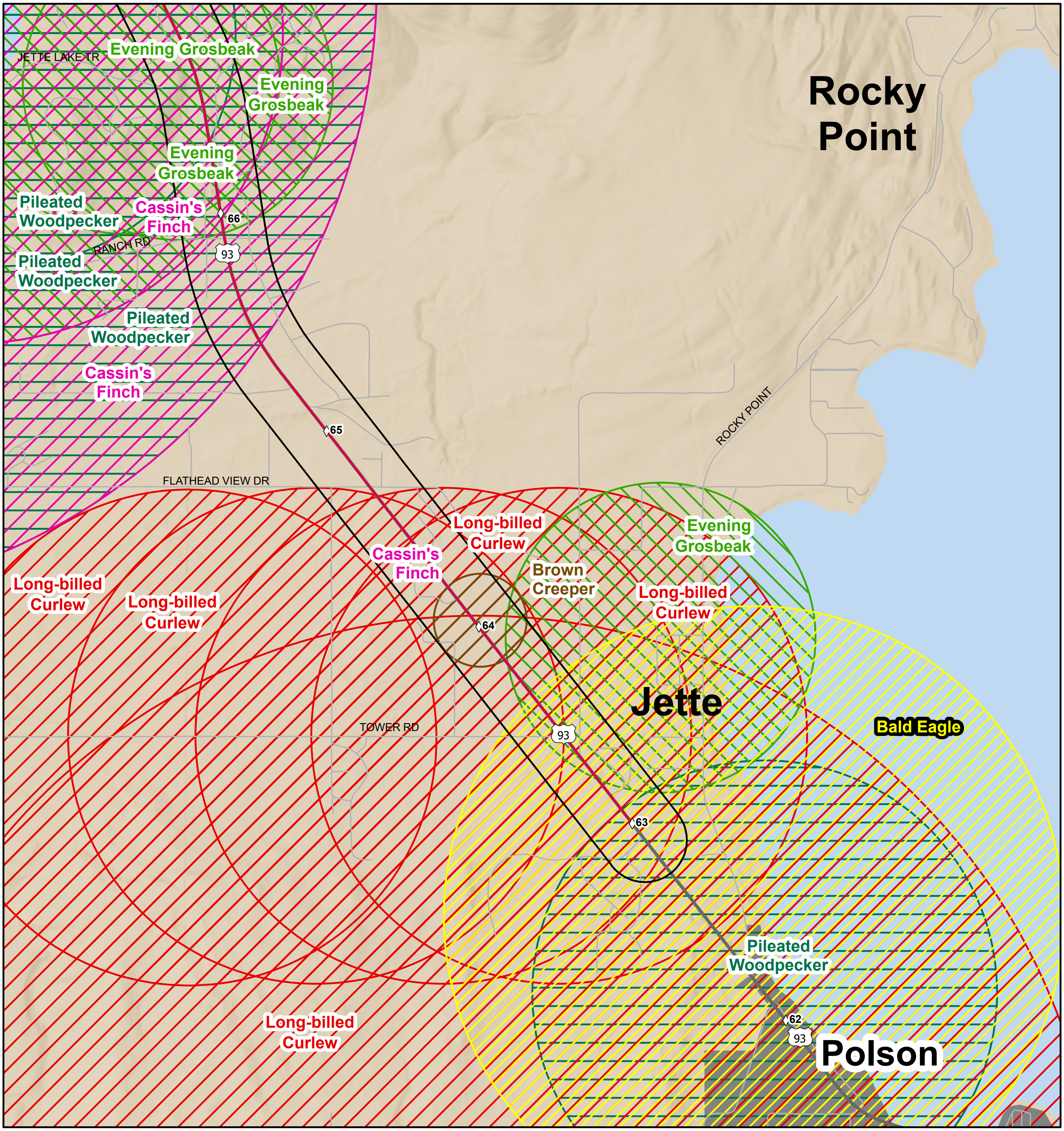
0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

Page 7 of 8

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Bird Species of Concern

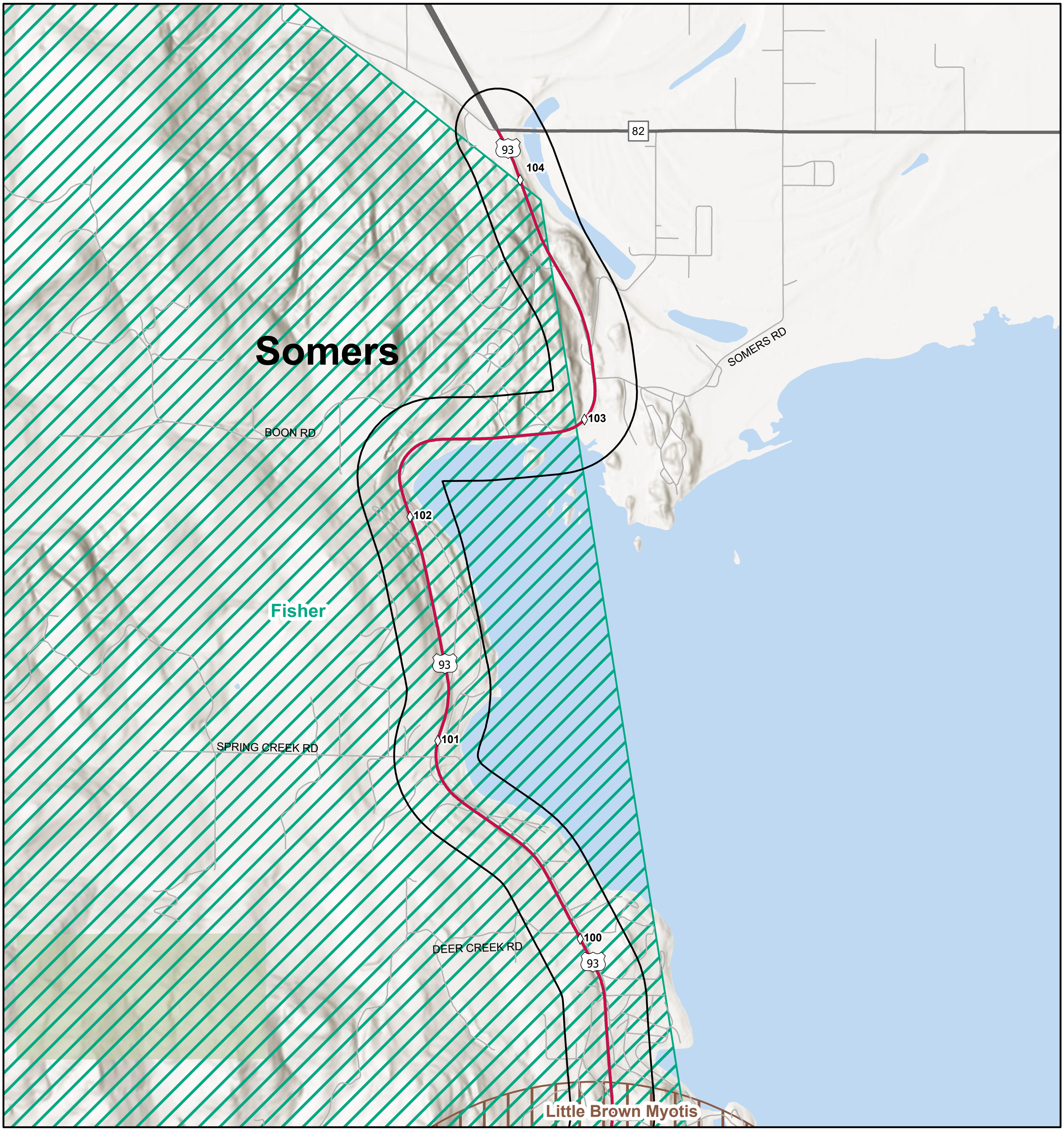
- Bald Eagle
- Brewer's Sparrow
- Great Gray Owl
- Brown Creeper
- Cassin's Finch
- Clark's Nutcracker
- Evening Grosbeak
- Great Blue Heron
- Lewis's Woodpecker
- Long-billed Curlew
- Pileated Woodpecker
- Trumpeter Swan
- Varied Thrush
- Veery

0 0.25 0.5 1 1.5 Miles

N

Figure A.14: Bird Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Mammal Species of Concern

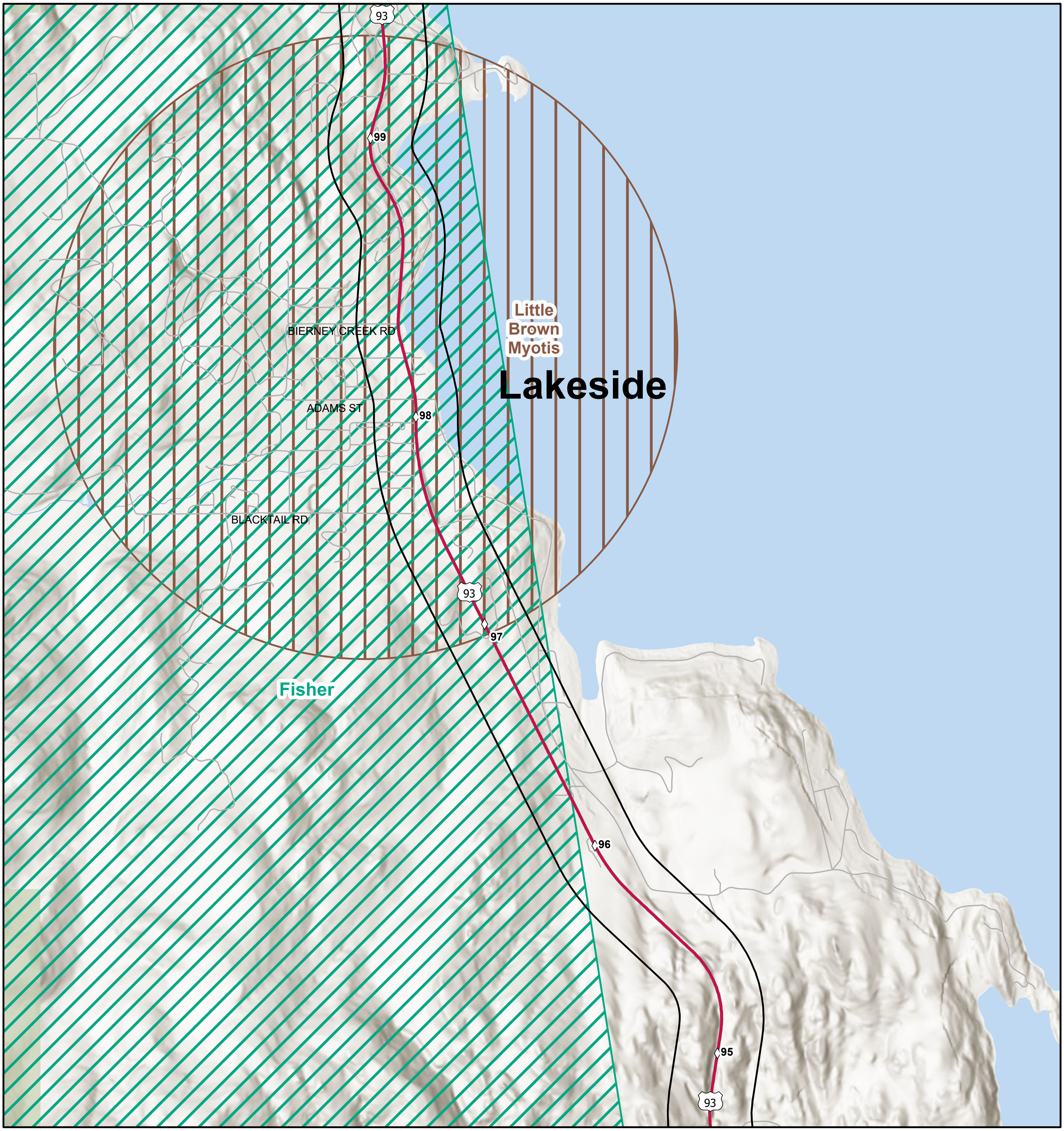
- Fisher
- Fringed Myotis
- Hoary Bat
- Little Brown Myotis
- Long-eared Myotis
- Long-legged Myotis
- Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Mammal Species of Concern

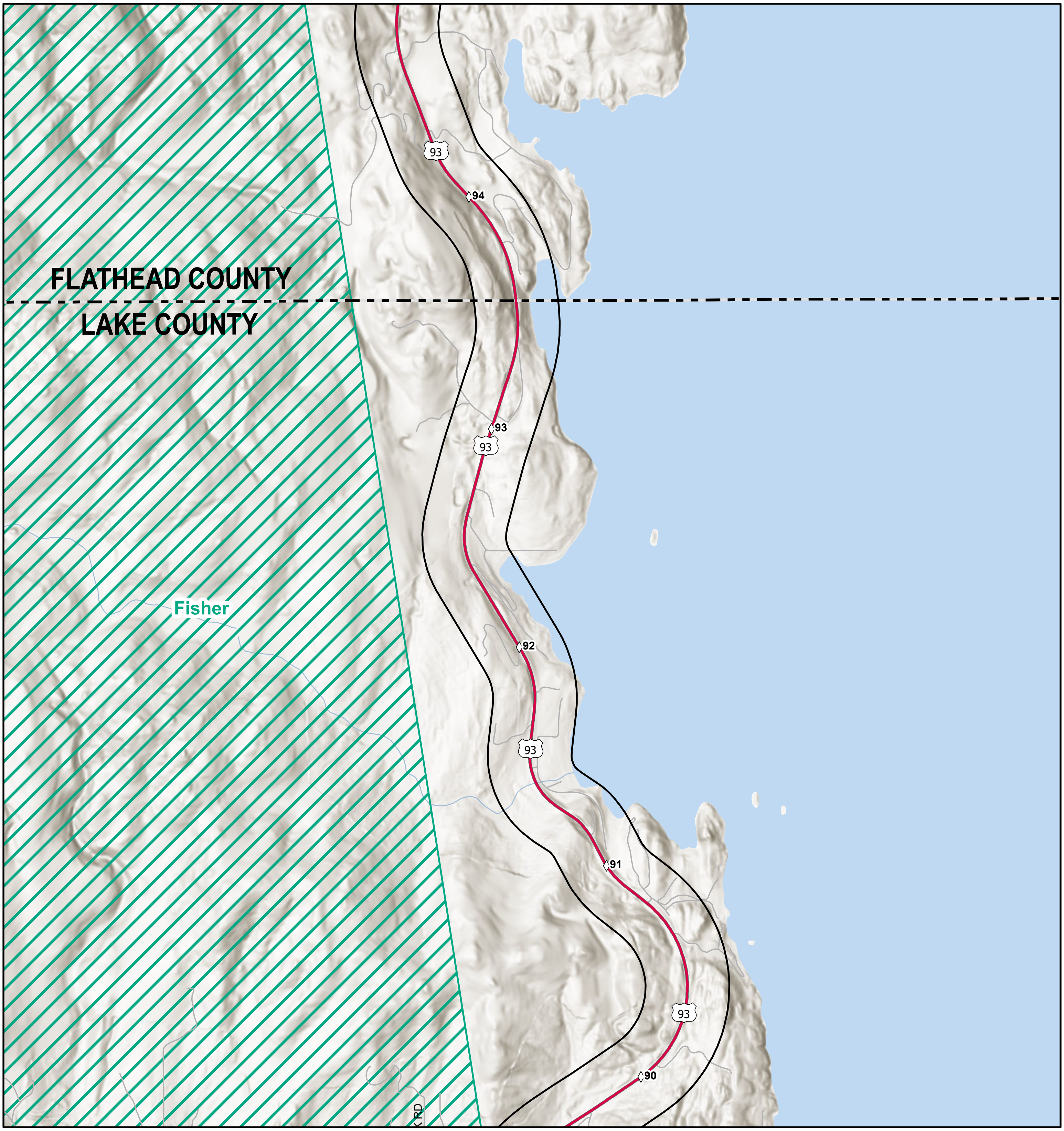
Fisher
Fringed Myotis
Hoary Bat
Little Brown Myotis
Long-eared Myotis
Long-legged Myotis
Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

Figure A.15: Mammal Species of Concern Occurrences

Page 2 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Mammal Species of Concern

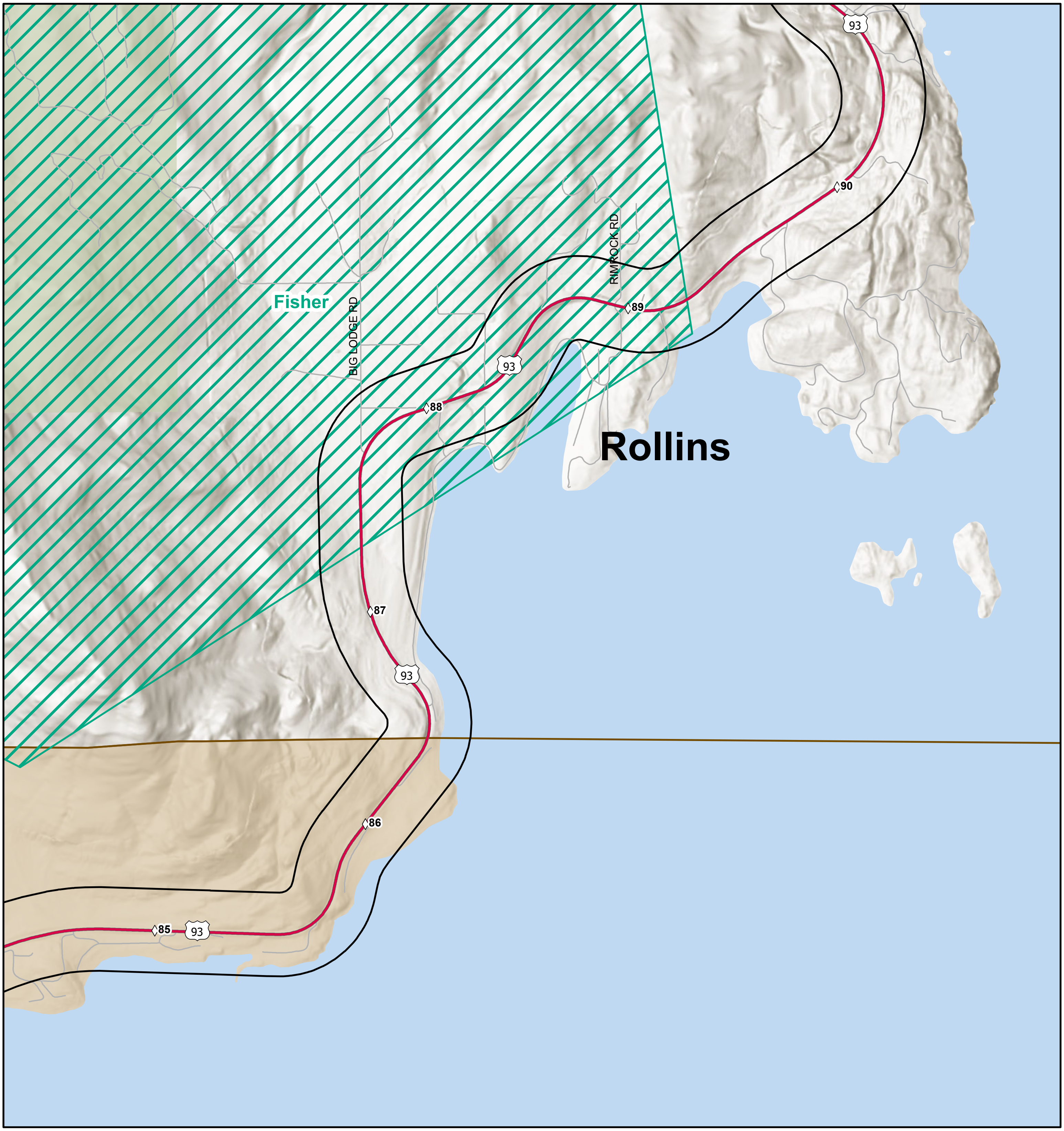
Fisher
Fringed Myotis
Hoary Bat
Little Brown Myotis
Long-eared Myotis
Long-legged Myotis
Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊ Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Mammal Species of Concern

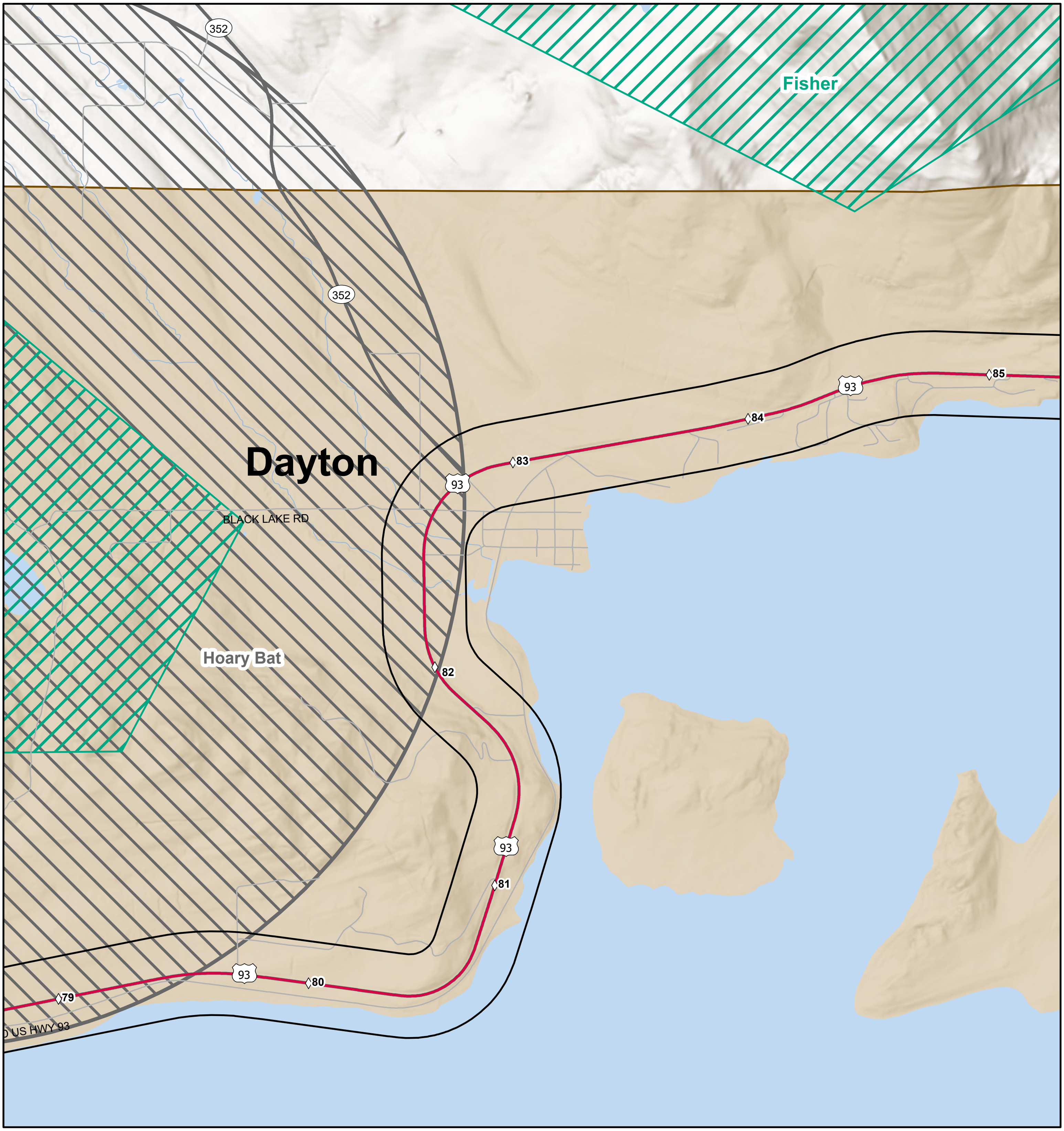
Fisher
Fringed Myotis
Hoary Bat
Little Brown Myotis
Long-eared Myotis
Long-legged Myotis
Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

Reference Post	
Study Corridor	
0.25 Mile Buffer	
Flathead Reservation Boundary	

Mammal Species of Concern

- Fisher
- Fringed Myotis
- Hoary Bat
- Little Brown Myotis
- Long-eared Myotis
- Long-legged Myotis
- Townsend's Big-eared Bat

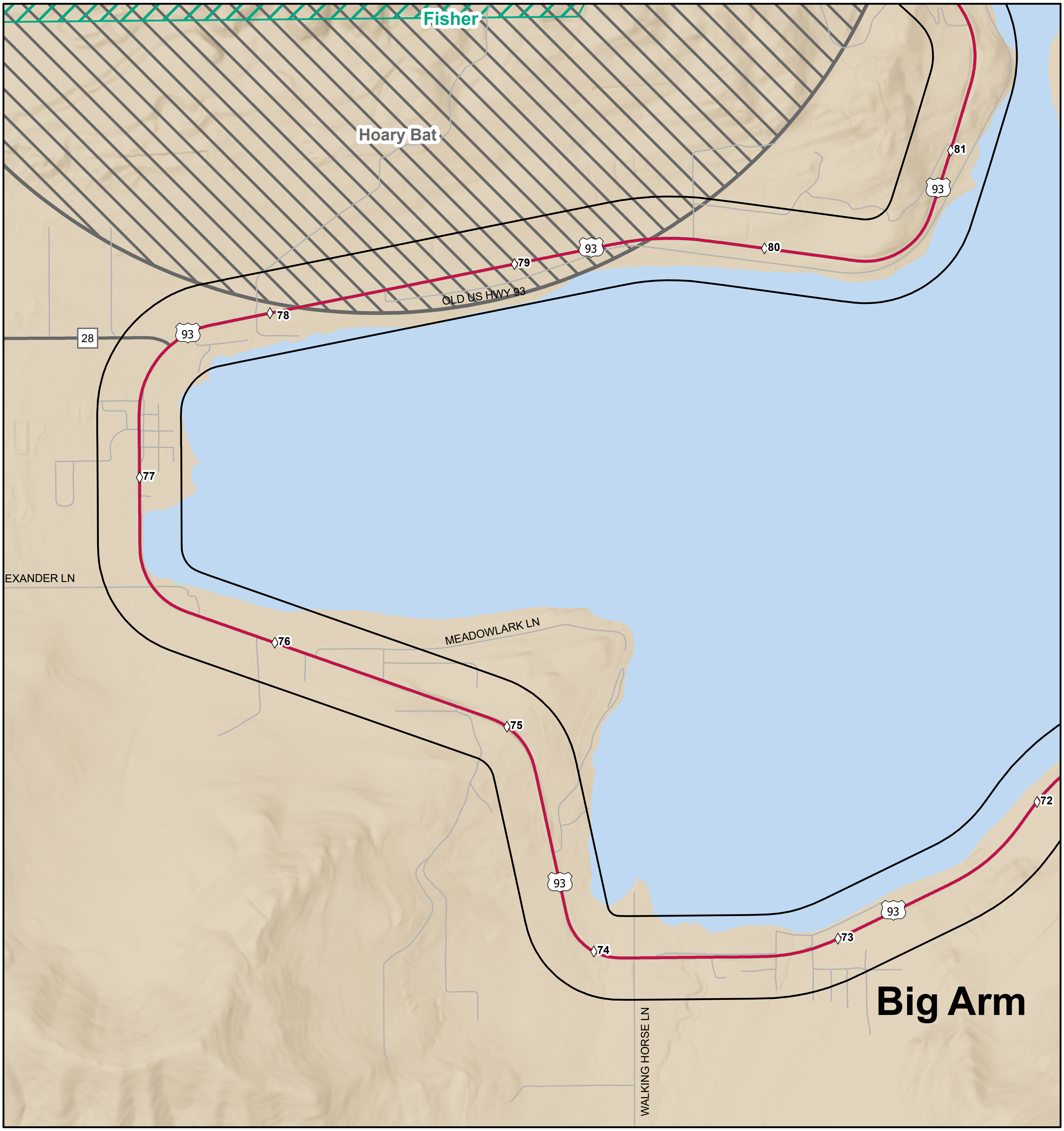
0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

Page 5 of 8

93 US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

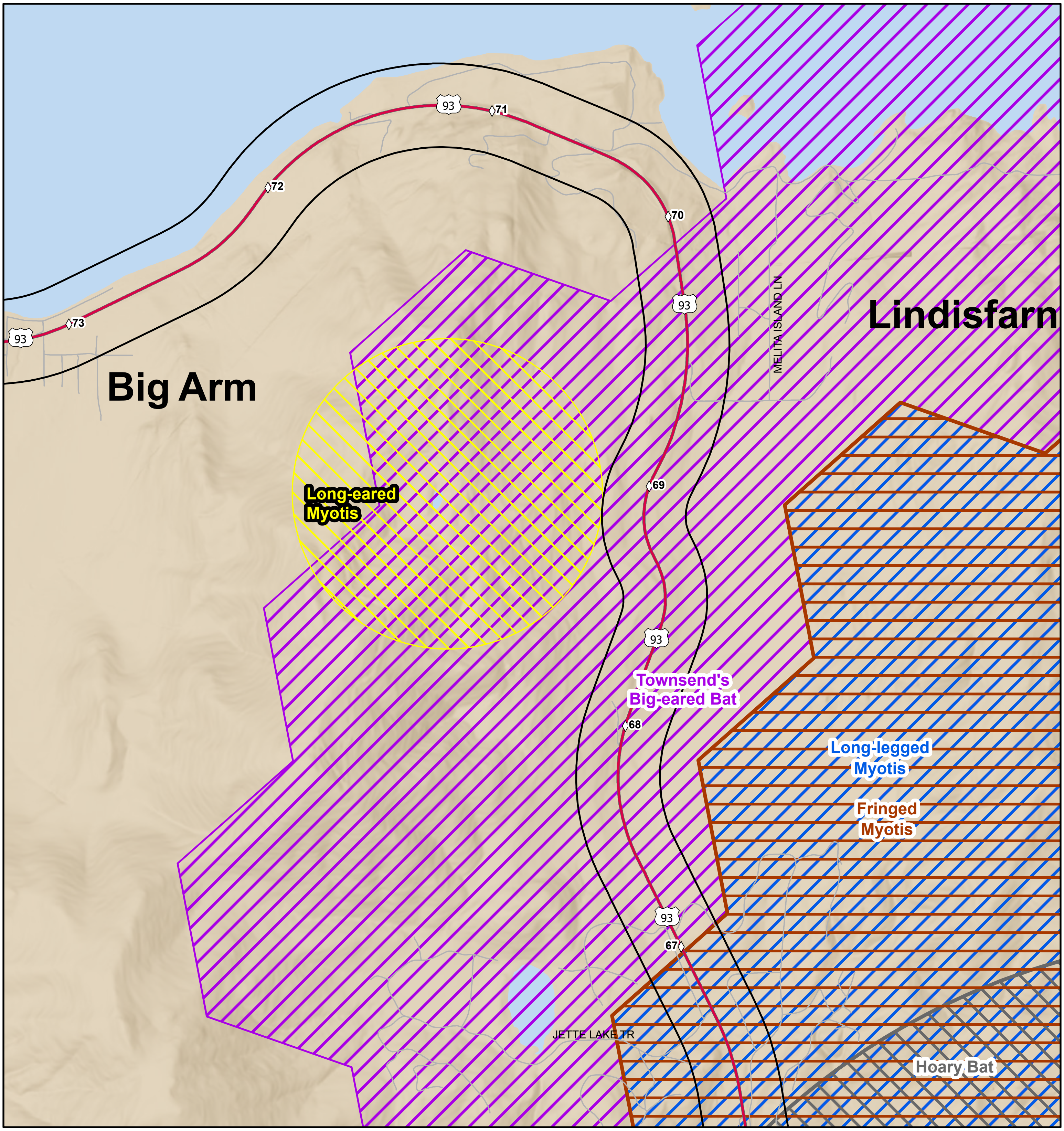
Mammal Species of Concern

- Fisher
- Fringed Myotis
- Hoary Bat
- Little Brown Myotis
- Long-eared Myotis
- Long-legged Myotis
- Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences



Legend

- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Mammal Species of Concern

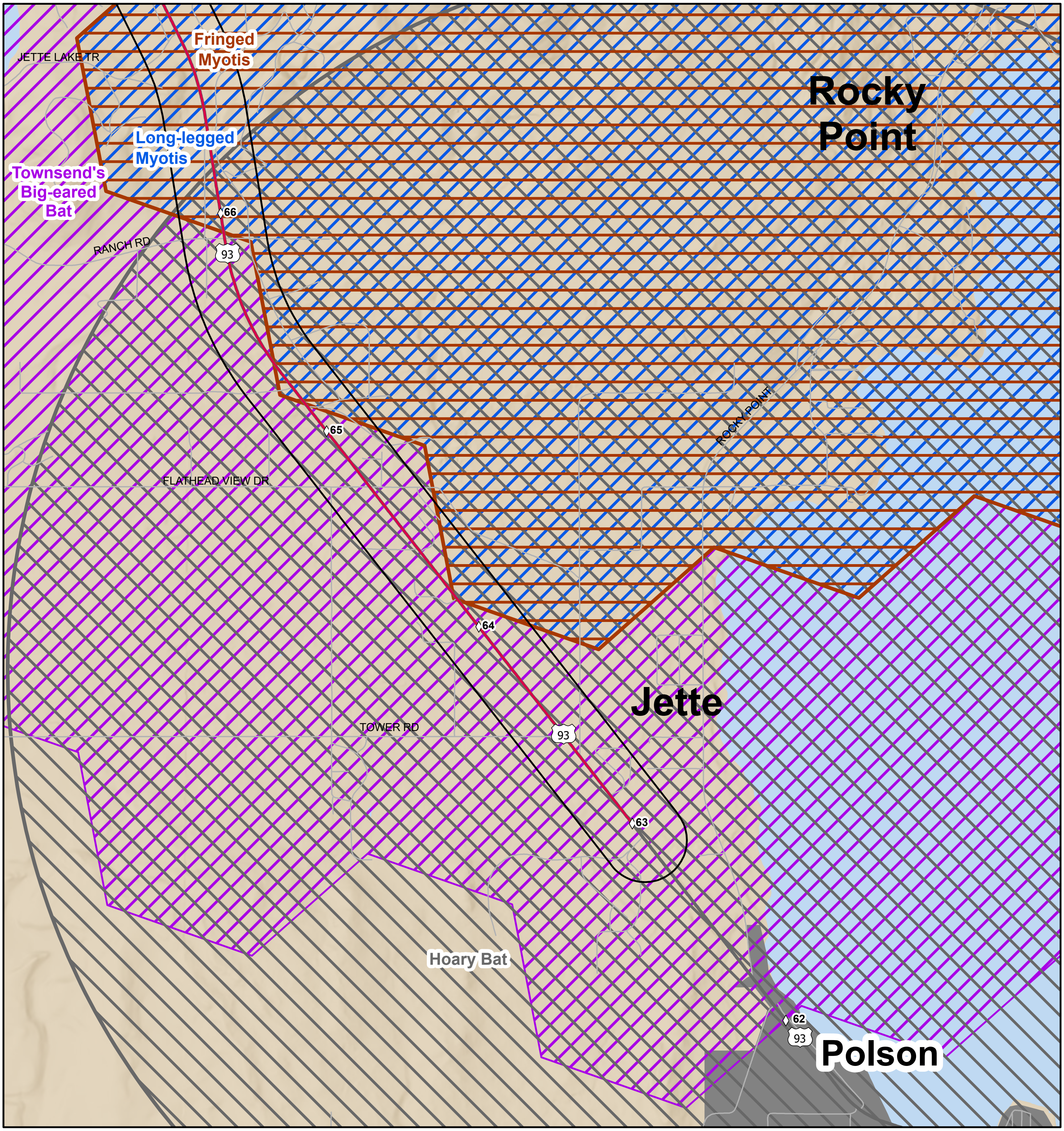
- Fisher
- Fringed Myotis
- Hoary Bat
- Little Brown Myotis
- Long-eared Myotis
- Long-legged Myotis
- Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



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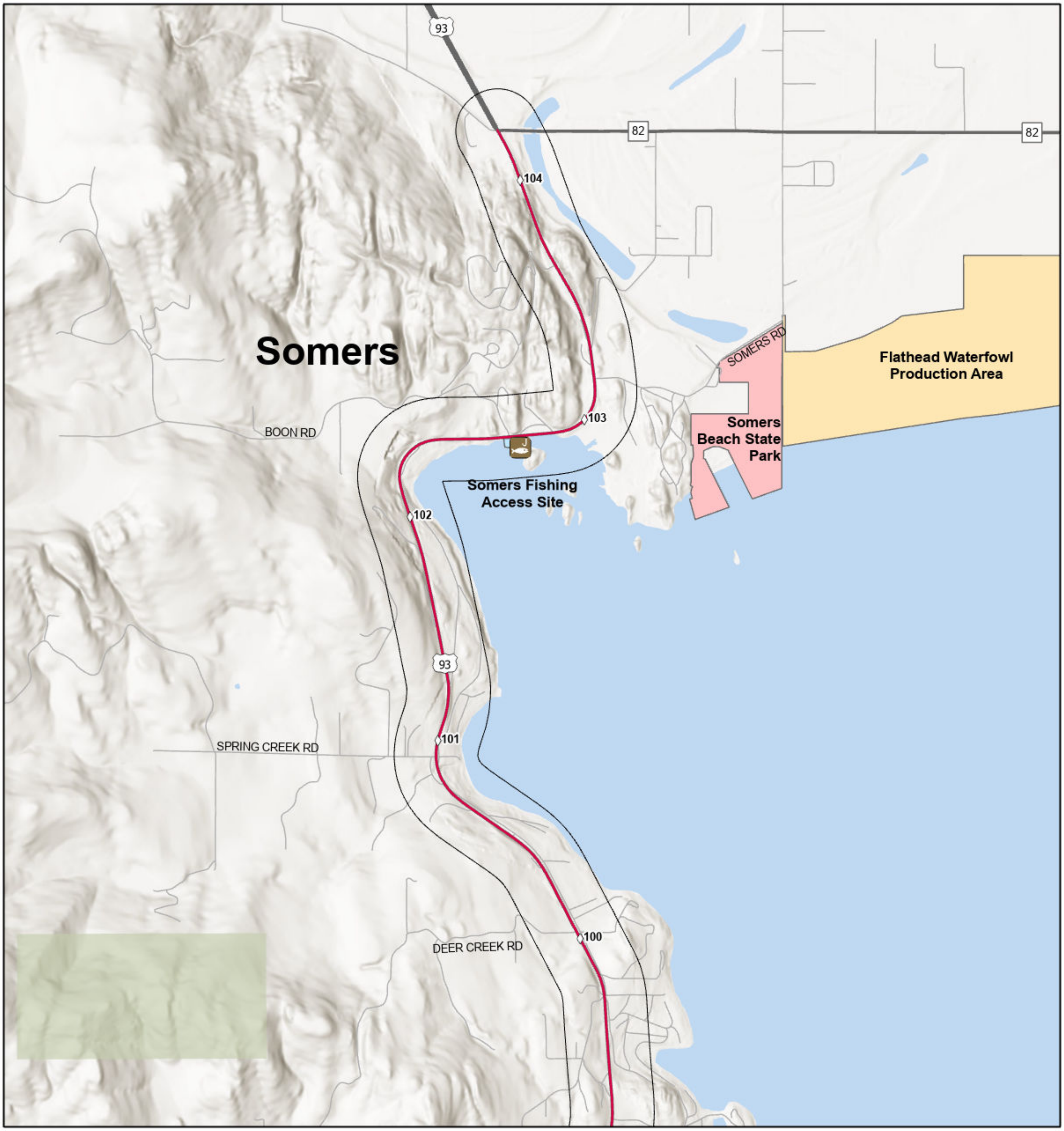
◊ Reference Post	**Mammal Species of Concern**	Little Brown Myotis
Study Corridor	Fisher	Long-eared Myotis
0.25 Mile Buffer	Fringed Myotis	Long-legged Myotis
Flathead Reservation Boundary	Hoary Bat	Townsend's Big-eared Bat

0 0.25 0.5 1 1.5 Miles

N

Figure A.15: Mammal Species of Concern Occurrences

US 93 POLSON-SOMERS CORRIDOR STUDY



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- Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Managed Recreation Areas

- State Park
- Wildlife Habitat Protection Area
- Wildlife Management Area
- Waterfowl Production Area
- Fishing Access Site
- Boat Launch
- Camping
- Fishing Access Site
- Park

0 0.25 0.5 1 1.5 Miles

N

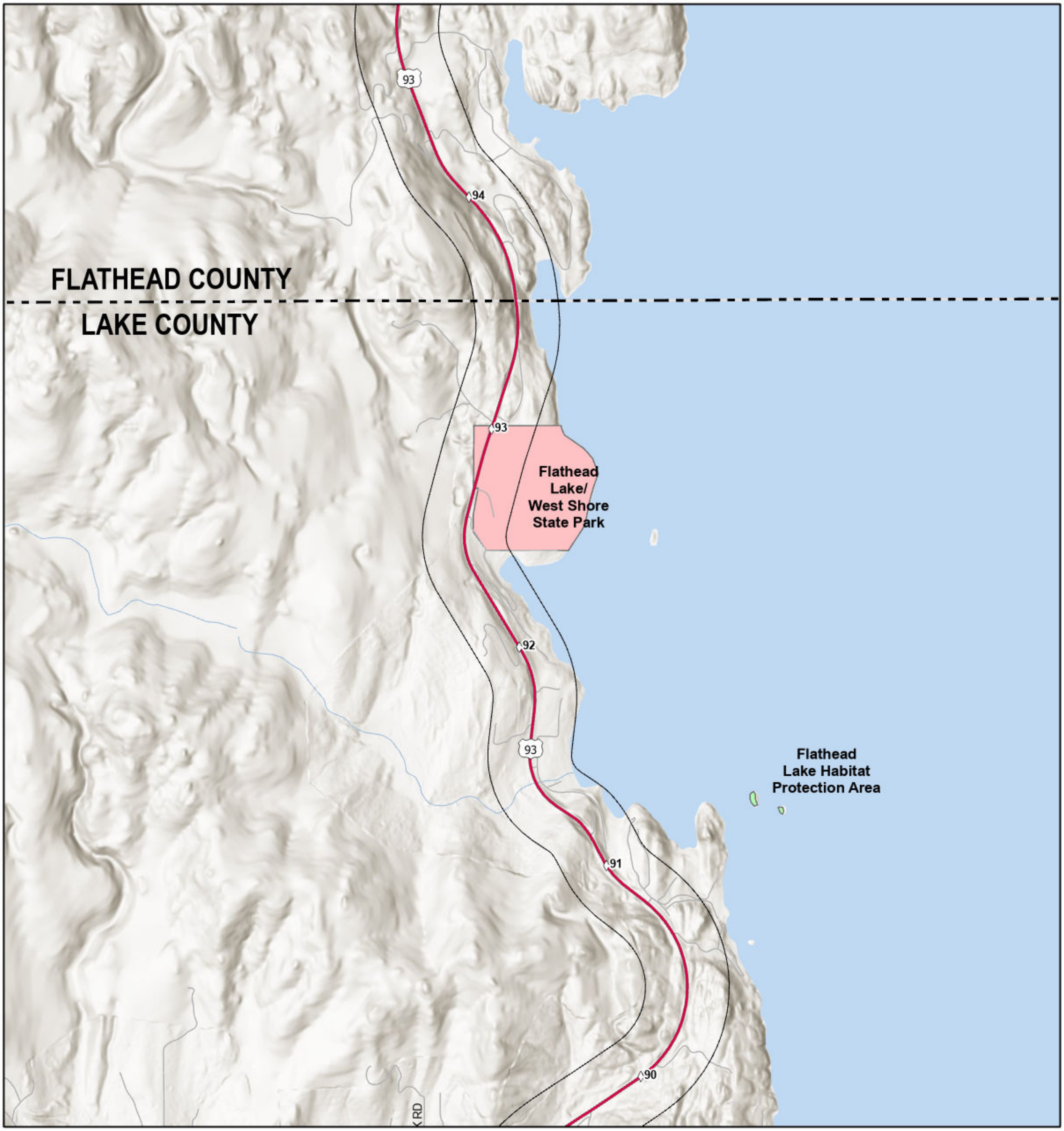
Figure A.16: Recreation Opportunities

Page 1 of 8

US 93 POLSON-SOMERS CORRIDOR STUDY

Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY



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Reference Post
Study Corridor
0.25 Mile Buffer
Flathead Reservation Boundary

Managed Recreation Areas

State Park
Wildlife Habitat Protection Area
Wildlife Management Area
Waterfowl Production Area

Fishing Access Site
Boat Launch
Camping
Fishing Access Site
Park

0 0.25 0.5 1 1.5 Miles

Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY

Legend

- ◊ Reference Post
- Study Corridor
- 0.25 Mile Buffer
- Flathead Reservation Boundary

Managed Recreation Areas

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N

Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY

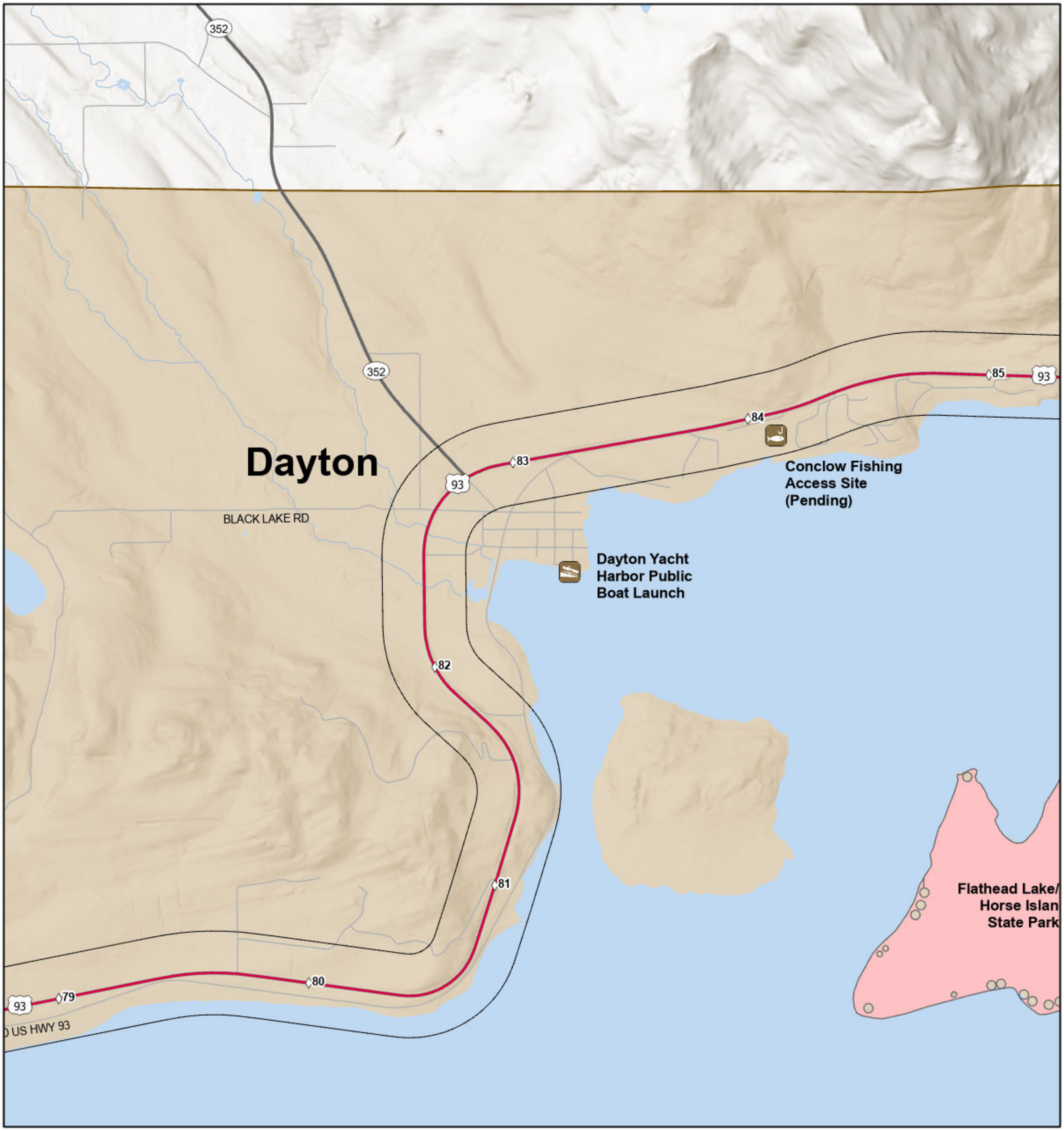

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Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY

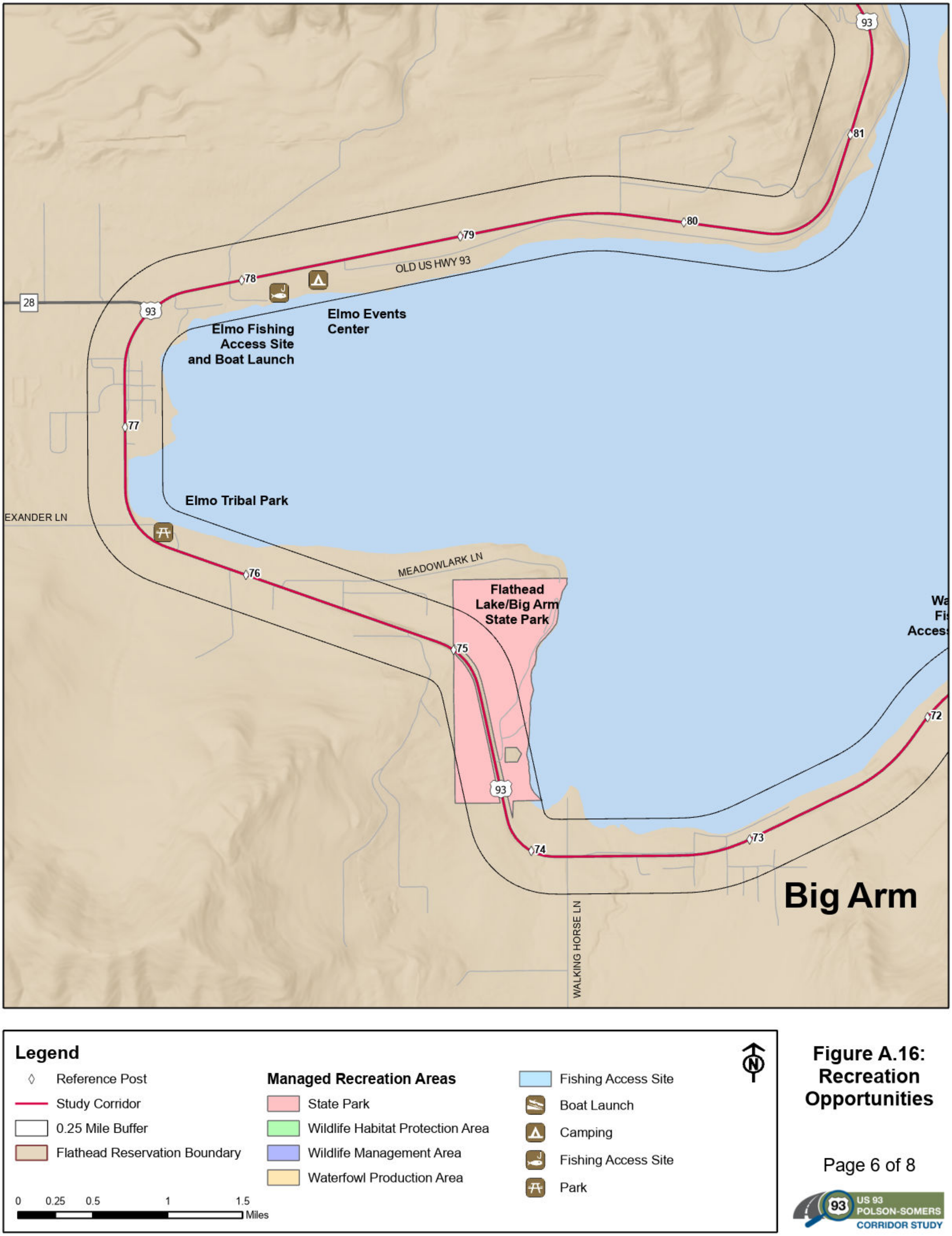
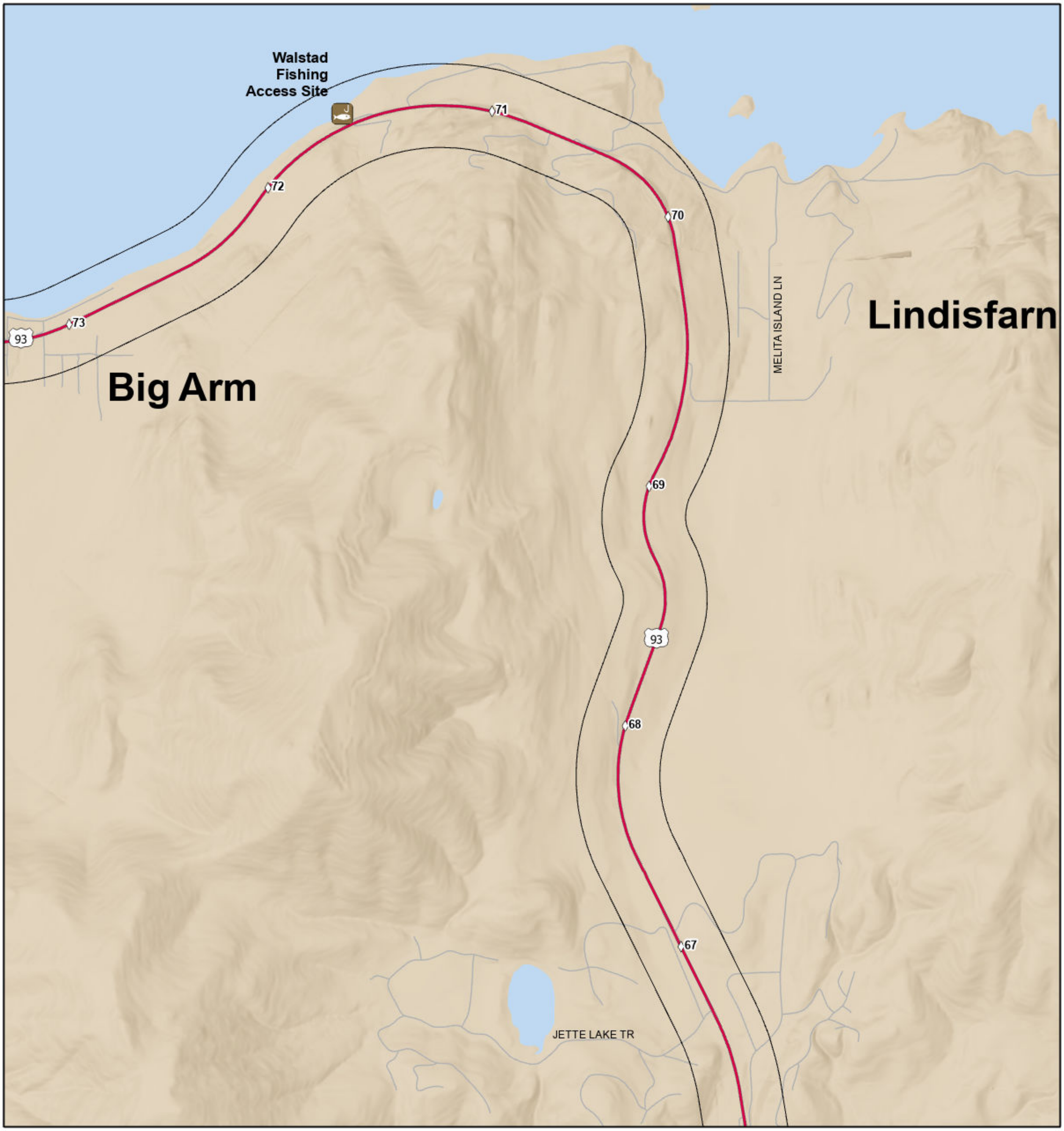


Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY



Legend

◊	Reference Post
	Study Corridor
	0.25 Mile Buffer
	Flathead Reservation Boundary

Managed Recreation Areas

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Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS CORRIDOR STUDY

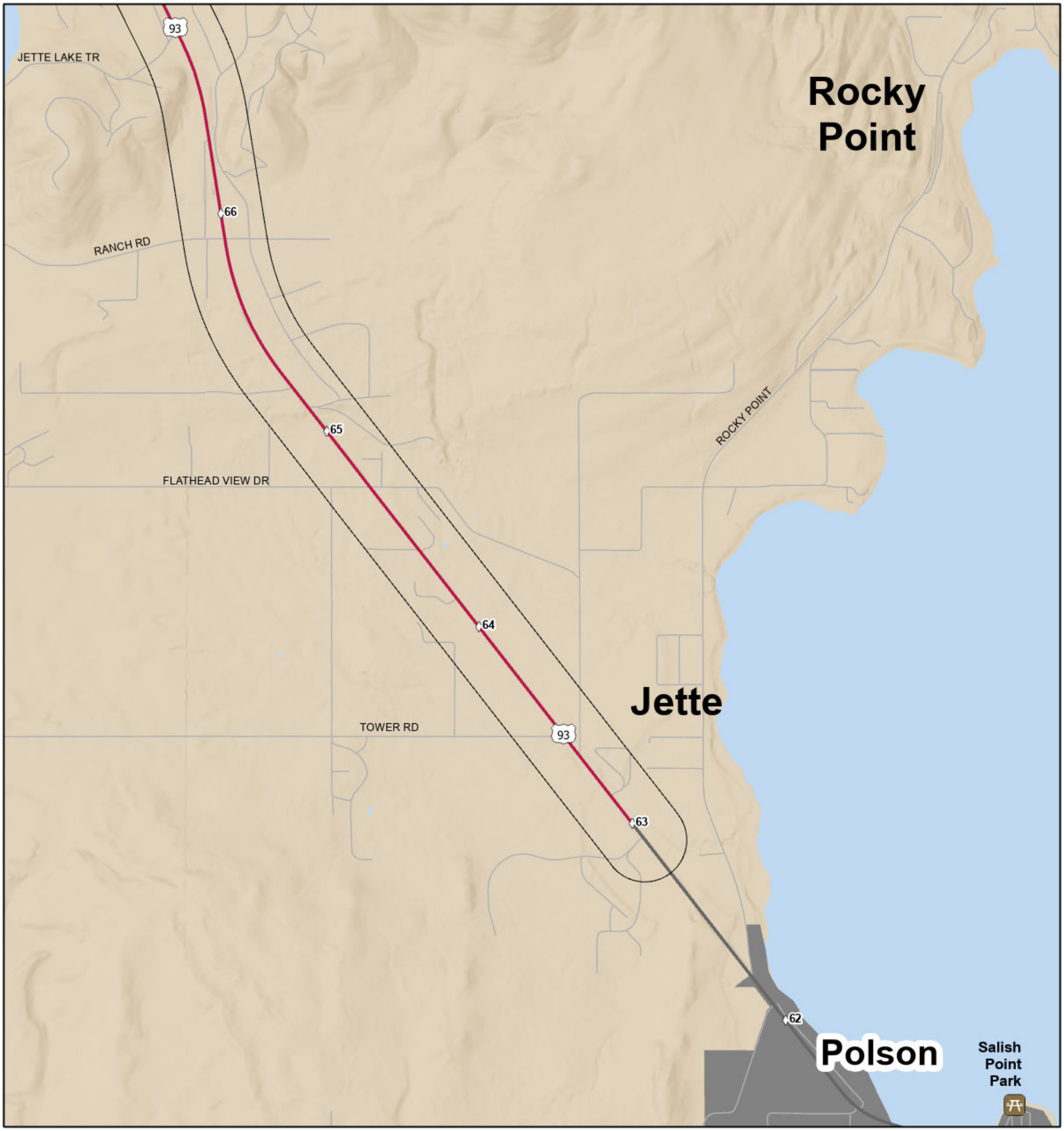


Figure A.16: Recreation Opportunities

US 93 POLSON-SOMERS
CORRIDOR STUDY

ENVIRONMENTAL SCAN

Appendix B

DNRC Water Resources Survey

Water Resources Survey

Part I:
HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:
MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Lake County, Montana

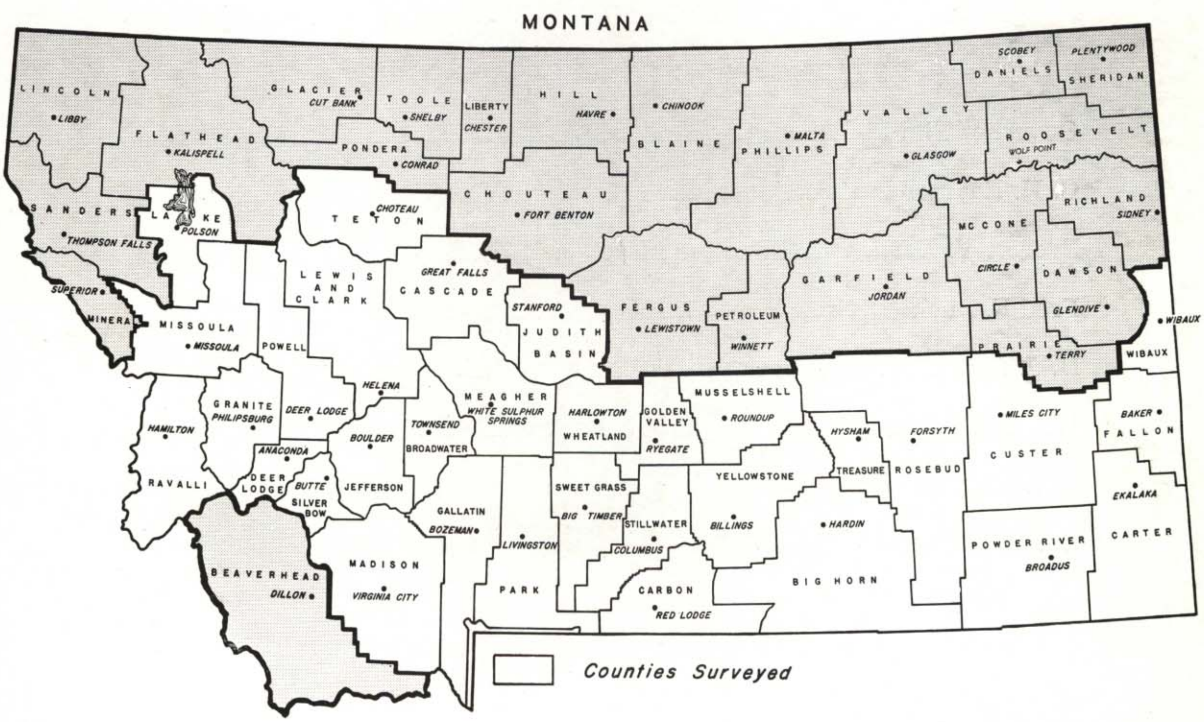
Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June 1963

WATER RESOURCES SURVEY

LAKE COUNTY
MONTANA

Part I

History of Land and Water Use
of Irrigated Areas



Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1963

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Director of Water Resources, Ground and Surface Water

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Water Resources Survey and Publication of County Reports

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Donald D. Sullivan (Effective May 1, 1963)..................Deputy State Engineer

A. D. McDermott..Accountant for State Engineer

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STATE WATER CONSERVATION BOARD

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MONTANA STATE AGRICULTURAL EXPERIMENT STATION

C. C. Bowman, Irrigation Engineer and Consultant, Bozeman

Honorable Tim M. Babcock
Governor of Montana
Capitol Building
Helena, Montana

June, 1963

Dear Governor Babcock:

Submitted herewith is a consolidated report on the Water Resources Survey of Lake County, Montana.

This work was accomplished with funds made available to the State Engineer by the 37th Legislative Session, 1961, and in co-operation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts: Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the County showing in colors the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties; Big Horn, Broadwater, Carbon, Carter, Cascade, Custer, Deer Lodge, Fallon, Gallatin, Golden Valley, Granite, Jefferson, Judith Basin, **Lake,** Lewis and Clark, Madison, Meagher, Missoula, Musselshell, Park, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wibaux, Wheatland and Yellowstone.

The office files contain minute descriptions and details of each individual water right and land use, which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in this report can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Respectfully submitted,

EVERETT V. DARLINTON, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid co-operation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

COUNTY OFFICIALS

Ralph Maxwell, Commissioner H. M. Hendrickson, Commissioner

George Davis, Jr., Commissioner

Mrs. Margaret Seines, Clerk of the District Court

Mrs. Hazel Kinnick, Clerk and Recorder C. W. Reynolds, Assessor

---

Robert G. Dunbar........................Professor of History, Montana State College

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R. A. Dightman....................Meteorologist in charge, U. S. Dept. of Commerce, Weather Bureau

David R. Cawlfield......State Soil Scientist, U. S. Dept. of Agriculture, S.C.S.

Wayne Gibson..County Extension Agent

H. D. Hurd........State Soil Conservationist, U. S. Dept. of Agriculture, S.C.S.

Harold W. Cooper........................Assistant State Conservationist, U. S. Dept. of Agriculture, S.C.S.

Frank Stermitz..................................District Engineer, U. S. Geological Survey

Robert D. Geach....Economic Geologist, Montana Bureau of Mines & Geology

Roger Fliger...State Fish & Game Department

E. F. Barry....................Assistant Regional Forester, U. S. Dept of Agriculture, Forest Service

George L. Moon............................Project Engineer, Flathead Irrigation Project

The State Engineer's Office, Water Resources Survey, hereby expresses sincere appreciation to the many ranchers, farmers and stockmen who have given their helpful co-operation in this survey.

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FOREWORD

SURFACE WATER

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. The law restricted the use of water to riparian owners and forbade them to reduce appreciably the stream flow, but the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted another law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the Mettler vs. Ames Realty Co. case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here. . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the streams to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to the Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriation are:

1. The use of water may be acquired by both riparian and non-riparian landowners.
2. It allows diversion of water regardless of the reduction of the water supply in the stream.
3. The value of the right is determined by the priority of the appropriation; i. e., first in time is first in right.
4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.
5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the county clerk's office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream, one must petition the District Court having jurisdiction over the stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Inasmuch as the Montana laws do not require water users to file official records of the completion of their appropriations, it becomes advisable as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. Thereupon the Judge of the District Court examines the claims of all the claimants and issues a decree establishing priority of the right of each water user and the amount of water he is entitled to use. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 percent of the water rights affected, must appoint a water commissioner to distribute the water. Chapter No. 231, Montana Session Laws 1963, Senate Bill 55 amended Section 89-1001 R.C.M. 1947, to provide that a water commissioner be appointed to distribute decreed water rights by application of fifteen per cent (15%) of the owners of the water rights affected, or, under certain circumstances at the discretion of the judge of the district court—**"provided that when petitioners make proper showing they are not able to obtain the application of the owners of at least fifteen per cent (15%) of the water rights affected, and they are unable to obtain the water to which they are entitled, the judge of the district court having jurisdiction may, in his discretion, appoint a water commissioner."** After the Commissioner has been appointed the Judge gives him full instructions on how the water is to be apportioned and distributed in accordance with the terms of the decree.

The recording of appropriations in local courthouses provides an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number or extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once, six appropriators each claimed all of the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of about 50 cfs. Today, the Big Hole River with an average flow of about 1,000 cfs has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently, water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a certain river or creek finds it difficult and expensive to examine records in several places. In addition, the records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and subdivided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, a record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can be readily seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain a clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly one half million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence. In the third place, if some claimant has been inadvertently left out of the action, the decree is not final and may be reopened for consideration by the aggrieved party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes subdivided in later years and the water not apportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownership on deeds and abstracts.

The Legislative Session of 1957 passed Chapter 114 providing for the policing of water released from storage to be transmitted through a natural stream bed to the place of use. The owner of the storage must petition the court for the right to have the water policed from the storage reservoir to his place of use. If there are no objections, the court may issue the right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on an adjudicated stream is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent man for a position so temporary. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate head gates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among the water users.

Since a water right is considered property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major faults affecting a stream after an adjudication is the failure of the District Court to have some definite control over the transfer of water rights from their designated places of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted, resulting in a complete breakdown of the purpose intended by the adjudication. To correct this situation, legal action must be initiated by the injured parties as it is their responsibility and not the Court's.

At one time or another all of the other Western Reclamation States have used similar methods of local regulation of water rights. Now all of them except Montana have more or less abandoned these practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system are the registration of both the initiation and completion of an appropriation in the State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users titles to the use of water as definite and defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) to catalogue by counties, in the office of the State Engineer, all recorded, appropriated and decreed water rights including use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting in any transaction where water is involved; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the encroachments of lower states, or Wyoming or Canada.

GROUND WATER

Ground water and surface water are often intimately related. In fact, it is difficult in some cases to consider one without the other. In times of heavy precipitation and surface runoff, water seeps below the land surface to recharge underground reservoirs which, in turn, discharge ground water to streams and maintains their flow during dry periods. The amount of water stored underground is far greater than the amount of surface water in Montana, and, without seepage from underground sources, it is probable that nearly all the streams in the State would cease to flow during dry periods.

It is believed that Montana's ground water resources are vast and only partly developed. Yet this resource is now undergoing an accelerating development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development without some regulation of its use will cause a depletion of ground water in areas where the recharge is less than the withdrawal. Experience in other states has shown that once overuse of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the area concerned.

Practical steps aimed at conserving ground water resources as well as correcting related deficiencies in surface water laws have become necessary in Montana. Prior to the Legislative Session of 1961, there was no legal method of appropriating ground water. Proposed ground water codes were introduced and rejected by four sessions of the Montana Legislative Assembly, in 1951, 1953, 1955, and 1959.

In 1961, during the 37th Legislative Session, a bill was introduced and passed which created a Ground Water Code in Montana. (Chapter 237, Revised Codes of Montana, 1961). This bill became effective as a law on January 1, 1962, with the State Engineer of Montana designated as "Administrator" to carry out provisions of the Act.

Some of the important provisions contained in Montana's New Ground Water Law are:

Section 1. DEFINITIONS OR REGULATIONS AS USED IN THE ACT.

(a) "Ground water" means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir, or other body of surface water. Fresh water shall be deemed to be water fit for domestic, livestock, or agricultural use. The Administrator, after a notice and hearing, is authorized to fix definite standards for determining fresh water in any controlled ground water area or sub-area of the State.

(b) "Aquifer" means any underground geological structure or formation which is capable of yielding water or is capable of recharge.

(c) "Well" means any artificial opening or excavation in the ground, however made, by which ground water can be obtained or through which it flows under natural pressures or is artificially withdrawn.

(d) "Beneficial use" means any economically or socially justifiable withdrawal or utilization of water.

(e) "Person" means any natural person, association, partnership, corporation, municipality, irrigation district, the State of Montana, or any political sub-division or agency thereof, and the United States or agency thereof.

(f) "Administrator" means State Engineer of the State of Montana.

(g) "Ground water area" means an area which as nearly as known facts permit, may be designated so as to enclose a single and distinct body of ground water, which shall be described horizontally by surface description in all cases and which may be limited vertically by describing known geological formations should conditions dictate this to be desirable. For purpose of administration, large ground water areas may be divided into convenient administrative units known as "sub-areas."

Section 2. RIGHT TO USE. Rights to surface water where the date of appropriation precedes January 1, 1962, shall take priority over all prior or subsequent ground water rights. The application of ground water to a beneficial use prior to January 1, 1962, is hereby recognized as a water right. Beneficial use shall be the extent and limit of the appropriative right. As to appropriations of ground water completed on and after January 1, 1962, any and all rights must be based upon the filing provisions hereinafter set forth, and as between all appropriators of surface or ground water on and after January 1, 1962, the first in time is first in right.

Montana's Ground Water Code provides for four different types of forms that may be filed.

Form No. 1. **"Notice of Appropriation of Ground Water"** — shall require answers to such questions as—(1) the name and address of the appropriator; (2) the beneficial use for which the appropriation is made, including a description of the lands to be benefited if for irrigation; (3) the rate of use in gallons per minute of ground water claimed; (4) the annual period (inclusive dates) of intended use; (5) the probable or intended date of first beneficial use; (6) the probable or intended date of commencement and completion of the well or wells; (7) the location, type, size and depth of the well or wells contemplated; (8) the probable or estimated depth of the water table or artesian aquifer; (9) the name, address, and the license number of the driller engaged; and (10) such other similar information as may be useful in carrying out the policy of this Act. This form is optional, but it has an advantage in that after filing the Notice of Appropriation, a person has 90 days in which to commence actual excavation and diligently prosecute construction of the well. Otherwise, a failure to file the Notice of Appropriation deprives the appropriator of his right to relate the date of the appropriation back upon filing the Notice of Completion (Form No. 2).

Form No. 2. **"Notice of Completion of Ground Water by Means of Well"**—this form shall require answers to the same sort of questions as required by Form No. 1 (Notice of Appropriation of Ground Water), except that for the most part it shall inquire into accomplished facts concerning the well or means of withdrawal, including (a) information as to the static level of water in the casing or the shut-in pressure if the well flows naturally; (b) the capacity of the well in gallons per minute by pumping or natural flow; (c) the approximate drawdown or pumping level of the well; (d) the approximate surface elevation at the well head; (e) the casing record of the well; (f) the drilling log showing the character and thickness of all formations penetrated; (g) the depth to which the well is drilled; and similar information.

It shall be the responsibility of the driller of each well to fill out the Form No. 2, "Notice of Completion of Ground Water by Means of a Well," for the appropriator, and the latter shall be responsible for its filing.

Form No. 3. **"Notice of Completion of Ground Water Appropriation Without a Well"** — is for the benefit of persons obtaining (or desiring to obtain) ground water without a well, such as by subirrigation or other natural processes so as to enable such persons to describe the means of using ground water; to estimate the amount of water so used; and requiring such other information pertinent to this particular type of ground water use.

Form No. 4. **"Declaration of Vested Ground Water Rights"** — shall be used by persons who have put ground water to a beneficial use (including sub-irrigation or other natural processes), prior to January 1, 1962 and will require the person within two (2) years after January 1, 1962, to file a declaration in the office of the county clerk of the county in which the claimed right is situated and shall contain the following information: (1) Name and address of the claimant; (2) the beneficial use on which the claim is based; (3) the date or approximate date of the earliest beneficial use, and how continuous the use has been; (4) the amount of ground water claimed; (5) if the beneficial use has been for irrigation, the acreage and description of lands to which such water has been applied and the name of the owner thereof; (6) the means of withdrawing such water from the ground and the location of each well or other means of withdrawal; (7) the date of commencement and completion of the construction of the well, wells or other works for withdrawal of ground water; (8) the depth of the water table; (9) so far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of ground water; (10) the estimated amount of ground water withdrawn each year; (11) the log of the formations encountered in the drilling of each well; and (12) such other information of similar nature as may be useful in carrying out the policy of the Act.

Failure to comply with this requirement shall in nowise work a forfeiture by not filing form No. 4, "Declaration of Vested Ground Water Rights," or prevent any such claimant from establishing such rights in the courts, but he must maintain the burden of proving such unrecorded rights. The law provides, however, that the court shall accept the filing of a "Declaration of Vested Ground Water Rights" as prima facie evidence of the right. This means that if a user has failed to make a filing and a case comes up in court to adjudicate the rights, the one who has not made a filing must prove his case by witnesses.

It shall be recognized that all persons who have filed a Water Well Log Form as provided for under Section 1 and 2 of Chapter 58, Sessions Laws of Montana, 1957, shall be considered as to having complied with the requirements of this Act.

Copies of the four types of forms used in filing on ground water are available in the County Clerk and Recorder's office in each of Montana's 56 counties. It shall be the duty of the County Clerk in every instance to file the original copy for the county records; transmit the second copy to the Administrator (State Engineer); the third copy to the Montana Bureau of Mines and Geology; and the fourth copy to be retained by the appropriator (person making the filing).

Accurate records and the amount of water available for future use are essential in the administration and investigation of water resources. In areas where the water supply becomes critical, the ground water law provides that the administrator may define the boundaries of the aquifer and employ inspectors to enforce rules and regulations regarding withdrawals for the purpose of safeguarding the water supply and the appropriators (see the wording of the law for establishing a "controlled area").

The filing of water right records in a central office under control of a responsible State agency, will provide the only efficient means for the orderly development and preservation of our water supplies and will protect all of Montana's use—on both ground and surface waters.

METHOD OF SURVEY

Water Resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts with landowners. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is taken from the files of the county courthouse and the data required includes; Landownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of landownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Noted on the photographs are the locations of each irrigation system, with the irrigated and irrigable land areas defined. All the information compiled on the aerial photo is transferred and drawn onto a final base map by means of aerial projection. From the base map color separation maps are made and may include three to ten overlay separation plates, depending on the number of irrigation systems within the township.

Field forms are prepared for each landowner showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system, source of water supply and the total acreage irrigated and irigable under each. All of the appropriated and decreed water rights that apply to each ownership are listed on the field forms with the description of intended place of use. During the field survey, all water rights listed on the field form are verified with the landowner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right and use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are as found at the time of completion of each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Complete data obtained from this survey cannot be included in this report as it would make the text too voluminous. However, if one should desire detailed information about any particular water right, lands irrigated, or the number and amount of water rights diverting from any particular stream, such information may be obtained by writing the State Engineer's Office in Helena.

Every effort is being made to produce accuracy of the data collected rather than to speed up the work which might invite errors.

HISTORY AND ORGANIZATION*

The earliest history of white men inhabiting the area of what is now Lake County tells of the fur traders and trappers in 1807. Prior to that time, in 1804-1805, the Lewis and Clark Expedition had crossed the mountains south of Lake County in search of a route to the Pacific Ocean and also to gather information about the Indians and the Far West country.

Many years before the Indians occupied the area, it was covered by a huge glacial ice mass. The change to warmer climatic conditions resulted in periods of freezing and thawing to form the topographic characteristics of the region, which included its mountains, valleys, lakes and streams. Because of its natural scenic beauty, Lake County is often referred to as "God's Country."

Before the arrival of the white settlers, the area was a paradise for the early-day Indians. It was a haven for wild game, and the lakes and streams were well supplied with fish. The Indians never knew hunger, for the land supplied them with all their needs.

When the first white men came to the Flathead country, they found three major Indian tribes: the Salish, commonly known as the Flatheads; the Kalispel, known as the Upper Pen d'Oreille; and the Kootenai. In 1805, when Lewis & Clark first met the Flatheads in what is now Ravalli County they described them as friendly and exceptional Indians.

Although the Flathead Indians had a few small wars with other tribes, they were generally peaceful. An exception to their friendly nature occurred only when they crossed the mountains to the plains to hunt buffalo. Here they would usually encounter a hunting party of Blackfeet, their hereditary enemies, and a skirmish would result. It is said that the Flathead tribes never took the life of a white man in war.

Among the early fur traders in the Flathead region were David Thompson, Jocko Finlay and Angus McDonald. David Thompson was one of the first white men to see the Flathead Indian country which was in the year 1808, when he was sent into the area as an employee of the Northwest Fur Company to explore the region and establish trade with the Indians. One of the first trading posts he established was where the present-day town of Libby now stands. In 1812, Thompson built another post near the present site of Thompson Falls. His fair trading with the Flathead Indians earned him their friendship as well as a thriving business in the fur trade. Making a trip one day to the present-day site of Dixon, Thompson was told about Flathead Lake and the surrounding country. Becoming interested in seeing the lake, the Indians provided him with a guide and ontic beauty of Flathead Lake.
became the first white men to view the majes March 1, 1812, David Thompson and his party

Jocko Finlay, another fur trader, was associated with Thompson and assisted him in building the Kalispel House on Flathead Lake. Jocko Finlay was born in Montreal, Canada in 1768, the son of James Finlay, one of the founders of the Northwest Fur Company. The Jocko River and valley were named in honor of this popular fur trader.

The competition for the fur trade increased when the Hudson Bay Fur Company established posts in the Montana territory at Fort Hall and Fort Colville and also at Fort Boise in Idaho. The chief trader in charge of the forts for the Company was Angus McDonald. He was born on October 15, 1816 and after graduating from college as a lawyer he emigrated to America, entering the employ of the Hudson Bay Fur Company in 1838. When Fort Connah was estbalished in 1845, the Company put Angus McDonald in charge to complete construction of the buildings. Fort Connah was located six miles north of the present town of St. Ignatius and one of the buildings still stands as a memorial to McDonald and the fur trade. He was in charge of the thriving fur business at Fort Connah for many years, enjoying his popularity with the Indians to such an extent that they included him in most of the tribal activities. In 1864, Angus McDonald was promoted to the position of general supervisor of various trading posts in the region.

Skirmishes between the Blackfeet and the Flathead tribes harassed the fur trading industry for many years after the establishment of the trading posts. In an effort to control the war-like tendencies between the tribes, the Flatheads were told stories of the white medicine men (Black Robes) who might help them overcome difficulties with their Blackfeet enemies. In April, 1840, Father Pierre Jean DeSmet, a young Jesuit Priest left Westport (now Kansas City) with a party of American Fur Company traders to fulfill his promise of the year before to meet with the Indians of the great northwest. He was met at Green River, Wyoming by a large band of Flatheads who had been sent to meet this man of God. They escorted him into the Montana territory where they were joined by members of the Nez Perce and Kalispel Indian tribes until they numbered about sixteen hundred. After two months of missionary work among the Indians, 200 children and fifty adults were baptized. Father DeSmet then went back to St. Louis, promising to return the next year. In the spring 1841, DeSmet made good his promise to return, and in September the first Catholic Mission in the territory was established 28 miles south of Missoula, between Stevensville and Fort Owen. Many other missionaries came into the region during the next decade. On September 24, 1854, Father Hoecken and his party officially founded the St. Ignatius Mission in what is now Lake County. A log hut was erected for the missionaries and before the end of the year, 82 Indians had been baptized; a chapel, two houses, a carpenter and blacksmith shop were constructed. Within the year, over 1,000 Indians, Kootenai, Flathead, Kalispel and Pend d'Oreille, arrived to make their homes near the new mission. A new church was built in 1910, the interior of which contains frescoes, requiring many months of work by J. Canignano, a coadjutor Brother of the Society of Jesus. This marvelous art work today is admired by many people traveling through the St. Ignatius area.

The agreement creating the Flathead Indian Reservation was completed on July 16, 1855, at a place called Council Grove, six miles west of the present city of Missoula. Signers of the agreement were: Governor Isaac Stevens, representing the United States Government, Chief Alexander of the Kalispel, Chief Michelle of the Kootenai and Chief Victor of the Salish (Flathead) Indian tribes. It was agreed that the Kalispel and Kootenai tribes would be located within the present boundaries of the Flathead Indian Reservation and Chief Victor and his Flatheads would settle in the Bitterroot valley. An alternate clause in the agreement empowered the President of the United States to make surveys which would determine whether it was better for the Flatheads to remain in the Bitterroot or be moved to the Jocko Agency on the Reservation.

In 1856, Dr. R. H. Landsdale, the first Indian Agent, established the Jocko Agency. Later that year, Major John Owen was appointed Indian Agent for the Flatheads, which position he served for 6 years. He kept his residence at Fort Owen but made frequent trips to the Jocko Agency. In 1871, a presidential order was issued decreeing that the Salish tribe move from the Bitterroot valley to the Jocko Agency on the reservation. Chief Charlot (Charlo), who had followed in the footsteps of his father, Chief Victor, as leader of the Salish tribe, refused to leave and began a resistance that was to last for twenty years. After many investigations and attempts were made to move Chief Charlot and his people to the Jocko, he finally consented to leave the Bitterroot. On October 17, 1891, after consulting with the Indian agent Major Ronan and his friend Amos Buck, a Stevensville merchant, Charlot and his people, totaling less than three hundred, moved to the Jocko. The government built the old Chief a nice home in the square near the Agency. Chief Charlot, broken in health and spirit died on January 10, 1910.

In the early 1860's and 70's many white men came to the northwest seeking their fortunes. Some became discouraged and moved on, but those who remained had enough vision to see a bright future in the Flathead country. The people who remained were of high caliber and played a vital part in the agricultural development of the Flathead. Many of their descendants, from the second to fourth generations, live on the reservation at the present time. Space will not permit an individual history of each, but among some of the more prominent pioneers were: Angus McLeod, Sr.; Joseph Ashley, Sr.; Louis Clairmont; Camille Dupuis, Sr.; Alexander Morigeau, Sr.; Dave, Louis and Octave Couture, Raphael Bisson; Louis Courville, Sr.; Joe Greiner, Sr.; Edwin Dubay; Joe Houle, Sr.; Jean B. Jette; Frank Jette; Isaac and Eli Pauline; Fred W. Glover, Sr.; August Finley; George Ledoux; Fred Roullier; Mike Matt; Joe Matt, Sr.; Garcon Demers; Bob Vinson and many others. Most of those named were engaged in agriculture, raising grain, cattle and horses.

In 1887 Congress passed the Dawes Act that would open the lands of the Flathead Indian Reservation to white settlement. The best of the lands were to be allotted to the Indians with the surplus lands to be sold to homesteaders. Several years passed, until April 23, 1904 when a bill was passed in Congress authorizing surveys to be made of the reservation lands and allotments made to the Indians. Work was begun under the administration of a new Indian superintendent, Major Samuel Ballew and completed in 1908. On May 22, 1909, President Taft issued a proclamation opening the balance of the reservation lands to white settlement. Out of 3,000 names drawn, only 403 people at that time chose to homestead on the reservation. Each person had to meet certain qualifications and after selecting the land, a down-payment of one-third the appraised price was required, with the balance to be paid in five equal installments.

In the 1904 Bill, Congress authorized a preliminary survey to determine whether or not an irrigation project was feasible on the reservation, and in 1907 an arrangement was made between the Office of Indian Affairs and the Reclamation Service whereby the latter furnished the engineering organization to make the surveys and carry on the construction work. Engineer Robert S. Stockton was detailed to the reservation in 1907 to make the preliminary survey and report on the feasibility of an extensive irrigation devlopment. His report was completed in 1908. Construction was begun in 1909 and has been carried on continuously since that date. Until April, 1924, the engineering work was done by the Reclamation Service and submitted to the Commissioner of Indian Affairs for approval, but since then, all of the work on the project has been under the Bureau of Indian Affairs.

The development of the Flathead Irrigation Project provides the basic economy for the majority of the Lake County residents. Briefly, the present irrigation system consists of fifteen storage reservoirs, having a total of 148,725 acre-feet of stored water. There are approximately 1,300 miles of feeder and distribution canals in the irrigation system. The water users are organized into three irrigation districts; the Flathead, Mission and Jocko Valley. For a detailed account of the project see the "Flathead Irrigation Project" of this report. (Page 40)

There are industrial and recreational developments in Lake County, in addition to agriculture that make this county one of the important areas in Western Montana.

Kerr Dam, with a total capacity of 180,000 Kilowatts, is located five miles below Polson on the Flathead River and is the largest electrical generating power plant in the Montana Power Company system. The dam is a concrete arch 204 feet high anchored deep in a solid rock base, which extents to either side. Kerr Dam stores water in Flathead lake amounting to 1,217,000 acre-feet and the water level of the lake is kept at an elevation between 2,883 and 2,893 feet above sea level. Kerr Dam was named in honor of Frank M. Kerr, President of the Montana Power Company from 1933 to 1940.

The lumber industry is second to agriculture in the amount of income derived from Lake County. Sawmills located north of Pablo are the Tom Wheeler, Danielson Brothers and Plum Creek Lumber Company No. 2; at Polson are the James Lumber Company, Inc., Dupuis Brothers Lumber Company and the U. S. Plywood Corporation Plant. The U. S. Plywood Corporation is the largest manufacture of plywood in the world, having plants in many other areas of the United States. A by-product, consisting of two and a half carloads of wood chips are shipped from the plant each day to the Waldorf-Hoerner Paper Products Company, near Frenchtown, for paper manufacturing. Another source of income connected with the lumber industry is the market for Christmas trees. Although seasonal, only during the months of October and November, the average harvest per year is about 150,000 bales. The source of supply comes mostly from tribal lands and brings in approximately $75,000 annually to the tribes.

In 1908, Congress at the request of President Theodore Roosevelt, appropriated $40,000 to purchase 19,000 acres of land from the Flathead tribes for a National Bison Reserve. It is located in the southern part of the Flathead Indian Reservation with about one-third of the land in Lake County and two thirds in Sanders County. The original foundation herd of 41 buffalo has now increased to 342 head. To maintain a herd consistent with the grazing area, about 100 head are butchered in November each year. The buffalo meat is sold by the quarter to the lucky individuals who register for the drawing that is held each summer. In addition to buffalo, there are seventy-five elk, 300 mule deer, 100 white tail deer, 35 bighorn sheep and 12 to 25 prong-horn sheep on the reserve.

The picturesque Flathead Lake and surrounding area is noted as a summer vacation land.

Polson, on the south end of Flathead lake, offers fishing, swimming, boating, water skiing, and golfing for the vacationing tourist. Nearby attractions are the Mission Mountain Range, Blue Bay Resort, Yellow Bay, St. Ignatius Mission, Kerr Dam and the National Bison Reserve. The annual Copper Cup Regatta is held at Polson during the third week-end in August. This event is a highlight of the boating season and attracts boat racing enthusiasts from all over the northwest.

The real estate development around Flathead Lake began soon after 1923, when Colonel A. A. White envisioned the Villa Sites and other lake shore properties as prospective sites for summer homes and tourists resorts. In 1924, prices for lake shore property were listed at $50-$100 an acre, which people thought too high. Since that time real estate development along the lake shore has been spectacular. Many beautiful summer homes have been built and lots that once sold for $50 now sell for $5,000 and more.

The east and south land areas bordering Flathead Lake are particularly adaptable to the growing of fruits and vegetables. Grown abundantly are several varieties of sweet cherries and apples. Yellow and red Delicious apples are raised commercially; other species are McIntosh, Wealthies, Ben Davis, Yellow Transparent and Crab apples. Plums, pears, strawberries and sour cherries grow equally well. One fruit which has been developed and always finds a ready market is the Flathead sweet cherry. This popular fruit arrives on the market after the Washington sweet cherries have been harvested and due to its superiority in color, firmness and size, commands a premium price. Carloads of the fruit are shipped yearly to the eastern market. The average price received for the cherry crop provides a real stimulus to the economy of the area in the amount of $250,000 annually.

Towns and small rural communities in Lake County are: Polson, Ronan, St. Ignatius, Charlo, Arlee, Pablo, Ravalli, Proctor, Rollins, Moiese, Dayton, Elmo, Big Arm, Radio and Round Butte.

Polson the county seat of Lake County, was originally known as Lamberts Landing and is located at the southern end of Flathead Lake. According to the last census in 1960, it had a population of 2,314 people. The town was named after David Polson, an early-day settler in the vicinity. The first post office was established there in 1898. Prior to the creation of Lake County in 1923, an election was held to determine which of the towns, Polson or Ronan would become the county seat. Results of the election gave Polson the honor by a margin of 674 votes.

Ronan, the second largest town in Lake County, with a population of 1,334 is located in the center of the rich agricultural area of the Lower Flathead and Mission valleys. In 1883, the town was a small trading post known as Spring Creek. When the government constructed a flour mill and saw mill at the post in 1885, the name was changed to Ronan Springs in honor of Peter Ronan, who was Indian agent from 1873 to 1892. A few years later in 1894, a post office was established and the name shortened to Ronan.

St. Ignatius is by far the oldest town in the county, being founded in 1854 by the Jesuit Fathers who established the St. Ignatius Mission. Located at St. Ignatius is the U. S. Indian Irrigation Service for the Flathead Project. It is the third largest town in the county and has a population of 940.

Charlo, known as Tabor in the early 1900's was named in honor of E. F. Tabor, a Reclamation Service Engineer. The name was changed to Charlo when a post office became established there in 1918, to honor the great Indian Chief Charlot (Charlo) and his descendants who were allotted acreage in the area. The population of Charlo, according to the 1960 census, was 200.

Arlee began as a community with the establishment of the Jocko Agency by the government in the spring of 1856. Jocko Agency was located about three miles east of the settlement of Arlee. The route of the Northern Pacific Railway to the west coast missed Jocko Agency by two miles and when a post office was established at the settlement on the railroad, April 27, 1882, it was named for the Indian Chief Arlee. This small community had a rich early-day pioneer history and had a population of 20) people in 1960.

Pablo is the youngest town on the reservation, becoming a townsite on September 13, 1917. When the Northern Pacific branch line from Dixon was nearing completion through the area to Polson, the U. S. Government held a public lot sale to establish the present town of Pablo. Today, Pablo has a population of about 100 people.

Ravalli was believed to have been named in honor of the popular Jesuit Father, Anthony Ravalli, who founded the St. Mary's Mission church in the Bitterroot. It is located on the passenger line of the Northern Pacific Railway and near the south boundary of the National Bison Reserve.

Proctor and Rollins are the only two towns in Lake County located outside the boundaries of the Flathead Indian Reservation. Both of these communities have populations of about 100 people.

Big Arm takes its name from its location on the big arm of Flathead Lake. It is a small community which depends upon vacationers and tourist business for its livelihood.

Moiese started as a small rural community in 1910, when the Moiese valley became well populated with settlers and the establishment of the bison range nearby created the need for a general store and post office. On May 4, 1918 James D. Sloan became the first postmaster of Moiese and proprietor of the new general store.

Dayton and Elmo are small resort communities located on the big arm of Flathead Lake. Each of these resort towns contain a post office, general store and lodging accommodations for the vacationing traveler.

Radio and Round Butte are now just rural farming areas. The post office and stores that were once a part of these communities, no longer exist.

Lake County was created in Montana on August 11, 1923. It was formed from the northern part of Missoula County and the southern portion of Flathead County and has a total land area of 1,654 square miles.

Transportation facilities in Lake County consist of the Northern Pacific Railway, U. S. Highways 93 and 10A, and State highways 35, 212, 28 and 209. In the southern part of the county, the main line of the Northern Pacific Railway passes through the towns of Arlee and Ravalli on its route to the west coast. At Dixon, in Sanders County, a branch freight line from the Northern Pacific Railway enters Lake County south of the community of Moiese and follows a northerly course through the towns of Charlo, Ronan, and Pablo, terminating at Polson. In addition to the main highways, there are many improved county roads to all of the outlying rural areas in Lake County. Passenger buses and auto freight lines serve the area. Polson has a local airport that will accommodate small private aircraft and chartered planes for those people who prefer air travel into and from the Flathead area.

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*Historical information and facts are taken mostly from the manuscript "The Fabulous Flathead," by J. F. McAlear. Copyright 1962, by the Reservation Pioneers, Inc. Also consulted was Major John Owen's Diary, 1850-1870, and other writings.

CLIMATE

Located well west of the Continental Divide, Lake County is nevertheless quite mountainous, a feature shared with all of Western Montana's counties. Although some of the valleys, particularly that of the Flathead River in some sections, are fairly broad with comparatively level bottoms, the fact that most of the county's area is either hilly or mountainous produces marked differences in climate within short horizontal distances. The area is well supplied with lakes, the largest of which is Flathead, situated in and occupying much of the northern end of the county. The lakes also produce local climate influences, but here the main effects are found along the shores of Flathead Lake, and are observed mainly during the winter season. By noting that elevations within the county vary from about 2,500 ft. above sea level where the Flathead River flows into Missoula County near Dixon, to 9,255 ft. on Swan Peak of the Swan Range—a change in elevation of nearly 7,000 ft. — the differences in climate can be better understood.

The larger drainages are the Flathead (flowing generally southward from the lake at Polson), the Swan (flowing north-northwestward and entering the lake south of Bigfork), and the Jocko (flowing westward across the south edge of the county—into Missoula County near Arlee). Located as it is, west of the Continental Divide but well within "mountain" country, Lake County climate can best be classified as modified Continental. This means that although the climate in general has continental characteristics, there are periods during which these characteristics are interrupted by invasions of Pacific Maritime air masses. These periods can last for days and may recur several times a year, although the more important Pacific weather effects occur during the winter season. It should be remembered, too, that there are large differences between valley floors and mountains — the mountains generally are much wetter than the valleys, with the greatest differences during the winter.

The area generally averages a little warmer than Montana East of the Continental Divide, due mainly to the sheltering effect of the Divide on polar cold air invasions from the North during the winter. While cold waves of this type can occur when the polar air masses develop enough vertical depth to spill westward over the Divide, such cold spells occur only about half as often as in the more typical continental climate of Eastern Montana. The coldest observed in 51 years at St. Ignatius was -36°, while along the shores of Flathead Lake, lowest of record at several points ranges from -20° to -30°. The warming effect of Flathead Lake perhaps has been exaggerated at times but it does exist, mainly on clear, still, winter nights when cool air drainage from surrounding hills moves onto the lake water surface and can there be warmed to a sufficient depth at times to reach a few hundred feet inland from the shore. That this effect may be important climatically is underlined by the fact that during recorded history, Flathead Lake has "frozen over" during the winter only about one winter out of seven. Summer temperatures average warm, but seldom become oppressive, having reached a county maximum as warm as 104° only at Polson (53 years of record). It should be noted that higher elevations run cooler most of the time than the valley bottoms where most weather observing stations are located.

The wettest month of the year is June, over the valleys, but it is thought (although actual measurements are lacking) that late fall, winter, and early spring mountain precipitation is heavier than in summer over the mountains. This substantial mountain cold season snowfall (largely from Pacific Ocean moisture sources) is stored on the slopes, and produces most of the spring season runoff observed in all major streams almost every year. Over the main valleys about 55 to 60 per cent of the annual average precipitation falls during the April-September so-called growing season, but east and southeast of Flathead Lake along Mission and Swan Ranges, most of an average year's moisture falls during the October-March half. The latter effect shows up especially where precipitation has been measured at some higher points, such as Upper Holland Lake in northeastern Missoula County, where it takes more than 60 inches to produce an average year—most of which (perhaps as much as 80 per cent) falls during the snow season.

Over the county as a whole the sun shines about half of the possible time during an average year (estimated from Missoula); from about 80 per cent of the time in July to about 25 per cent in December. Cloudy days outnumber partly cloudy and clear, but on most cloudy days the sun breaks through for short periods. The freeze-free period averages about 140 days around Flathead Lake to less than 100 days over many of the higher valleys. Valley fog is observed occasionally during the fall season, mainly in November and December. High relative humidity rarely occurs with high temperature, and the combination of these elements, therefore, is rarely oppressive.

Really severe weather seldom occurs. Instances of timber "blow-down" have been reported from high winds but not often. Summer thunder - showers produce occasional local hail or wind gust damage but here again the phenomenon is unusual. Severe cold (-10° to -20°) can occur once a year or so, usually with some snow, but real blizzard conditions are practically unknown. The following tabulation of weather data observed in and near Lake County will illustrate some of points made in the preceding paragraphs.

Selected Temperature and precipitation data for Lake County are listed in the following tables:

TEMPERATURE

Station	Highest of Record	Lowest of Record	January Average	July Average	Annual Average
Big Fork (1939-1960)	100	-20	26.2	67.5	46.0
Polson (1907-1960)	104	-30	25.1*	67.4*	45.5*
Polson Kerr Dam (1951-1960)	104	-23	25.9	68.1	46.2
St. Ignatius (1909-1960)	103	-36	25.1*	67.6*	46.0*

*1931-1960

PRECIPITATION

Station	Yearly Average	Growing Season† Average	Per Cent Falling in Growing Season	Wettest Year	Driest Year
Big Fork (1939-1960)	22.01	11.57	53%	28.79 (1951)	16.10 (1952)
Polson (1907-1960)	15.03*	8.53*	57%	21.90 (1958)	10.17 (1931)
Polson Kerr Dam (1951-1960)	15.28	8.81	58%	19.93 (1959)	10.03 (1952)
St. Ignatius (1909-1960)	15.10*	9.31*	62%	25.15 (1916)	8.77 (1935)
Round Butte (1941-1960)	12.92	7.66	59%	17.39 (1948)	7.46 (1952)
Swan Lake (1941-1960)	28.19	11.41	40%	37.33 (1959)	17.23 (1952)

*1931-1960
†April-September

SOILS

The character of soils is determined by parent material, relief, vegetation, climate, and the length of time the soil has been developing. In Lake County the soil forming factors, except parent materials, are highly variable and there are numerous distinctly different soils. The orginal source of parent materials is chiefly quartzites and argillites of the Belt Formation. These rocks are pre-Cambrian in age. Most of the farming and grazing lands are developed from glacial till alluvium or lacustrine deposits derived from the Belt rocks. Some of the forested soils are also derived from these reworked deposits, but many of them are weathered in place from the hard Belt rocks. The wide variation in elevation and climate (both in temperature and precipitation) is the chief contributing factor to soil variation. Variation in soil texture and in the amount of gravel, cobble, and stone in the soil also contributes to soil differences. Of common occurrence in Lake County are soils belonging to Alluvial, Regosol, Lithosol, Brown, Chestnut Chernozem, Solonetz, Humic Gley, Gray Wooded and Brown Podsolic great soil groups with minor areas of Alpine soils at elevations above 8,000 feet. There are also large areas of barren rockland in the higher mountains.

Agricultural soils are largely confined to Alluvial, Brown, Chestnut, Chernozem and Solonetz soils. They include, however, some Regosols, Gray Wooded and Brown Podsolic soils from which timber has been cleared. Soils developed in glacial lacustrine deposits make up about half of the farming and grazing soils. A large portion of the irrigated cropland is on soils derived from these lacustrine deposits. The remainder are developed in glacial till or alluvial deposits on fans, terraces and on bottomlands in narrow stream valleys. The lacustrine deposits range from sandy loam to clay in texture with clay loam and clay textures predominating. Glacial till and alluvial materials are of clay loam to sandy loam texture but contain varying amounts of gravel, cobbles, or stones throughout the soil.

Problems associated with irrigated soils include impeded drainage and salinity on the more clayey materials with the additional problems of slow water intake rate on the Solonetz soils. Some irrigated soils developed in alluvium are of coarse texture or overlie loose gravel and sand at shallow depths. Such soils can store only limited soil moisture for use by plants.

The published soil survey of the Lower Flathead Valley shows the location and relative extent of the more important soils in the irrigated and dry farmed lands in Lake County. More detailed soil surveys are being made on individual farms and ranches as they are needed for conservation planning.

CROPS AND LIVESTOCK

Lake County consists of approximately 960,000 acres of land, of which 162,397 acres are Federal lands and 18,503 acres are taken up by towns, roads, water and etc. There is a great deal of variation in the climate as well as the soil types located within the county. Flathead Lake, which lies predominately in Lake County, helps to regulate the weather in the area around the lake, making possible the raising of many fruit crops. The Mission Mountain Range split the county from north to south, thereby helping to hold some of the moisture in the productive Flathead Valley.

Due to the mild climate within the valley, a variety of all types of crops are produced abundantly. There are no main crops because of the tremendous variety raised. In 1959, there were 103,430 acres of cropland harvested. Included in the cropland harvested were 49,860* acres of irrigated land and 53,570 acres of non-irrigated land. Crops taken from the irrigated land totaled $3,219,900 with an average value per acre of $64.48. The non-irrigated land crops had a valuation of $1,828,700, for an average of $34.14 per acre. (See table for major crops raised and their valuation).

The U. S. Indian Irrigation Service has a project located in Lake County covering nearly all the Lower Flathead Valley. This project has a storage capacity of about 148,725 acre-feet of water in its system of fifteen reservoirs. There are about 1,300 miles of canals and laterals on the project.

According to the 1960 Agricultural Statistics there has been a steady increase in the number of cattle, calves and hogs over the past few years. Dairy animals, horses and sheep have steadily but slowly declined. In 1959, the total receipts of livestock and livestock products sold, totaled $6,094,900. A table included at the end of this section gives valuation and number of livestock in the county.

Lake County is broken into several definite communities. These include the East Shore, Valley View, Round Butte, Charlo, Mission, Moiese, Arlee, Irvine Flats, Ronan and Polson. These communities are based primarily on the type of agriculture, which in itself, is based on the soil types.

The people living on the East Shore of Flathead Lake are basically horticulturists, cherries being the main crop raised there. Most of these cherries are sold through the Flathead Cherry Growers' Association.

Farmers located in the Valley View and Irvine Flats area are basically dryland and livestock men. Most of these farms and ranches are larger than the county average.

Dairying is the most important enterprise of farmers living in the Round Butte, Charlo and Mission areas. These farms are located within the Irrigation Project and are quite diversified. Many other areas are too diversified to list a major crop.

Lake County has one of the most active weed control districts in the State. The entire county is within the district boundaries and generally the farmers' attitude toward the district is excellent.

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*Figure does not correspond with the irrigated acreage compiled by Water Resource Survey.

Weed control is a major problem in Lake County with serious infestations of Spotted Knapweed, St. Johnswort, White Top, Canada Thistle, Field Bindweed, Dalmation and Yellow Toadflax, Leafy Spurge and several other weeds. Due to the large amount of hay and feed grains which are transported from out of state and counties within the state, it is very hard to do an effective job of eradication. One of the major expenses of many farms is weed control.

The Lake County Soil and Water Conservation District includes nearly all of Lake County. The District owns some machinery and does a considerable amount of work each season.

Listed below is a table showing the crops, their acreages, yields and value, with a total of livestock and livestock products sold during the year 1959.

CROPS PRODUCTION, 1959, HARVESTED ACRES

	Irrigated		Non-Irrigated		TOTALS		
CROPS	Acres	Yield Per Acre	Acres	Yield Per Acre	Acres	Yield Per Acre	Value
Rye	......	......	100	19.0	100	1,900 bu	$ 1,200
Winter Wheat	700	38.0	15,000	27.0	15,700	431,600 bu	703,500
Spring Wheat	2,200	27.0	5,300	21.0	7,500	170,700 bu	273,100
Corn	200	40.0	......	......	200	800 bu	10,400
Oats	4,400	52.0	2,900	30.0	7,300	315,800 bu	202,100
Barley	4,200	31.0	8,800	29.0	13,000	385,400 bu	323,700
Potatoes (Certified Seed)	790	180 cwt	70	50 cwt	860	145,700 cwt	502,700
Alfalfa Hay (@ $18 per ton)	24,200	2.10 ton	16,100	1.50 ton	40,300	75,000 ton	1,450,000
Wild Hay (@ $12 per ton)	1,600	1.3 ton	1,800	1.00 ton	3,400	3,900 ton	46,000
Alfalfa Seed	......	......	200	70 lbs	200	1,400 lbs	4,000
Red Clover Seed	100	200 lbs	......	......	100	20,000 lbs	5,800
Crested Wheatgrass Seed	......	......	100	100	100	10,000 lbs	2,400
Sugar Beets	470	13.0	......	......	470	6,100 ton	76,900

LIVESTOCK, 1960 CENSUS OF AGRICULTURE

Horses and Mules	2,800 head	$ 280,000
Sheep and Lambs	16,000	401,200
Hogs and Pigs	8,800	273,680
Chickens	60,100	75,125
Dairy Animals	8,500	1,963,500
Cattle and Calves	53,900	9,270,800

Total Cash Receipts, 1959

Crops	Livestock & Livestock Products	Total Marketing Receipts	Government Payments	Total
$2,396,500	$6,094,900	$8,491,400	$117,700	$8,609,100

SNOW SURVEYS

Snow surveys are made annually in Lake County for the purpose of predicting the probable streamflow from the winter snowpack which will be available for use during spring and summer months. This information is useful to farmers and ranchers who irrigate, reservoir operators, power companies and other water management agencies. With water forecast information, farmers and ranchers can plan crops for the year, amounts of water for each crop, number of irrigations, etc. Other water users can plan economic operation of reservoirs and flood control structures.

Snow surveys consist of measuring the snow water equivalent, depth and density of the snowpack. Thirty five snow survey courses are measured to serve the Flathead River drainage contiguous to Lake County. The seven high elevation stations used to prepare seasonal forecasts of water used on agricultural land are:

SNOW COURSE

Name	Number	Elevation	Year Established	Dates Measured[1]
Mission Valley drainage				
North Fork Jocko	13-B-7	6330	1941	3, 4, 5, 6
Big Creek	13-B-3	6750	1941	3, 4, 5, 6
TV Mountain	14-B-1	6800	1956	1, 2, 3, 4, 5
Little Bitterroot River drainage				
Brush Creek	14-A-4	5000	1937	3, 4, 5
Logan Creek	14-A-5	4300	1937	3, 4, 5
Griffin Creek	14-A-9	5150	1960	3, 4, 5
Bassoo Peak	14-B-3	5150	1961	3, 4, 5

Current season information predicting probable streamflow from the winter snow pack is available at the Soil Conservation Service, Bozeman, Montana.

[1] Numerals 1, 2, 3, 4, 5, 6 refer to January 1, February 1, March 1, April 1, May 1 and June 1 measurements.

STREAM GAGING STATION

The U. S. Geological Survey measures the flow of streams, co-operating with funds supplied by several state and federal agencies. The results have been published yearly in book form by drainage basins as Water Supply Papers through the year 1960. Beginning with 1961 the streamflow records are being published annually by the U. S. Geological Survey for the entire state under the title "Surface Water Records of Montana". Data for 1961-65 and subsequent five year periods will be published in Water Supply Papers. Prior to general issuance, advance copies of station records may be obtained from the U. S. Geological Survey. That agency's records and reports have been used in the preparation of this resume.

Data given below cover the stream gaging records which are available for Lake County from the beginning of measurements through the water year 1961. The water year begins October 1 and ends September 30 of the following year. The irrigated acreage figure for diversions above the gage on Swan River near Bigfork are taken from the results of the Water Resources Survey. Acreage figure for irrigation above other gaging stations were estimated by the U. S. Geological Survey at the date of operation.

Following are equivalents useful in converting from one unit of measurement to another:

(a) In Montana, one cubic foot per second equals 40 miner's inches.

(b) One acre-foot is the amount of water required to cover an acre one foot deep.

(c) One cubic foot per second will nearly equal two acre-feet (1.983) in 24 hours.

(d) A flow of 100 miner's inches will equal five acre-feet in 24 hours.

(e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

For reference purposes, the stream gaging stations are listed in downstream order.

Swan River near Bigfork*

The water-stage recorder is at outlet of Swan Lake, 1,000 feet downstream from Johnson Creek, and 5 miles southeast of Bigfork. The drainage area is 671 square miles. Records are available from May 1922 to date (1963) and gage heights only from October 1910 to May 1911. The maximum discharge computed was 8,400 cfs (May 24, 1948) and the minimum observed, 193 cfs (January 26-29, 1930). The average discharge for 39 years (1922-61) was 1,127 cfs or 815,900 acre-feet per year. The highest annual runoff was 1,350,000 acre-feet (1928) and the lowest 439,300 acre-feet (1941). There are diversions for irrigation of about 360 acres above the station.

Hell Roaring Creek (Big Creek) near Polson†

The water-stage recorder was just downstream from the power plant, three-quarters of a mile upstream from mouth, and 7 miles east of Polson. The drainage area is 6.41 square miles. Records are available from June 1917 through September 1932, and crest-stage records

*This gaging station is now in operation (1963).

†Name officially changed from Big Creek in 1932.

from 1960 to date. The maximum discharge observed was 104 cfs (June 9, 1917) and the minimum, no flow at times during November and December, 1932 when power plant was shut down. The average discharge for 15 years, (1917-32) was 6.64 cfs or 4,807 acre-feet per year. The highest annual runoff was 7,420 acre-feet (1928) and the lowest 3,180 acre-feet (1920). Records include water diverted by the Flathead irigation project canal for irrigation of lands downstream and the Polson municipal water-supply pipeline. The flow is regulated by the power plant and two reservoirs with a combined capacity of about 200 acre-feet.

Flathead River near Polson*

The water-stage recorder is half a mile downstream from Kerr Dam, 4 miles west of Polson, and 5 miles downstream from Flathead Lake. The drainage area is 7,096 square miles. Records are available from July 1907 to date (1963). The maximum discharge was 82,800 cfs (May 29, 1928), the minimum, probably less than 5 cfs (April 13, 1938) and the minimum daily, 32 cfs (April 12, 1938). Flood of June 1894 was about 110,000 cfs, from lake elevation-discharge study. The average discharge for 54 years (1907-1961) was 11,610 cfs or 8,405,000 acre-feet per year, adjusted since October 1, 1952 for change in contents in Hungry Horse Reservoir and Flathead Lake. The highest annual runoff was 12,500,000 acre-feet (1927) and the lowest 3,762,000 acre-feet (1941) not adjusted for Flathead Lake regulation. There are diversions above the station for irrigation of about 10,000 acres. Flathead Projects pumps can divert up to 12,000 acre-feet per month when required for irrigation of lands downstream from station. Flow has been regulated by Flathead Lake (Kerr Dam) since April 1938 and Hungry Horse Reservoir since September 1951.

Crow Creek near Ronan

The staff gage was 500 feet upstream from bridge on former St. Ignatius-Ronan highway, a quarter of a mile upstream from bridge on present route, and 3 miles south of Ronan. The drainage area is 46.1 square miles. Records are available from September 1906 through September 1917 except for winter months. The maximum discharge observed was 1,400 cfs (June 6, 1908) and the minimum observed, 2.0 cfs (April 4-9, 1913). There were diversions above gage for lands below the station during 1913-17.

Mud Creek near Ronan

The staff gage was at Jeffrey's Ranch, 3 miles northwest of Ronan. The drainage area is 30.4 square miles. Records are available for open-water periods from August 1908 through December 1910. The maximum discharge observed was 40 cfs (discharge measurement June 27, 1908) and the minimum observed, 1.6 cfs (April 7-8, 1909). There were diversions for irrgation above the station.

Crow Creek at Lozeau's Ranch near Ronan

The chain gage was at private bridge about 1 mile downstream from Mud Creek, 2½ miles upstream from mouth, and 8 miles southwest of Ronan. The drainage area is 139 square

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*This gaging station is now in operation (1963).

miles. Records are available from April 1911 through September 1916 with those for many winter months missing. The maximum discharge observed was 960 cfs (June 29, 1911) and the minimum observed, 4 cfs (March 21, 1913). There were diversions above the station for irrigation on lands below.

Dry Creek near St. Ignatius

The staff gage was at Felsman Ranch, 4 miles downstream from St. Marys Lake (now called Tabor Reservoir), and 5 miles southeast of St. Ignatius. The drainage area is 19.5 square miles. Records are available from May 1908 through September 1916 with those for many winter months missing except for 1910-14 when there was no winter flow. The maximum discharge observed was 220 cfs (June 19, 1916) and the minimum, no flow during most winters. There was one small diversion above the station. Flow is regulated by Tabor Reservoir (St. Marys Lake).

Mission Creek near St. Ignatius

The staff gage was about 1 mile northwest of St. Ignatius. The drainage area is 74.8 square miles. Records are available from October 1906 through September 1917 except for a few missing months during winters of 1911-12 and 1914-15. The maximum discharge was 1,700 cfs (June 10, 1908 from floodmark and rating curve extended above 340 cfs), and the minimum observed, 5 cfs (March 2, 3, 1911). The average discharge for 9 years (1906-11, 1912-14, 1915-17) was 71.7 cfs or 51,910 acre-feet per year. The highest annual runoff was 76,500 acre-feet (1908) and the lowest, 30,900 acre-feet (1910). There are several diversions above the station for irrigation.

Post Creek at Fitzpatrick's Ranch near Ronan

The staff gage was at bridge near house of J. A. Fitzpatrick, 2 miles upstream from Marsh Creek, (formerly North Fork Post Creek), 7 miles southeast of Ronan, and 9 miles north of St. Ignatius. The drainage area is 28.4 square miles. Records are available from October 1906 through May 1911. The maximum discharge was 2,800 cfs (about June 10, 1908 from floodmark and rating curve extended above 210 cfs) and the minimum, not determined. The highest annual runoff (1907-10) was 107,000 acre-feet (1908) and the lowest 50,200 acre-feet (1910). There were two small diversions for irrigation above the station.

Post Creek at Deschamps' Ranch near Ronan

The staff gage was 600 feet upstream from Marsh Creek (formerly North Fork Post Creek), 7½ miles southeast of Ronan, and 6½ miles northeast of St. Ignatius. The drainage area is 29.7 square miles. Records are available from April through November 1911. The maximum discharge observed was 546 cfs (June 25) and the minimum observed, 16 cfs (April 20). There were a few small diversions for irrigation above the station.

Post Creek near St. Ignatius

The chain gage was on highway bridge on road between St. Ignatius and Ronan 2 miles downstream from Marsh Creek (formerly North Fork Post Creek) and 5 miles north of St. Ignatius. The drainage area is 47.6 square miles. Records are available from October 1911 through September 1917 with some winter months missing. The maximum discharge observed was 680 cfs (June 29, 1916) and the minimum observed, 20 cfs (September 3, 1914). There were diversions above the station for the irrigation of several hundred acres.

Middle Fork Jocko River near Jocko

The staff gage was 300 feet upstream from South Fork, 10 miles northeast of Jocko and 11½ miles east of Arlee. The drainage area is 14.9 square miles. Records are available from May 1912 through September 1916 with winter months missing. The maximum discharge observed was 134 cfs (June 1, 1912) and the minimum, not determined. There were no diversions or regulation above the station.

South Fork Jocko River near Jocko

The staff gage was 300 feet downstream from Middle Fork, 10 miles northeast of Jocko, and 11½ miles east of Arlee. The drainage area is 72.3 square miles. Records are available from June 1912 through September 1916 except for winter months. The maximum discharge observed was 782 cfs (May 31, 1913) and minimum observed, 28 cfs (December 7, 1912). There was no diversions or regulation above the station.

North Fork Jocko River near Jocko

The staff gage was three-quarters of a mile upstream from Falls Creek, 11 miles northeast of Jocko, and 11½ miles northeast of Arlee. The drainage area is 19.5 square miles. Records are available from May 1912 through September 1916, with winter months missing. The maximum discharge observed was 492 cfs (May 31, 1913) and the minimum, not determined. There was no diversions or regulation above the station.

Falls Creek near Jocko

The staff gage was a quarter of a mile upstream from mouth, 10 miles northeast of Jocko, and 11 miles northeast of Arlee. The drainage area is 3.57 square miles. Records are available from May 1912 through September 1916 except for winter months. The maximum discharge observed was 110 cfs (June 17, 1916), and the minimum was not determined. There were no diversions or regulation during period of record.

Jocko River near Jocko

The staff gage was 500 feet upstream from headworks of Jocko "K" Canal, 800 feet upstream from Big Knife Creek, 2 miles northeast of Jocko, and 4½ miles east of Arlee. The drainage area is 140 square miles. Records are available from May 1918 through September 1919. The maximum discharge observed was 2,720 cfs (June 11, 1918) and the minimum observed, 48 cfs (March 7, 1919). The flood of May-June, 1948 reached a discharge of 2,660 cfs, from slope-area measurement. There was no diversion above the station.

Big Knife Creek above Big Knife Canal near Jocko

The staff gage was 200 feet upstream from Big Knife Canal headgate, 1 mile upstream from mouth, 2½ miles northeast of Jocko, and 5½ miles east of Arlee. The drainage area is 7.16 square miles. Records are available from August 1910 through September 1916 except for the winter periods. The maximum discharge observed was 78 cfs (June 30, 1916) and the minimum observed, 4.3 cfs (April 17, 1911). There were no diversions or regulation above the station.

Big Knife Creek near Jocko

The staff gage was 25 feet upstream from county bridge, about a quarter of a mile upstream from mouth, and 2 miles northeast of Jocko. The drainage area is 7.44 square miles. Records are available from May 1909 through November 1910 except for December through February. A fragmentary gage-height record is available for August to November 1908. The maximum discharge was 52 cfs (June 19, 1909) and the minimum observed, 0.9 cfs (September 28, October 24, 29, and 31, 1910). Water was diverted above the station for irrigation by Big Knife Canal since August 1, 1910.

Jocko River below Big Knife Creek near Jocko

The staff gage was on the bridge pier 1 mile north of Jocko, about 2 miles downstream from Big Knife Creek, and 3 miles east of Arlee. The drainage area is 154 square miles. Records are available from May 1909 through September 1916 with many winter months missing. A fragmentary gage-height record is available for August to November 1908. The maximum discharge observed was 1,630 cfs (June 20, 1916) and the minimum observed, 21 cfs (August 1, 1910). The flood of June 6, 1908 had a discharge of 6,200 cfs (by float measurement). There were several diversions for irrigation above the station. This station was referred to as Jocko River near Jocko in the early reports.

Agency Creek near Jocko

The staff gage was just above the intake of Matt ditch, 1½ miles southeast of Jocko, and 5 miles southeast of Arlee. The drainage area is 4.00 square miles. Records are available for most of the open-water months from May 1909 through September 1916. Occasional gage heights are available for August to November 1908. The maximum discharge observed was 228 cfs (June 20, 1916, from rating curve extended above 110 cfs) and the minimum observed, 2.0 cfs (December 12, 1913). There were no diversions or regulation above the station. It is in Missoula County about a mile north of the county boundary line, but data were omitted from the report for that county.

Blodgett Creek Near Jocko

The staff gage was a third of a mile upstream from mouth, 1½ miles northeast of Jocko, and 4 miles east of Arlee. The drainage area is 5.48 square miles. Records are available from June through November 1909. Gage heights only have been reported from March to November 1910. The maximum discharge observed was 3.5 cfs (June 11) and the minimum observed 0.4 cfs at times in November.

East Finley Creek near Jocko

The staff gage was 100 feet upstream from intake of Indian ditch, 200 feet downstream from crossing of Jocko "N" Canal, 3 miles southwest of Jocko, and 5 miles southeast of Arlee. The drainage area is 8.35 square miles. Records are available from May 1909 through September 1916 with those for most winter months missing. The maximum discharge observed was 165 cfs (June 20, 1916 from rating curve extended above 65 cfs) and the minimum observed, no flow at times during irrigation season. The Jocko "N" Canal diverts the entire flow at times for irrigation. This station is in Missoula County, but data for it were omitted from the report for that county.

Finley Creek near Jocko

The staff gage was an eighth of a mile downstream from confluence of East and West Forks, 4 miles southwest of Jocko, and 5 miles southeast of Arlee. The drainage area is 36.7 square miles. Records are available from May 1909 through September 1916 with those for most winter months missing. Occasional gage heights and discharge measurements are available for August to November 1908. The maximum discharge observed was 518 cfs (June 20, 1916 from rating curve extended above 170 cfs) and the minimum, not determined. Jocko "N" Canal, Indian Ditch and several smaller irrigation ditches divert water above the station. This station is in Missoula County, but data for it were omitted from the report for that county.

Valley Creek near Ravalli

The staff gage was 25 feet upstream from highway bridge near mouth, 2 miles south of Ravalli and 7 miles northwest of Arlee. The drainage area is 64.1 square miles. Records are available for open water months from May 1909 through June 1910, and some gage heights and discharge measurements in 1908 and 1911. The maximum discharge observed was 302 cfs (June 3, 1909) and the minimum, not determined. There were a few small diversions for irrigation above the station.

Jocko River at Ravalli

The chain gage was near the railroad station at Ravalli. The drainage area is 348 square miles. Records are available from October 1903 through March 1911. The maximum discharge was 7,500 cfs (June 10, 1908 from rating curve extended above 1,900 cfs) and the minimum, not determined. The highest annual runoff for the three years of complete record was 310,000 acre-feet (1908) and the lowest 201,000 acre-feet (1910). There were several diversions for irrigation above the station.

Partial Record Stations and Miscellaneous Discharge Measurements

In order to provide information on more streams than are covered by stream gaging stations the U. S. Geological Survey has for several years been collecting some partial records. These are in addition to the miscellaneous discharge measurements which have always been reported. These partial records when correlated with simultaneous discharges of nearby continuous-record stations give fair indications of available flow.

There are two dozen crest-stage partial-record stations in the Clark Fork Basin in Montana. Operation of most of these began in 1959. Crest-stage stations are now being operated in Lake County on Teepee Creek near Polson, Hell Roaring (Big) Creek near Polson and on Dayton Creek near Proctor.

The partial-record stations as well as the miscellaneous discharge measurements are listed at the end of each U. S. Geological Survey Water Supply Paper or Surface Water Records report.

RESERVOIRS

Details of operation records of the following reservoirs are available in U. S. Geological Survey publications.

Flathead Lake at Somers

The water stage recorder is at the steamboat dock at Somers. The drainage area is 7,086 square miles. Records are available from January 1910 to date. They were published as "at Polson" prior to April 1923. Staff gage readings were reported prior to 1924. Some supplemental readings were obtained in 1900, 1908 and 1909. The Polson readings were obtained at the south end of the lake at Polson in Lake County, while Somers is in Flathead County. The maximum contents was 2,208,000 acre-feet (June 19, 1933) and the minimum 347,000 acre-feet (December 5, 1936). The lake was nearly 4 feet higher during the flood of June, 1894. Natural storage was increased by construction of Kerr Dam 4 miles downstream from natural lake outlet. Storage began April 11, 1938. The usable capacity is 1,791,000 acre-feet. Water is used for power, flood control and irrigation.

Mission Valley Reservoirs

A group of eight reservoirs in an area tributary to Flathead River from the east extending from Flathead Lake to Jocko River has been operated for irrigation and recreation. Records for December 1939 and from September 1940 to date have been furnished by the U. S. Bureau of Indian Affairs. They are:

Twin Reservoir

4 miles southeast of Polson, fed by canals, has a usable capacity of 899 acre-feet.

Pablo Reservoir

3 miles south of Polson, fed by canals, some water supplies by Flathead pumping plant, has a usable capacity of 27,100 acre-feet.

Lower Crow Reservoir

On Crow Creek 6 miles west of Ronan, has a usable capacity of 10,350 acre-feet.

Mission Reservoir

On Mission Creek 4 miles east of St. Ignatius, has a usable capacity of 7,250 acre-feet.

Tabor Reservoir

On Dry Creek 8 miles southeast of St. Ignatius, fed by water diverted from Jocko River, has a usable capacity of 23,300 acre-feet.

McDonald Reservoir

On Post Creek 9 miles east of Charlo has a usable capacity of 8,220 acre-feet.

Kicking Horse Reservoir

5 miles south of Ronan, fed by canals, has a usable capacity of 8,350 acre-feet.

Ninepipe Reservoir

2 miles northeast of Charlo, fed by canals, has a usable capacity of 14,870 acre-feet.

Lower Jocko Lake

The staff gage is at dam on Middle Fork of Jocko River 15 miles east of Arlee. The drainage area is 7.39 square miles. Data for most of the month-end reservoir contents since 1940 have been furnished by the U. S. Bureau of Indian Affairs. Transmountain diversion takes water from Placid Creek in the Clearwater basin to Upper Jocko Lake, thence to Lower Jocko Lake. The usable capacity is 6,380 acre-feet. The station is in Missoula County about 3 miles east of the Lake County boundary, but the data were omitted from the report for Missoula County.

MINING

The geomorphic form of Lake County originated in early Tertiary time (70,000,000 years ago) when the land area of western Montana was involved in massive uplift and deformation. After a period of relative quiescence and erosion, lasting perhaps 10 to 20 million years, deformation in the form of block faulting took place forming large northwestward-trending intermontane valleys and mountain ranges similar to the present Flathead Valley and its nearby mountains.

This valley of the Flathead is part of what is known in geologic literature as the Rocky Mountain trench and is described as a "narrow wonderfully straight depression". It continues north from Lake County 800 miles to the Laird River in British Columbia, and is an orogenic depression of great magnitude.

In Pleistocene time (1,000,000 years ago) vast sheets of ice and their lobes (valley glaciers) advanced and retreated in successive stages during periods of climatic change. One such lobe or glacier from the Cordilleran ice sheet advanced southward through the Flathead Valley, leaving glacial debris strewn along its path upon melting; another such lobe advanced similarly along the Burcell trench near the Montana-Idaho border. Its consequence was of extreme importance as it blocked the westward drainage of the Clark Fork River whose waters then inundated the land, creating a glacial lake known as Lake Missoula. This vast glacial lake covered an area of 2,900 square miles, including much of Lake County, and contained an estimated 500 cubic miles of water. Evidence of its former existence can still be seen today by the faint shorelines preserved on grassy slopes and by local deposits of glacial lake sediments.

Glacial lake deposits and glacial drift occupy most of the valley floors in Lake County whereas the predominant rock types in the mountains are quartzites, argillites, limestones, and dolomites of the Precambrian Belt Series. Noteworthy is the absence of exposures of igneous rocks within the county as contrasted with most other counties in western Montana. As it is firmly and widely established in geologic literature that metallic mineralization is genetically associated with igneous rocks, the lack of such rock exposures accounts for the paucity of metallic lode deposits in the area. As a result, metal mining has been of little importance in Lake County.

Only two mining properties, the Chief Cliff and Silverstone lead-silver mines, are known to have been worked—neither one has been a significant producer of ore nor active in recent years.

The real mineral wealth of Lake County, however, may eventually come from the exploitation of the nonmetallic or industrial mineral type of natural resource, such as clay, sand, and gravel. Deposits of glacial clay occur extensively throughout the countryside, though as yet no deposits are known to contain clay of quality useful for ceramic purposes. The best known clays are suitable for blending with other higher-quality clays or for use as low-firing bonding material; many of the other clays are much too silty and low in plasticity to be used even as bonding material.

Lake County undoubtedly contains enough sand and gravel deposits to be self-sufficient in its needs. The best sources may be from the gravel terraces along the Flathead valley from Ravalli northward to Polson.

SOIL CONSERVATION DISTRICTS

Lake County is served by three soil conservation districts, but the major portion is served by the Lake County Soil Conservation District, which was organized in 1945.

Areas that are not included within the district are about 6 sections of land in T. 26N, R. 18W; and T. 26N, R. 19W; which were included in Flathead Soil Conservation District and 68 sections of land in T. 22N, R. 23W; and T. 23N, R. 23W; which were included in the Eastern Sanders County Soil Conservation District. Lake County has an area of 960,000 acres of which 920,000 acres are within the Lake County Soil Conservation District.

Each district is governed by a board of five supervisors who are elected by the land occupiers of the respective district. They carry out a program in erosion control, water conservation, soil fertility management, land improvement and land adjustment to proper land use.

Under state law, the supervisors have the power to call upon local, state and federal agencies to assist in carrying out a soil and water conservation program. The Lake County Soil Conservation District has memoranda of understanding with the Soil Conservation Service, State Forestry Department and Extension Service to provide technical assistance to district co-operators in carrying out a sound soil and water conservation program. Close working relations are maintained with the Bureau of Indian Affairs, the Farmers Home Administration, the Agricultural Stabilization and Conservation Committee and the United States Forest Service.

The Soil Conservation Service assists the district by furnishing and interpreting basic data on soils and plant cover and other features of the land. Technical data are interpreted in terms of accepted alternative land uses and treatments to help guide the farm and ranch operators in developing sound conservation plans. It also aids district co-operators in performing operations requiring technical skills beyond the experience of the individuals involved.

The Office of the State Forester and U. S. Forest Service co-operate with the district by co-ordinating the programs in timber management, tree planting, forest and range fire control and watershed management on federal, state and private lands.

The Extension Service assists the district with its education and information program. An important function of each district is to inform landowners and occupiers of the benefits derived from wise use of the communities soil and water resources.

One of the major problems of these districts is to acquaint the urban people who comprise a large percentage of the total population of the districts, with the need for conservation.

Technical phases of the district's program include detailed soil surveys, forest site and utilization investigations, range site and condition surveys, ground water investigations, topographic and other engineering surveys. By a careful analysis of this basic resource information, proper land use and needed conservation treatment of each field can be determined. The technician interprets the surveys and provides the district co-operator with alternatives in land use and treatment that will enable him to treat the hazards and limitations that occur on each tract of land. With this information and by counseling with the technician the farmer or rancher makes the final decisions. These decisions are recorded in the Conservation Plan. The co-operator determines what will be done on his place and when it will be carried out.

When the plan is completed the co-operator is given further technical assistance on lay out work essential in establishing conservation practices on the land as called for in the conservation plan. This technical assistance is provided without cost to the co-operating farmer or rancher.

There are 162,397 acres of federal lands in Lake County. Approximately one third of the total area is held in trust for the Indians of the Flathead Indian Reservation. Of the total area approximately 128,500 acres are cropland. It is estimated that about 111,208 acres are irrigated and 50,000 acres are dryland. Approximately 225,100 acres are devoted to pasture and range use of which 186,000 is native range, 28,500 acres seeded dryland pasture and 10,000 rougher irrigated lands permanently seeded to pasture. There are 564,397 acres of wooded land of which 162,397 are federally owned, 56,000 small private ownerships, 90,000 large corporate ownerships and 255,000 controlled by the Bureau of Indian Affairs. There are approximately 42,003 acres of land considered other land such as townsites, roads and highways, railroads and like lands.

The major enterprise on agricultural lands is livestock production. Beef cattle, dairy cattle, sheep and swine are produced. Cash crops produced are potatoes, sugar beets, grains and sweet cherries.

Work done since the organization of the district on irrigated lands consists largely of improvement of irrigation systems within the farm boundaries, installation of sprinkler systems, land leveling, construction of permanent ditches, installation of water control structures, farm drainage systems, improved cropping and pasture management systems, soil management and improvement of wildlife habitat. On dryland pasture and range the work done has been improvement of vegetative cover through seeding, deferred-rotation grazing, fencing, livestock water development and improvement of wildlife habitat. On private woodlands the emphasis has been toward stand improvement for long term timber production plus production of higher quality Christmas trees. Pruning, thinning and weeding have been emphasized along with improved harvest methods.

Since the district was organized assistance has been given on proper cropping systems on over 32,000 acres, improved water application 25,000 acres, land leveling and grading 2,500 acres, 130 sprinkler systems installed, drainage installed on 4,000 acres requiring nearly 110 miles of ditch, over 500 structures installed, 100 miles of irrigation ditch construction, range improvement on 27,000 acres, pasture improvement on 37,000 acres, seeding of hay and pasture on 20,000 acres, 70 stock ponds constructed, 40 springs developed, 55 wells developed, 1,500 acres of land cleared, 7 ponds stocked with fish, 1,600 acres improved wildlife habitat, 100 acres of trees planted, improved methods of harvest cutting on 4,700 acres of woodland, 900 acres woodland trimming and pruning, 1,900 acres woodland thinning and other approved conservation measures.

An inventory of soil and water conservation needs in Lake County has recently been completed. This inventory is a part of a National Inventory and estimates remaining conservation needs by land uses. The inventory is based upon statistically expanded data obtained from randomly selected 160 acre samples on which detailed soil surveys were completed. The inventory estimates that approximately 64% of the non-irrigated cropland and approximately 80% of the irrigated cropland needs additional treatment and is feasible to treat; that approximately 67% of native range, 70% of tame pasture and 78% of irrigated native grassland is in need of additional conservation treatment. It estimates that approximately 80,000 acres of private woodland needs planting, 135,000 acres need improvement of the existing stand and most of the privately owned woodland needs protection from fire, insects, disease and from animals. The needed treatment consists primarily of a combination of practices to adequately control erosion and conserve moisture.

A considerable amount of conservation work has been accomplished through efforts of organized groups and this is encouraged wherever possible.

The most of the irrigation water used is delivered to the farm by the United States Indian Irrigation Service. Some is from private water rights.

The Lake County Soil Conservation District owns equipment consisting of D-7 Cat, TD-14 tractor, dragline, land plane, ripper, scraper and truck-transport which is available to district co-operators on a rental basis to carry out needed conservation measures.

Co-operative efforts of landowners and operators, other groups and agencies have contributed to the overall success of the district.

FISH AND GAME

Lake County is richly gifted with a wide variety of wildlife. The Mission area is one of the last great strongholds of the grizzly bear. Other big game animals in the county include white-tailed and mule deer, elk, moose, mountain goat, mountain sheep and black bear.

The National Bison Range is located near Moiese where remnants of the once great herd can be studied and photographed.

For years, big horn sheep have been live-trapped on Wild Horse Island at Flathead Lake and have been transplanted to many areas of the state by the Montana Fish and Game Department.

The cultivated lands in the lower Flathead Valley have produced bird hunting that compares with the best in the nation. The ring-necked pheasant has found the cover and cultivated fields to be ideal.

Waterfowl hunting is excellent in the pot-holes that dot the lower Flathead Valley.

Kicking Horse Reserve, Ninepipe and Pablo all produce ducks and geese. The bays and sheltered areas of Flathead Lake provide excellent hunting for mallards, pintails and scaup as well as the Canada goose. The Flathead River also provides excellent goose hunting.

Mountain grouse are found throughout the forested areas of the county. Blue, Franklin's and Ruffed grouse all inhabit the area. Hungarian and Chukar partridge provide added sport to the shot gunner.

Furbearing animals that once coaxed mountain men in this area are still present. They include: marten, coyote, beaver, muskrat, mink and otter.

There are probably few places in the nation where a mixed bag of upland game birds, waterfowl and mountain grouse can be taken within a few miles distance that can compare with Lake County.

Fishermen needn't look far to enjoy their favorite sport. Flathead Lake produces Kokanee salmon, Mackinaw and Dolly Varden trout in record size. Large Cutthroat trout also add to the bag. Perch and large-mouth bass are warm-water species that are enjoyed by the sportsmen on Ninepipe and Kicking Horse Reservoir.

Kokanee salmon spawn on the rocky edges of Flathead and Swan Lake and are taken by snagging during a special season. Lake Mary Ronan, Swan Lake and the Flathead are all famous fishing spots for bass, trout and Kokanee. The Swan and Flathead rivers produce a variety of fishing to test the angler. Pablo Reservoir is managed for rainbow trout.

Winter fishing is becoming more popular every year and Pablo and Ninepipe produce bumper crops of yellow perch for the warmly-clothed fisherman.

With its wealth of wildlife and scenic beauty, Lake County attracts visitors from every state and many nations. It provides unparalleled outdoor recreation for people who like to boat, fish, hunt or just look.

NATIONAL FORESTS

Most of the 148,614 acres of National Forest land in Lake County are on the Flathead National Forest. A small acreage of Lolo National Forest land is in Lake County just north of Frenchtown. The majority of National Forest lands in this county are in the Swan Valley and about 17,000 acres are along the east shore of Flathead Lake. These National Forest lands in Lake County are managed under a multiple use concept by Forest Rangers and their staffs at the Condon, Bigfork, Swan Lake, and Ninemile Ranger Stations.

A large area of wild lands, in what is now Lake County, was set aside by President Cleveland as a Forest Reserve in 1897. Eleven years later, in 1908, President Theodore Roosevelt designated part of this Forest Reserve as National Forest.

Topography on National Forest land in Lake County ranges from flat, level land in the Swan Valley bottom to rugged, mountainous terrain in the Swan and Mission Mountain ranges. Elevations vary from 3,100 feet to 9,300 feet. Wide valleys are flanked by parallel steep, rocky ridges. The Swan Valley is four to five miles in width; thirty miles of this valley is in Lake County. Drainages to the Swan River flow westward from the Swan Divide and eastward from the Mission Divide. These drainages are five to eight miles in length; the upper three to five miles are steep and rugged.

While water is undoubtedly the most valuable resource on these public lands in Lake County, it is difficult to assign a dollar value and measure this important resource. Water stored in the heavy snows on National Forest land is released into the Columbia River system in warmer months and makes significant contributions to irrigation, power production, domestic needs, and industrial demands in the local area as well as throughout the Columbia River Valley.

Along the east shore of Flathead Lake residents depend on water originating on National Forest lands in the west slopes of the Mission Mountains. Because of dependence on this source of domestic water, the Mission Mountain water shed must be managed as would any municipal water supply water shed.

The National Forest lands in Lake County have stable soils. Watershed conditions are considered good. Recognizing the importance of favorable soil-water conditions as the foundation for all other uses and resource management, the Forest Service gives first consideration to soil and water in all planning. Timber is cut and roads are built only when adequate provision is made to prevent harmful erosion and stream pollution. Fire prevention and suppression, balancing the number of livestock against available forage, maintaining wildlife numbers within the support capacity of these public lands and insect and disease control all contribute to watershed protection of these National Forest lands.

Water is but one of the basic resources managed by the Forest Service under the multiple use concept. Wildlife, wood, recreation, forage, as well as water, contribute to the economy of Lake County. In addition to their impact on the local economy, Lake County receives 25 percent of Forest Service revenue from National Forest lands within the county. These funds are made available to the county for local schools and roads.

Grazing on National Forest land in this county is transitory. In the past year temporary grazing permits allowed 206 cattle and 36 horses to be grazed on these public lands.

National Forest lands are playing a big part in the growing outdoor recreation activity in Lake County. There is heavy and increasing recreational use of the East Shore of Flathead Lake. The recently completed Swan Valley highway is contributing to a recreational boom throughout the Valley. Indications are that increased recreational use of this area will continue for many years.

An estimated 40,000 recreational visits were made to National Forest lands in Lake County in 1962. Camping and picnic facilities are available at several popular sites. Forest Service plans include more and improved recreational facilities in Lake County.

A part of the Mission Mountain Primitive Area is within the county. The Bob Marshall Wilderness Area is adjacent to the county on the east. These two popular recreational areas bring many tourists and vacationers to Lake County. These two areas and other National Forest lands offer beautiful mountain lakes, quiet mountain trails, and excellent hunting and fishing.

National Forest fish and game resources are important to the local economy and recreation. Big game animals in the area include white-tailed deer, mule deer, moose, elk, mountain goat, black bear and grizzly bear. Fishing and hunting attracted an estimated 20,000 visits to the National Forest lands in Lake County in 1962. Indications are that this number will increase each year.

There is extensive timber on the Swan Lake Ranger District and the Condon Ranger District in the county. Since World War II there has been considerable commercial logging and road construction into these timber stands. Prior to 1945 there was significant timber harvesting in the Swan Lake area. On January 3, 1913, fifty-two million board feet of National Forest timber in the Swan Lake area was sold to the Somers Lumber Company. This timber was harvested over a 3-year period, 1914-1917.

The first harvest of Flathead National Forest timber using anything other than horsepower was in 1918-19. A ledgerwood skidder was used in skidding thirty-four million board feet of timber to the railroad. These logs, harvested from 5,719 acres in the Swan Lake area, were transported by railroad to the banking ground on the lake.

During this period of logging on National Forest lands in Lake County, a wagon road was completed through the Swan Valley. This road was completed before Lake County was created in 1923.

Today National Forest lands in Lake County have a sustained yield annual allowable timber cut of approximately twenty million board feet. This stabilized sustained timber production capacity is important to the local economy.

SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE FOLLOWING COUNTIES COMPLETED TO DATE

Big Horn, Broadwater, Carbon, Carter, Cascade, Custer, Deer Lodge, Fallon, Gallatin, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis & Clark, Madison, Meagher, Missoula, Musselshell, Park, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wheatland, Wibaux and Yellowstone

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
***Missouri River**	**98,430.50**	**22,286.50**	**120,717.00**
Jefferson River	61,291.00	9,713.00	71,004.00
Beaverhead River	40,771.00	6,076.00	48,847.00
Big Hole River	23,775.00	1,950.00	25,725.00
Madison River	39,445.00	7,660.00	47,105.00
Gallatin River	111,914.00	21,097.00	133,011.00
Smith River	32,934.00	19,679.00	52,613.00
Sun River	124,474.58	4,385.00	128,859.58
Marias River	1,724.00	0	1,724.00
Teton River	61,228.00	14,255.00	75,483.00
Musselshell River	64,789.00	57,870.00	122,659.00
Little Missouri River	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin	**703,289.08**	**166,470.50**	**869,759.58**
Yellowstone River Drainage Basin			
Yellowstone River	**303,501.00**	**96,148.00**	**399,649.00**
Stillwater River	27,489.00	16,403.00	43,892.00
Clark Fork River	91,768.00	24,195.00	115,963.00
Big Horn River	65,395.00	25,579.00	90,974.00
Tongue River	28,170.00	7,762.00	35,932.00
Powder River	35,948.00	2,299.00	38,247.00
Grand Total Yellowstone River Basin	**552,271.00**	**172,386.00**	**724,657.00**
Columbia River Drainage Basin			
Clark Fork (Deer Lodge, Hellgate, Missoula) River	**145,804.70**	**14,934.20**	**160,738.90**
Bitterroot River	111,102.43	3,200.00	114,302.43
Flathead River	111,208.61	1,702.82	112,911.43
Grand Total Columbia River Basin	**368,115.74**	**19,837.02**	**387,952.76**
Grand Total in the Counties Completed to Date	**1,623,785.82**	**358,706.52**	**1,982,492.34**

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF LAKE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Columbia River			
***Clark Fork Columbia River**	0	0	0
Flathead River	0	0	0
Flathead Lake	185.00	0	185.00
Swan River (Below Lake)	0	0	0
Johnson (Tinkle) Creek	0	31.00	31.00
School Meadow Creek	14.00	5.00	19.00
Karney Creek	13.00	0	13.00
Swan Lake	0	0	0
Bond Creek	8.00	0	8.00
Unnamed Creek	15.00	7.00	22.00
Swan River (Above Lake)	0	0	0
Kaser Creek	100.00	0	100.00
Lost Creek	0	0	0
North Fork Lost Creek	35.00	6.00	41.00
Stopher Creek	0	19.00	19.00
Unnamed Lake	1.00	9.00	10.00
Unnamed Stream	38.00	0	38.00
Dads (Crow) (Mosai) Creek	25.00	0	25.00
Porcupine Creek	0	0	0
Unnamed Creeks & Springs	23.00	0	23.00
Big Lodge Creek	44.00	14.00	58.00
Birch (Louie) Creek	14.00	0	14.00
Rock Spring Creek	1.00	0	1.00
Howsley Creek	10.00	0	10.00
Unnamed Creek & Spring	9.00	0	9.00
Hutchins Creek	19.00	0	19.00
Michaels Creek	0	0	0
Michaels Springs	2.00	0	2.00
Springs & Seepage	5.00	0	5.00
Henry Creek	38.00	0	38.00
Springs (3)	2.00	0	2.00
Parker (Glen) (Logan) Creek	60.00	0	60.00
Alma (Yellow Bay) Creek	138.00	3.00	141.00
Unnamed Stream	5.00	0	5.00
Proctor (Spring) Creek	0	0	0
Miller Creek	47.00	0	47.00
Indian Springs	11.00	0	11.00
Spring Creek	24.00	0	24.00
Dayton Creek	363.00	0	363.00

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF LAKE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Ronan (Irvine) (Ervin) (Gardner) Creek	208.00	60.00	268.00
Lake Mary Ronan	0	0	0
Donaldson Creek	17.00	0	17.00
Kootenai Creek	56.00	0	56.00
Well	17.00	0	17.00
Blue Boy (Meadow) Creek	4.00	1.00	5.00
Sunset Spring	6.00	0	6.00
Starvation (Four Mile) Creek	3.00	0	3.00
Boulder (Five Mile) Creek	9.00	0	9.00
Station Creek	27.00	0	27.00
Mann Springs	3.00	0	3.00
Spring	3.00	0	3.00
Unnamed Creek & Spring	6.00	0	6.00
Mahood Creek	1.00	0	1.00
Skidoo (Big) (Hellroaring) Creek	102.00	0	102.00
Holmes Creek	1.00	0	1.00
Weishair Spring	16.00	0	16.00
Gingras Springs (3)	26.00	0	26.00
Unnamed Creek	0	0	0
Unnamed Stream & Springs	16.00	0	16.00
Unnamed Creek	18.00	0	18.00
Ducharme (Smith) (Centipede) Creek	0	108.00	108.00
Moss Creek	0	70.00	70.00
Springs	97.90	0	97.90
Twin Reservoir (Turtle Lake)	0	0	0
Dupuis Creek	0	40.00	40.00
White Clay Creek	0	0	0
Irvine (White Clay) Creek	131.00	0	131.00
North Fork White Clay Creek	3.00	0	3.00
Springs (2)	20.00	0	20.00
Little Bitterroot River	0	0	0
Sullivan Creek	53.00	0	53.00
Artesian Wells	561.00	0	561.00
Crow Creek	0	0	0
North Crow Creek	510.30	5.60	515.90
Middle Crow Creek	7.00	0	7.00
Drainage	11.00	0	11.00
Lost (Rainbow) (Koupal) Creek	46.00	0	46.00
Courville Creek	7.00	0	7.00

IRRIGATION SUMMARY OF LAKE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Spring Creek	0	0	0
Well	33.00	0	33.00
Courville Creek	103.00	10.20	113.20
South Fork Courville (Rock) (Spring) Creek	18.00	10.00	28.00
Mud Creek	459.80	34.00	493.80
Unnamed Springs	10.00	0	10.00
Meinsinger Spring & Creek	40.00	0	40.00
Unnamed Springs	6.00	0	6.00
Drain Ditch	130.00	0	130.00
Big Creek	78.20	0	78.20
Bisson Creek	87.02	0	87.02
Spring	8.00	0	8.00
Mission Creek	968.00	0	968.00
Spring	5.00	0	5.00
Dry Creek	222.90	0	222.90
Mikes Creek	95.50	0	95.50
Sabine Creek	680.00	0	680.00
Thorne Creek	23.30	0	23.30
Post Creek	974.50	30.20	1,004.70
Mollman (Marsh) Creek	338.50	17.00	355.50
Unnamed Stream (Seepage)	8.00	0	8.00
Unnamed Creek	40.00	0	40.00
Poison Oak (Lantow) (Beachmin) Creek	289.50	0	289.50
Dimmick Spring	7.00	0	7.00
Ashley (Dry) Creek	428.46	0	428.46
Ashley Creek	31.70	0	31.70
Unnamed Creek & Spring	6.70	0	6.70
Unnamed Streams	263.10	10.40	273.50
Matt Creek	18.00	0	18.00
Big (Dublin) Gulch	0	0	0
Well & Pond	19.00	0	19.00
Jocko River	241.50	47.43	288.93
North Fork Jocko River	0	0	0
Unnamed Creek	58.00	7.00	65.00
Big Knife Creek	0	20.50	20.50
Agate Stevens Creek	8.50	0	8.50
Moiese Creek	10.40	5.30	15.70
Pellew Creek	2.40	0	2.40
Barnaby Creek	23.40	0	23.40

IRRIGATION SUMMARY OF LAKE COUNTY BY RIVER BASINS

COLUMBIA RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Finley Creek	403.70	19.60	423.30
Agency Creek	367.70	173.37	541.07
Adams Creek	0	0	0
Alkali (Flat) Creek	25.00	0	25.00
Spring Creek	290.00	0	290.00
Lamoose (Big) Creek	81.30	43.00	124.30
Valley Creek	677.80	0	677.80
Swamp & Seepage	13.00	0	13.00
Total Private Irrigation	**10,830.08**	**806.60**	**11,636.68**
Flathead Irrigation Project*			
Flathead Irrigation District	75,526.28	90.68	75,616.96
Mission Irrigation District	18,953.74	8.60	18,962.34
Jocko Valley Irrigation District	5,898.51	796.94	6,695.45
Total Project Irrigation	**100,378.53**	**896.22**	**101,274.75**
Total Irrigation in Lake County	**111,208.61**	**1,702.82**	**112,911.43**

*Due to the mingled water supply, irrigated acreage totals from each stream were not determined for the Flathead Irrigation Project.

FLATHEAD IRRIGATION PROJECT
(Including Jocko Valley, Mission and Flathead Irrigation Districts)

HISTORY

Irrigation was practiced in the region of what is now Lake County as long ago as 1854 to flood small areas for the production of garden crops and grain. Shortly after the mission was founded at St. Ignatius in 1854, water was taken from Mission Creek by the Jesuit Priests for the irrigation of lands adjacent to that stream. This was the first record of irrigation on the present Flathead Indian Reservation.

In 1904, Congress authorized a preliminary survey of the reservation lands to determine whether or not an irrigation project was feasible. Three years later, in 1907, an arrangement was made between the Office of Indian Affairs and the Reclamation Service whereby the latter would furnish the engineering service for the survey and to carry on the construction work. Engineer Robert S. Stockton was in charge of the first preliminary survey. His report on the feasibility and irrigation development was completed in 1908. Actual construction of the project began in 1909 and has been carried on continuously to the present time. Until April, 1924, the engineering work was done by the Reclamation Service, but since then, all of the work in connection with the Flathead Irrigation Project has been under the Bureau of Indian Affairs.

The water users on the project are represented by three Irrigation District Boards, the Confederated Kootenai and Salish Tribal Council, and the Flathead Agency Superintendent. The irrigated lands are located in Lake, Sanders and Missoula counties; and extend along the Jocko River from above Arlee to below Dixon, along the Flathead River from the Bison Range to Polson, and along the Little Bitterroot River from below Hot Springs to above Lonepine.

Organized under the Flathead Irrigation Project are Flathead, Mission and Jocko Valley Irrigation Districts. All three districts were created by a district court decree on August 26, 1926. (For the exact location of the land under the three districts see Maps in Part II of this report).

In Lake County, the Jocko Valley Irrigation District is served mainly from the "K" canal complex with the major diversion in the Jocko River north of Arlee.

The Mission Valley, which includes all of Flathead and Mission Irrigation Districts in Lake County totals 114,900 acres and is a unified and highly interrelated complex of nine storage reservoirs, two pumping plants and the Pablo Feeder Canal. By the way of the Placid Creek trans-mountain diversion canal, water is brought from Placid Creek on the Clearwater River drainage into the North Fork of the Jocko above the Jocko Lakes. This water and Jocko River water are then diverted through the Tabor Feeder Canal into Tabor Reservoir (St. Mary's Lake) on Dry Creek. Tabor Dam and Reservoir stores Placid Creek, Jocko and Dry Creek water and regulates that supply into the Pablo Feeder Canal heading in Dry Creek and ending in Pablo Reservoir, approximately 30 miles north. Two mountain reservoirs, Mission and McDonald, store Mission and Post Creek water which they then supply to the Pablo Feeder or for direct diversion from the creeks. Enroute to Pablo Reservoir, the Pablo Feeder Canal also supplies water to three valley floor reservoirs, Kicking Horse, Ninepipe and Crow and to several main canals. The Pablo Feeder also supplies water to part of the Polson area of the Pablo Division. The balance of the Polson area is supplied by flows from Big Creek and other creeks through Twin Reservoir about 5 miles southeast of Polson.

The 216 cfs Flathead pumping system supplies water to Pablo Reservoir and to the western part of the Polson area. The pumps are operated only when there is a need to supplement gravity supplies. The pump supply has averaged about 15,000 acre feet per year. The small 25 cfs Crow Creek pump lifts water from Post Creek which is primarily return flow from irrigation above, into a sub-main canal in the Post Division. This is also used only to supplement short supplies from the gravity system as the occasion demands.

A small acreage of irrigated land of the Camas Division extends into Lake County. The water supply for the Camas "B" canal enters Lake County from the Little Bitterroot drainage. Included in the Camas Division water supply are the Little Bitterroot River, several of its tributaries and storage in four reservoirs. Two of the reservoirs are located in Flathead County and two in Sanders County.

PRESENT STATISTICS

Location: The location of the irrigated land areas of the three districts under the Flathead Irrigation Project are:

Jocko Valley Irrigation District; Township 16 North, Ranges 19 and 20 West; Township 17 North, Ranges 19 and 20 West; and Township 18 North, Range 20 West.

Mission Irrigation District; Township 18 North, Ranges 19 and 20 West; Township 19 North, Ranges 19 and 20.

Flathead Irrigation District; Township 19 North, Ranges 19, 20, 21 and 22 West, Township 20 North, Ranges 19, 20, 21 and 22 West, Township 21 North, Ranges 19, 20 and 21 West, Township 22 North, Ranges 19, 20, 21 and 23 West.

Length and Capacity of Canals: Under this project there is estimated 1,300 miles of canals and lateral ditches in the distribution system. There are approximately 16 miles of concrete lining on some of the major canals of the project. This was necessary in certain areas to eliminate excessive water loss due to seepage and ditch bank erosion. The capacities of some of the main canals are: For the Jocko Valley Irrigation District, Jocko "K" canal at the intake has a capacity of 231 cfs. Capacities of major canals affecting both the Mission and Flathead Irrigation Districts are: the Tabor Feeder Canal, 200 cfs, Pablo Feeder Canal, 500 cfs and the Pablo "A" canal 485 cfs.

Reservoirs: The following are reservoirs of the project and their capacities: Tabor 23,300 ac. ft., Mission 7,250 ac. ft., McDonald 8,225 ac. ft., Kicking Horse 8,350 ac. ft., Ninepipe 14,870 ac. ft., Crow 10,350 ac. ft., Pablo 27,270 ac. ft., Twin 836 ac. ft., Horte 260 ac. ft., Hillside 95 ac. ft., Little Bitterroot Lake 24,000 ac. ft., Hubbart 12,125 ac. ft., Upper Dry Fork 2,700 ac. ft., and Dry Fork 4,000 ac. ft.

Operation and Maintenance: The water charge per acre on this project includes both operation and maintenance and the cost of pumped water. The charges for the different types of land ownership on the Flathead Reservation are as follows:

WHITE OWNED LAND (1962)

Jocko Valley Irrigation District	$3.50 per acre
Mission Irrigation District	$3.30 per acre
Flathead Irrigation District	$3.50 per acre

INDIAN OWNED LAND (1962)

Jocko Valley Division	$2.75 per acre
Mission Valley Division	$3.36 per acre
Camas Division	$4.57 per acre

Water charges for the Non-District White Owned Land are the same as those listed above for Indian Owned Land. Non-district white owned land is land sold by an Indian that requires a time period before the transaction is completed to become legally included in an irrigation district.

Present Water Users: On the Flathead Irrigation Project in 1962 there were approximately 73 water users listed under the Jocko Valley Irrigation District, 227 for the Mission Irrigation District and 1,040 under the Flathead Irrigation District.

Acreage Irrigated: In 1962, the three districts of the project had the following irrigated acreage: Jocko Valley 5,898.51 irrigated acres with 796.94 irrigable acres; Mission 18,953.74 irrigated acres with 8.60 irrigable acres and Flathead has 75,526.28 irrigated acres with 90.68 irrigable acres.

WATER RIGHT DATA

The water rights applicable to the Flathead Irrigation Project were filed by the United States of America and are as follows:

An appropriation from Agency Creek, dated 1-22-10 for 4,000 miner's inches (Ref. Book A, Page 46); from Agency Creek, dated 4-2-10 for 4,000 miner's inches (Ref. Book A, Page 52); from Agency Creek, dated 10-10-13 for 4,000 miner's inches (Ref. Book A, Page 290); from Agency Creek, dated 10-9-13 for 4,000 miner's inches (Ref. Book A, Page 286); from Ashley Creek, dated 12-27-09 for 20,000 miner's inches (Ref. Book A, Page 14); from Ashley Creek, dated 2-8-18 for 4,000 miner's inches (Ref. Book A, Page 327); from Barnaby Creek, dated 1-22-10 for 2,000 miner's inches (Ref. Book A, Page 42); from Big Creek (Flood), dated 7-21-32 for 3,000 miner's inches (Ref. Book 5, Misc. Records, Page 179); from Big Knife Creek, dated 1-22-10 for 40,000 miner's inches (Ref. Book A, Page 35); from Big Knife Creek dated 4-2-10 for 4,000 miner's inches (Ref. Book A, Page 59); from Big Knife Creek, dated 8-1-10 for 4,000 miner's inches (Ref. Book A, Page 282); from Crow Creek, dated 12-27-09 for 80,000 miner's inches (Ref. Book A, Page 7); from Crow Creek, dated 12-27-09 for 160,000 miner's inches (Ref. Book A, Page 8); from North Fork Crow Creek, dated 4-4-12 for 80,000 miner's inches (Ref. Book A, Page 240); from South Fork Crow Creek, dated 12-27-09 for 40,000 miner's inches (Ref. Book A, Page 5); from Dry Creek, dated 12-27-09 for 80,000 miner's inches (Ref. Book A, Page 15); from Dry Creek, dated 12-27-09 for 40,000 miner's inches (Ref. Book A, Page 18); from Falls Creek, dated 7-27-11 for 8,000 miner's inches (Ref. Book A, Page 73); from Finley Creek, dated 1-22-10 for 20,000 miner's inches (Ref. Book A, Page 40); from Finley Creek, dated 4-2-10 for 200,000 miner's inches (Ref. Book A, Page 57); from Finley Creek, dated 10-10-13 for 4,000 miner's inches (Ref. Book A, Page 288); from East Branch Finley Creek, dated 1-22-10 for 20,000 miner's inches (Ref. Book A, Page 38); from Flathead River, dated 3-15-13 for 800 miner's inches (Ref. Book A, Page 99); from Griffin Creek, dated 9-28-54 for 8,000 miner's inches (Ref. Book 18, Misc. Records, Page 173); from Jocko River, dated 1-22-10 for 200,000 miner's inches (Ref. Book A, Page 34); from Jocko River, dated 5-21-13 for 16,000 miner's inches (Ref. Book A, Page 268); from Jocko River, dated 9-7-20 for all miner's inches (Ref. Book A, Page 371); from Middle Fork Jocko River, dated 11-23-11 for 4,000 miner's inches (Ref. Book A, Page 81); from North Fork Jocko River, dated 7-27-11 for 16,000 miner's inches (Ref. Book A, Page 72); from South Fork Jocko River, dated 11-23-11 for 8,000 miner's inches (Ref. Book A, Page 79); from LaMoose Creek, dated 1-22-10 for 2,000 miner's inches (Ref. Book A, Page 45); from Marsh Creek, dated 12-27-09 for 20,000 miner's inches (Ref. Book A, Page 30); from Marsh Creek, dated 6-22-12 for 4,000 miner's inches (Ref. Book A, Page 248); from Branch Marsh Creek, dated 6-22-12 for 4,000 miner's inches (Ref. Book A, Page 246); from Mikes Creek, dated 12-27-09 for 800 miner's inches (Ref. Book A, Page 16); from Mission Creek, dated 12-27-09 for 120,000 miner's inches (Ref. Book A, Page 12); from Mission Creek, dated 3-8-10 for 160 miner's inches (Ref. Book A, Page 49); from Mission Creek, dated 7-1-10 for 8,000 miner's inches (Ref. Book A, Page 264); from Mission Creek, dated 3-13-13 for 8,000 miner's inches (Ref. Book A, Page 91); from Mission Creek, dated 3-14-13 for 6,000 miner's inches (Ref. Book A, Page 232); from Mission Creek, dated 4-2-13 for 12,000 miner's inches (Ref. Book A, Page 260); from Moise Creek, dated 1-22-10 for 2,000 miner's inches (Ref. Book A, Page 41); from Mud Creek, dated 4-4-12 for 4,000 miner's inches (Ref. Book A, Page 242); from Pellew Creek, dated 1-22-10 for 2,400 miner's inches (Ref. Book A, Page 44); from Pellew Creek, dated 4-2-10 for 2,000 miner's inches (Ref. Book A, Page 64); from Post Creek, dated 12-27-09 for 200,000 miner's inches (Ref. Book A, Page 4); from Post Creek, dated 5-9-12 for 20,000 miner's inches (Ref. Book A, Page 254); from "S-14" Creek, dated 7-27-11 for 4,000 miner's inches (Ref. Book A, Page 70); from Sabin Creek, dated 8-8-11 for 2,000 miner's inches (Ref. Book A, Page 75).

The above appropriations may be found in the County Clerk and Recorder's Office, Polson, Montana.

An appropriation from Big Creek, dated 10-2-09 for 40,000 miner's inches (Ref. Book 71, Page 382); from Big Creek, dated 9-25-15 for 4,000 miner's inches (Ref. Book 129, Page 386); from Big Creek, dated 9-17-18 for 2,000 miner's inches (Ref. Book 129, Page 432); from Hell Roaring Creek, dated 10-2-09 for 20,000 miner's inches (Ref. Book 71, Page 367); from Hell Roaring Creek, dated 2-10-20 for 800 miner's inches (Ref. Book 129, Page 463); from Flathead River, dated 1-22-10 for 4,000,000 miner's inches (Ref. Book 71, Page 403); from Little Bitterroot River, dated 9-1-09 for 40,000 miner's inches (Ref. Book 71, Page 364); from Little Bitterroot River, dated 10-2-09 for 400,000 miner's inches (Ref. Book 71, Page 376); from Mud Creek, dated 12-27-09 for 8,000 miner's inches (Ref. Book 71, Page 397); from Branch Mud Creek, dated 12-27-09 for 2,000 miner's inches (Ref. Book 71, Page 391); from Branch Mud Creek, dated 12-27-09 for 800 miner's inches (Ref. Book 71, Page 392); from Little Bitterroot River, dated 12-

21-13 for 400,000 miner's inches (Ref. Book 71, Page 500); from Little Bitterroot River, dated 12-20-13 for 400,000 miner's inches (Ref. Book 71, Page 502).

The above appropriations may be found in the County Clerk and Recorder's Office, Kalispell, Montana.

An appropriation from Jocko River 12-27-09 for 1,600 miner's inches (Ref. Book D, Page 524); from Placid Creek, dated 5-9-31 for 8,000 miner's inches (Ref. Book J, Page 287); from Placid Creek, dated 5-7-34 for 200 miner's inches (Ref. Book J, Page 324).

The above appropriations may be found in the County Clerk and Recorder's Office, Missoula, Montana.

An appropriation from Alder Creek, dated 7-19-32 for 3,000 miner's inches (Ref. Book 3, Page 118); from Little Bitterroot River, dated 10-2-09 for 200,000 miner's inches (Ref. Book 1, Page 341); from Little Bitterroot River, dated 12-22-13 for 200,000 miner's inches (Ref. Book 1, Page 591); from Little Bitterroot River, dated 3-8-17 for 400,000 miner's inches (Ref. Book 3, Page 18); from Mill Creek, dated 12-23-13 for 40,000 miner's inches (Ref. Book 1, Page 588).

The above appropriations may be found in the County Clerk and Recorder's Office, Thompson Falls, Montana.

In addition to filings listed above, there are more than 100 other filings made by the United States for this project on surplus and flood water from unnamed creeks and coulees too numerous to mention here. A list of these other recorded filings and their location may be obtained from the State Engineer's Office, Water Resources Survey.

See Maps in Part II, Pages 1-2, 4-12, 14-20.

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
STREAM	**No. of Filings**	**Miner's Inches**	**Cu. Ft. Per Sec.**	**Case No.**	**No. of Decrees**	**Miner's Inches**	**Cu. Ft. Per Sec.**
COLUMBIA RIVER BASIN							
***Clark Fork**							
Columbia River	0	0	0				
Big Blackfoot River	0	0	0				
Clearwater River	0	0	0				
Owl Creek	0	0	0				
Placid Lake	0	0	0				
Placid Creek	2	8,200.00	205.00				
Flathead River (Below Lake)	37	94,473,520.00	2,361,838.00				
Flathead Lake	11	2,180.00	54.50				
Flathead River (Above Lake)	0	0	0				
Stillwater River	0	0	0				
Logan Creek	0	0	0				
Griffin Creek	2	16,000.00	400.00				
Swan River (Below Lake)	0	0	0				
Johnson (Tinkle) Creek	5	796.00	19.90				
North Fork Johnson (Tinkle) (Schmidt) (Lost) Creek	4	1,100.00	27.50				
South Fork Johnson (Tinkle) Creek	1	60.00	1.50				
Horseshoe Lake	0	0	0				
Unnamed Creek	1	All	All				
School Meadow Creek	4	1,060.00	26.50				
Karney Creek	3	140.00	3.50				
Unnamed Spring	2	100.00	2.50				
Swan Lake	0	0	0				
Bond Creek	5	4,080.00	102.00				
Spring Creek	1	20.00	0.50				
East Branch Spring Creek	1	13.00	0.32				
Groom Creek	4	360.00	9.00				
Unnamed Spring	1	40.00	1.00				
Small Spring Branch	4	200.00	5.00				
Unnamed Spring	1	100.00	2.50				
Hall Creek	3	180.00	4.50				
Unnamed Spring	1	1,000.00	25.00				
Unnamed Creek	2	300.00	7.50				
Six Mile Creek	2	800.00	20.00				
Camp Creek	1	2,000.00	50.00				
Swan River (Above Lake)	0	0	0				
Lost Lake (& Swan River)	1	14,000.00	350.00				
High Park Lake (& Swan River)	1	20,000.00	500.00				
Gray Wolf Lake (& Swan River)	1	18,000.00	450.00				
Glacier Creek & Turquoise Lake	1	14,000.00	350.00				

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Kaser Creek	2	6,100.00	152.50				
Pony Creek	1	80.00	2.00				
Jim Creek	1	10,000.00	250.00				
Piper Creek	1	80.00	2.00				
Lion Creek	3	1,960.00	49.00				
Cedar Creek	1	240.00	6.00				
Squeezer Creek	1	1,000.00	25.00				
Soup Creek	2	190.00	4.75				
Cilly Creek	0	0.00	0.00				
Southwest Branch Cilly Creek	1	All	All				
Lost Creek	0	0.00	0.00				
North Fork Lost Creek	2	320.00	8.00				
Stopher Creek	1	40.00	1.00				
North Fork Stopher Creek	2	160.00	4.00				
Lime Creek	1	100.00	2.50				
Total Swan River & Tributaries	**69**	**98,619.00**	**2,465.47**				
Unnamed Spring	1	2,000.00	50.00				
Boulder Spring	1	20.00	0.50				
Unnamed Springs	2	20.00	0.50				
Shearers Creek	1	40.00	1.00				
Canyon Spring	1	All	All				
Unnamed Spring	1	80.00	2.00				
Unnamed Lakes	1	8,000.00	200.00				
Hunger Creek	2	160.00	4.00				
Dads (Mosai) (Crow) Creek	3	172.00	4.30				
Lost Spring	1	40.00	1.00				
Unnamed Spring	1	5.00	0.12				
Crane Creek	7	1,138.40	28.46				
Unnamed Spring	6	120.00	3.00				
Porcupine Creek	2	65.00	1.62				
Unnamed Creek	2	126.80	3.17				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	6	444.80	11.12				
Big Lodge Creek	6	5,050.00	126.25				
Unnamed Springs	5	720.00	18.00				
The North Spring	1	40.00	1.00				
Birch (Louie) Creek	1	200.00	5.00				
Unnamed Springs	4	10.00	0.25				
Unnamed Stream	1	40.00	1.00				
Rock Spring Creek	3	460.00	11.50				
Unnamed Spring	1	20.00	0.50				
Unnamed Spring	1	20.00	0.50				
Unnamed Creek	2	140.00	3.50				
Howsley Creek	3	280.00	7.00				
Unnamed Spring	1	160.00	4.00				
Unnamed Creek	1	All	All				
Unnamed Spring	5	235.00	5.87				
Fred T. Purvis Spring	2	15.00	0.37				
Hutchins Creek	8	355.00	8.87				
Unnamed Spring	1	40.00	1.00				
Two Unnamed Springs	1	20.00	0.50				

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Michaels Creek	2	160.00	4.00				
Michaels Springs	1	40.00	1.00				
Seepage	1	25.00	0.62				
Unnamed Spring	2	820.00	20.50				
Henry Creek	2	400.00	10.00				
Unnamed Spring	2	200.00	5.00				
Parker (Glen) (Logan) Creek	9	534.00	13.35	2476	10	All	All
Loten Creek	1	150.00	3.75				
Unnamed Spring	1	80.00	2.00				
Lolo (Reds) Creek	8	32,240.00	806.00				
Alma (Yellow Bay) Creek	11	41,920.00	1,048.00				
Unnamed Creek	2	200.00	5.00				
Meredith Spring	1	20.00	0.50				
Malmo Creek	1	40.00	1.00				
Malmo Spring	1	20.00	0.50				
Unnamed Creek	1	200.00	5.00				
Big Willow Spring	1	40.00	1.00				
Little Willow Spring	1	0	0				
Poplar Spring Creek	1	40.00	1.00				
Poplar Spring	1	40.00	1.00				
Unnamed Stream	0	0	0				
Unnamed Spring	2	40.00	1.00				
Bickford Spring	2	100.00	2.50				
Chief Spring	1	300.00	7.50				
Unnamed Springs	2	160.00	4.00				
Spring (Clear) Creek	1	240.00	6.00				
Unnamed Spring	2	All	All				
Foss Springs	1	40.00	1.00				
Unnamed Springs	2	120.00	3.00				
Proctor (Spring) Creek	5	820.00	20.50				
Miller Creek	1	60.00	1.50				
Indian Springs	1	40.00	1.00				
Spring Creek	1	20.00	0.50				
Unnamed Springs	1	11.57	0.29				
Mikes Pond	1	160.00	4.00				
Dayton Creek	16	6,438.00	160.95				
Middle Fork Dayton Creek	1	80.00	2.00				
South Fork Dayton Creek	0	0	0				
Unnamed Creek	1	20.00	0.50				
Gillard Spring	2	106.00	2.65				
Ronan (Ervin) (Irvine) (Gardner) Creek	12	8,380.00	209.50				
Lake Mary Ronan	2	All	All				
Donaldson Creek	2	70.00	1.75				
Unnamed Springs	1	400.00	10.00				
Little Spring Creek	1	50.00	1.25				
Red Lake	1	40.00	1.00				
Kootenai Creek	2	200.00	5.00				
Unnamed Springs	2	40.00	1.00				
Unnamed Creek	1	120.00	3.00				
Blue Bay (Meadow) Creek	20	39,600.00	990.00				
Unnamed Creek	1	200.00	5.00				
Black Lake	0	0	0				

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	All	All				
Unnamed Spring	1	500.00	12.50				
Sunset Spring	1	10.00	0.25				
Unnamed Creek	2	10.00	0.25				
Starvation (Four Mile) Creek	7	32,410.00	810.25				
Boulder (Five Mile) Creek	11	48,700.00	1,217.50				
Laugh A Way Creek	1	400.00	10.00				
Unnamed Spring	1	20.00	0.50				
Bear Track (Dee) (Six Mile) Creek	11	18,280.00	457.00				
Unnamed Springs	1	13.33	0.33				
McIntire Springs	1	40.00	1.00				
Unnamed Creek	1	20.00	0.50				
Rock Creek	1	5,000.00	125.00				
Unnamed Creek	2	55.00	1.37				
Station Creek	9	32,480.00	812.00				
Unnamed Springs	1	80.00	2.00				
Unnamed Spring	4	140.00	3.50				
Mann Springs	2	120.00	3.00				
Unnamed Springs	2	All	All				
Mahood Creek	2	105.00	2.62				
Unnamed Spring	5	540.00	13.50				
Skidoo (Big) (Hellroaring) Creek	21	64,835.00	1,620.87	1600	2	80.00	2.00
Unnamed Spring	1	10.00	0.25				
Holmes Creek	2	80.00	2.00				
Unnamed Spring	2	80.00	2.00				
Unnamed Creek	1	80.00	2.00				
Weishair Spring	1	100.00	2.50				
Unnamed Spring	1	All	All				
Unnamed Creek	1	20.00	0.50				
Jette (Turtle) Lake	3	1,400.00	35.00				
Unnamed Spring	3	240.00	6.00				
Gingras Springs (Three)	1	160.00	4.00				
Unnamed Springs	4	260.00	6.50				
Unnamed Creek	7	451.39	11.28				
Unnamed Spring	4	42.00	1.05				
Unnamed Springs	6	256.00	6.40				
Rosenberger Spring	2	100.00	2.50				
Unnamed Creek	1	40.00	1.00				
Leader Spring	1	6.00	0.15				
Unnamed Spring	6	626.00	15.65				
Hellroaring (Big) (Deep) Creek	17	121,080.00	3,027.00				
Unnamed Spring	2	160.00	4.00				
Ducharme (Smith) (Centipede) Creek	4	290.00	7.25				
Unnamed Spring	2	26.00	0.65				
Moss Creek	2	30.00	0.75				
Unnamed Springs	2	160.00	4.00				
Unnamed Spring	1	40.00	1.00				
Unnamed Stream	2	160.00	4.00				
Unnamed Spring	6	245.50	6.13				
Addison M. Sterling Spring	1	10.00	0.25				
Unnamed Spring	1	5.00	0.13				

WATER RIGHT DATA — LAKE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Twin Reservoir (Turtle Lake)	0	0	0				
Dupuis Creek	0	0	0				
Michell Spring	1	40.00	1.00				
Polson Spring	1	50.00	1.25				
Grandview Drainage Flume	1	20.00	0.50				
Killdeer Spring	1	20.00	0.50				
Unnamed Springs, Seeps, Potholes	3	580.00	14.50				
Unnamed Springs	2	40.00	1.00				
Unnamed Spring	3	40.00	1.00				
Unnamed Stream	2	440.00	11.00				
White Clay Creek	3	40,000.00	1,000.00				
Mary's Springs	1	40.00	1.00				
Irvine (White Clay) Creek	3	280.00	7.00				
Unnamed Spring	6	110.00	2.75				
Little Bubbler Spring	1	20.00	0.50				
Hillside Spring	1	20.00	0.50				
Unnamed Creek	1	40.00	1.00				
Unnamed Spring	4	320.00	8.00				
La Rose Creek	1	80.00	2.00				
Unnamed Springs	1	10.00	0.25				
Holt Spring & Creek	1	120.00	3.00				
Unnamed Springs	2	80.00	2.00				
Burton Spring	1	All	All				
Unnamed Creek	1	100.00	2.50				
Unnamed Spring	1	All	All				
North Fork White Clay Creek	4	840.00	21.00				
Unnamed Springs	1	All	All				
Vinson Creek	2	400.00	10.00				
Unnamed Springs	3	260.00	6.50				
Buffalo Springs	1	80.00	2.00				
Unnamed Spring	4	85.21	2.13				
Unnamed Creek & Tributaries	1	200.00	5.00				
Unnamed Creek	1	All	All				
Little Bitterroot River	4	440,130.00	11,003.25				
Sullivan Creek	2	120.00	3.00				
Unnamed Creek	1	150.00	3.75				
Jansen's Spring	1	All	All				
Big Creek	2	600.00	15.00				
Unnamed Springs	2	1.16	0.03				
Unnamed Creek	2	240.00	6.00				
Unnamed Spring	2	60.00	1.50				
Suny-Side Springs	1	1.16	0.03				
Mary's Springs	4	250.00	6.25				
Grant's Spring	1	40.00	1.00				
Unnamed Spring	3	80.00	2.00				
Unnamed Spring	1	240.00	6.00				
Dubay Creek	2	240.00	6.00				
Minesinger Creek	1	200.00	5.00				
Unnamed Spring Creek	1	60.00	1.50				
Unnamed Spring	1	40.00	1.00				

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per. Sec.	DECREED RIGHTS No. Case	Decrees No. of	Inches Miner's	Per Sec. Cu. Ft.
Poirier Creek	2	120.00	3.00				
Bisson Creek	2	400.00	10.00				
Bishop Creek	1	200.00	5.00				
Underground Stream (Artesian Well)	1	120.00	3.00				
West Miller Coulee	1	80.00	2.00				
Unnamed Spring	1	20.00	0.50				
Unnamed Springs	2	86.00	2.15				
Drainage	1	200.00	5.00				
Total Crow Creek and Tributaries	**84**	**637,216.00**	**15,930.40**				
Unnamed Spring	1	100.00	2.50				
Unnamed Springs	1	40.00	1.00				
Mission Creek	38	328,392.00	8,209.80				
Dry Creek	7	201,110.00	5,027.75				
Unnamed Spring	1	All	All				
Cold Creek	1	1,600.00	40.00				
Mike's Creek	2	840.00	21.00				
Unnamed Spring	1	All	All				
Unnamed Spring	2	204.00	5.10				
Sabine Creek	25	35,420.00	885.50	2167	2	Ditch Decree	
Thorne Creek	1	20.00	0.50				
Unnamed Stream	1	60.00	1.50				
McCollum Creek	1	100.00	2.50				
Unnamed Stream	1	2,000.00	50.00				
Pistol (Johnson) Creek	3	440.00	11.00				
Unnamed Spring & Pond	1	150.00	3.75				
Unnamed Springs	1	All	All				
Post Creek	6	440,800.00	11,020.00				
Seepage Water (Unnamed Creek)	2	850.00	21.25				
Mollman (Marsh) Creek	4	28,120.00	703.00				
Unnamed Spring	1	40.00	1.00				
Unnamed Stream	1	80.00	2.00				
Unnamed Spring	1	All	All				
June Creek	1	80.00	2.00				
Samathy Well	1	6.00	0.15				
Valentine Creek	1	200.00	5.00				
Deschamp's Spring	1	All	All				
Baker Creek	1	150.00	3.75				
Unnamed Spring	3	280.00	7.00				
Unnamed Stream	1	50.00	1.25				
Unnamed Springs	5	200.00	5.00				
Crystal Spring	1	2,000.00	50.00				
Dan Springs Creek	1	120.00	3.00				
Unnamed Creek	0	0	0				
Unnamed Spring	1	40.00	1.00				
Unnamed Springs	1	80.00	2.00				
Coyote Creek	0	0	0				
Unnamed Spring	1	40.00	1.00				
Total Little Bitterroot & Tributaries	**41**	**444,872.32**	**11,121.81**				

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS No. Case	Decrees No. of	Inches Miner's	Per Sec. Cu. Ft.
Mahoney Spring	1....	200.00....	5.00				
Spring Creek	1....	600.00....	15.00				
Unnamed Spring	1....	20.00....	0.50				
A Gulch (Waste Water)	1....	200.00....	5.00				
Crow Creek	3....	400,000.00....	10,000.00				
North Crow Creek	9....	94,760.00....	2,369.00				
Waste Water	1....	80.00....	2.00				
Middle Crow Creek	2....	160.00....	4.00				
Unnamed Stream	1....	2,000.00....	50.00				
Lost (Rainbow) (Koupal) Creek	4....	220.00....	5.50				
Courville Creek	1....	120.00....	3.00				
South Crow Creek	4....	91,000.00....	2,275.00				
Spring Creek	3....	3,360.00....	84.00				
Huckleberry Spring	1....	60.00....	1.50				
Courville Creek	2....	160.00....	4.00				
Unnamed Stream	1....	80.00....	2.00				
South Fork Courville (Rock) (Spring) Creek	4....	300.00....	7.50				
South Fork Spring	1....	160.00....	4.00				
Unnamed Springs (3)	1....	100.00....	2.50				
Mud Creek	12....	36,090.00....	902.25				
Branch of Mud Creek	3....	2,400.00....	60.00				
South Fork Mud Creek	1....	440.00....	11.00				
Unnamed Spring	3....	200.00....	5.00				
Unnamed Creek	1....	160.00....	4.00				
Unnamed Springs (3 or more)	2....	40.00....	1.00				
Meinsinger Spring Creek	2....	420.00....	10.50				
Meinsinger Springs	1....	100.00....	2.50				
Unnamed Spring	2....	120.00....	3.00				
Big Creek	3....	1,900.00....	47.50				
Poison Oak (Lantow) (Beauchmin) Creek	5....	664.00....	16.60				
Poison Oaks Spring	1....	24.00....	0.60				
Big Spring	1....	100.00....	2.50				
Red Horne Springs	1....	24.00....	0.60				
Unnamed Spring	1....	40.00....	1.00				
Ashley (Dry) Creek	9....	44,620.00....	1,115.50				
Unnamed Creek	1....	100.00....	2.50				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Springs	1....	100.00....	2.50				
Ashley Creek	1....	4,000.00....	100.00				
Dishman Spring	1....	60.00....	1.50				
Unnamed Streams	101....	85,800.00....	2,145.00				
Unnamed Spring	4....	290.00....	7.25				
Unnamed Stream	14....	12,800.00....	320.00				
Unnamed Springs	1....	80.00....	2.00				

WATER RIGHT DATA — LAKE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS No. Case	Decrees No. of	Inches Miner's	Per Sec. Cu. Ft.
Matt Creek	22	16,500.00	412.50				
Camp Spring	1	30.00	0.75				
Unnamed Spring	1	80.00	2.00				
Dry Lake Creek	1	All	All				
Unnamed Gulch	1	100.00	2.50				
Unnamed Spring	1	25.00	0.62				
Total Mission Creek & Tributaries	**275**	**1,206,049.00**	**30,151.22**				
Jocko River	17	421,610.00	10,540.25				
North Fork Jocko River	4	48,500.00	1,212.50				
Falls Creek	5	40,000.00	1,000.00				
S-14 Creek	4	16,000.00	400.00				
Middle Fork Jocko River	4	16,000.00	400.00				
South Fork Jocko River	4	32,000.00	800.00				
Big Knife Creek	2	44,000.00	1,100.00				
Unnamed Spring	1	10.00	0.25				
Moiese Creek	2	4,000.00	100.00				
Unnamed Spring	2	18.00	0.45				
Pellew Creek	2	4,400.00	110.00				
Unnamed Springs	1	All	All				
Unnamed	2	160.00	4.00				
Unnamed Springs	1	86.00	2.15				
Barnaby Creek	3	4,010.00	100.25				
Spring Creek	2	660.00	16.50				
Unnamed Springs	1	All	All				
Finley Creek	9	1,430.00	35.75				
Agency Creek	1	160.00	4.00				
Blodgett Creek	2	200.00	5.00				
Unnamed Spring	1	50.00	1.25				
Waste Water	1	160.00	4.00				
Mary Creek	1	50.00	1.25				
Unnamed Spring & Creek	1	350.00	8.75				
Adams Creek	3	45.00	1.12				
Unnamed Spring	3	20.00	0.50				
Alkali (Flat) Creek	2	60.00	1.50				
Spring Creek	6	6,600.00	165.00				
Unnamed Spring	1	10.00	0.25				
Lamoose (Big) Creek	2	4,000 00	100.00				
Unnamed Spring	1	80.00	2.00				
Valley Creek	9	13,600.00	340.00				
Copper Creek	2	140.00	3.50				
Unnamed Springs (Four)	1	160.00	4.00				
Total Jocko River & Tributaries	**103**	**658,569.00**	**16,464.22**				
Grand Total Lake County	**1,088**	**98,074,897.32**	**2,451,872.43**				

DRAINAGES IN LAKE COUNTY NOT LOCATED

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Morrow Creek	1	300.00	7.50
Waste, Seep	1	400.00	10.00
Spring, Near Arlee	1	All	All
Spring	1	3.00	0.07
Spring	1	50.00	1.25
Unnamed Stream	1	8,000.00	200.00
Unnamed Stream	1	2,000.00	50.00
Unnamed Stream	1	800.00	20.00
Unnamed Stream	1	800.00	20.00
Unnamed Stream	1	800.00	20.00
Unnamed Stream	1	1,600.00	40.00
Unnamed Stream	1	1,600.00	40.00
Unnamed Creek	1	800.00	20.00
Unnamed Stream	1	800.00	20.00
Unnamed Stream	1	800.00	20.00
Unnamed Creek	1	800.00	20.00
Unnamed Stream	1	800.00	20.00
Unnamed	1	100.00	2.50
Total	**18**	**20,453.00**	**511.32**

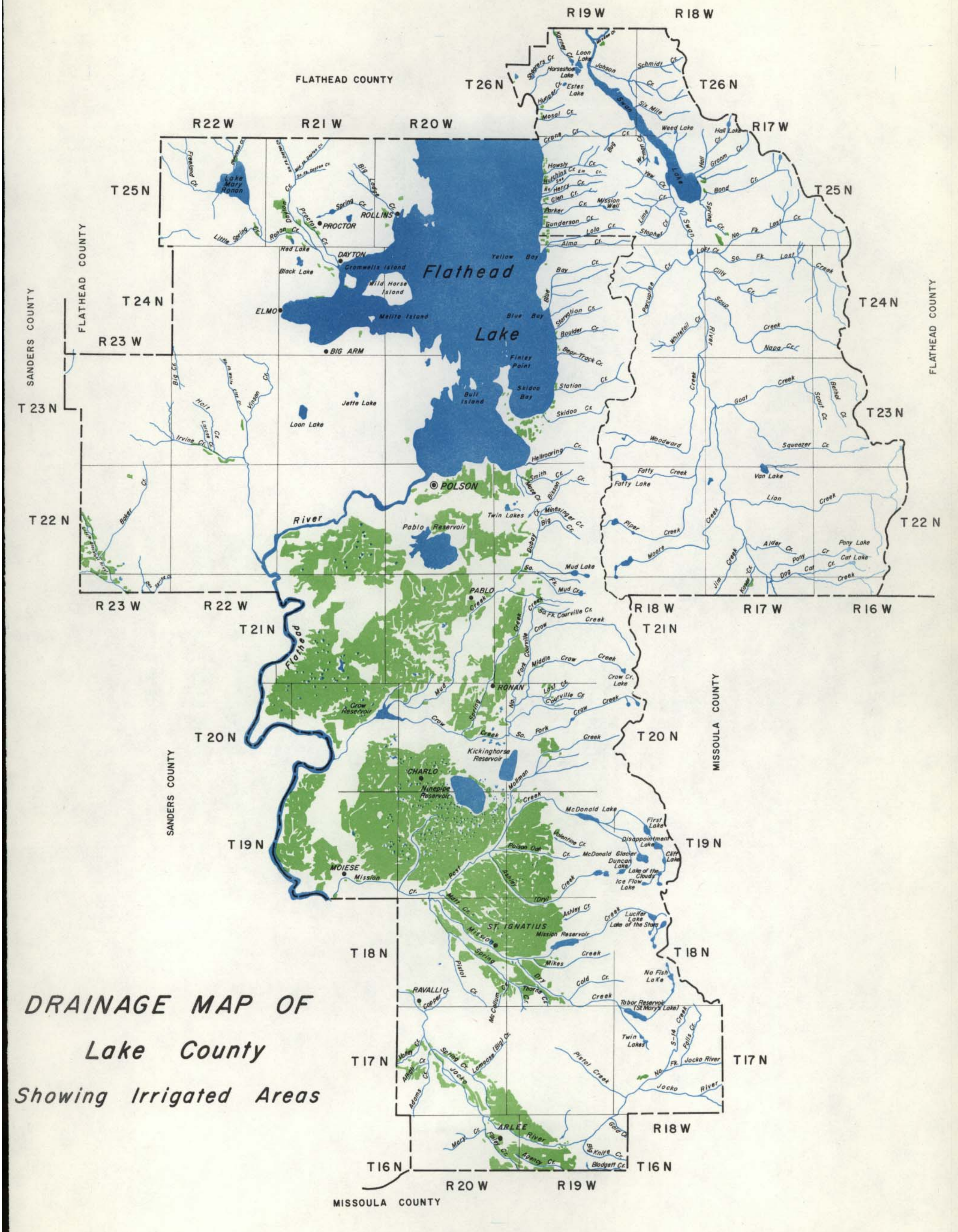
WATER RESOURCES SURVEY

Lake County, Montana

Part II

Maps Showing Irrigated Areas

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1963



DRAINAGE MAP OF Lake County

Showing Irrigated Areas

MAP INDEX

Township	Range	Page	Township	Range	Page
16 North	19 West	1	21 North	21 West	16
16 North	20 West	2	21 North	23 West	17
17 North	18 West	3	22 North	19 West	18
17 North	19 West	4	22 North	20 West	19
17 North	20 West	4	22 North	21 West	20
18 North	19 West	5	22 North	23 West	17
18 North	20 West	6	23 North	19 West	21
19 North	19 West	7	23 North	20 West	22
19 North	20 West	8	23 North	22 West	23
19 North	21 West	9	23 North	23 West	24
19 North	22 West	9	24 North	19 West	25
20 North	19 West	10	24 North	21 West	26
20 North	20 West	11	25 North	18 West	27
20 North	21 West	12	25 North	19 West	28
20 North	22 West	12	25 North	20 West	29
21 North	17 West	13	25 North	21 West	30
21 North	19 West	14	25 North	22 West	31
21 North	20 West	15	26 North	19 West	32

ALL MAPS HAVE BEEN MADE FROM AERIAL PHOTOGRAPHS

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

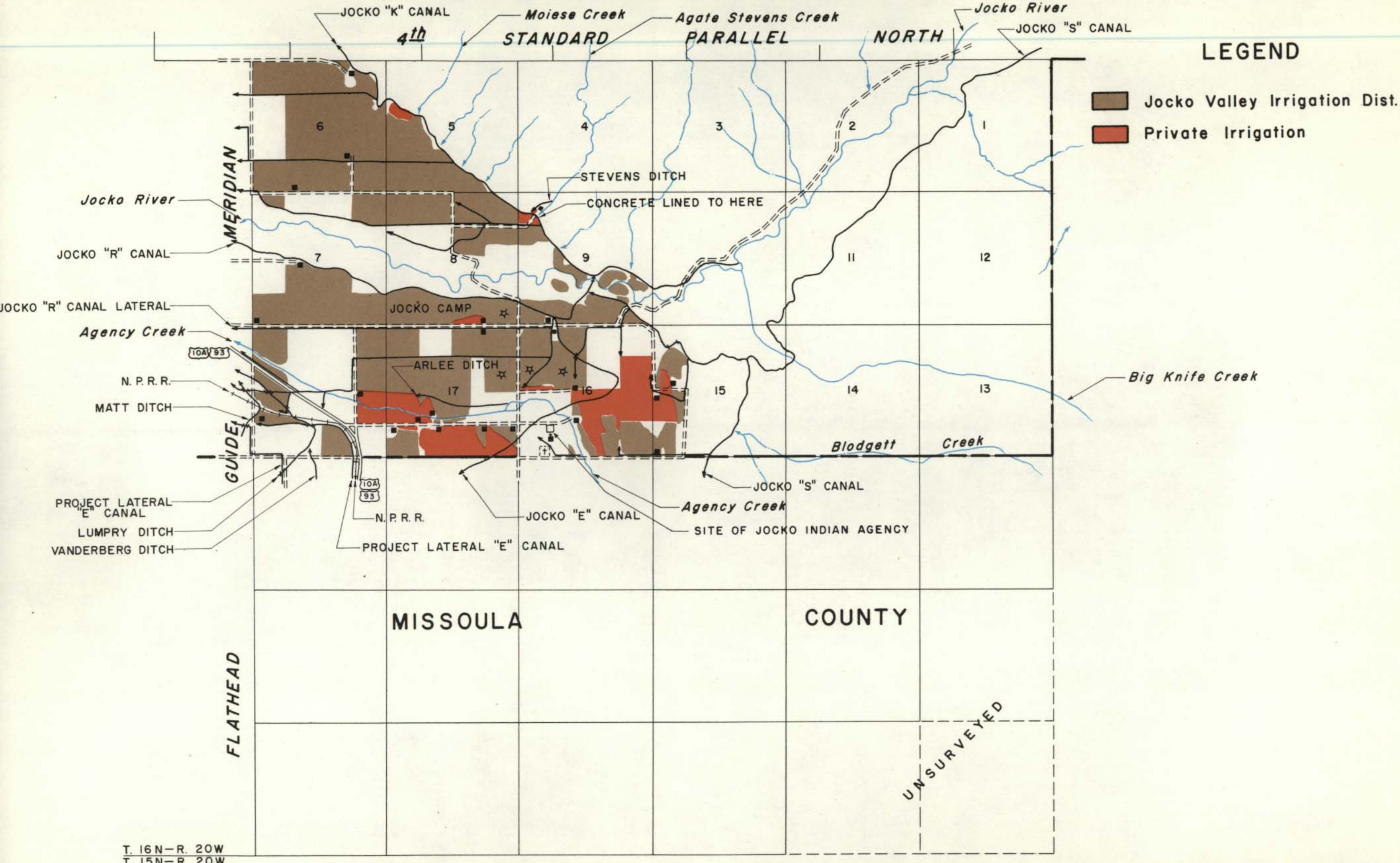
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U.S. HIGHWAY
- AIRPORT

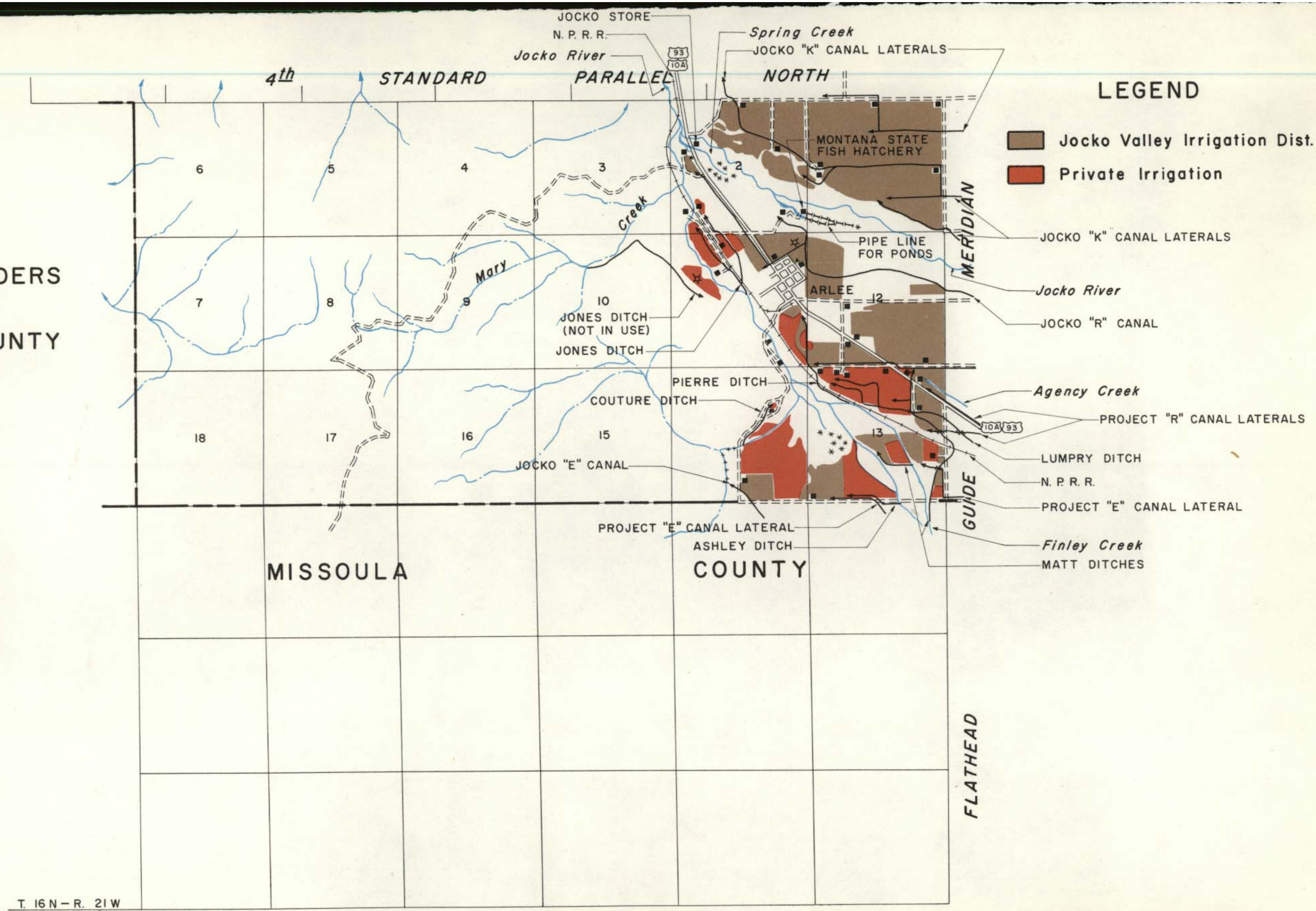
STRUCTURES & UNITS

- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT



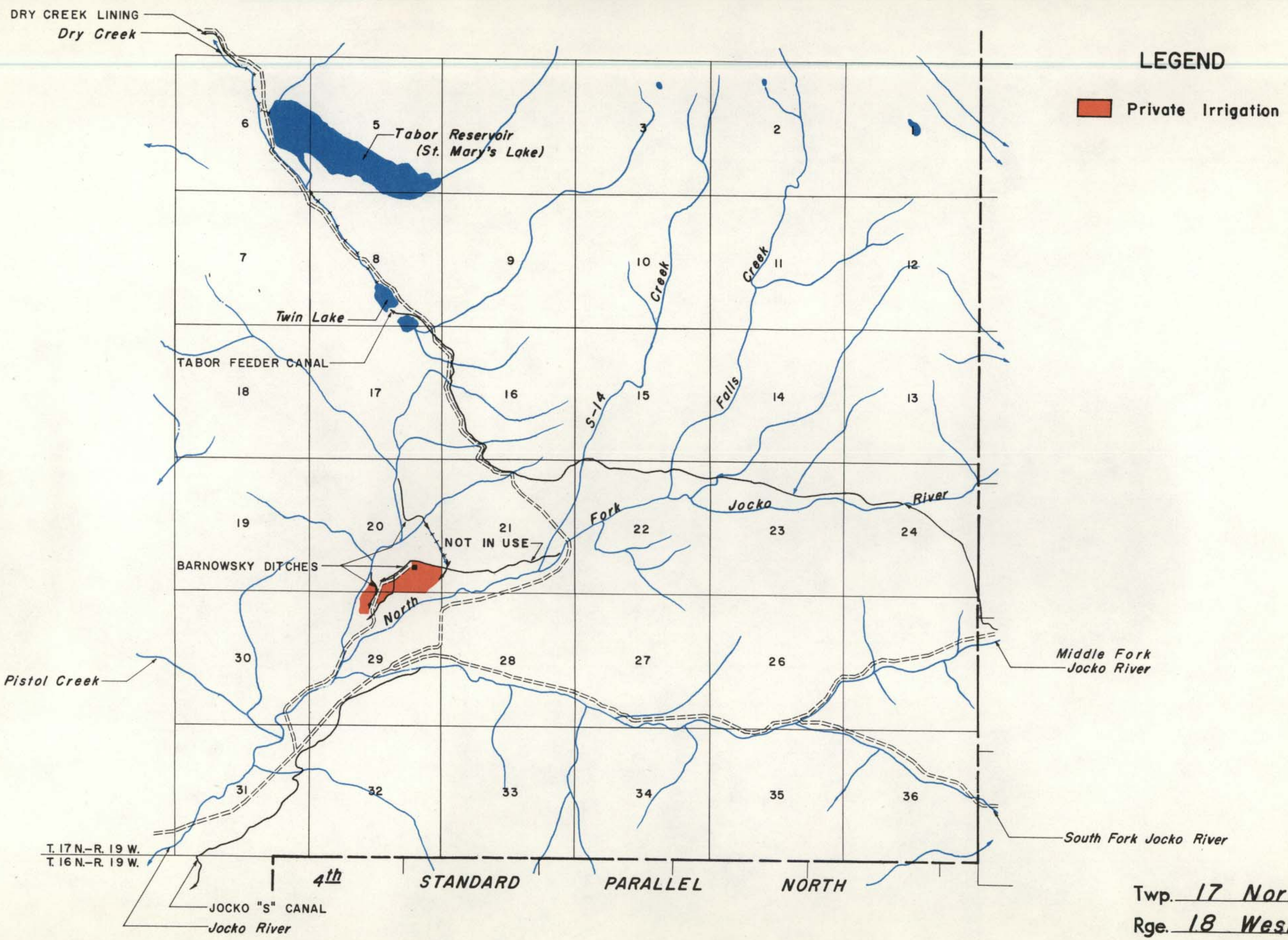
Twp. *16 North*

Rge. *19 West*

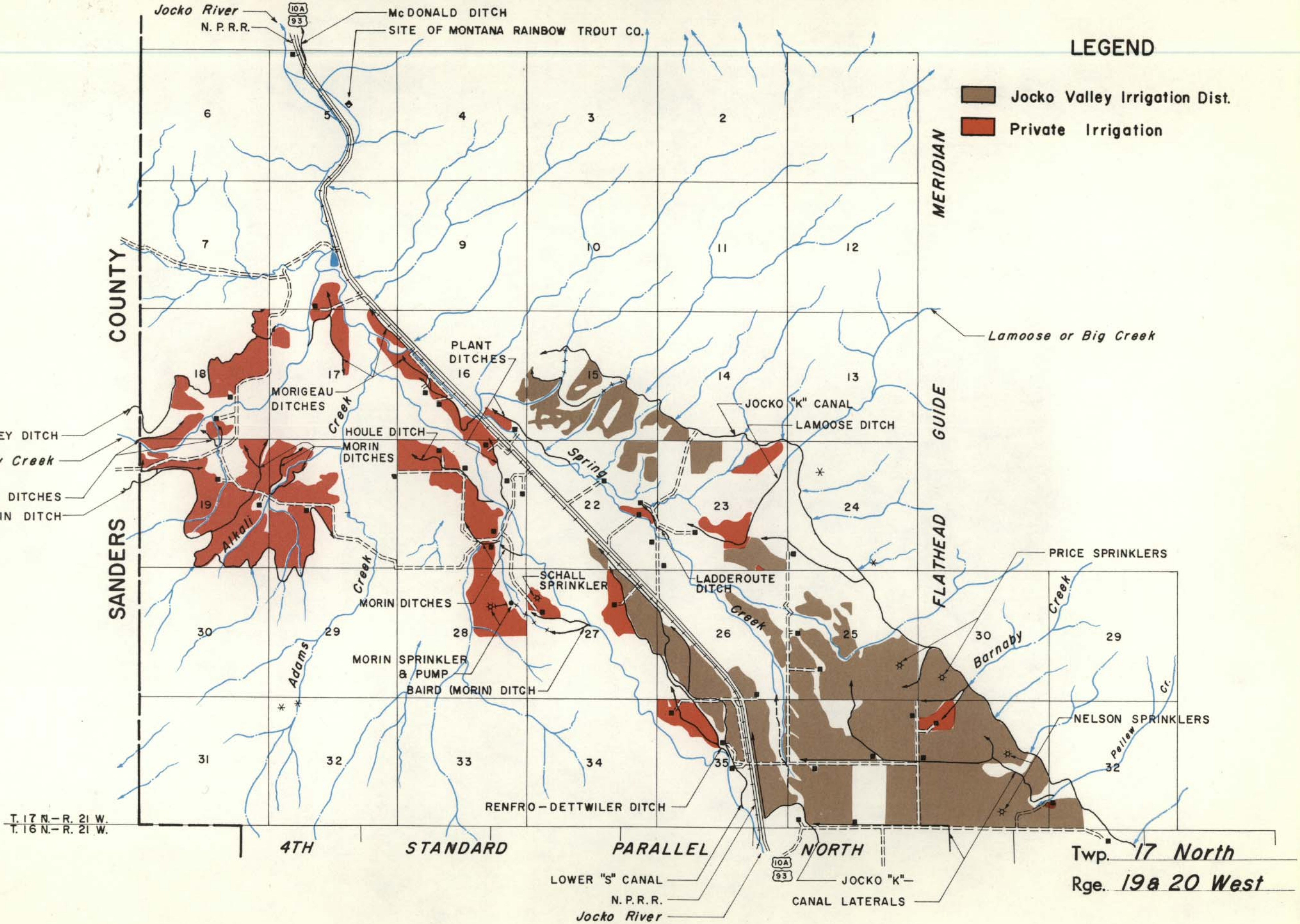


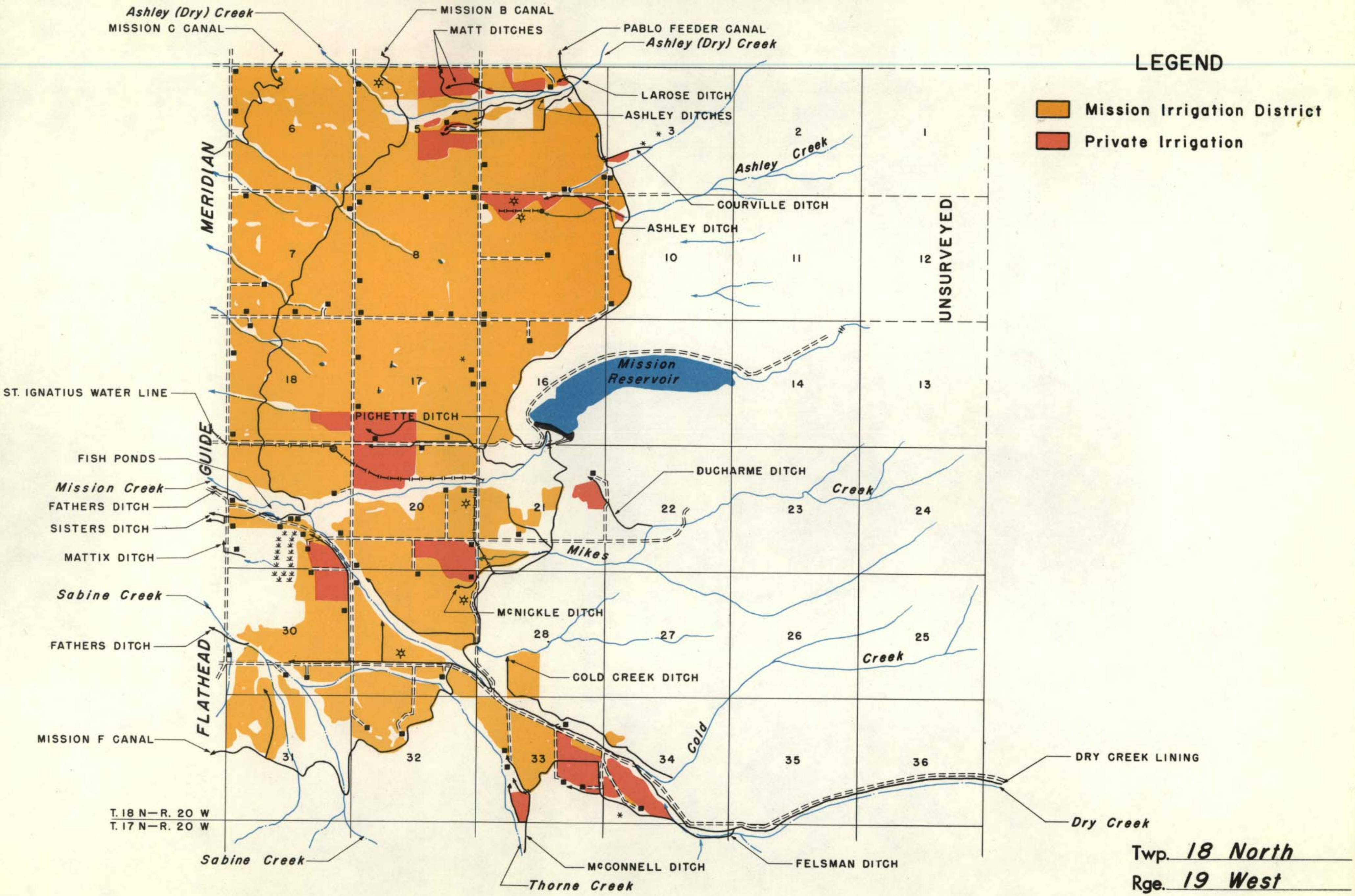
Twp. *16 North*

Rge. *20 West*

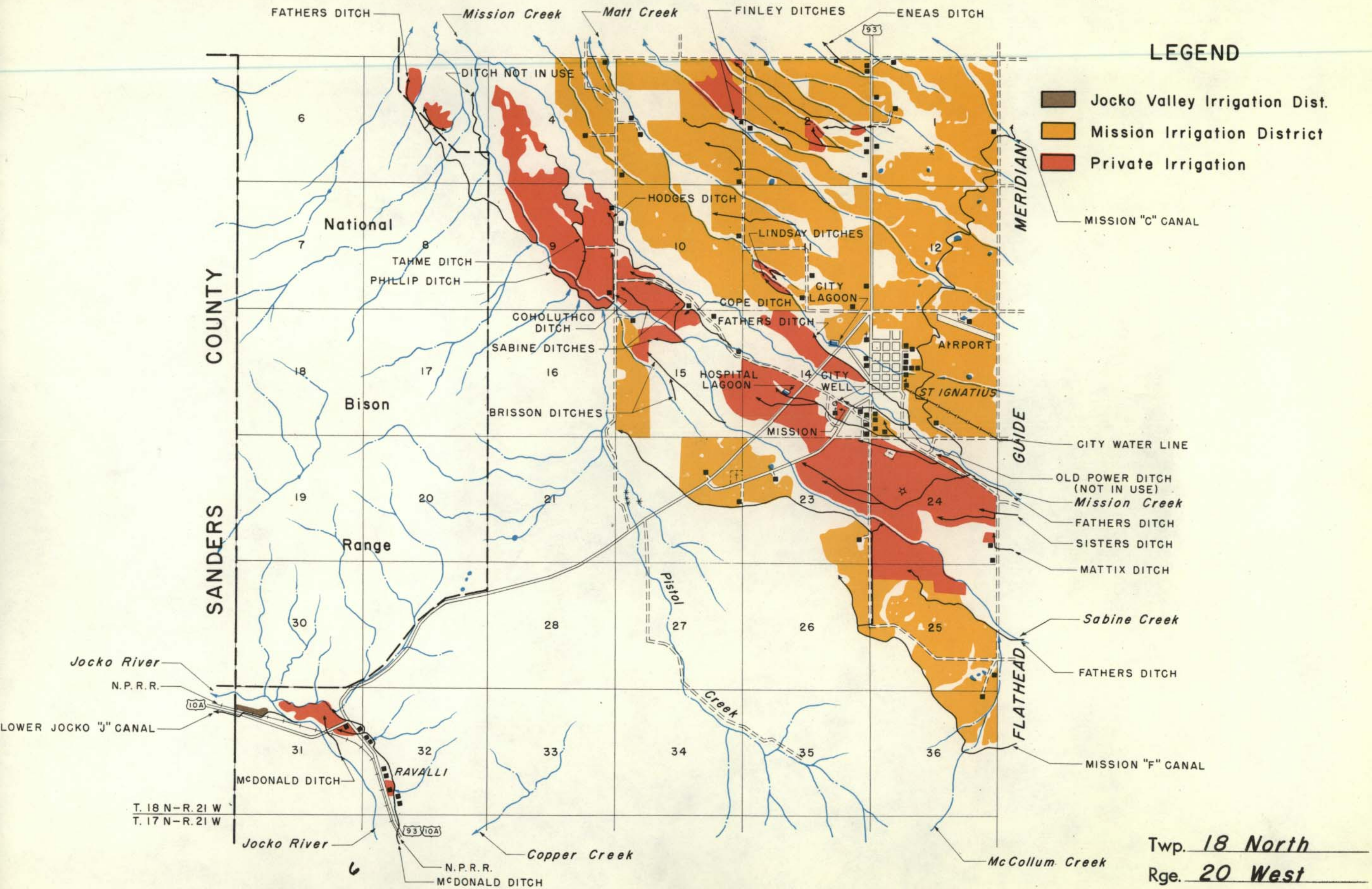


Twp. 17 North
Rge. 18 West


Jocko River
N. P. R. R.
10A
93
McDONALD DITCH
SITE OF MONTANA RAINBOW TROUT CO.
LEGEND
Jocko Valley Irrigation Dist.
Private Irrigation
MERIDIAN
GUIDE
FLATHEAD
SANDERS
COUNTY
Lamoose or Big Creek
PLANT DITCHES
MORIGEAU DITCHES
HOULE DITCH
MORIN DITCHES
MACKEY DITCH
Valley Creek
FYANT DITCHES
MORIN DITCH
Alkali
Creek
Spring
Creek
JOCKO "K" CANAL
LAMOOSE DITCH
PRICE SPRINKLERS
SCHALL SPRINKLER
LADDEROUTE DITCH
MORIN DITCHES
Adams
Creek
Barnaby
Creek
Pellew
Cr.
MORIN SPRINKLER & PUMP
BAIRD (MORIN) DITCH
NELSON SPRINKLERS
RENFRO-DETTWILER DITCH
T. 17 N. - R. 21 W.
T. 16 N. - R. 21 W.
4TH STANDARD PARALLEL NORTH
LOWER "S" CANAL
N. P. R. R.
Jocko River
JOCKO "K"- CANAL LATERALS
Twp. 17 North
Rge. 19 & 20 West



Ashley (Dry) Creek
MISSION C CANAL
MISSION B CANAL
MATT DITCHES
PABLO FEEDER CANAL
Ashley (Dry) Creek
LAROSE DITCH
ASHLEY DITCHES
Ashley Creek
COURVILLE DITCH
ASHLEY DITCH
MERIDIAN
UNSURVEYED
Mission Reservoir
ST. IGNATIUS WATER LINE
PICHETTE DITCH
FISH PONDS
Mission Creek
FATHERS DITCH
SISTERS DITCH
MATTIX DITCH
DUCHARME DITCH
Creek
Mikes
Sabine Creek
McNICKLE DITCH
FATHERS DITCH
COLD CREEK DITCH
Creek
Cold
GUIDE
FLATHEAD
MISSION F CANAL
DRY CREEK LINING
Dry Creek
T. 18 N—R. 20 W
T. 17 N—R. 20 W
Sabine Creek
McCONNELL DITCH
Thorne Creek
FELSMAN DITCH
LEGEND
Mission Irrigation District
Private Irrigation
Twp. 18 North
Rge. 19 West


LEGEND
Jocko Valley Irrigation Dist.
Mission Irrigation District
Private Irrigation
FATHERS DITCH
Mission Creek
Matt Creek
FINLEY DITCHES
ENEAS DITCH
93
DITCH NOT IN USE
HODGES DITCH
LINDSAY DITCHES
TAHME DITCH
PHILLIP DITCH
CITY LAGOON
COPE DITCH
FATHERS DITCH
COHOLUTHCO DITCH
SABINE DITCHES
AIRPORT
HOSPITAL LAGOON
CITY WELL
ST IGNATIUS
BRISSON DITCHES
MISSION
MISSION "C" CANAL
MERIDIAN
GUIDE
CITY WATER LINE
OLD POWER DITCH (NOT IN USE)
Mission Creek
FATHERS DITCH
SISTERS DITCH
MATTIX DITCH
Sabine Creek
FATHERS DITCH
FLATHEAD
MISSION "F" CANAL
National
Bison
Range
SANDERS
COUNTY
Pistol
Creek
Jocko River
N.P.R.R.
10A
LOWER JOCKO "J" CANAL
RAVALLI
McDONALD DITCH
T. 18 N–R. 21 W
T. 17 N–R. 21 W
Jocko River
93 10A
N.P.R.R.
McDONALD DITCH
Copper Creek
McCollum Creek
6
4
2
7
8
9
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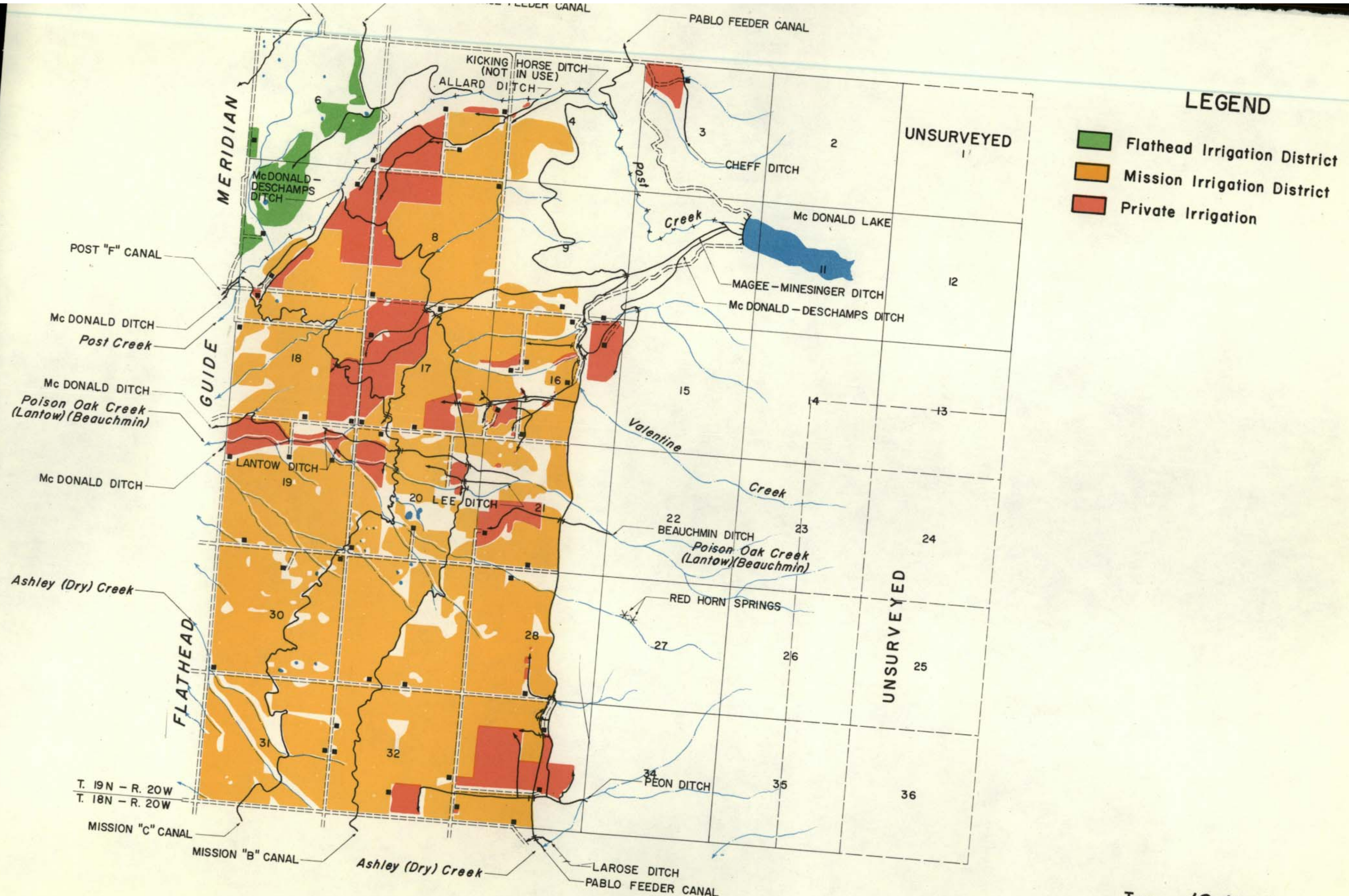
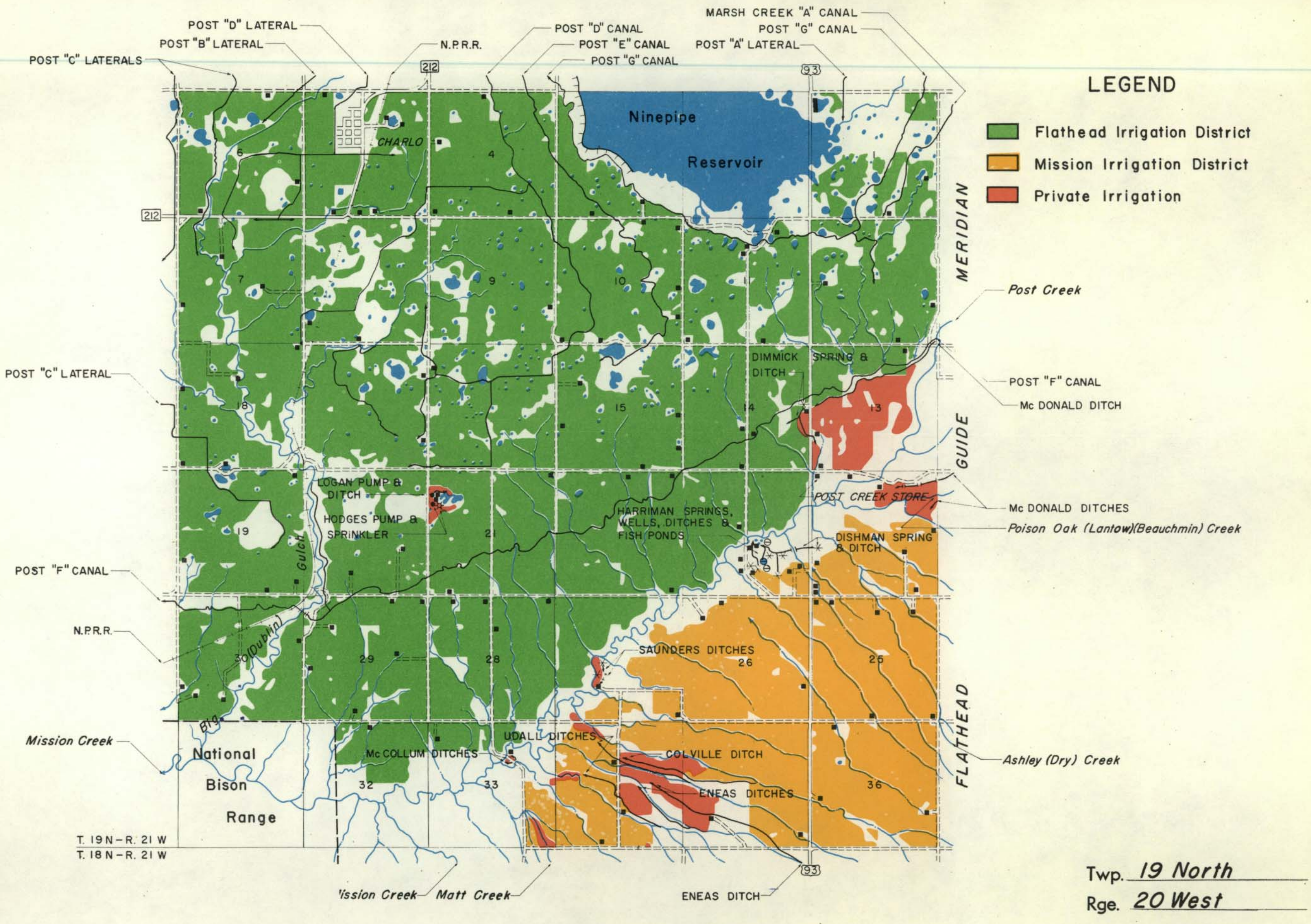
36
Twp. 18 North
Rge. 20 West



Twp. *19 North*

Rge. *19 West*


LEGEND
Flathead Irrigation District
Mission Irrigation District
Private Irrigation
POST "D" LATERAL
POST "B" LATERAL
POST "C" LATERALS
N.P.R.R.
POST "D" CANAL
POST "E" CANAL
POST "G" CANAL
MARSH CREEK "A" CANAL
POST "G" CANAL
POST "A" LATERAL
212
93
Ninepipe
Reservoir
CHARLO
MERIDIAN
GUIDE
FLATHEAD
Post Creek
POST "F" CANAL
Mc DONALD DITCH
Mc DONALD DITCHES
Poison Oak (Lantow)(Beauchmin) Creek
Ashley (Dry) Creek
POST "C" LATERAL
POST "F" CANAL
N.P.R.R.
Mission Creek
DIMMICK SPRING &
DITCH
LOGAN PUMP &
DITCH
HODGES PUMP &
SPRINKLER
HARRIMAN SPRINGS,
WELLS, DITCHES &
FISH PONDS
POST CREEK STORE
DISHMAN SPRING
& DITCH
SAUNDERS DITCHES
UDALL DITCHES
Mc COLLUM DITCHES
COLVILLE DITCH
ENEAS DITCHES
Gulch
(Dublin)
Big
National
Bison
Range
T. 19 N – R. 21 W
T. 18 N – R. 21 W
Mission Creek
Matt Creek
ENEAS DITCH
6
4
7
9
10
18
15
14
13
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21
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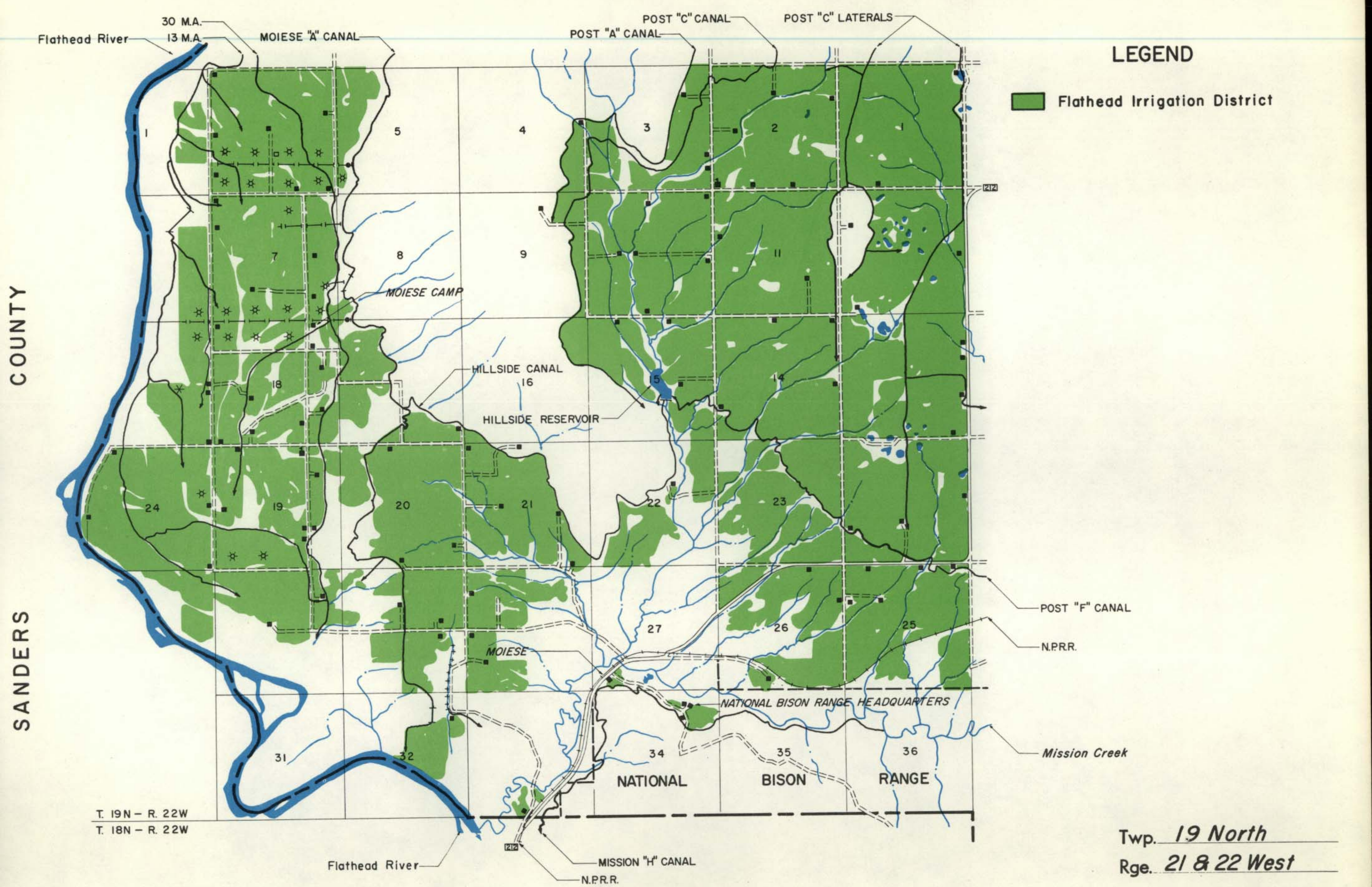
29
28
26
25
32
33
36
Twp. 19 North
Rge. 20 West



LEGEND
Flathead Irrigation District
Flathead River
30 M.A.
13 M.A.
MOIESE "A" CANAL
POST "A" CANAL
POST "C" CANAL
POST "C" LATERALS
SANDERS COUNTY
MOIESE CAMP
HILLSIDE CANAL
HILLSIDE RESERVOIR
MOIESE
NATIONAL BISON RANGE HEADQUARTERS
POST "F" CANAL
N.P.R.R.
Mission Creek
NATIONAL BISON RANGE
T. 19N – R. 22W
T. 18N – R. 22W
Flathead River
MISSION "H" CANAL
N.P.R.R.
212
1
2
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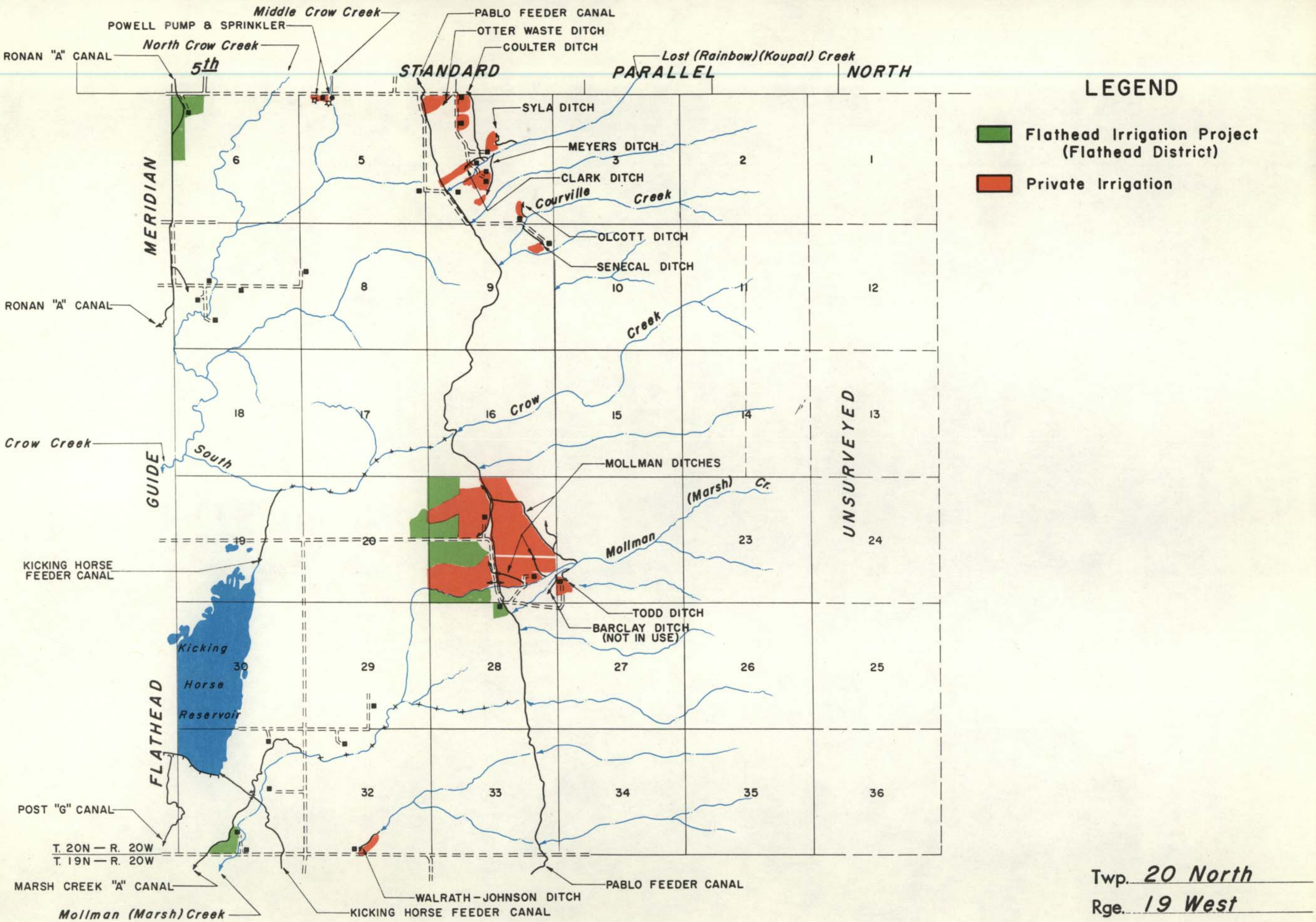
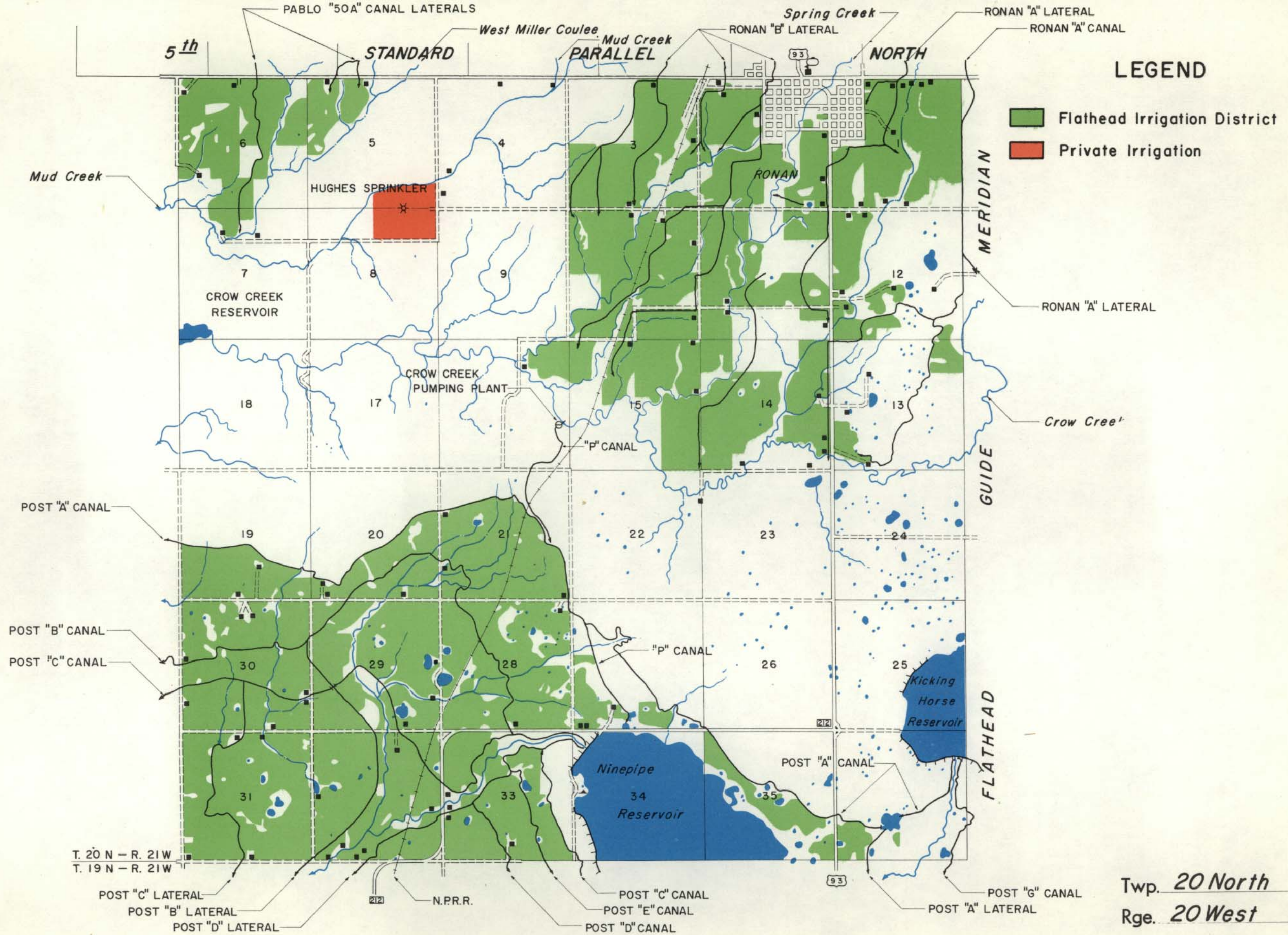
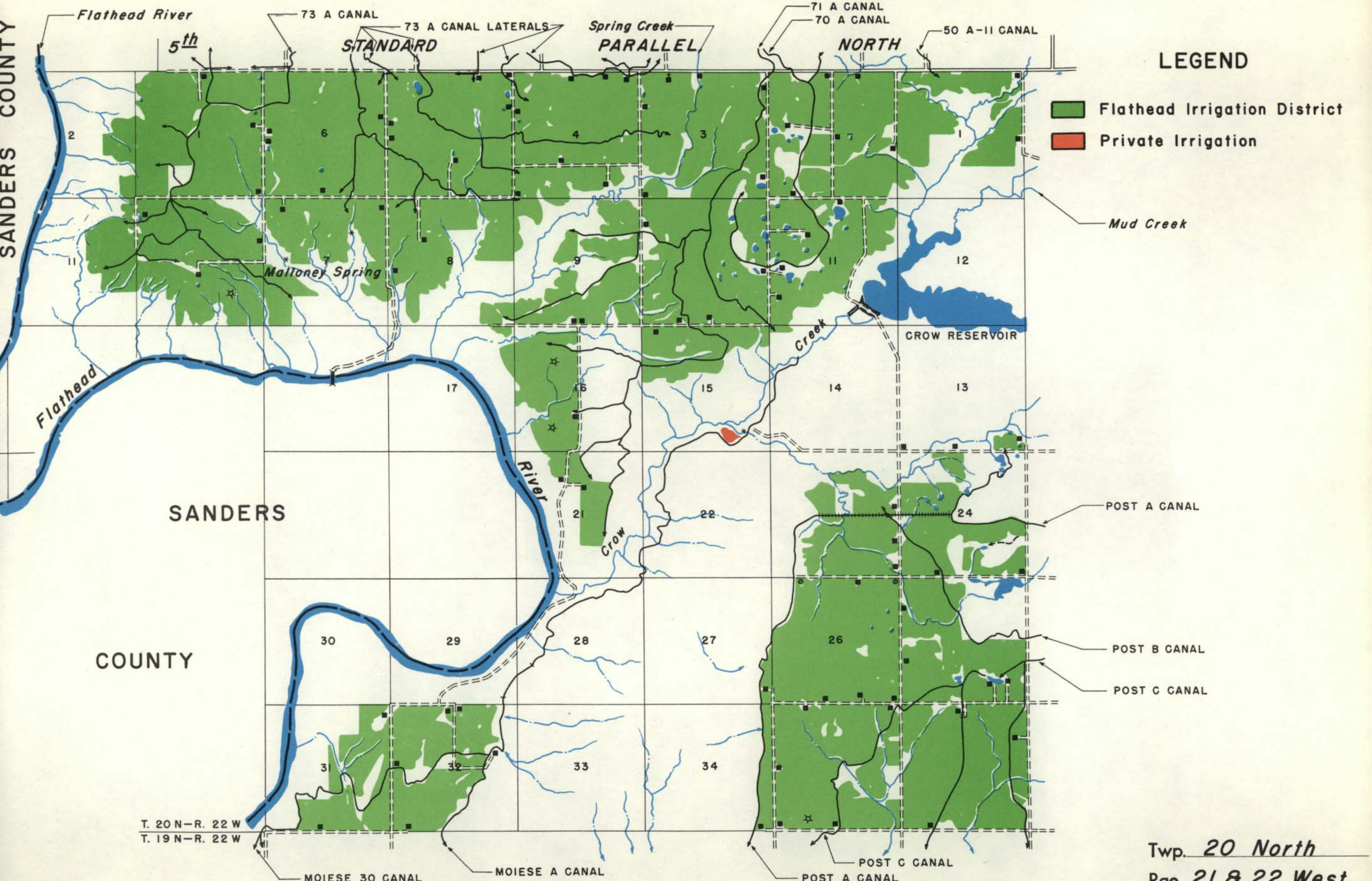
36
Twp. 19 North
Rge. 21 & 22 West


LEGEND
Flathead Irrigation Project (Flathead District)
Private Irrigation
5th STANDARD PARALLEL NORTH
GUIDE MERIDIAN
FLATHEAD
UNSURVEYED
RONAN "A" CANAL
POWELL PUMP & SPRINKLER
North Crow Creek
Middle Crow Creek
PABLO FEEDER CANAL
OTTER WASTE DITCH
COULTER DITCH
Lost (Rainbow)(Koupal) Creek
SYLA DITCH
MEYERS DITCH
CLARK DITCH
Courville Creek
OLCOTT DITCH
SENECAL DITCH
Crow Creek
South
MOLLMAN DITCHES
Mollman (Marsh) Cr.
KICKING HORSE FEEDER CANAL
Kicking Horse Reservoir
TODD DITCH
BARCLAY DITCH (NOT IN USE)
POST "G" CANAL
T. 20N — R. 20W
T. 19N — R. 20W
MARSH CREEK "A" CANAL
Mollman (Marsh) Creek
WALRATH-JOHNSON DITCH
Twp. 20 North
Rge. 19 West

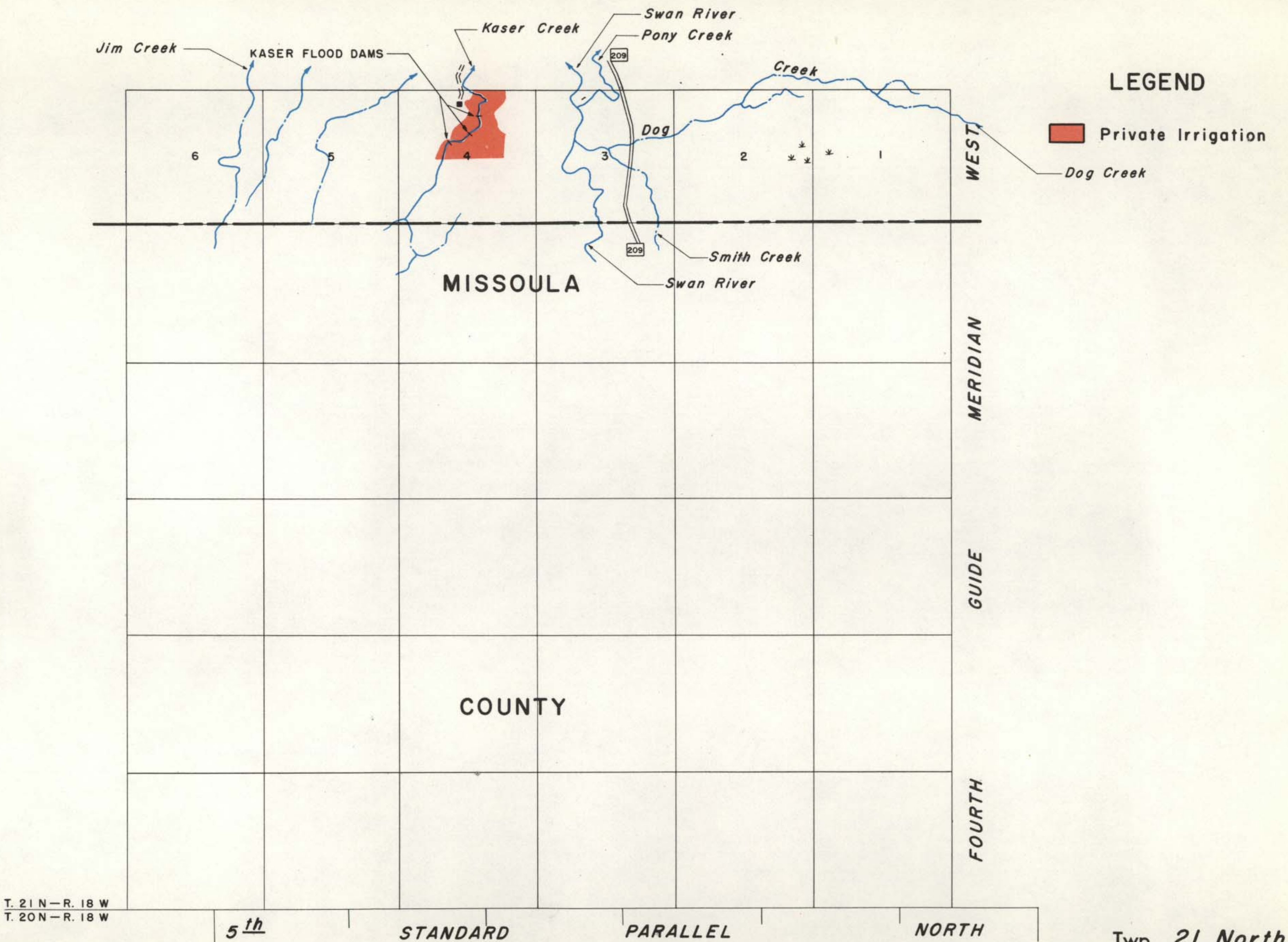


Twp. 20 North

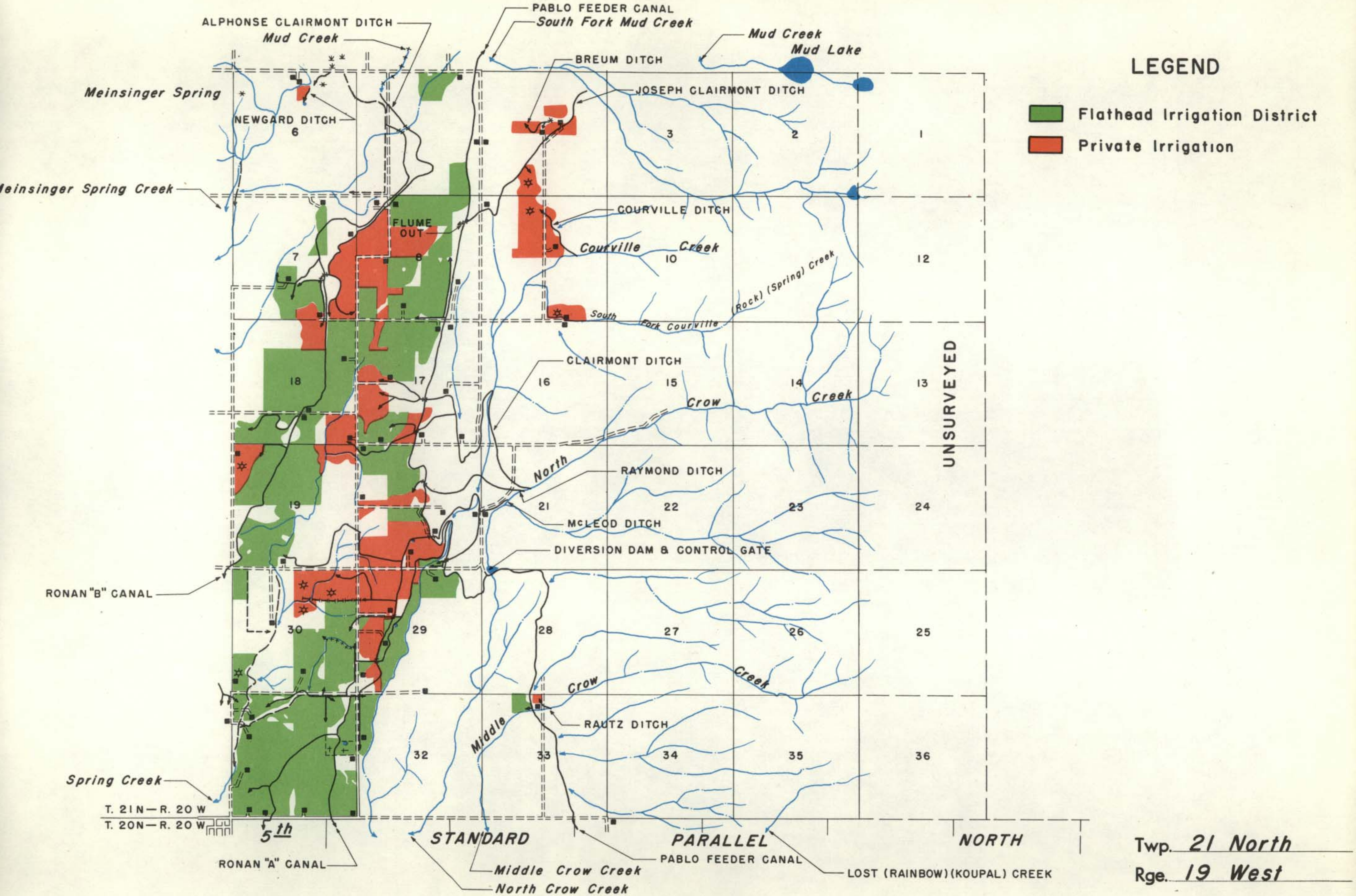
Rge. 20 West



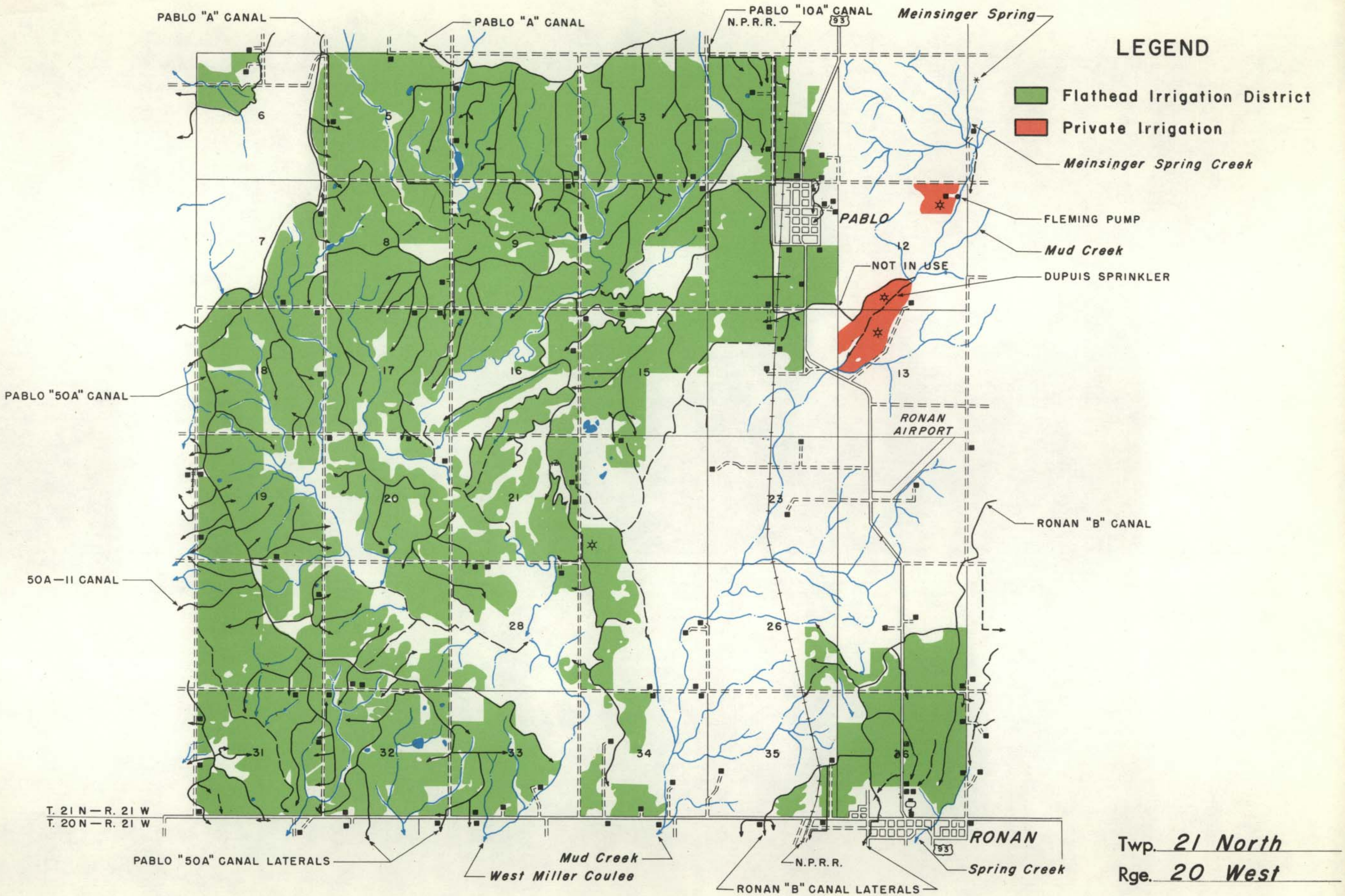
LEGEND
Flathead Irrigation District
Private Irrigation
Flathead River
73 A CANAL
73 A CANAL LATERALS
Spring Creek
71 A CANAL
70 A CANAL
50 A-11 CANAL
5th STANDARD PARALLEL NORTH
SANDERS COUNTY
Mud Creek
Malloney Spring
Crow Creek
CROW RESERVOIR
Flathead River
SANDERS
COUNTY
POST A CANAL
POST B CANAL
POST C CANAL
T. 20 N-R. 22 W
T. 19 N-R. 22 W
MOIESE 30 CANAL
MOIESE A CANAL
POST C CANAL
POST A CANAL
Twp. 20 North
Rge. 21 & 22 West



Twp. 21 North
Rge. 17 West



LEGEND
Flathead Irrigation District
Private Irrigation
PABLO FEEDER CANAL
South Fork Mud Creek
ALPHONSE CLAIRMONT DITCH
Mud Creek
Mud Creek
Mud Lake
BREUM DITCH
JOSEPH CLAIRMONT DITCH
Meinsinger Spring
NEWGARD DITCH
Meinsinger Spring Creek
COURVILLE DITCH
FLUME OUT
Courville Creek
South Fork Courville (Rock) (Spring) Creek
CLAIRMONT DITCH
North Crow Creek
UNSURVEYED
RAYMOND DITCH
McLEOD DITCH
DIVERSION DAM & CONTROL GATE
RONAN "B" CANAL
Middle Crow Creek
RAUTZ DITCH
Spring Creek
T. 21 N—R. 20 W
T. 20 N—R. 20 W
5th STANDARD PARALLEL NORTH
RONAN "A" CANAL
Middle Crow Creek
North Crow Creek
PABLO FEEDER CANAL
LOST (RAINBOW) (KOUPAL) CREEK
Twp. 21 North
Rge. 19 West



LEGEND
Flathead Irrigation District
Private Irrigation
PABLO "A" CANAL
PABLO "A" CANAL
PABLO "10A" CANAL
N.P.R.R.
93
Meinsinger Spring
Meinsinger Spring Creek
FLEMING PUMP
Mud Creek
DUPUIS SPRINKLER
NOT IN USE
PABLO
RONAN AIRPORT
RONAN "B" CANAL
PABLO "50A" CANAL
50A—11 CANAL
T. 21 N—R. 21 W
T. 20 N—R. 21 W
PABLO "50A" CANAL LATERALS
Mud Creek
West Miller Coulee
N.P.R.R.
RONAN "B" CANAL LATERALS
RONAN
93
Spring Creek
3
5
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9
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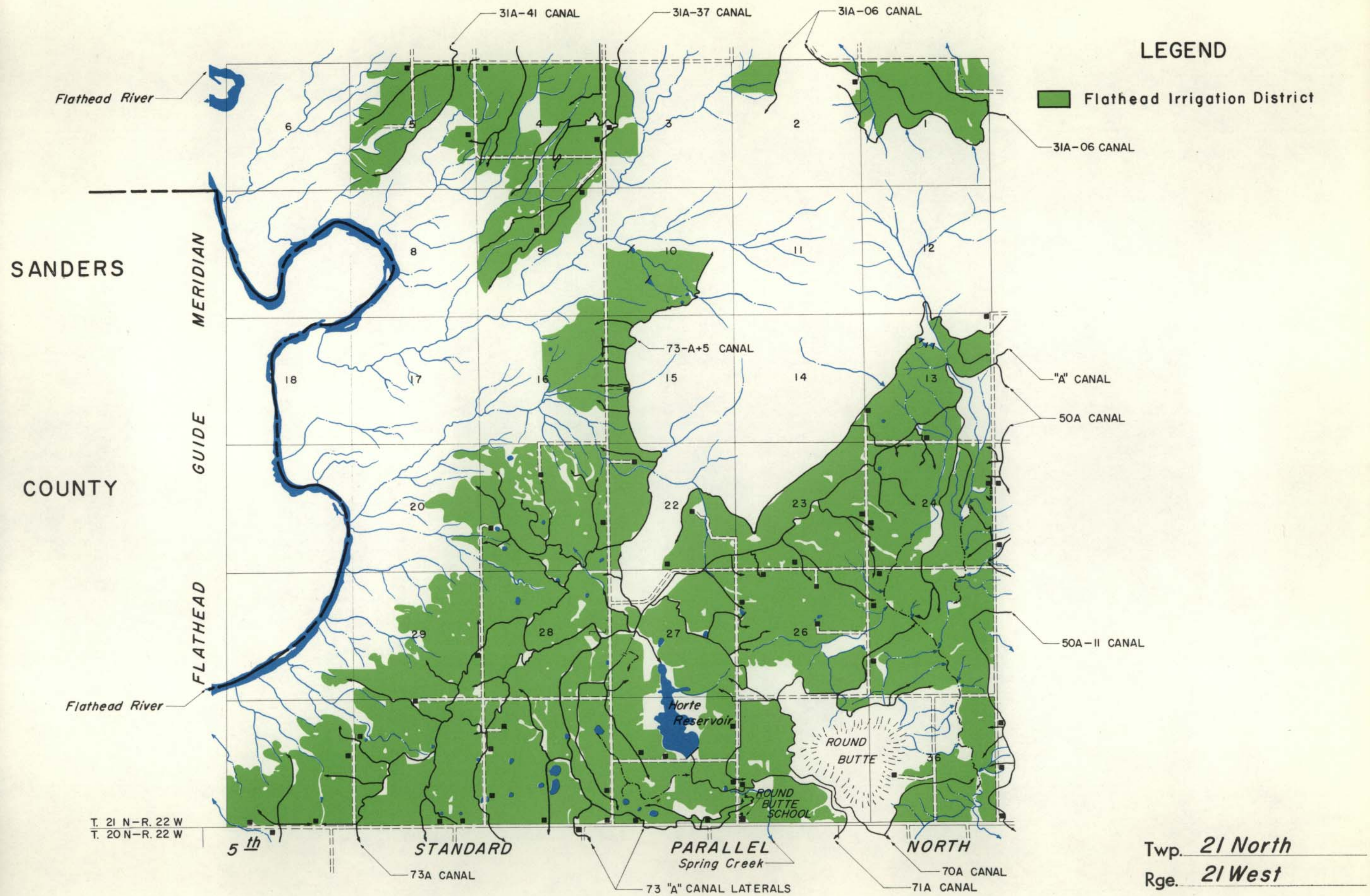
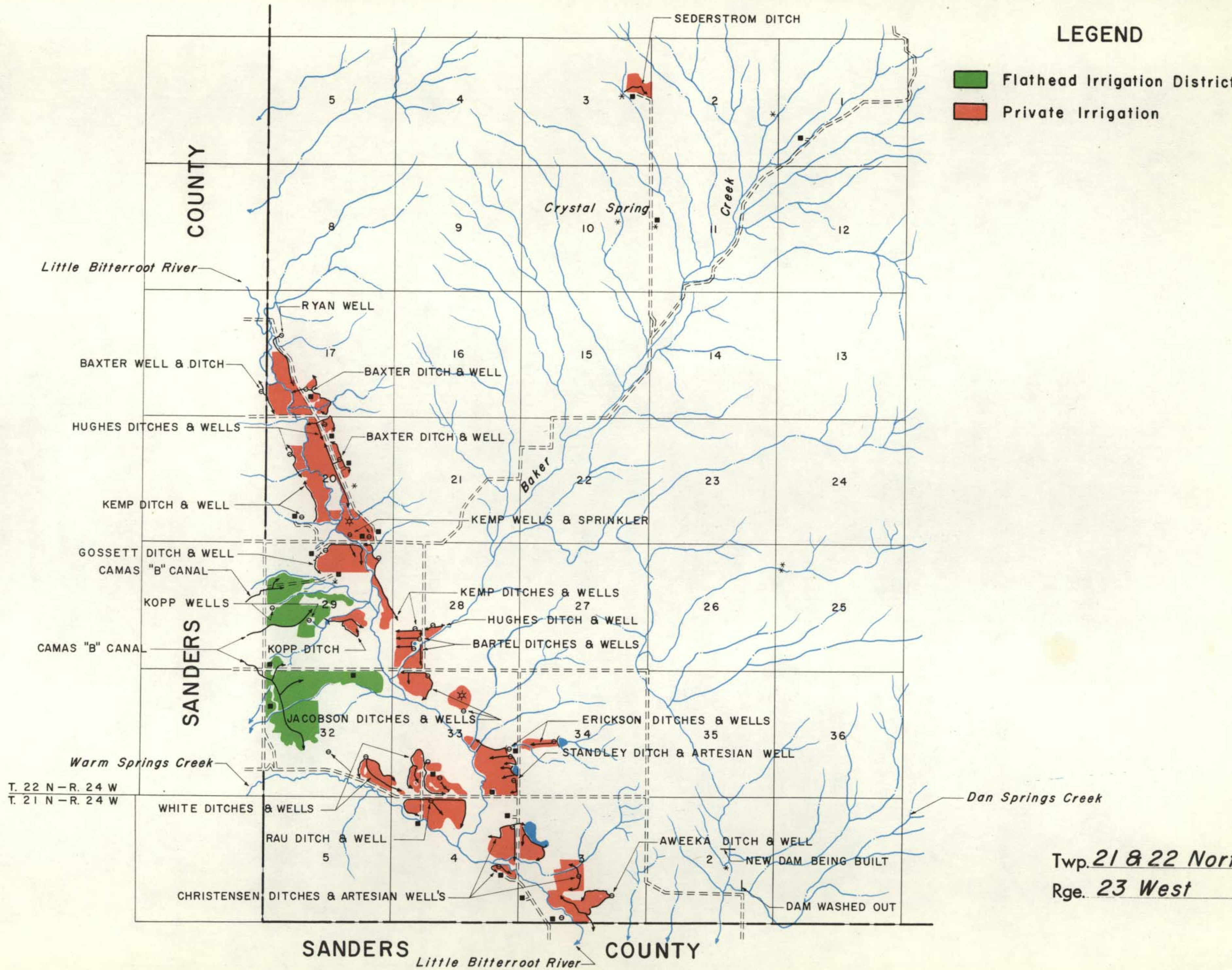
36
Twp. 21 North
Rge. 20 West

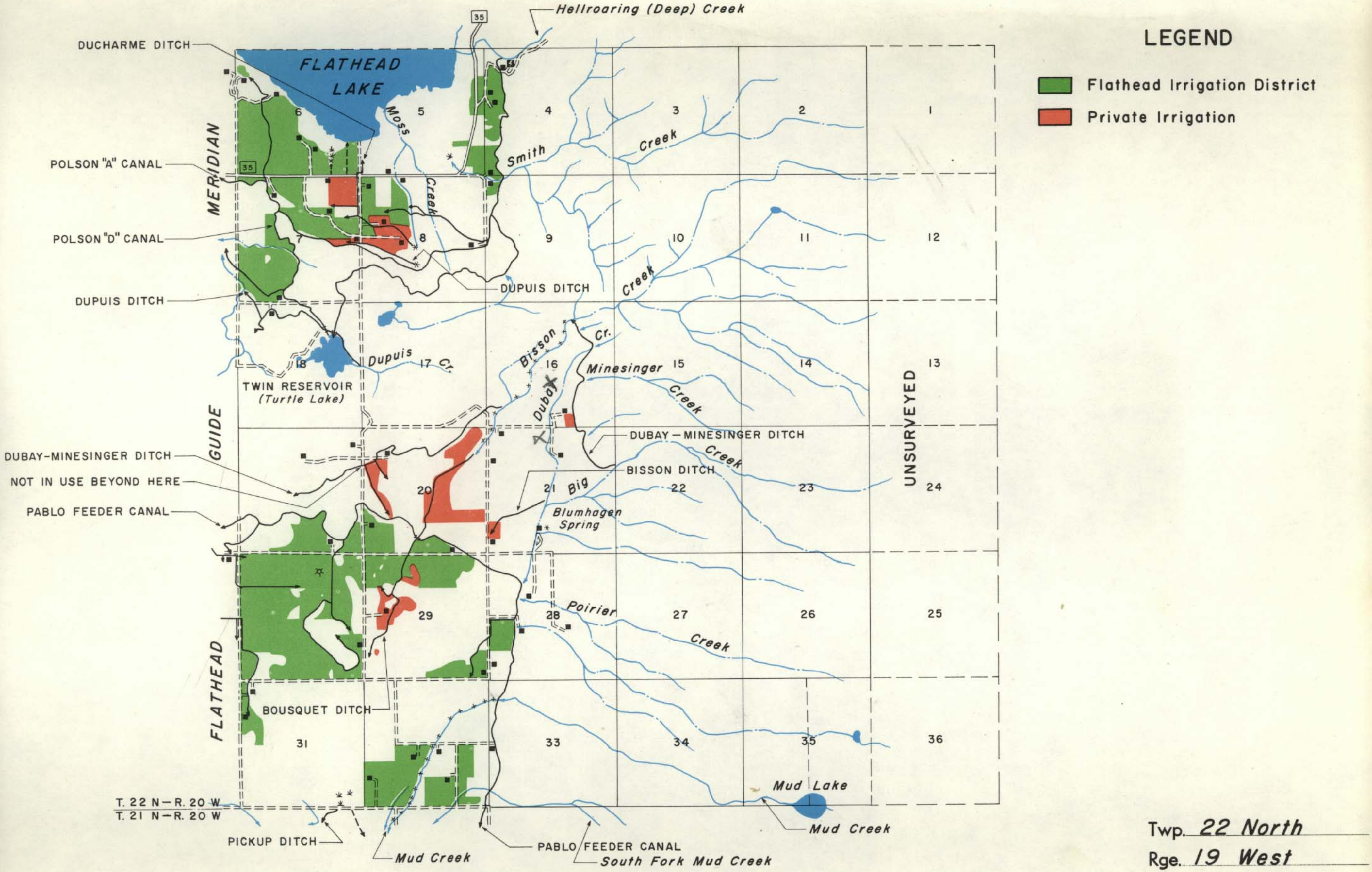


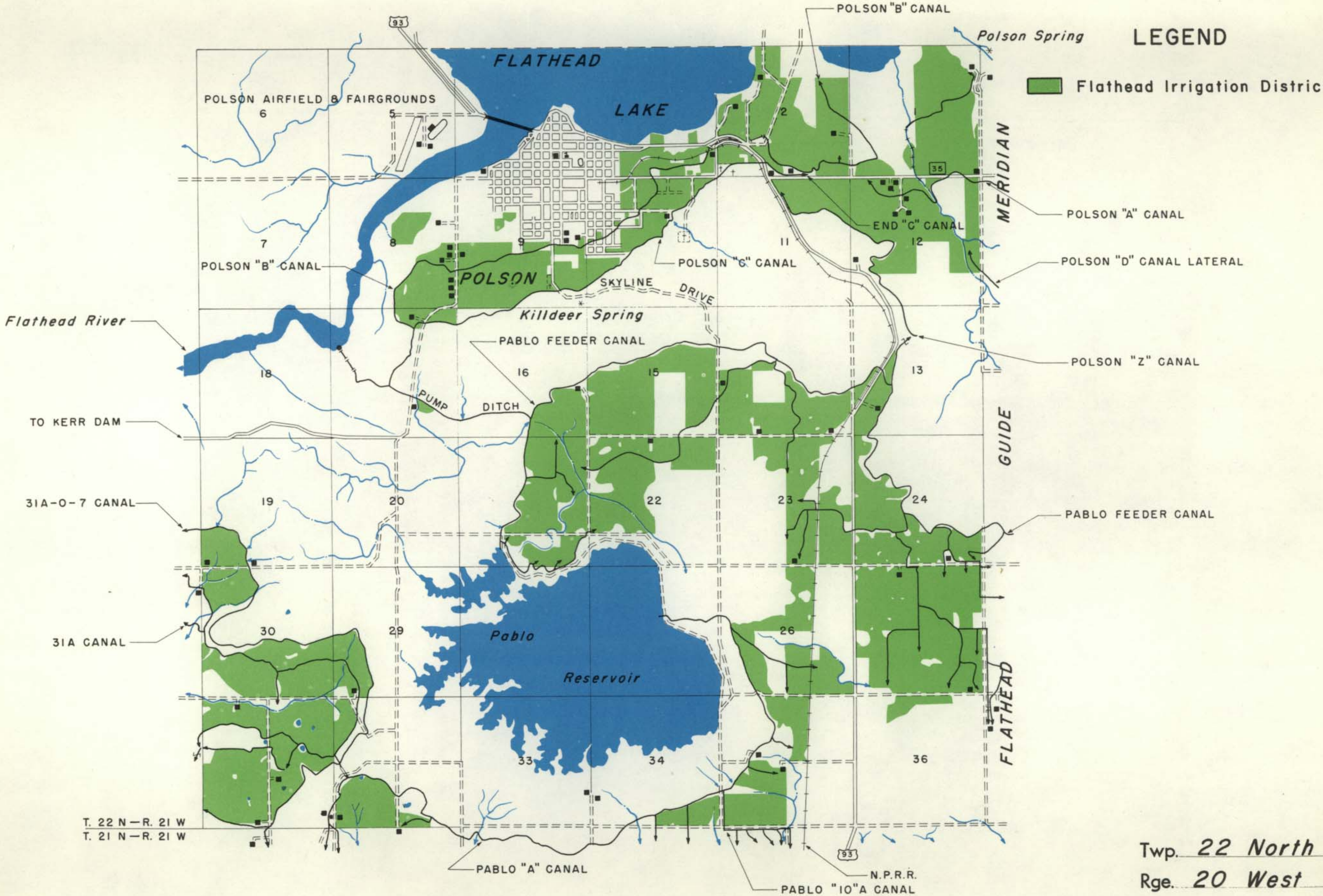
Twp. *21 North*

Rge. *21 West*



Twp. 21 & 22 North
Rge. 23 West


LEGEND
Flathead Irrigation District
Private Irrigation
Hellroaring (Deep) Creek
FLATHEAD LAKE
DUCHARME DITCH
POLSON "A" CANAL
POLSON "D" CANAL
DUPUIS DITCH
DUBAY-MINESINGER DITCH
NOT IN USE BEYOND HERE
PABLO FEEDER CANAL
BOUSQUET DITCH
PICKUP DITCH
TWIN RESERVOIR
(Turtle Lake)
Moss Creek
Smith Creek
Dupuis Cr.
Bisson Cr.
Dubay
Minesinger Creek
Big Creek
BISSON DITCH
Blumhagen Spring
Poirier Creek
Mud Lake
Mud Creek
South Fork Mud Creek
FLATHEAD GUIDE MERIDIAN
UNSURVEYED
T. 22 N – R. 20 W
T. 21 N – R. 20 W
Twp. 22 North
Rge. 19 West

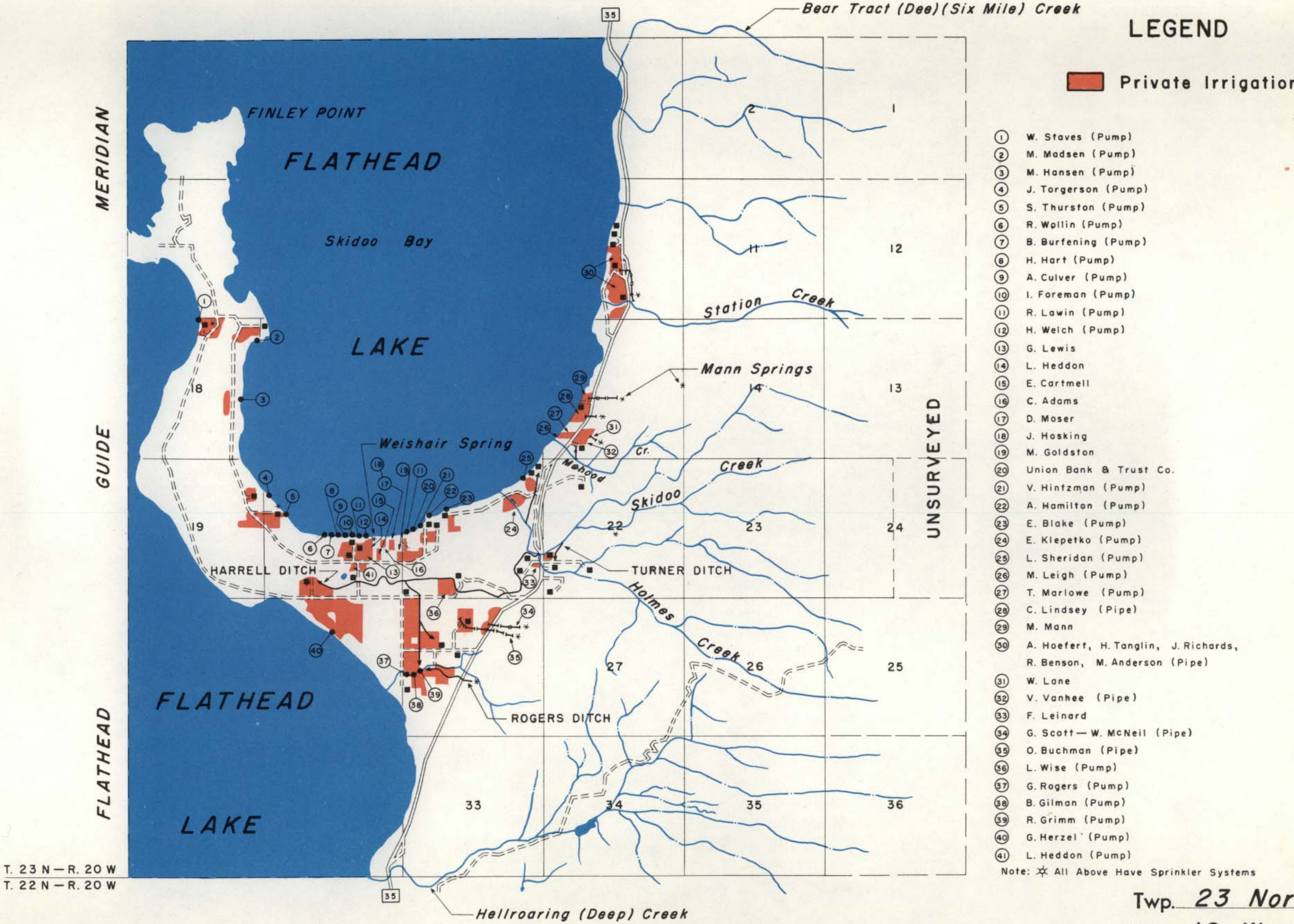


Twp. 22 North

Rge. 20 West

Twp. *22 North*

Rge. *21 West*



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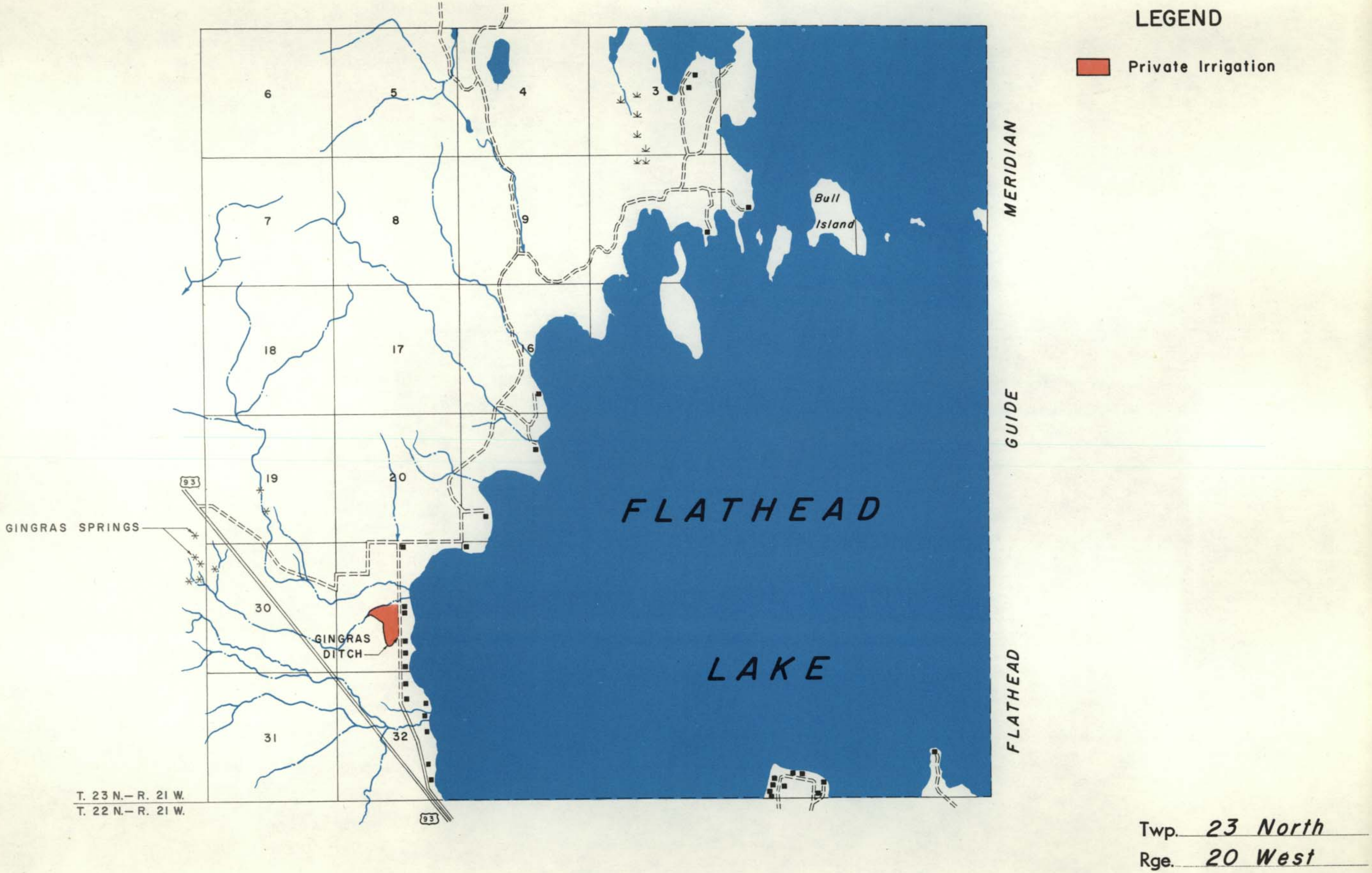
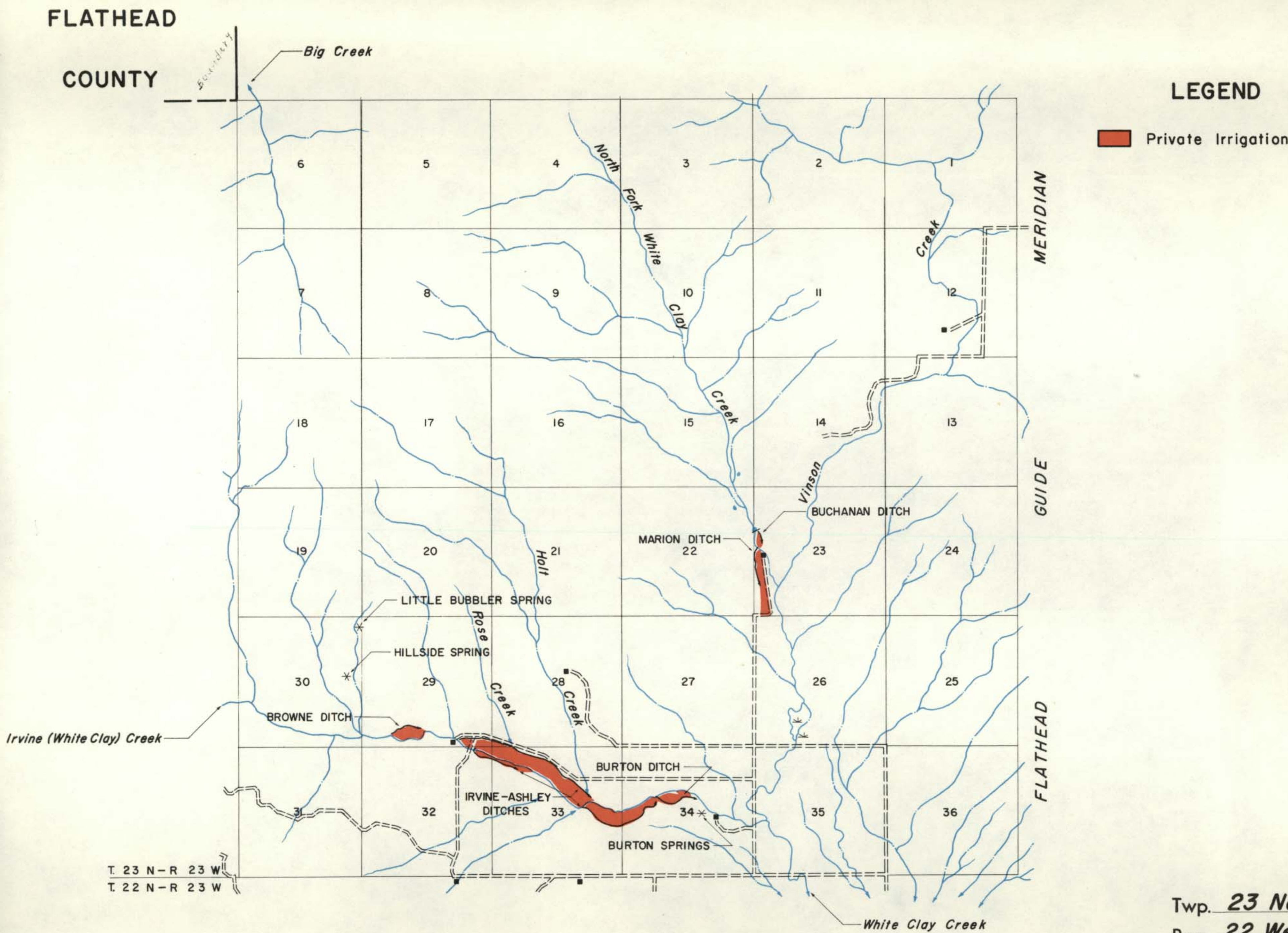
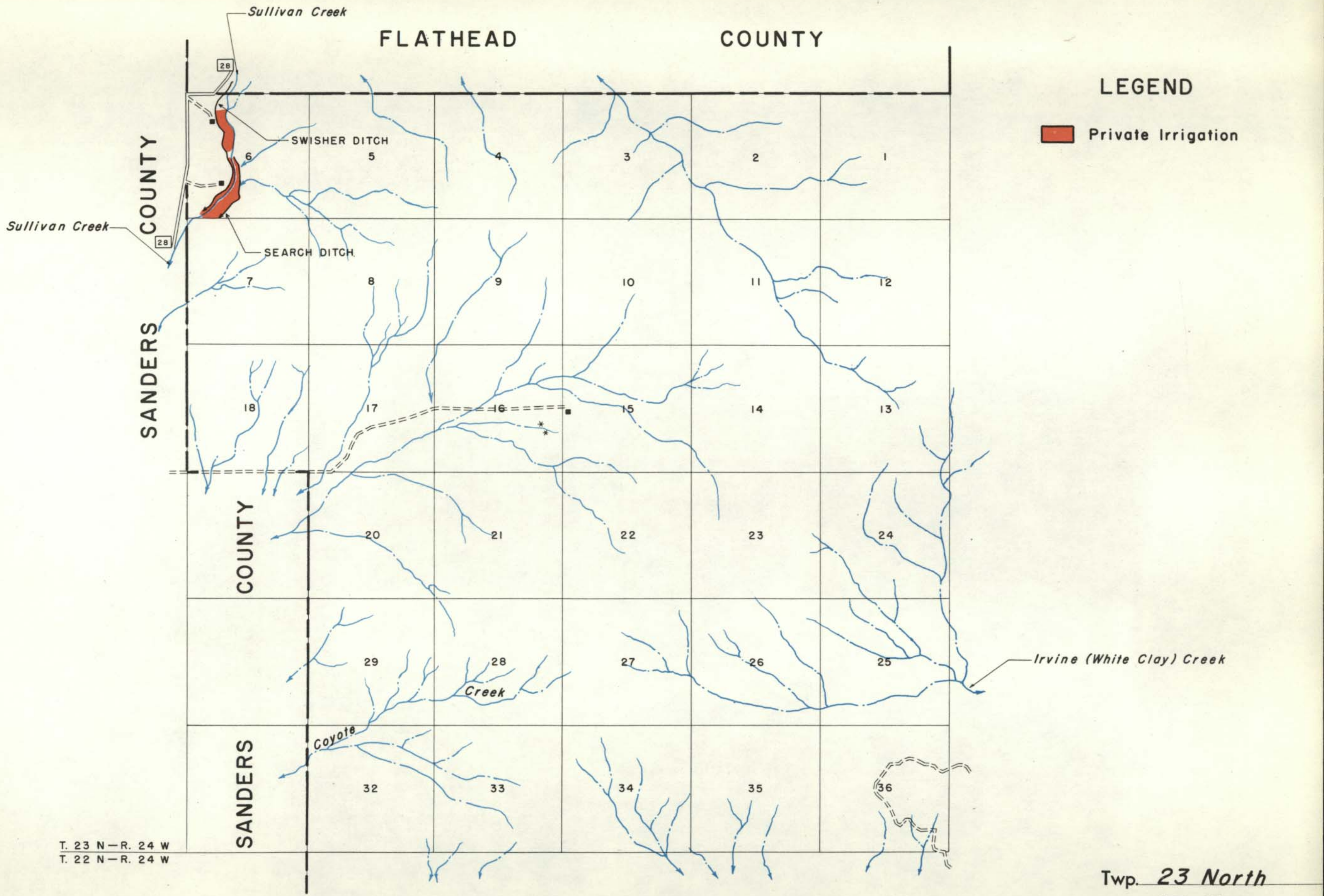
Rge. *19 West*


LEGEND
Private Irrigation
6
5
4
3
7
8
9
18
17
16
19
20
30
31
32
93
Bull
Island
FLATHEAD
LAKE
GINGRAS SPRINGS
GINGRAS
DITCH
FLATHEAD GUIDE MERIDIAN
T. 23 N.– R. 21 W.
T. 22 N.– R. 21 W.
Twp. 23 North
Rge. 20 West



Twp. 23 North
Rge. 22 West


Sullivan Creek
FLATHEAD
COUNTY
SANDERS COUNTY
28
SWISHER DITCH
SEARCH DITCH
Sullivan Creek
28
1
2
3
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5
6
7
8
9
10
11
12
13
14
15
16
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18
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22
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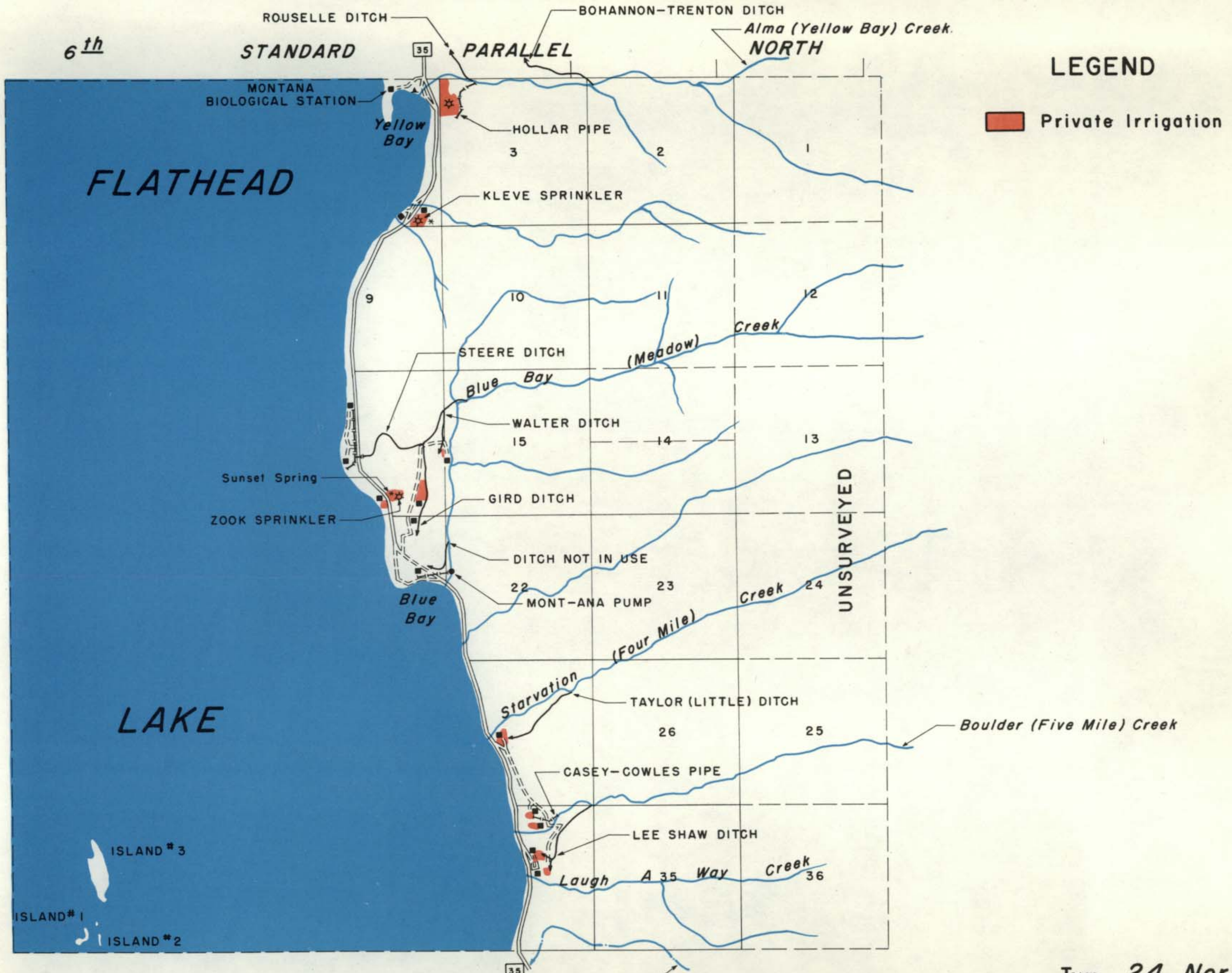
26
27
28
29
32
33
34
35
36
Coyote
Creek
COUNTY
SANDERS
Irvine (White Clay) Creek
T. 23 N—R. 24 W
T. 22 N—R. 24 W
LEGEND
Private Irrigation
Twp. 23 North
Rge. 23 West



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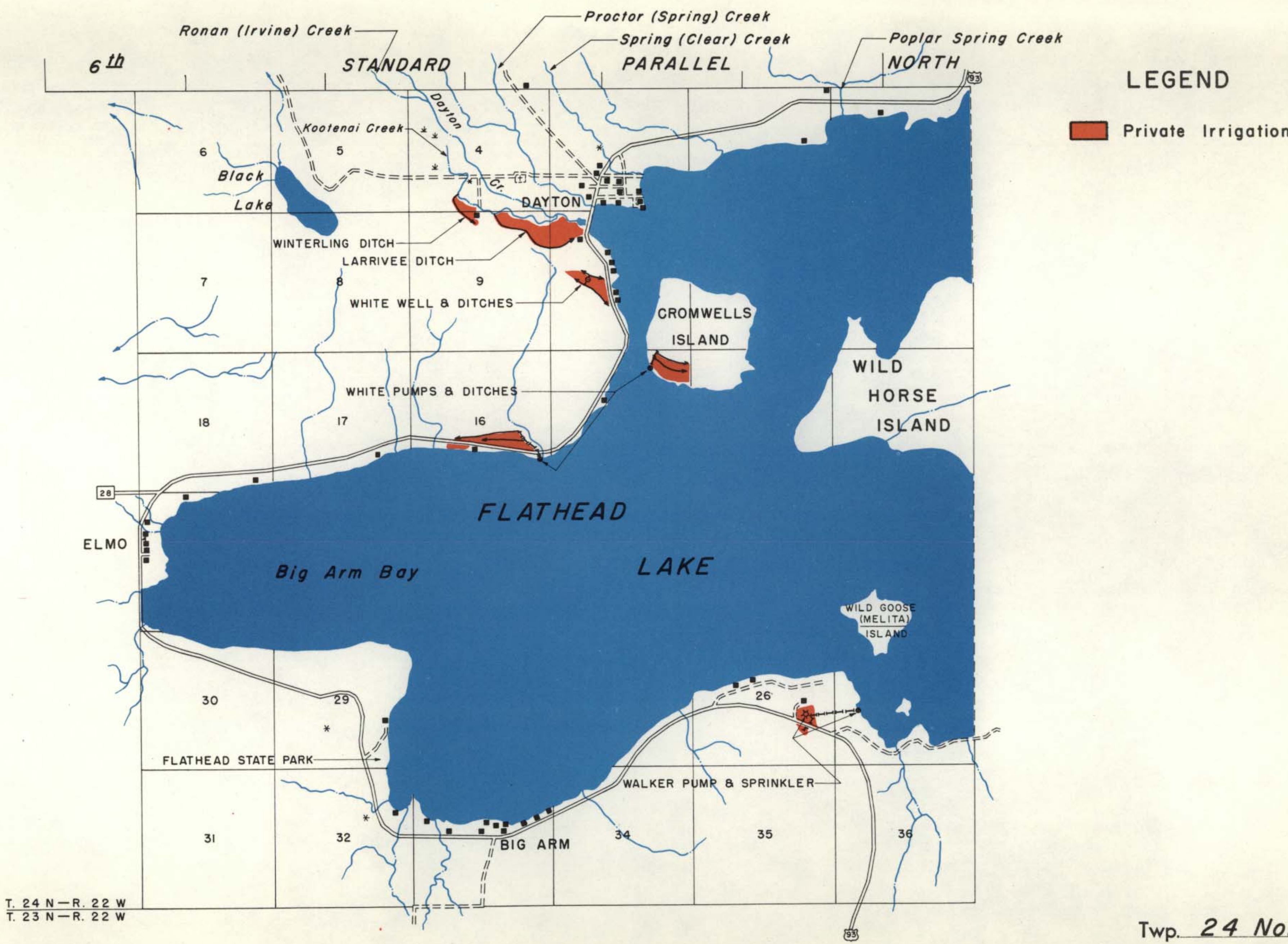
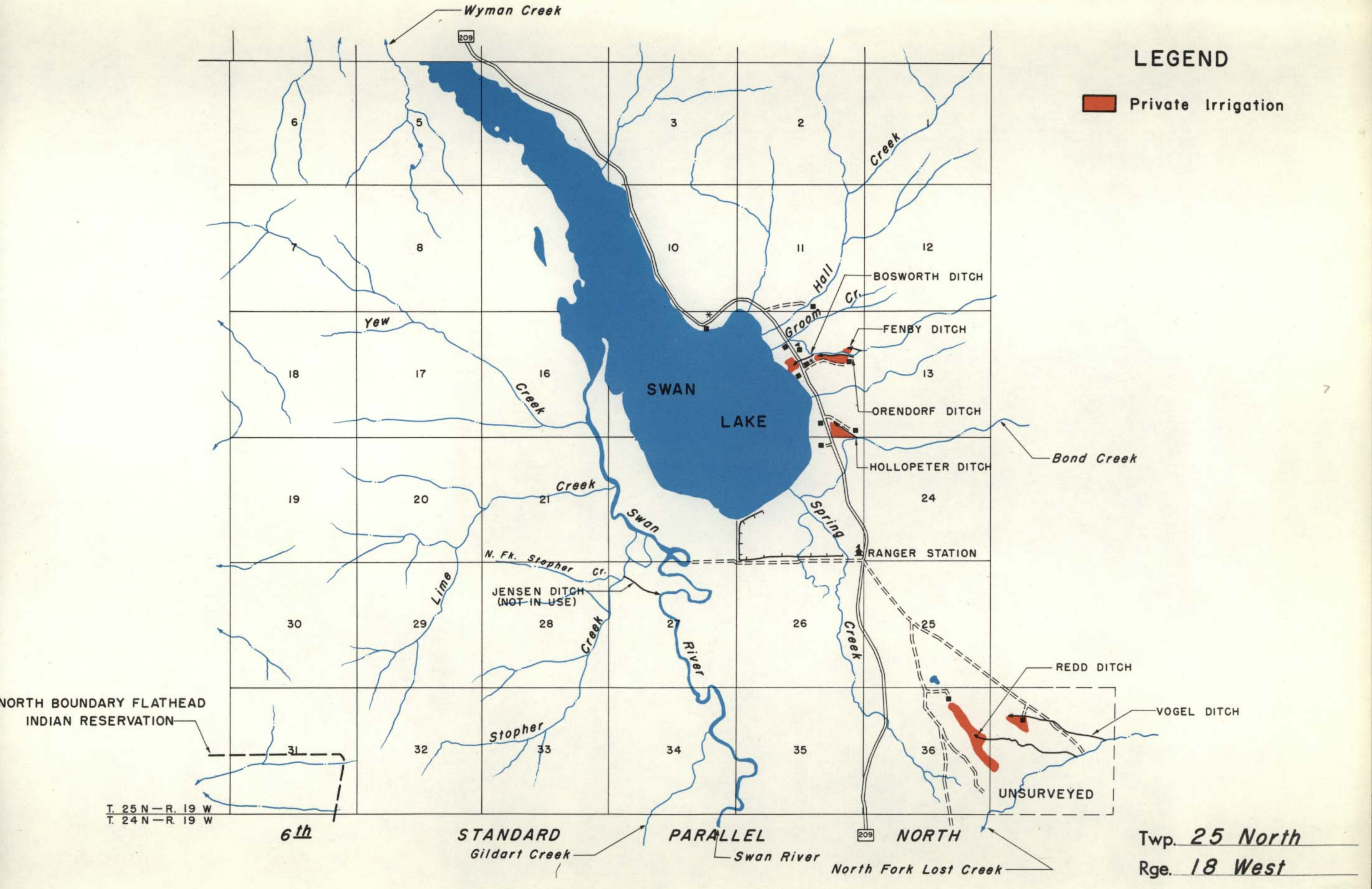
Rge. 19 West



Twp. 24 North
Rge. 21 West

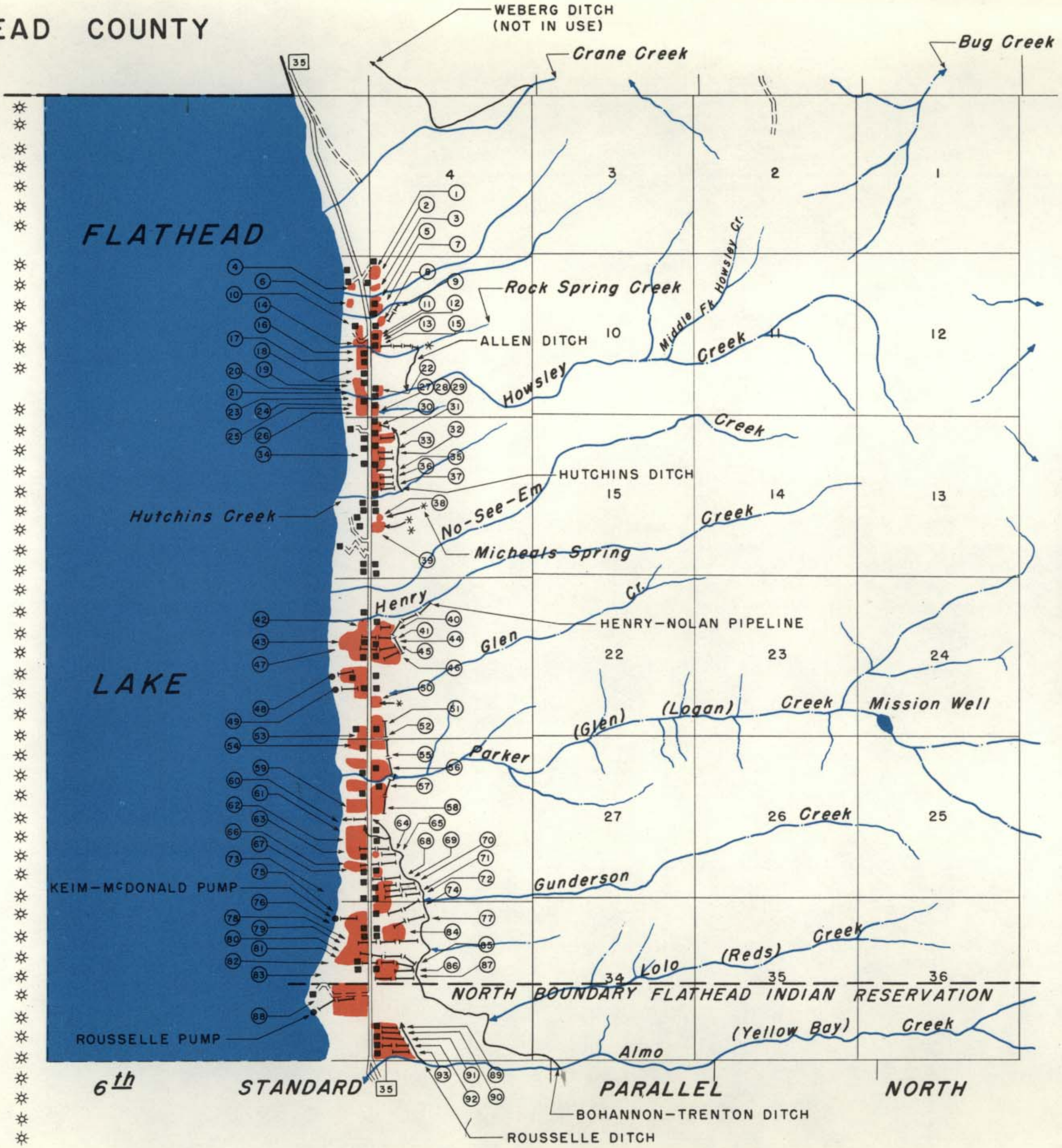


Twp. *25 North*

Rge. *18 West*

FLATHEAD COUNTY

1 Perry Beebe Pipeline ☼
2 Adams & Gregoire Pipeline ☼
3 Lyons & Greenup Pipeline ☼
4 Henry Vanderpas Pipeline ☼
5 Harry Thompson Pipeline ☼
6 Ben Stranahan Pipeline ☼
7 Mabel Tesky Pipeline ☼
8 Geo. Bruffey & —
E. Hinderman Pipeline ☼
9 Pruden Felton Pipeline ☼
10 Robert Stocking Pipeline ☼
11 Maude Larson Pipeline ☼
12 A.V. Lake Pipeline ☼
13 Allen Seymour Pipeline ☼
14 Denton Deedon
15 Heber Magnuson Pipeline ☼
16 W.S. Sanders Pipeline ☼
17 N.E. Solander Pipeline ☼
18 Ronald Dundas Pipeline ☼
19 Marjorie McKenzie Pipeline ☼
20 Henry Larson Pipeline ☼
21 Sylvia Johnson Pipeline ☼
22 G.C. Allen Pipeline ☼
23 Louis Ratterman ☼
24 J.G. Webber Pipeline ☼
25 Jerome Podbielski Pipeline ☼
26 Marshall McConnell Pipeline ☼
27 Henry D. Brown Pipeline ☼
28 I. H. Rodgers Pipeline ☼
29 L. Diestler Pipeline ☼
30 Chris Evenson ☼
31 Adam Bowman ☼
32 Eby Bowman ☼
33 Paul Beebe ☼
34 Leonard Ehlang ☼
35 Ernest Townsley ☼
36 Harold Orr ☼
37 Walter Jennison ☼
38 Harold Olson Pipeline ☼
39 C.F. Shade Pipeline ☼
40 Floyd Walker Pipeline ☼
41 Ione Shidler Pipeline ☼
42 C. Dixon Pipeline ☼
43 L. Larson Pipeline ☼
44 B. Boerner Pipeline ☼
45 Nat Boyd Pipeline ☼
46 E. Nolan Pipeline ☼
47 Jim Browne Pipeline ☼
48 D. Milliren Pipeline, Pump ☼
49 J. McIntire Pipeline, Pump ☼
50 J. Hubbard Pipeline ☼
51 Fred Larson Jr. Pipeline ☼

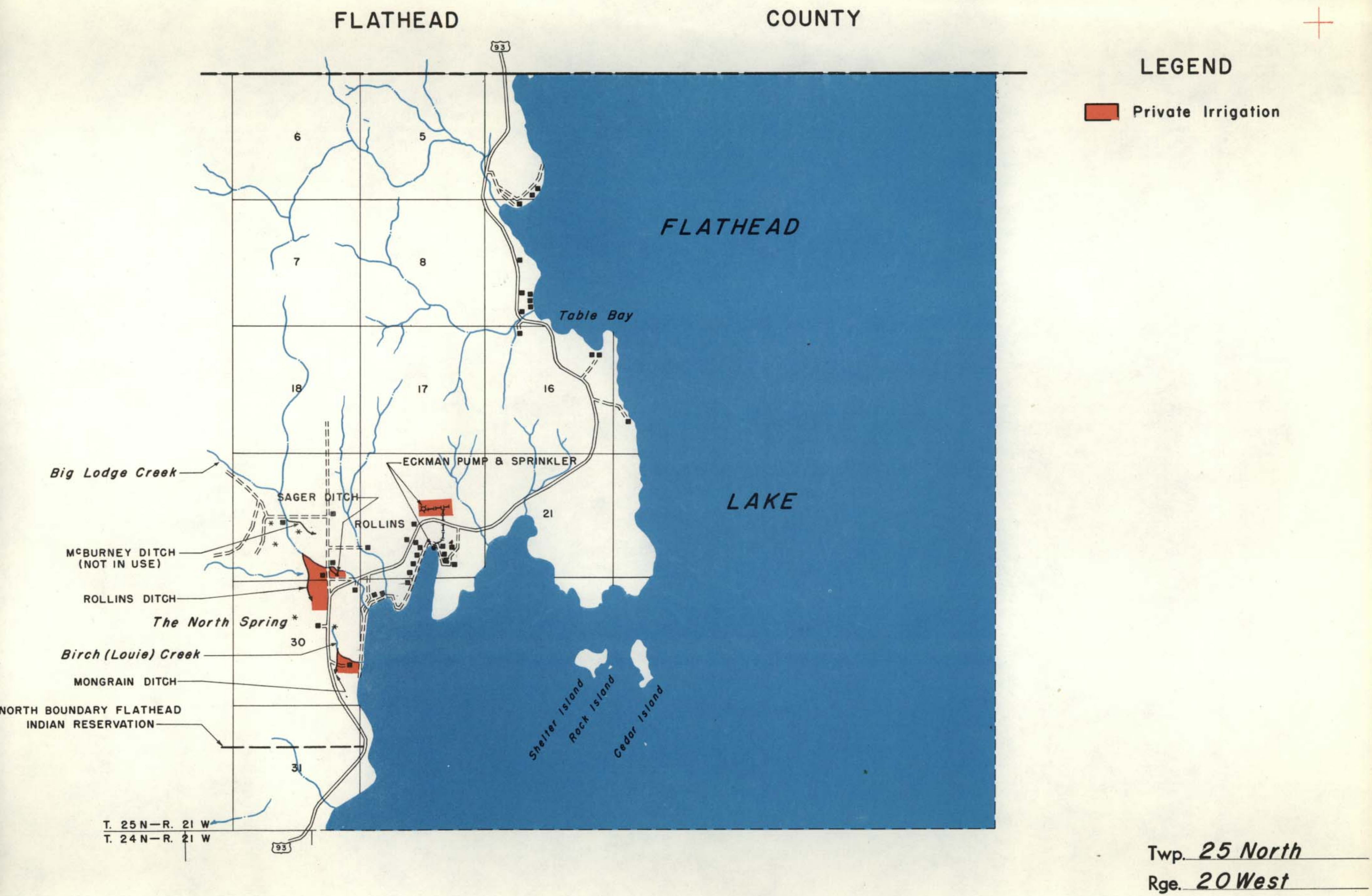


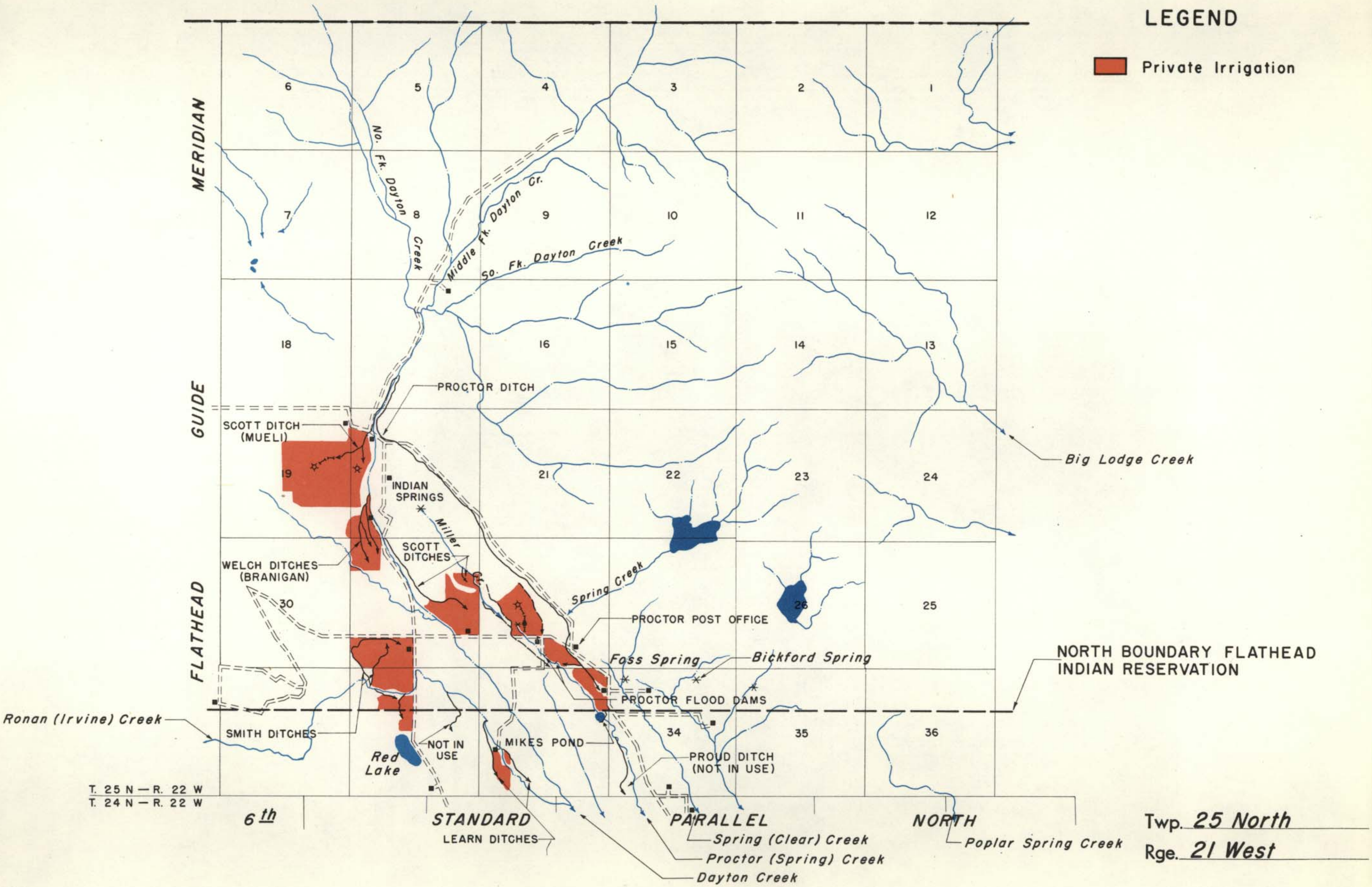
LEGEND

Private Irrigation

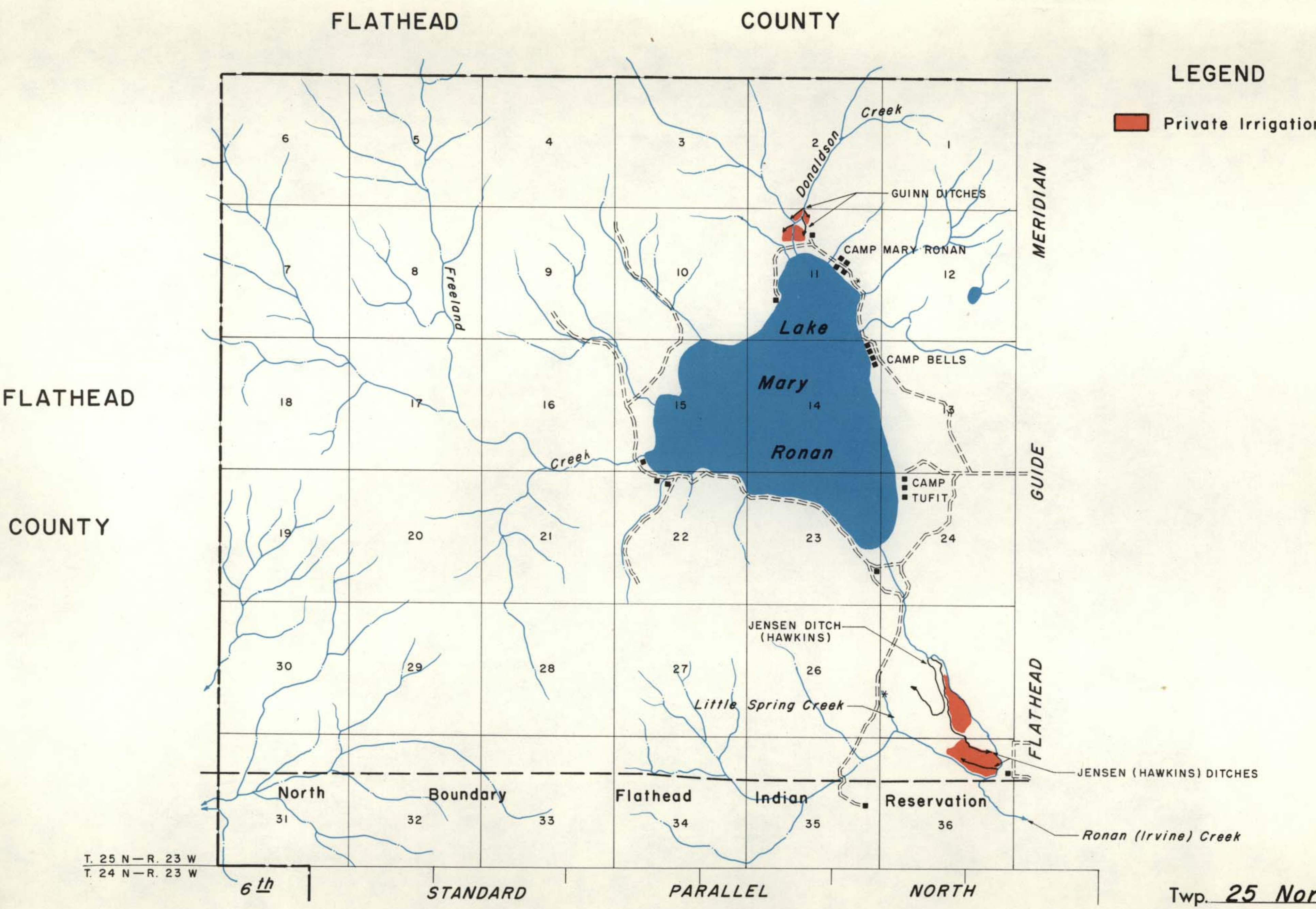
52 Maude Bolton Pipeline ☼
53 Cecil Miller Pipeline ☼
54 John Malone Pipeline ☼
55 E.J. Ober Pipeline ☼
56 Mary Orser Pipeline ☼
57 Noel Dolven Pipeline ☼
58 B.J. Krogstad Pipeline ☼
59 T. Moore Jr. Pipeline ☼
60 R. Wilder McDonald ☼
61 Harriet Robbin
62 Rudy Robbin
63 Albert Hixon ☼
64 Iva Darnall ☼
65 Ernest Allen ☼
66 George Britton ☼
67 Covington & Butler ☼
68 John Olsen ☼
69 Linda Nixon ☼
70 Fred Kelso ☼
71 John Shields ☼
72 Swan Swanson ☼
73 Leonard Kohlmier ☼
74 Donaven Rognlie ☼
75 Chas. Keim Pipeline, Pump ☼
76 McDonald Pipeline, Pump ☼
77 Geo. Gilpin ☼
78 T.R. Willson ☼
79 Anna Walchi ☼
80 Anna Starfa ☼
81 Dorthy Robbin ☼
82 Edna Robbin ☼
83 Delia Dickerson ☼
84 L. Ratterman & E. Lake ☼
85 Thomas Cahill ☼
86 Carl Carlson ☼
87 William Bolton ☼
88 Rousselle & Vogt Pipeline, Pump ☼
89 Mary E. Sullivan
90 Dorothy Schermerham ☼
91 Robert Elliott ☼
92 Leonard Tiensvoid ☼
93 John W. DeYoung ☼

Twp. 25 North
Rge. 19 West

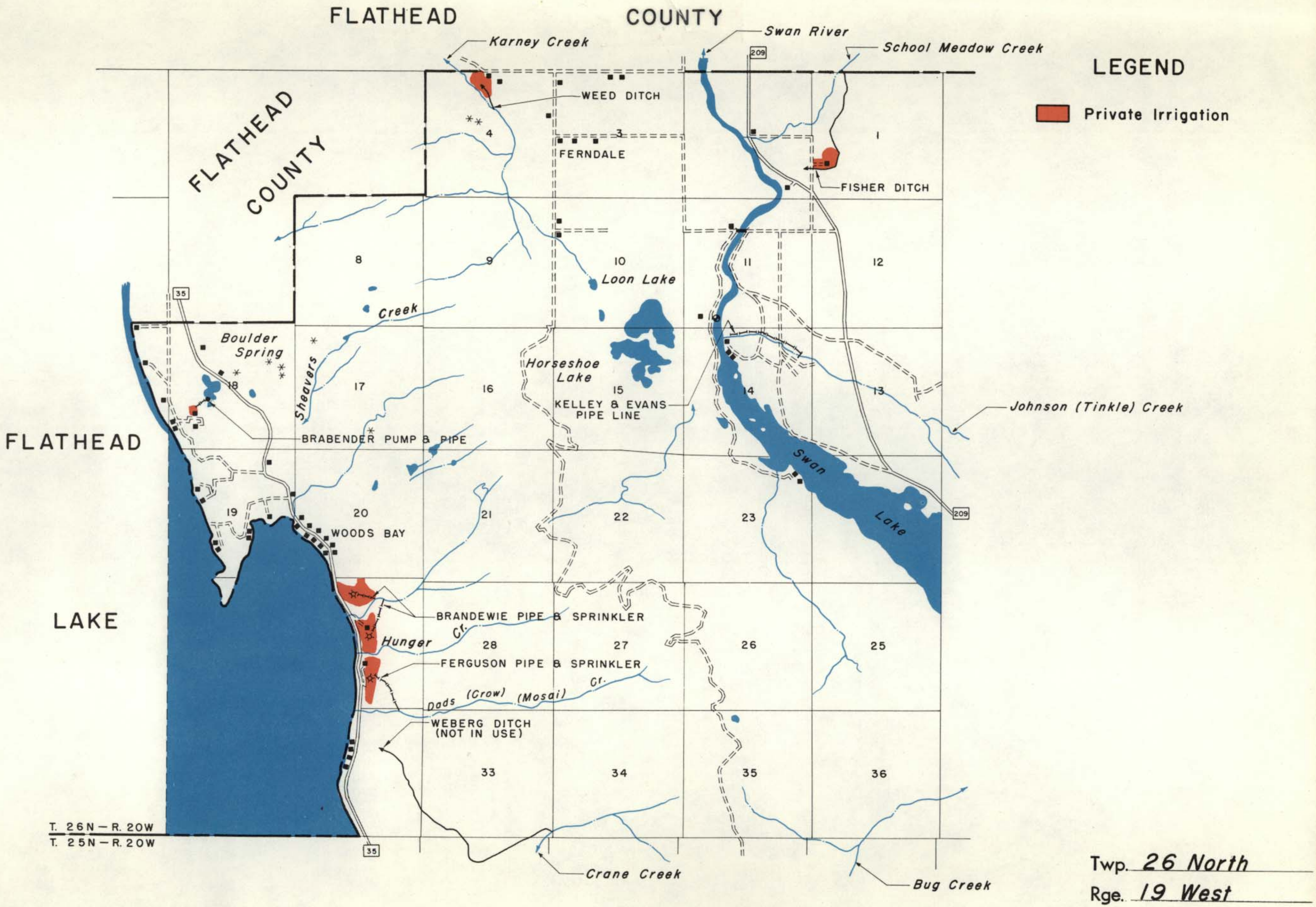

FLATHEAD COUNTY
LEGEND
Private Irrigation
FLATHEAD
LAKE
Table Bay
6
5
7
8
18
17
16
21
30
31
93
Big Lodge Creek
ECKMAN PUMP & SPRINKLER
SAGER DITCH
ROLLINS
McBURNEY DITCH
(NOT IN USE)
ROLLINS DITCH
The North Spring
Birch (Louie) Creek
MONGRAIN DITCH
NORTH BOUNDARY FLATHEAD
INDIAN RESERVATION
Shelter Island
Rock Island
Cedar Island
T. 25 N—R. 21 W
T. 24 N—R. 21 W
Twp. 25 North
Rge. 20 West



Twp. 25 North
Rge. 21 West



Twp. 25 North
Rge. 22 West


FLATHEAD
COUNTY
FLATHEAD
COUNTY
Karney Creek
Swan River
School Meadow Creek
LEGEND
Private Irrigation
WEED DITCH
FERNDALE
FISHER DITCH
Loon Lake
Creek
Boulder Spring
Sheavers
Horseshoe Lake
KELLEY & EVANS PIPE LINE
Johnson (Tinkle) Creek
FLATHEAD
BRABENDER PUMP & PIPE
Swan Lake
WOODS BAY
LAKE
BRANDEWIE PIPE & SPRINKLER
Hunger Cr.
FERGUSON PIPE & SPRINKLER
Dads (Crow) (Mosai) Cr.
WEBERG DITCH (NOT IN USE)
T. 26N – R. 20W
T. 25N – R. 20W
Crane Creek
Bug Creek
Twp. 26 North
Rge. 19 West

Water Resources Survey

Flathead and Lincoln Counties, Montana

Part I:

HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:

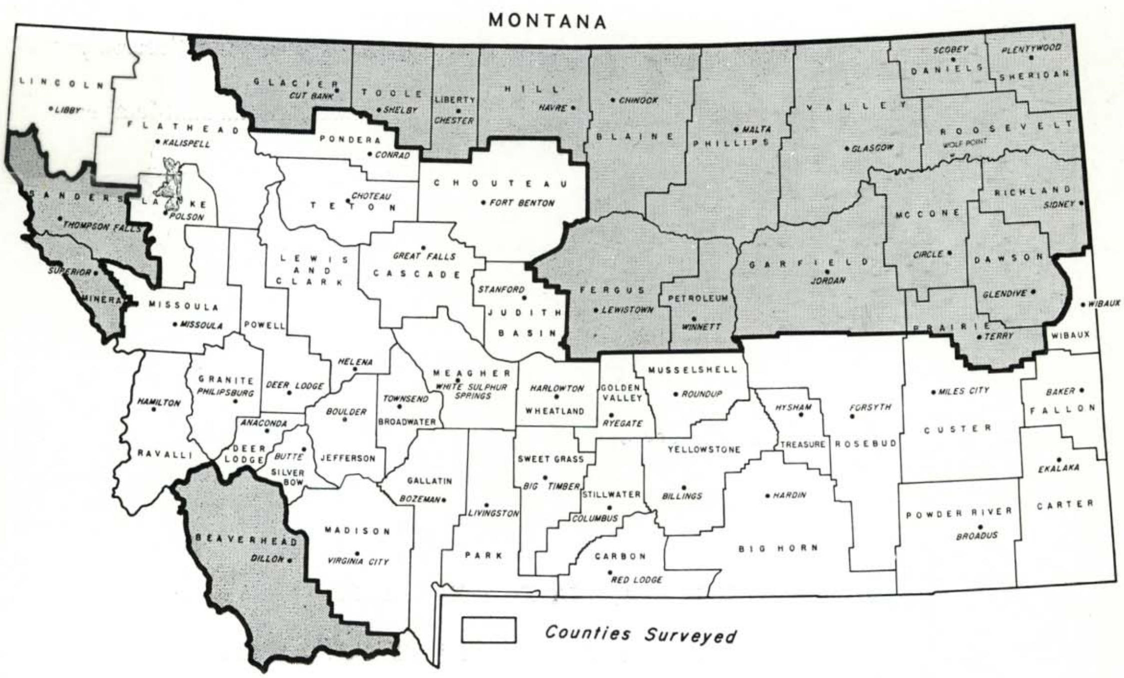
MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June, 1965

WATER RESOURCES SURVEY

FLATHEAD AND LINCOLN COUNTIES
MONTANA

Part I
History of Land and Water Use
on Irrigated Areas



Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1965

STATE ENGINEER'S OFFICE

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Water Resources Survey and Publication of County Reports

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MONTANA STATE AGRICULTURAL EXPERIMENT STATION

C. C. Bowman, Irrigation Engineer and Consultant, Bozeman

3 REPORTER PRTG. & SUPPLY CO.

June, 1965

Honorable Tim M. Babcock
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Babcock:

Submitted herewith is a consolidated report on the Water Resources Survey of Flathead and Lincoln Counties, Montana.

This work was accomplished with funds made available to the State Engineer by the 38th Legislative Session, 1963, and in co-operation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts: Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the County showing in colors the land irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Big Horn, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fallon, **Flathead,** Gallatin, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, **Lincoln,** Madison, Meagher, Missoula, Musselshell, Park, Pondera, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweetgrass, Teton, Treasure, Wibaux, Wheatland, and Yellowstone.

The office files contain minute descriptions and details of each individual water right and land use, which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Respectfully submitted,

EVERETT V. DARLINTON, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid cooperation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

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Henry Lenarz....Chairman of Commissioners, Glen Lake Irrigation District

Lynn Purdy....Glen Lake Irrigation District

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Maps Showing Irrigated Areas in Colors
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FOREWORD

SURFACE WATER

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in the eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. The law restricted the use of water to riparian owners and forbade them to reduce appreciably the stream flow, but the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted another law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the Mettler vs. Ames Realty case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here. . . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the streams to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to the Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriation are:

1. The use of water may be acquired by both riparian and non-riparian landowners.

2. It allows diversion of water regardless of the reduction of the water supply in the stream.

3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.

4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.

5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the county clerk's office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream one must petition the Distrcit Court having jurisdiction over the stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Inasmuch as the Montana laws do not require water users to file official records of the completion of their appropriations, it becomes advisable as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. Thereupon the Judge of the District Court examines the claims of all the claimants and issues a decree establishing priority of the right of each water user and the amount of water he is entitled to use. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 percent of the water rights affected, must appoint a water commissioner to distribute the water. Chapter No. 231, Montana Session Laws 1963, Senate Bill 55 amended Section 89-1001 R.C.M. 1947, to provide that a water commissioner be appointed to distribute decreed water rights by application of fifteen percent (15%) of the owners of the water rights affected, or, under certain circumstances at the discretion of the Judge of the District Court—**"provided that when petitioners make proper showing they are not able to obtain the application of the owners of at least fifteen percent (15%) of the water rights affected, and they are unable to obtain the water to which they are entitled, the Judge of the District Court having jurisdiction may, in his discretion, appoint a water commissioner."** After the Commissioner has been appointed the Judge gives him instructions on how the water is to be apportioned and distributed in accordance with the full terms of the decree.

The recording of appropriations in local courthouses provides an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number or extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once, six appropriators each claimed all the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of about 50 cfs. Today, the Big Hole River with an average flow of about 1,000 cfs. has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected onces since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a certain river or creek finds it difficult and expensive to examine records in several places. In addition, the records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and subdivided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, a record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can readily be seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated the litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly one-half million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence. In the third place, if some claimant has been inadvertently left out of the action, the decree is not final and may be reopened for consideration by the aggreived party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes subdivided in later years and the water is not apportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water ownership on deeds and abstracts.

The Legislative Session of 1957 passed Chapter 114 providing for the policing of water released from storage to be transmitted through a natural stream bed to the place of use. The owner of the storage must petition the court for the right to have the water policed from the storage reservoir to his place of use. If there are no objections, the court may issue the right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on adjudicated streams is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent man for a position so temporary. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate head gates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among water users.

Since a water right is considered property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major faults affecting a stream after an adjudication is the failure of the District Court to have some definite control over the transfer of water rights from their designated places of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted, resulting in a complete breakdown of the purpose intended by the adjudication. To correct this situation, legal action must be initiated by the injured parties as it is their responsibility and not the Court's.

At one time or another all of the Western Reclamation States have used similar methods of local regulation of water rights. Now all of them except Montana have more or less abandoned these practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system are the registration of both the initiation and completion of an appropriation in the State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users titles to the use of water as definite and defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) to catalogue by counties in the office of the State Engineer, all recorded, appropriated, and decreed water rights including the use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting in any transaction where water is involved; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the encroachments of lower states, or Wyoming or Canada.

GROUND WATER

Ground water and surface water are often intimately related. In fact, it is difficult in some cases to consider one without the other. In times of heavy precipitation and surface runoff, water seeps below the land surface to recharge underground reservoirs which, in turn, discharge ground water to streams and maintains their flow during dry periods. The amount of water stored underground is far greater than the amount of surface water in Montana, and, without seepage from underground sources, it is probable that nearly all streams in the state would cease to flow during dry periods.

It is believed that Montana's ground-water resources are vast and only partly developed. Yet this resource is now undergoing an accelerated development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development without some regulation of its use would cause a depletion of ground water in areas where the recharge is less than the withdrawal. Experience in other states has shown that once overuse of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the area concerned.

Practical steps aimed at conserving ground-water resources as well as correcting related deficiencies in surface water laws became necessary in Montana. Prior to the Legislative Session of 1961, there was no legal method of appropriating ground water. Proposed ground-water codes were introduced and rejected by four sessions of the Montana Legislative Assembly in 1951, 1953, 1955, and 1959.

In 1961, during the 37th Legislative Session, a bill was introduced and passed which created a Ground-Water Code in Montana. (Chapter 237, Revised Codes of Montana, 1961.) This bill became effective as a law on January 1, 1962, with the State Engineer of Montana designated as "Administrator" to carry out provisions of the Act.

Some of the important provisions contained in Montana's New Ground-Water Law are:

Section 1. DEFINITIONS OR REGULATIONS AS USED IN THE ACT.

(a) "Ground-Water" means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir, or other body of surface water. Fresh water shall be deemed to be the water fit for domestic, livestock, or agricultural use. The Administrator, after a notice of hearing, is authorized to fix definite standards for determining fresh water in any controlled ground-water area or sub-area of the State.

(b) "Aquifer" means any underground geological structure or formation which is capable of yielding water or is capable of recharge.

(c) "Well" means any artificial opening or excavation in the ground, however made, by which ground water can be obtained or through which it flows under natural pressures or is artificially withdrawn.

(d) "Beneficial use" means any economically or socially justifiable withdrawal or utilizations of water.

(e) "Person" means any natural person, association, partnership, corporation, municipality, irrigation district, the State of Montana, or any political sub-division or agency thereof, and the United States or any agency thereof.

(f) "Administrator" means State Engineer of the State of Montana.

(g) "Ground-Water area" means an area which as nearly as known facts permit, may be designated so as to enclose a single distinct body of ground water, which shall be described horizontally by surface description in all cases and which may be limited vertically by describing known geological formations, should conditions dictate this to be desirable. For purpose of administration, large ground-water areas may be divided into convenient administrative units known as "sub-areas."

Secton 2. RIGHT TO USE. Rights to surface water where the date of appropriation precedes January 1, 1962, shall take priority over all prior or subsequent ground-water rights. The application of ground water to a beneficial use prior to January 1, 1962, is hereby recognized as a water right. Beneficial use shall be the extent and limit of the appropriative right. As to appropriations of ground water completed on and after January 1, 1962, any and all rights must be based upon the filing provisions hereinafter set forth, and as between all appropriators of surface or ground water on and after January 1, 1962, the first in time is first in right.

Any ground water put to beneficial use **after** January 1, 1962 **must** be filed upon in order to establish a water right thereto.

Montana's Ground Water Code originally provided for four different types of forms that could be filed.

Form No. 1 **"Notice of Appropriation of Ground Water"**—shall require answers to such questions as (1) the name and address of the appropriator; (2) the beneficial use for which the appropriation is made, including a description of the lands to be benefited if for irrigation; (3) the rate of use in gallons per minute of ground water claimed; (4) the annual period (inclusive dates) of intended use; (5) the probable or intended date of first beneficial use; (6) the probable or intended date of commencement and completion of the well or wells; (7) the location, type, size, and depth of the well or wells contemplated; (8) the probable or estimated depth of the water table or artesian aquifer; (9) the name, address, and license number of the driller engaged; and (10) such other similar information as may be useful in carrying out the policy of this Act. This form is optional, but it has an advantage in that after filing the Notice of Appropriation, a person has 90 days in which to commence actual excavation and diligently prosecute construction of the well. Otherwise, a failure to file the Notice of Appropriation deprives the appropriator of his right to relate the date of the appropriation back upon filing the Notice of Completion. (Form No. 2).

Form No. 2 **"Notice of Completion of Ground Water by Means of Well"**—this form shall require answers to the same sort of questions as required by Form No. 1 (Notice of Appropriation of Ground Water), except that for the most part it shall inquire into accomplished facts concerning the well or means of withdrawal, including (a) information as to the static level of water in the casing or the shut-in pressure if the well flows naturally; (b) the capacity of the well in gallons per minute by pumping or natural flow; (c) the approximate drawdown or pumping level of the well; (d) the approximate surface elevation at the well head; (e) the casing record of the well; (f) the drilling log showing the character and thickness of all formations penetrated; (g) the depth to which the well is drilled; and similar information.

It shall be the responsibility of the driller of each well to fill out the Form No. 2, "Notice of Completion of Ground Water by Means of a Well," for the appropriator, and the latter shall be responsible for its filing.

Form No. 3 **"Notice of Completion of Ground Water Appropriation Without a Well"**—is for the benefit of persons obtaining (or desiring to obtain) ground water without a well, such as by sub-irrigation or other natural processes so as to enable such persons to describe the means of using ground water; to estimate the amount of water so used; and requiring such other information pertinent to this particular type of ground water use.

Form No. 4 **"Declaration of Vested Ground Water Rights"**—shall be used by persons who have put ground water to a beneficial use (including sub-irrigation or other natural processes), prior to January 1, 1962. The appropriator must within four (4) years after January 1, 1962 (the original law called for two years but the 1965 Legislature extended the time to four years after January 1, 1962) file a declaration in the office of the county clerk of the county in which the claimed right is situated and the declaration shall contain the following information: (1) Name and address of the claimant; (2) the beneficial use on which the claim is based; (3) the date or approximate date of the earliest beneficial use, and how continuous the use has been; (4) the amount of ground water claimed; (5) if the beneficial use has been for irrigation, the acreage and description of lands to which such water has been applied and the name of the owner thereof; (6) the means of withdrawing such water from the ground and the location of each well or other means of withdrawal; (7) the date of commencement and completion of the construction of the well, wells or other works for withdrawal of ground water; (8) the depth of the water table; (9) so far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of ground water; (10) the estimated amount of ground water withdrawn each year; (11) the log of the formations encountered in the drilling of each well; and (12) such other information of similar nature as may be useful in carrying out the policy of the Act.

Failure to file Form No. 4 "Declaration of Vested Ground Water Rights" within the four-year period does not cause a forfeiture of a claimant's vested ground-water rights although he might be called upon at some future time to prove his rights in court. A valid filing of Form No. 4, however, will be accepted by the courts as prima facie evidence of a ground-water right.

It shall be recognized that all persons who have filed a Water Well Log Form as provided for under Section 1 and 2 of Chapter 58, Session Laws of Montana, 1957, shall be considered as having complied with the requirements of this Act.

It is important to note that the ground-water law states, "UNTIL A NOTICE OF COMPLETION (Form No. 2 or No. 3) IS FILED WITH RESPECT TO **ANY** USE OF GROUND WATER INSTITUTED **AFTER** JANUARY 1, 1962, **NO** RIGHT TO THAT USE OF WATER SHALL BE RECOGNIZED."

Copies of the forms used in filing on ground water are available in the County Clerk and Recorder's office in each of Montana's 56 counties. It shall be the duty of the County Clerk in every instance to file the original copy for the county records; transmit the second copy to the Administrator (State Engineer); the third copy to the Montana Bureau of Mines and Geology; and the fourth copy to be retained by the appropriator (person making the filing).

Accurate records and the amount of water available for future use are essential in the administration and investigation of water resources. In areas where the water supply becomes critical, the ground-water law provides that the administrator may define the boundaries of the aquifer and employ inspectors to enforce rules and regulations regarding withdrawals for the purpose of safeguarding the water supply and the appropriators (see the wording of the law for establishing a "controlled area").

The filing of water right records in a central office under control of a responsible State agency, provides the only efficient means for the orderly development and preservation of our water supplies and it protects all of Montana's use — on both ground and surface water.

METHOD OF SURVEY

Water resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts with landowners. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is taken from the files of the county courthouse and the data required includes: landownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of landownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Noted on the photographs are the location of each irrigation system, with the irrigated and irrigable land areas defined. All the information compiled on the aerial photo is transferred and drawn onto a final base map by means of aerial projection. From the base map color separation maps are made and may include three to ten overlay separation plates, depending on the number of irrigation systems within the township.

Field forms are prepared for each landowner showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system, source of water supply and the total acreage irrigated and irrigable under each. All of the appropriated and decreed water rights that apply to each ownership are listed on the field forms with the description of intended place of use. During the field survey, all water rights listed on the field form are verified with the landowner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right and use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are as found at the time of completion of each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Complete data obtained from this survey cannot be included in this report as it would make the text too voluminous. However, if one should desire detailed information about any particular water right, lands irrigated, or the number and amount of water rights diverted from any particular stream, such information may be obtained by writing the State Engineer's Office in Helena.

Every effort is being made to produce accuracy of the data collected rather than to speed up the work which might invite errors.

WATER RESOURCES SURVEY

Flathead County, Montana

PART I

History of Land and Water Use
On Irrigated Areas

Published By
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HISTORY AND ORGANIZATION

There was a legend among the Indians of the Flathead Country that they originally came from the Far North, and wandered southward in search of a better place to live until they came to the Flathead. The Flathead region pleased them so well that they made it their permanent home. In 1805, Lewis and Clark first came in contact with the Flathead Indians when they passed through the Bitterroot Valley of western Montana on their way to the Pacific Coast. Lewis and Clark called the Indians Cotlashoots, who were properly known as Salish, and who most white men called "Flatheads." However, they never practiced the flattening of the skull which was popular among some of the Pacific Coast tribes. The Flathead-Salish Indians of western Montana were called "Flatheads," in translation of their tribal sign which meant natural head and signifying that there was no implication of forehead mutilation.

The Flathead Indians are classified as being one of the tribal groups belonging to the Interior Salish Tribal Nation. The most important of these tribes were the Colville, Spokane, Kalispel, Flathead, Columbia, and Coeur d'Alene. The town of Kalispell derived its name from the Kalispel Indians who are also known as the Pend d'Oreille Tribe.

David Thompson, early day explorer and geographer, was probably the first white man to view the Flathead Valley, coming into the area in 1809. In 1842, Angus McDonald, a trader with the Hudson Bay Company, built the first cabin in the valley and established a trading post at the head of Flathead Lake, 7 miles southeast of the present town of Kalispell. A few years later this post was abandoned.

Actual settlement in the Flathead Valley came comparatively late. In 1847, Angus McDonald established a second Hudson Bay Company Post on Post Creek (Ft. Connah) south of Flathead Lake (now in Lake County), and his son Duncan, born there in 1849, was the first white child in this area.

The first settlement in the upper Flathead Valley was made by Joe Ashley, a trader under Angus McDonald, near the foothills south of the creek and lake which now bears his name. Ashley, seeing no future in the valley, sold his claim for $10.00 and moved out. Jack Fisher was perhaps the first white man to settle permanently in the Flathead Country in the year 1860. Farming in the upper Flathead Valley was first tried by Frank Greville who farmed by dry land methods. Next came Nicholas P. Moon who had profited from an earlier farming experience in California. Moon took out a water right and became the Flathead Valley's first irrigation farmer. By 1880 there were twelve men in the valley with intentions of settling there permanently. The following year John G. Dooley established the first post office at "Dooley's Landing" on the Flathead River.

Most of the early settlers coming into the valley drove their wagon trains overland from Missoula, and later from Ravalli, after the building of the Northern Pacific Railway through there in 1883. The roads they traveled were nothing better than trails and the trip around the west side of Flathead Lake was extremely difficult. After traveling through this rough country and arriving in the valley proper the new settlers still had to cross the Flathead River to locate on the better land.

Usually the crossing was made by boat or by crude ferries and frequently supplies, household goods, and livestock were lost. George Larkin, a trapper from Oregon, built the first ferry at Holt, near the head of Flathead Lake, which he operated successfully for several years.

Navigation by boat on the Flathead Lake and River began in 1884, thereby making the trip into the valley relatively easy and adding another chapter into the annals of the Flathead Valley history. The 65 miles from the foot of Flathead Lake to the end of navigation on the river was first attempted by the sailboat "Swan," but this sailboat proved to be so impractical that a steam engine and propeller was installed and its name changed to the "U. S. Grant." The U. S. Grant made semi-weekly round trips from the landing where Polson now stands to other points on the river where boat landings were established. Notable among the landing places built and used by boats during this period of navigation were Holt, Selish (where John Dooley had established a post office), Egan and Greggs Landing, afterward known as Demersville. As the demand for boat service increased, boats built on various dates and placed in operation were: the "Pocahontas," "Tom Carter," "Cresent," "State of Montana," "Maryann," "Montana," "The Flyer," "City of Polson" and the "Star." With the coming of the Great Northern Railway in 1891 some of the steamboat traffic declined, but due to the poor roads in the upper part of the valley the career of steamboats did not end until after the turn of the century.

During the latter half of the 1880's the Flathead Valley began to boom with a marked increase in population and industrial activity. Roads were constructed, lumber mills built, and the rich soil of the farm lands grew highly productive crops. Ashley, one-half mile west of Kalispell, was the first town in the valley and was chosen as the most likely place to build a main business center of the Flathead Valley. In 1882 the first business places were opened in Ashley and for a few years the town grew and seemed destined to be the focal point of the valley. However, with the advent of the steamboat and the railroad, Ashley fell behind, with hardly a trace of the townsite left today.

Kalispell actually started with the town of Demersville, which was also known as Greggs Landing, Greggsville and Scooptown. This town was located a few miles east and south of Kalispell. Demersville was named for "Telesphore J. Demers," a cattleman, merchant and freighter. He bought 80 acres of land, laid out the townsite and started a mercantile business which he operated successfully for a few years. In the fall of 1890, word was received that the Great Northern Railway had crossed the mountains and was coming down the middle fork of the Flathead River. Charles E. Conrad and A. A. White located the new town of Kalispell for the Great Northern Railway 3 miles northwest of Demersville and many thought the new town would be as large as St. Paul, Minnesota. Demersville was moved over the prairie to the new railroad town and today there is nothing left of it except one or two old buildings.

Flathead County was created out of Missoula County on February 6, 1893, with Kalispell chosen as the county seat and incorporated as a city. Kalispell continued to increase in size and population until 1902 when the railroad (to avoid a long uphill freight haul) moved its division point 14 miles north to Whitefish, a small town on Whitefish Lake. Kalispell and the surrounding area suffered a temporary set-back by the move but soon recovered to become one of the leading cities in Montana.

Water is the basic resource of any land and the Flathead area is rich in water resources. It has, in addition to Flathead Lake, the Swan, Flathead, Whitefish and Stillwater Rivers which provide an abundance of water for irrigation, industrial and domestic use.

Agriculture, with the growing use of irrigation and other modern farming techniques, is one of the main industries in Flathead County. Well kept productive farm land covers much of the valley floor (see Crops & Livestock of this report), with thriving fruit orchards, namely cherries and apples, grown along the east shore of Flathead Lake. The Flathead seed potatoes are among the world's finest and it is said that Idaho's famous potatoes came from the Flathead seed.

Lumbering ranks high in the industrial activity of the diversified economy in Flathead County. In 1956, the Flathead National Forest Headquarters reported sales to private loggers in excess of $1,000,000 and estimated the overall lumber value at $16,000,000. The lumber industry provides employment for thousands of valley residents and annually ranks among the top three industries in the county and in the state.

Last, but not least, of the industries in Flathead County is the Anaconda Aluminum Company reduction works at Columbia Falls, completed in 1956 at a cost of $60,000,000. This plant provides year-round employment for 600 valley residents and produces 60,000 tons of aluminum annually. The Flathead Valley was chosen as the site of the Anaconda Company's initial venture into the aluminum field, utilizing hydroelectric power from Hungry Horse Dam.

Hungry Horse Dam, built in 1953, on the south fork of the Flathead River, is the world's fourth highest and third largest dam. The huge concrete structure, located 20 miles northeast of Kalispell, reaches a height of 564 feet above bed rock and has a crest length of 2,115 feet. It impounds 3,500,000 acre-feet of water and forms a lake 34 miles long and 3½ miles wide at its widest part. The estimated cost of this hydroelectric project was approximately $108,000,000.

Glacier National Park is located 32 miles northeast of Kalispell on Federal Highway 2 and attracts thousands of visitors into Flathead County each year. It contains an area of nearly 1,583 square miles of which approximately two-thirds lies in Flathead County. Glacier National Park has some of the most spectacular scenery and primitive wilderness in the entire Rocky Mountain region. The famous "Going-To-The-Sun" highway carries the tourists along the nation's most scenic route, over the "Alps of America." Accommodations inside the park range from fine hotels to mountain chalets, cabin camps, trailer parks and public camp grounds.

The northern part of Flathead Lake which extends into Flathead County is located in the heart of Montana's vacationland. The lake is 38 miles long and 15 miles wide and is surrounded by 104 miles of hard surfaced highway. Flathead Lake, one of America's most beautiful lakes, is the largest body of fresh water west of the Mississippi River and covers 120,000 surface acres with crystal clear water. Vacationers have for their enjoyment boating, water skiing, swimming and fishing, combined with excellent over-night accommodations along its shores.

The Big Mountain ski resort near Whitefish and 24 miles north of Kalispell offers the skiing enthusiasts one of the nation's finest ski resorts, with lodging accommodations, excellent food, a well equipped ski shop and challenging ski runs.

Transportation facilities in Flathead County include the Great Northern Railroad, Federal Highways 2 and 93, State Highways 35, 40, 206, 208, 326 and 424 and numerous improved county roads. The most important towns in the county and their population are: Kalispell 10,500, Whitefish 3,000, Columbia Falls 2,100, Somers 700 and Big Fork 500. Other smaller communities are Lakeside, Hungry Horse, Martin City, Coram, West Glacier, Creston, Olney, Marion, Kila and Essex. In 1960, Flathead County's total population was listed as 32,965 people.

CLIMATE

Flathead County, with its eastern boundary coinciding with the Continental Divide, is one of Montana's largest counties, with topography ranging from extremely mountainous in its eastern and northern sections to only moderately mountainous in the southwest. Many large lakes dot the county, and several deep river valleys cut through the mountains in a very complex drainage system. As in any mountainous area these (and other) geographical features help to produce wide variations in climate – extremely wide between the actual slopes of the Continental Divide and the broad valleys north of Flathead Lake to the Whitefish-Columbia Falls area. Except for the higher mountain ridges and the cultivated or populated valley bottoms, the county is heavily forested, reflecting a climate very favorable for vegetative growth.

The larger valleys are those of the South Fork of the Flathead (flowing generally northward into Hungry Horse Reservoir), the Middle Fork of the Flathead (flowing generally northwestward between the Flathead Range and the Continental Divide), the North Fork of the Flathead (flowing generally southward to join the Middle Fork just upstream from Hungry Horse), the Stillwater River (running southeastward through the Kalispell area), and the Flathead River itself from Columbia Falls to Flathead Lake. In addition, there are numerous tributaries of some importance (Spotted Bear River, Bear Creek, etc.), but the Flathead River complex is primary in its effects on climate. County elevations range from over 10,000 feet on a few peaks in Glacier National Park to about 2,900 feet along the shore of Flathead Lake.

County climate in general may be classed as a modified Pacific maritime type, but on a couple of occasions in most winters polar continental air may spill westward over the Continental Divide, bringing brief periods of Continental type winter weather. While running a little cooler and not so wet as Pacific Coast climates, the modifications are not very large, and the coastal tendency for dry summers and warm summertime days (except along the immediate coast line) reaches as far as Flathead County much of the "warm" season in most years. Annual average temperatures range from 35.8° at Summit (Marias Pass) to 44.2° in downtown Kalispell (see temperature table), and average temperatures roughly run 3° or 4° warmer in the southern part of the county than in the north at the same elevation. For its latitude (about 47° 36′ to 49°), winters are not very cold, averaging around 20° in January in most of the county, and 15.4° even at Summit. Summers are pleasantly warm – see July averages in the table.

Growing season (number of days between last spring and first fall 32° occurrences) varies considerably throughout the county. At the Kalispell Airport this season averages 135 days (4½ months), but at the mountain location of Summit it is only 17 days, and at Polebridge on the North Fork of the Flathead and at Pleasant Valley it is 30 days. At West Glacier it is 90 days, and it is estimated that 100-day or more seasons may be found only in the lower elevations around Flathead Lake and north through the Kalispell vicinity to the Columbia Falls-Whitefish area.

Precipitation averages heavier over much of the county than in most of Montana. A 12-year average at Essex indicates nearly 40 inches a year, but mountain slopes – particularly of the Continental Divide – are undoubtedly wetter. Records indicate that the old Post Office weather station in downtown Kalispell may be the driest point in the county, averaging 14.73 inches. The seasonal distribution of precipitation is different over most of the county from almost all of Montana to the south and east. The pronounced early summer rainfall maximum common to most of Montana is not found here; the variation from month to month is relatively small, the driest months are July and August, and mid-winter precipitation is substantial—particularly in the mountains where winter and early spring snowfall usually is heavy. Snowfall of several hundred inches a year is common in the county's northern and eastern mountains. This mountain snowfall contributes heavily to the pronounced spring - early summer runoff maximum observed in all mountain source streams during May and June every year.

Winters are cloudy much of the time; Kalispell, the only point in the county for which long records of cloudiness are on file, shows 8.6 sky cover on a 0-10 scale in January (10 meaning overcast sky) and most other sections of the county probably have even more sky cover than Kalispell. In a normal January, the sun shines only 28 percent of the time. On the other end of the scale, summers in Flathead County have a lot of sunny weather. At Kalispell the sun shines 77 percent of the time in July, and cloud cover averages only 3.6 on the 10 scale. Relative humidity in mid-afternoon averages, in January, about 85 percent in most of the county. But in July mid-afternoon is often dry—averaging around 30 percent in most years. Oppressive combinations of heat and humidity are unknown. In an average year Kalispell will have 19 days of 90° maximum or warmer, 53 days maximum 32° or colder, 190 days minimum 32° or lower, and only 18 days 0° minimum or colder. Maximums of 100° occur only rarely—about once in 10 years in Kalispell, less often than that elsewhere.

Really severe storms are not common in Flathead County, particularly if one recognizes that heavy snows are a yearly part of the mountain climate complex. Thunderstorms usually are less energetic here than east of the Continental Divide, but once in a while one will produce enough hail to cause some crop damage. They also are less frequent than in other parts of the state. Possibly the greatest problem is caused by the infrequent occurrence of a heavy windstorm, possibly on the order of once in 5 to 10 years, which can blow down timber in large quantities, damage power and telephone lines, etc. Even with the low frequency of occurrence, usually only small areas are affected, and in any one locality they must be considered rare. The northeast wind accompanying about two or three cold waves a year sometimes can be troublesome as it blows out of Bad Rock Canyon onto the Columbia Falls-Kalispell plain. Sometimes reaching speeds of more than 60 m.p.h. with temperatures falling from above freezing to near or below zero and with blowing snow, these cold wave winds warrant careful handling. But the wind force decreases with distance from the canyon in most cases, and only rarely does a cold wave wind achieve gale strength over a large part of the county.

Selected temperature and precipitation data for Flathead County appears in the following condensed tables:

TEMPERATURE

Station	Years of Record	Highest of Record-Date	Lowest of Record Date	Average Jan.	July	Annual
Creston	1949-1963	100-8/4/61	–40-1/30/50	20.6	64.2	43.2
Hungry Horse Dam	1948-1963	102-7/19/60	–40-1/30/50	19.5	64.8	42.5
Kalispell (City)	1949-1963	101-8/5/61**	–28-1/31/50	19.1	65.7	44.2
Kalispell (WBO)	1899-1948	101-7/28/34	–34-1/11/09	21.8	65.6	43.3
Kalispell (WBAS)	1949-1963	105-8/4/61	–38-1/31/50	21.1	65.5	43.2
Pleasant Valley	1923-1963	102-8/4/61	–51-12/18/24	19.5*	60.1*	40.1*
Polebridge	1933-1963	101-7/19/36**	–46-1/25/57**	16.5	61.2	39.2
Summit	1935-1963	96-8/4/61	–55-1/3/59	15.4	57.0	35.8
West Glacier	1914-1963	101-7/28/34	–42-12/18/24	21.1*	64.0*	42.1*

*1931-1960

**Also on earlier dates, months, or years.

PRECIPITATION

Station	Years of Record	Yearly Average	Growing Season Average	Percent Falling in Growing Season	Wettest Amt.	Wettest Year	Driest Amt.	Driest Year
Creston	1949-63	18.55	9.92	53	26.52	1951	11.43	1952
Essex	1951-63	39.21	14.41	37	47.87	1953	27.58	1952
Hungry Horse Dam	1948-63	31.30	13.20	42	40.99	1959	16.72	1952
Kalispell (City)	1949-63	15.17	8.01	53	20.29	1959	8.79	1952
Kalispell (WBO)	1899-48	14.73	7.82	53	20.91	1948	10.39	1929
Kalispell (WBAS)	1949-63	15.04	7.97	53	21.87	1951	11.15	1952
Pleasant Valley	1908-63	18.84*	7.99*	42	29.18	1933	10.39	1931
Pleasant Valley (4SE)	1946-63	20.88	7.97	38	26.22	1948	9.67	1952
Polebridge	1933-63	22.42	9.18	41	33.21	1951	13.07	1952
Summit	1935-63	36.87	14.62	40	55.51	1953	25.30	1939
West Glacier	1914-63	28.06*	11.74*	42	38.97	1951	17.43	1935

*1931-1960

SOILS

Local rock formations furnish the material for soils found in a given locality. The physiography, drainage and glacial history of the area determined how these materials were deposited and, in fact, account for some of the differences we find in the soils. Soil depth, density, texture and acidity or alkalinity are directly related, within limits, to the material from which the soil was formed.

Most of Flathead County has been influenced by alpine glaciation. These areas are covered with material that was picked up, mixed and redeposited either by the ice or by water from the ice as it melted. The variations in soils we see today result from alterations of geologic material by **climate** and **living organisms**, especially vegetation. The length of **time** these forces have been active and the **topography** on which the action has taken place also contribute to these variations.

The Great Soil Groups most widely represented in Flathead County are Alluvial, Lithosol, Chestnut, Chernozem, Solodized-Solonetz, Gray Wooded and Brown Podzolic soils.

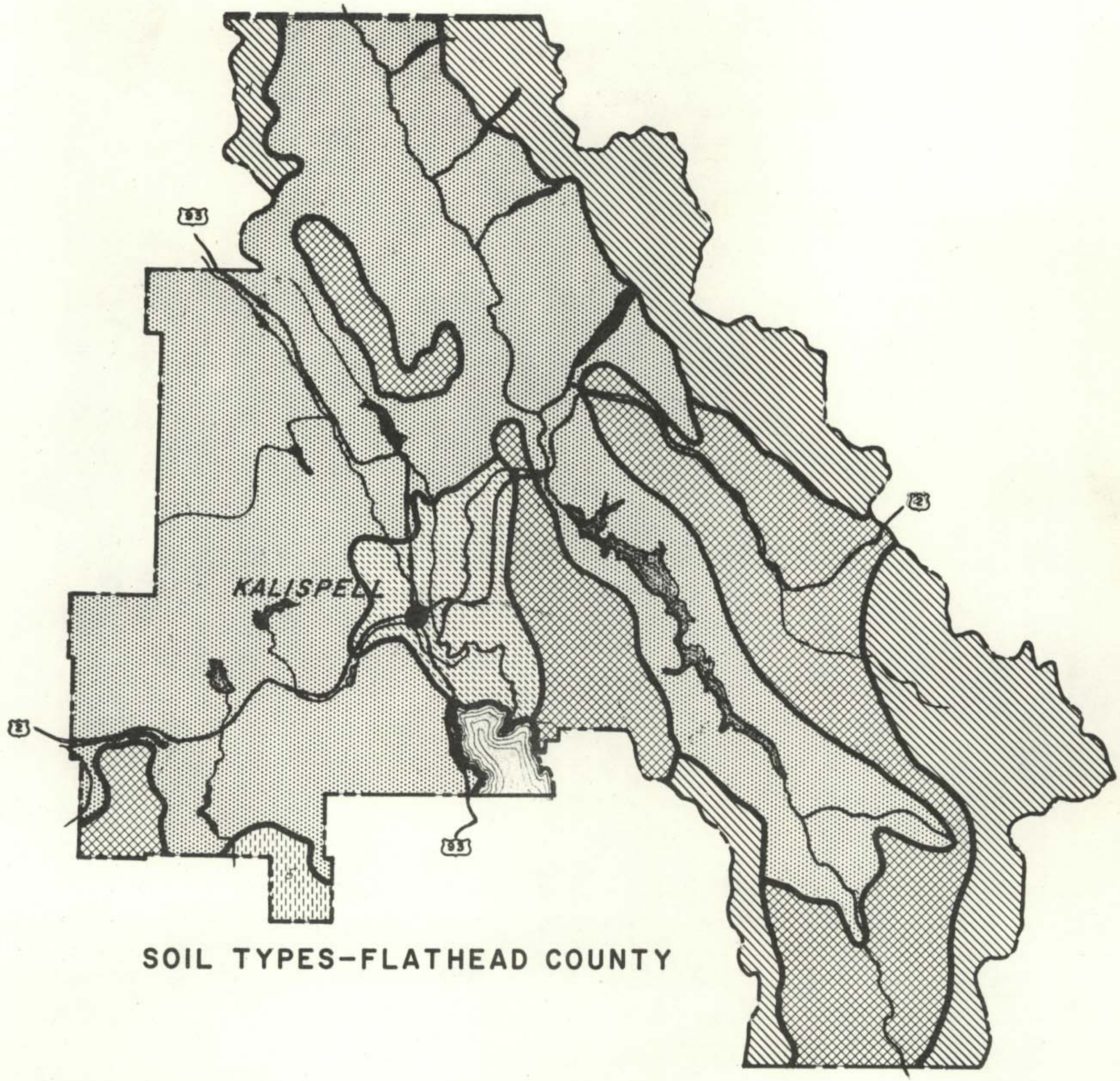
Alluvial soils (Entisols*) are young. They occur usually in small areas along streams and may be flooded periodically. The only development that has occurred in these soils is the darkening of the surface by an accumulation of organic matter. The material below the surface is essentially the same as it was at the time of deposition. These soils are used mainly for production of grain and hay, some of which is irrigated.

Lithosols (Entisols*) are soils developed in material that is less than 30 inches deep over bedrock. These are young soils without strongly contrasting horizons. Soil development has been confined largely to darkening of the surface by organic matter. These soils are used for grain and hay production and native range.

Chestnut and Chernozem soils (Mollisols*) have a dark surface soil, usually a clayey, prismatic subsoil and a lime accumulation at 20-25 inches below the surface. This lime horizon may extend to 50 inches. The Chernozem soils are developed under a higher precipitation (16-24") and have a darker surface than the Chestnut soils (10-16" precipitation). The depth to the lime accumulation may be somewhat greater in the Chernozem soils. These soils are used mainly for grain and hay production and some native range.

Solodized-Solonetz soils (Natrustolls*) generally occur in small areas in association with Chestnut soils. They are characterized by thin platy surface soils over dense hard clay-pan subsoils. The upper part of the subsoil often has a light-colored (bleached) zone 1-4 inches thick. The bleached zone should not be confused with the lime zone which is usually found below the clay-pan subsoil. These soils often occur as "Slick spots", "Scab land" or "Micro pits". These show up under cultivation in all but the wettest years as spots – shorter plants surrounded by taller ones on the adjacent soils. Their use is generally the same as that of the associated Chestnut soils. Greasewood is often found on Solodized-Solonetz soils in their natural state.

Gray Wooded soils (Alfisols*) occur principally in the mountain regions. The mean annual precipitation varies from about 12-25 inches. The vegetation consists mainly of coniferous forests. A dark surface layer of less than 4 inches may be present just under the forest litter. In the absence of the dark layer, a light gray to white zone 4 to 12 inches thick lies just beneath the litter. The



SOIL TYPES—FLATHEAD COUNTY

Dominantly Chernozem and Chestnut soils with associated Solodized—Solonetz and Alluvial soils along streams.

Dominantly Gray Wooded soils.

Dominantly Brown Podzolic soils.

Steep mountainous land above 8500 feet.

Dominantly Lithosols and associated Solodized—Solonetz soils.

Note: Alluvial soils occur along most streams but in areas too small to show on the map.

subsoil—a mixture of surface soil and substratum—may extend to depths of 3-4 feet. The major clay accumulations lie below this zone of mixing and may extend to depths of 6 feet in extreme samples. These soils are used mainly for timber production and Christmas trees.

Brown Podzolic soils (Spodosols*) occur principally in the mountain regions. They are found under a mean annual precipitation of 25-50". The most striking feature of these soils is the brown or reddish-brown horizon just under the forest litter. This brown horizon may extend to a depth of 12 inches and is in striking contrast to the gray or nearly white horizon of the Gray Wooded soil. Timber production and Christmas trees are important uses of these soils.

For more detailed information on soils — See the Soil Survey Report of the Upper Flathead Valley, 1960. Available from the Information Office, Montana State College, Bozeman.

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*New names for same soils. Based on the new Soil Classification System, 1960—Soil Classification—A Comprehensive System. USDA, SCS.

CROPS AND LIVESTOCK

Flathead County encloses 3,113,281 acres of land. Ninety percent of the county is forested and mountainous. Glacier National Park contains 560,000 acres and the State and National Forests encompass 1,790,000 acres.

Most of the county's 1,100 farms are located in the Flathead Valley. This valley is about fifteen miles wide and twenty-five miles long with a gradual slope from north to south. The largest river is the Flathead which drains into Flathead Lake at the southern end of the valley. Other important rivers include the Swan, Stillwater, and Whitefish.

The farming area of Flathead County is confined to the floor of the Flathead Valley and relatively small benchland and foothill holdings. About 40 percent of the cropland lies in the first 107 feet of altitude above Flathead Lake, 47 percent in the next 500 feet, and only 13 percent above 3,500 feet in altitude. The highly productive valley area is fringed at east, west, and north by cutover or forest land. The type of land, and the timber cover which naturally grows on it, severely limits grazing opportunities.

Field crops, livestock, and dairy products are the principal products of Flathead farms. Cash products produced include beef cattle, wheat, barley, oats, peas, milk products, swine, potatoes, hay, sheep, poultry, miscellaneous livestock products, farm forest products including Christmas trees, cherries, other fruits, and miscellaneous horticultural specialties.

According to the 1964 Montana Agricultural Statistics report, farm sales for the year 1963 were \$3,311,400 for livestock and livestock products. The sale of crops totaled \$2,951,600.

While primarily a dry land farming area, irrigation use is steadily increasing. Sprinkler irrigation started in the county in 1947 and has grown steadily since that time. The 1964 Montana Agricultural Statistics report shows 22,046 acres devoted to irrigation. The value of crops produced on this irrigated land totals \$1,153,600. The results is an average value of \$52.00 per acre of production on the irrigated land in comparison to \$40.00 per acre on the dryland where 71,557 acres produced \$2,876,200 worth of farm products.

The climate, the availability of water for irrigation and soils that yield a tremendous response to management make it possible for Flathead farmers to diversify and shift production emphasis as economic conditions warrant.

Wheat and barley remain the primary crops in the better soils, such as Creston and the Lower Valley areas. Livestock and forage production are increasing steadily in all other areas of the county. Increased production is resulting from irrigation development, increased use of commercial fertilizer, animal manures, and other organic material. Additional acres are being diverted to livestock and forage production as a result of land clearing, drainage, and seeding of cropland to pasture and hay.

Expansion in cattle production is evidenced by three developments. First, over 10,000 head of cattle will be fed in the valley in 1965. There was almost no feeding just ten years ago. Second, a cattle slaughtering facility has been installed with a capacity of 600 head per week. Third, the feasibility of a livestock auction yard has been established and one will be installed in 1965. Continued growth in the valley's livestock production can be expected.

Sweet cherry growing is another expanding segment of the agricultural economy. Production of sweet cherries is particularly profitable adjacent to Flathead Lake because this area grows a large, firm premium cherry which is marketed after competition from other areas has ceased. Production is nearing four million pounds annually. This is double the production five years ago. Orchard land is still being developed.

The Flathead has many desirable natural conditions to enable dairying to remain a thriving business. Irrigation improved forage quality and more comfortable housing has enabled dairy producers to maintain a competitive position in the production of dairy products.

The breeding of registered livestock is an expanding industry in the county. Beef cattle breeds include Hereford, Aberdeen Angus, Shorthorns, and Charollais; sheep breeds include Targhees, Columbias, and Suffolks; swine breeds include Durocs and Chester Whites.

Although sheep production has remained fairly stable over a period of years, there is opportunity for expansion of farm flocks on many of the smaller farms.

Swine production has experienced a steady growth over the years. A further expansion is anticipated with increased feed production and improved and more efficient physical plants.

Potatoes furnish one of the best opportunities to use irrigation to advantage in the Flathead. Certified seed potatoes now grown in the area under sprinkler irrigation are fairly free of the virus diseases which cause concern in Idaho, Washington, and Oregon. Flathead seed potatoes have been finding a market in Idaho, California, and Washington.

There are a number of commercial truck gardens in the valley. The climate, soils, and availability of water along with a steady increase in population point to a greater intensification of vegetable, berry, and fruit gardens. A number of processing, manufacturing, and service activities can be expected to develop as the Flathead farm economy is intensified and diversified.

Listed below is a table showing the crops, their acreages, yields, and value, with a total of livestock and livestock products sold during the year:

CROP PRODUCTION, 1959, HARVESTED ACRES

Crops	Acres	Yield/Acre	Total Yield
Winter Wheat	20,457	34.4 Bu/A.	704,020 bushels
Spring Wheat	5,275	18.5 Bu/A.	97,360 bushels
Barley	15,229	32.9 Bu/A.	501,805 bushels
Oats	7,286	32.6 Bu/A.	237,280 bushels
Potatoes	750	138 cwt/A	103,553 cwt.
Alfalfa	18,347	2 T/A	36,862 tons
Mixed Hay	8,342	1.2 T/A.	9,857 tons
Wild Hay	4,258	1.2 T/A.	5,141 tons
Other Hay	2,119	2 T/A.	4,381 tons
Silage (green wt.)	427	5.7 T/A.	2,440 tons

LIVESTOCK AND LIVESTOCK PRODUCTS SOLD FROM FARMS, 1959

Product			Dollar Value Sales
Livestock and Livestock Products:			
Livestock sold alive	1,984,508		
Poultry and Poultry Products	209,308		
Dairy Products	1,092,734	Total	$3,286,050
Crops Sold:			
Field Crops	2,015,183		
Forest and Horticultural Products	413,024		
Vegetables and Fruits	58,579	Total	$2,486,786
All Farm Products Sold			$5,772,836

SNOW SURVEYS

The Soil Conservation Service, in cooperation with other federal, state and private agencies makes snow surveys throughout the winter and spring months to predict the streamflow. This information is used by farmers and ranchers to assess the amount of irrigation water that will be available, by irrigation and flood control organizations to manage reservoir operation, by power companies and many other groups and individuals whose operations are related to or dependent on streamflow. This foreknowledge allows water users and managers time to plan operations according to the expected runoff. Farmers and ranchers can plan crops for the coming year. Reservoirs can be operated for maximum efficiency by combining flood control with power generation and irrigation storage. Bankers, railroad managers, equipment builders and persons in various other businesses can determine and plan for the effect the anticipated water supply may have on their operation.

In Flathead County the operation of both Hungry Horse Reservoir and Flathead Lake is based on streamflow forecasts made from snow survey data.

A snow survey consists of measuring the depth and amount of water in the snow, or snow water equivalent. Measurements are taken at the same place each year, using standard snow sampling equipment. Almost all courses are measured near the first of March, April and May, with a few courses measured earlier and later in the season.

Snow courses in or immediately adjacent to Flathead County are shown in the following tabulation. Other snow courses used to forecast the Flathead River streamflow, but not in Flathead County, are shown in the reports for Lake, Missoula and Powell Counties.

SNOW COURSES AND SOIL MOISTURE STATIONS

Drainage and Name	Number	Eevation	Year Established	Dates Measured[1]*
North Fork Flathead River				
Grave Creek	14A11	4300	1965	3, 4, 5, 5½, 6
Kishenehn	14A06	3890	1954	3, 4
Murphy Lake R. S. Soil Moisture	14A10M	3000	1964	Monthly
Weasel Divide	14A07	5450	1955	3, 4, 5, 5½, 6
Middle Fork Flathead River				
Badger Pass	13A15	6900	1964	3, 4, 5
Beaver Lake	13A11	5900	1964	3, 4, 5
Freight Creek	12A01	6000	1948	3, 4, 5
Gunsight Lake	13B12	6300	1964	3, 4, 5
Marias Pass	13A05	5250	1934	1, 2, 3, 4, 5
Marias Pass Soil Moisture	13A05M	5250	1950	Monthly
Mineral Creek	13A16	4000	1957	3, 4, 5
Wrong Ridge	12B03	6800	1949	3, 4, 5
South Fork Flathead River				
Desert Mountain	13A02	5600	1937	1, 2, 3, 4, 5, 6
Desert Mountain Soil Moisture	13A02M	5600	1957	Monthly
Holbrook	13B13	4530	1951	1, 2, 3 ,4, 5
Spotted Bear Mountain	13B02	7000	1948	1, 2, 3, 4, 5
Strawberry Lake	13A10	5600	1948	3, 4, 5
Twin Creeks	13B11	3580	1951	1, 2 ,3, 4, 5
Swan River				
Camp Misery	13A17	6400	1962	3, 4, 5
Trinkus Lake	13B01	6100	1949	3, 4, 5
Whitefish River				
Hell Roaring Divide	14A03	5770	1942	1, 2, 3, 4, 5, 5½, 6
Stillwater River				
Brush Creek	14A04	5000	1937	3, 4, 5
Logan Creek	14A05	4300	1937	3, 4, 5
Little Bitterroot River				
Bassoo Peak	14B03	5150	1961	3, 4, 5
Griffin Creek Divide	14A09	5150	1960	3, 4, 5

Current information on snow surveys and streamflow forecasts can be obtained from the Soil Conservation Service, P .O. Box 855, Bozeman, Montana, or Soil Conservation Service, Kalispell, Mont.

*[1]Numerals 1, 2 ,3, 4, 5, 5½, 6 refer to January 1, February 1, March 1, April 1, May 1, May 15 and June 1 measurements.

STREAM GAGING STATIONS

The U. S. Geological Survey measures the flow of streams, co-operating with funds supplied by several state and federal agencies. The results have been published yearly in book form by drainage basins in Water-Supply Papers through the year 1960. Beginning with 1961, the streamflow records have been published annually by the U. S. Geological Survey for the entire state under the title, "Surface Water Records of Montana". Data for 1961-65 and subsequent five year periods will be published in Water-Supply Papers. Prior to general issuance, advance copies of station records may be obtained from the U. S. Geological Survey. That agency's records and reports have been used in the preparation of this resume'.

Data given below covers the stream gaging records which are available from Flathead County from the beginning of measurements through the water year 1963. The water year begins October 1 and ends September 30 of the following year.

Following are equivalents useful in converting from one unit of measurement to another:

(a) In Montana, one cubic foot per second equals 40 miner's inches.

(b) One acre-foot is the amount of water required to cover an acre one foot deep.

(c) One cubic foot per second will nearly equal two acre-feet (1.983) in 24 hours.

(d) A flow of 100 miner's inches will equal five acre-feet in 24 hours.

(e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

For reference purposes, the stream gaging stations are listed in downstream order.

Flathead River at Flathead, British Columbia*

The water-stage recorder is at the highway bridge, 0.2 miles north of the international boundary, 0.2 miles northwest of Flathead, British Columbia, and 7 miles northwest of Trail Creek, Montana. The drainage area is approximately 450 square miles. Records are available from March 1929 to date (1965) with no winter records prior to 1952. The maximum discharge was 16,300 cfs (June 8, 1964) and the minimum observed, 65 cfs (April 9, 1929). The average discharge for 12 years (1951-63) was 975 cfs or 705,900 acre-feet per year. The highest annual runoff since 1952 was 900,800 acre-feet (1954) and the lowest 556,000 acre-feet (1958). There are no diversions above the station. This is one of a number of stations which are maintained jointly by Canada and the United States.

Flathead River near Columbia Falls*

The water-stage recorder is 1½ miles downstream from Canyon Creek, 3¾ miles upstream from Middle Fork, and 9 miles northeast of Columbia Falls. The drainage area is 1,548 square miles. Records are available from September 1910 to September 1917 (no winter records in some years), April 1929 to February 1935 (incomplete), June 1935 to date (1965). The maximum discharge was 69,100 cfs (June 9, 1964) and the minimum, 198 cfs (January 8, 1953). The average discharge for 32 years (1910-12, 1913-15, 1935-63) was 2,913 cfs or 2,109,000 acre-feet per year. The highest annual runoff was 3,002,000 acre-feet (1954) and the lowest 1,004,000 acre-feet (1944). There are a few small diversions from tributaries for irrigation of hay meadows above station.

Middle Fork Flathead River near Essex

The water-stage recorder was 1 mile downstream from Charlie Creek and 7½ miles southeast of Essex. The drainage area is 408 square miles. Records are available from April 1957 to September 1961 (no winter records after 1958). The maximum discharge during the period of record was 10,500 cfs (June 6, 1959) and the minimum daily determined, 85 cfs (January 1, 1958). The maximum discharge during the flood of June 8, 1964 was 57,900 cfs, from slope-area measurement of peak flow. There are no diversions above station.

Skyland Creek near Essex

The water-stage recorder was 150 feet upstream from mouth and 10 miles east of Essex. The drainage area is 8.09 square miles. Records are available from January 1946 to September 1952. Annual maximums for water years 1954, 1959 to date (1965). The maximum discharge during the period of continuous record was 284 cfs (May 22, 1948) and the minimum, 0.1 cfs (November 15, 1946). The maximum discharge during the flood of June 8, 1964 was 3,580 cfs, from slope-area measurement of peak flow. The average discharge for 6 years (1946-52) was 19.2 cfs or 13,900 acre-feet per year. The highest annual runoff was 18,140 acre-feet (1950) and the lowest, 9,440 acre-feet (1949). There are no diversions above station.

Bear Creek near Essex

The water-stage recorder was located 1 mile downstream from Autumn Creek and 8½ miles east of Essex. The drainage area is 20.7 square miles. Records are available from January 1946 to September 1952. The maximum discharge during the period of record was 696 cfs (May 22, 1948) and the minimum daily, 5.5 cfs (January 21 to March 4, March 8-16, 1949). The maximum discharge during the flood of June 8, 1964 was 8,380 cfs, from slope-area measurement of peak flow. The average discharge for 6 years (1946-52) was 46.0 cfs or 33,300 acre-feet per year. The highest annual runoff was 41,500 acre-feet (1951) and the lowest, 22,170 acre-feet (1949). There are a few small diversions above station.

Middle Fork Flathead River at Essex

The water-stage recorder was located at the highway bridge 0.6 miles upstream from Ole Creek, 0.7 miles southeast of Essex, and 4 miles downstream from Bear Creek. The drainage area is 510 square miles. Records are available from October 1939 to September 1953, June 1956 to September 1964. The maximum discharge was 75,300 cfs (June 8, 1964), from slope-area measurement of peak flow, and the minimum daily, 30 cfs (January 22, 1940). The average discharge for 21 years was 922 cfs or 766,700 acre-feet per year. The highest annual runoff was 1,142,000 acre-feet (1959) and the lowest 336,400 acre-feet (1941). There are no significant diversions above the station.

Middle Fork Flathead River at West Glacier (Belton)

The staff gage was located at West Glacier (Belton), half a mile upstream from highway bridge, and 2 miles upstream from outlet of Lake McDonald. The drainage area is 943 square miles. Records are available from October 1911 to September 1923 (no winter records some years), March 1929 to September 1933, August 1943 to November 1947. The maximum discharge during the period of record was 45,000 cfs (June 21, 1916) and the minimum observed, 115 cfs (March 1, 1929). The average discharge for 13 years (1910-12, 1915-16, 1918-19, 1920-21, 1929-33, 1943-47) was 2,294 cfs or 1,661,000 acre-feet per year. The highest annual runoff was 2,450,000 acre-feet (1916) and the lowest 914,800 acre-feet (1944). There are no significant diversions above the station.

Lake McDonald Outlet at Lake McDonald

The staff gage was located on the highway bridge at lower end of Lake McDonald, in Glacier National Park. The drainage area is 175 square miles. Records are available for some summer months during the period 1912-14. The maximum and minimum discharges were not determined. No diversions above station.

Middle Fork Flathead River near West Glacier (Belton)*

The water-stage recorder is three-quarters of a mile downstream from McDonald Creek, 1¼ miles west of West Glacier, and 3½ miles upstream from mouth. The drainage area is 1,128 square miles. Records are available from October 1939 to date (1965). The maximum discharge was 140,000 cfs (June 8, 1964), and the minimum, less than 173 cfs (November 27, 1952). The average discharge for 24 years was 2,864 cfs or 2,073,000 acre-feet. The highest annual runoff was 2,814,000 acre-feet (1959) and the lowest 1,040,000 acre-feet (1941). There are no significant diversions above the station.

South Fork Flathead River at Spotted Bear Ranger Station, near Hungry Horse*

The water-stage recorder is 600 feet south of Spotted Bear Ranger Station, 1,000 feet upstream from Spotted Bear River, and 40 miles southeast of Hungry Horse. The drainage area is 958 square miles. Records are available from August 1948 to September 1957, August 1959 to date (1965). The maximum discharge was 36,700 cfs (June 8, 1964), from slope-area measurement of peak flow, and the minimum, less than 121 cfs (December 26, 1952). The average discharge for 13 years (1948-57, 1959-64) was 1,921 cfs or 1,391,000 acre-feet per year. The highest annual runoff was 1,705,000 acre-feet (1950) and the lowest 1,065,000 acre-feet (1949). There are no diversions above the station.

Spotted Bear River near Hungry Horse

The water-stage recorder was a third of a mile upstream from mouth and 40 miles southeast of Hungry Horse. The drainage area is 184 square miles. Records are available from October 1948 to September 1956. The maximum discharge during the period of record was 5,480 cfs (May 20, 1954) and the minimum, 20 cfs (January 5, 1953), but may have been less during periods of ice effect. The maximum discharge during the flood of June 8, 1964 was 20,200 cfs, from slope-area measurement of peak flow. The average discharge for 8 years was 380 cfs or 275,100 acre-feet per year. The highest annual runoff was 324,100 acre-feet (1954) and the lowest 208,700 acre-feet (1949). There are no diversions above the station.

South Fork Flathead River above Twin Creek, near Hungry Horse*

The water-stage recorder is 1,000 feet downstream from Tin Creek, a quarter of a mile upstream from Twin Creek, and 36 miles southeast of Hungry Horse. The drainage area is 1,160 square miles. Records are available from October 1964 to date (1965). The maximum discharge during the flood of June 8, 1964 was 50,900 cfs, from slope-area measurement of peak flow. There are no diversions above the station.

Twin Creek near Hungry Horse*

The water-stage recorder is 300 feet upstream from road bridge, 0.1 miles upstream from mouth, and 36 miles southeast of Hungry Horse. The drainage area is 47.0 square miles. Records are available from August 1948 to September 1956, October 1964 to date (1965). The maximum discharge during the period of record was 2,790 cfs (May 19, 1954) and the minimum, 3.9 cfs (March 8, November 26, 1952), but may have been less during periods of ice effect. The maximum discharge during the flood of June 8, 1964 was 5,830 cfs, from slope-area measurement of peak flow. The average discharge for 8 years was 119 cfs or 86,150 acre-feet per year. The highest annual runoff was was 103,600 acre-feet (1950) and the lowest 66,160 acre-feet (1949). There are no diversions above the station.

Lower Twin Creek near Hungry Horse

The water-stage recorder was half a mile upstream from mouth and 35 miles southeast of Hungry Horse. The drainage area is 22.4 square miles. Records are available from August 1948 to September 1956. The maximum discharge during the period of record was 909 cfs (May 21, 1956) and the minimum, 0.8 cfs (January 28, 1952). The maximum discharge during the flood of June 8, 1964 was 5,110 cfs, from slope-area measurement of peak flow. The average discharge for 8 years was 69.4 cfs or 50,240 acre-feet per year. The highest annual runoff was 58,810 acre-feet (1950) and the lowest 40,890 (1949). There are no diversions above the station.

Soldier Creek near Hungry Horse*

The water-stage recorder is 200 feet upstream from bridge on west shore road and 35 miles southeast of Hungry Horse. The drainage area is 4.77 square miles. Records are available from October 1964 to date (1965). The maximum discharge during the flood of June 8, 1964 was 206 cfs, from slope-area measurement of peak flow. There are no diversions above the station.

Sullivan Creek near Hungry Horse*

The water-stage recorder is located a quarter of a mile downstream from Quintonkon Creek, 1 mile upstream from Hungry Horse Reservoir flow line, and 30 miles southeast of Hungry Horse. The drainage area is 71.3 square miles. Records are available from September 1948 to September 1956, August 1959 to date (1965). The maximum discharge during the period of record was 5,020 cfs (June 8, 1964), from slope-area measurement of peak flow, and the minimum daily, 10 cfs (November 26, 1952). The average discharge for 12 years was 217 cfs or 157,100 acre-feet per year. The highest annual runoff was 200,300 acre-feet (1960) and the lowest 129,000 cfs (1949, 1953). There are no diversions above the station.

Grave Creek near Hungry Horse*

The water-stage recorder is 500 feet upstream from Hungry Horse Reservoir flow line, and 2 miles southeast of Hungry Horse. The drainage area is 27.0 square miles. Records are available from August 1948 to September 1956, October 1964 to date (1965). The maximum discharge during the period of record was 1,520 cfs (June 22, 1950) and the minimum daily, 4.5 cfs (November 26, 1952). The maximum discharge during the flood of June 8, 1964 was 2,710 cfs, from slope-area measurement of peak flow. The average discharge for 8 years (1948-56) was 134 cfs or 97,010 acre-feet per year. The highest annual runoff was 121,300 acre-feet (1950) and the lowest 76,180 acre-feet (1953). There are no diversions above the station.

Canyon Creek near Hungry Horse*

The water-stage recorder is 50 feet downstream from bridge on east shore road, 400 feet upstream from Hungry Horse Reservoir flow line, and 18 miles southeast of Hungry Horse. The drainage area is 4.59 square miles. Records are available from October 1964 to date (1965).

Wounded Buck Creek near Hungry Horse*

The water-stage recorder is 50 feet upstream from culvert on west shore road, 800 feet upstream from Hungry Horse Reservoir flow line, and 9 miles southeast of Hungry Horse. The drainage area is 13.6 square miles. Records are available from October 1964 to date (1965). The maximum discharge during the flood of June 8, 1964 was 706 cfs, from slope-area measurement of peak flow.

Emery Creek near Hungry Horse*

The water-stage recorder is 500 feet upstream from Hungry Horse Reservoir flow line, on east shore road, and 6 miles southeast of Hungry Horse. The drainage area is 26.4 square miles. Records are available from October 1964 to date (1965). The maximum discharge during the flood of June 8, 1964 and 832 cfs, from slope-area measurement of peak flow.

South Fork Flathead River near Columbia Falls*

The water-stage recorder is 1½ miles downstream from Hungry Horse Dam, 3½ miles upstream from mouth, and 7 miles east of Columbia Falls. The drainage area is 1,663 square miles. Records are available from September 1910 to January 1911 (discharge measurements only), February 1911 to September 1913 (no winter records), October 1913 to August 1916 (scattered daily discharge only), April 1923 to November 1924 (no winter records) July to October 1925, May to November 1927, May 1928 to date (1965). The maximum discharge observed during the period of record was 46,200 cfs (June 19, 1916) and the minimum observed, 7.3 cfs (September 24, 1951), result of dam closure. The average discharge for 35 years (1928-63) was 3,461 cfs or 2,506,000 acre-feet per year, adjusted for storage. The highest annual runoff was 3,856,000 acre-feet (1959) and the lowest 732,600 acre-feet (1953), adjusted for storage. There is complete regulation by Hungry Horse Reservoir.

Flathead River at Columbia Falls*

The water-stage recorder is 200 feet downstream from county bridge at Columbia Falls and 5 miles downstream from South Fork. The drainage area is 4,464 square miles. Records are available from May 1922 to September 1923 (fragmentary), June 1928 to date (1965). The maximum discharge was 176,000 cfs (June 9, 1964) and the minimum, 798 cfs (December 8, 1929). The average discharge for 35 years (1928-63) was 9,522 cfs or 6,894,000 acre-feet per year, adjusted for change in contents in Hungry Horse Reservoir since October 1, 1951. The highest annual runoff was 9,648,000 acre-feet (1959) and the lowest 3,488,000 acre-feet (1941). Regulation of about one-third flow by Hungry Horse Reservoir.

Flathead River near Kalispell

The chain gage was located at highway bridge, 3 miles east of Kalispell. Records are available (gage heights only) from May 1928 to September 1945. The maximum elevation observed was 2,913.95 feet (May 27, 1928) and the miinmum elevation observed, 2,899.25 feet (December 17, 1940). Datum of gage is at mean sea level (Somers datum).

Logan Creek at Tally Lake near Whitefish

The staff gage was located 2½ miles downstream from Tally Lake and 10 miles west of Whitefish. The drainage area is 183 square miles. Records are available from August 1931 to August 1934 (fragmentary), May 1936 to September 1942, May 1945 to September 1947. The maximum discharge observed was 1,380 cfs (May 11, 1947) and the minimum observed, 0.7 cfs (September 1, 2, 1940). The average discharge for 8 years (1936-42, 1945-47) was 75.0 cfs or 54,300 acre-feet per year. The highest annual runoff was 125,600 acre-feet (1947) and the lowest 15,920 acre-feet (1941). There is natural storage in Tally Lake.

Logan Creek near Whitefish

The staff gage was located 100 feet upstream from Good Creek and 10 miles northwest of Whitefish. The drainage area is 199 square miles. Records are available from April to September 1931. The maximum discharge observed during the period was 240 cfs (May 8) and the minimum observed, 1.2 cfs (September 4, 5). There is natural storage in Tally Lake.

Stillwater River near Whitefish

The water-stage recorder was located 600 feet downstream from highway bridge, 7 miles southwest of Whitefish, and 10 miles upstream from Whitefish River. The drainage area is 524 square miles. Records are available from October 1930 to September 1950. The maximum discharge was 4,330 cfs (May 26, 1948) and the minimum daily, 40 cfs (December 24, 1944). The average discharge for 20 years (1930-50) was 340 cfs or 246,100 acre-feet per year. The highest annual runoff was

405,400 acre-feet (1948) and the lowest 90,200 acre-feet (1944). There are a few diversions for irrigation above the station.

Stillwater River near Kalispell

The staff gage was located on highway bridge 5 miles upstream from Whitefish River and 5 miles north of Kalispell. The drainage area is 537 square miles. Records are available from October to December 1906, January to May 1907 (gage heights only), May to August 1922, July 1928 to October 1930 (fragmentary). The maximum discharge observed was 2,750 cfs (May 22, 1922) and the minimum observed, 26 cfs (November 11, 1929). There were no diversions above the station.

Whitefish River near Kalispell

The water-stage recorder was located 8 miles upstream from mouth and 8 miles north of Kalispell. The drainage area is 170 square miles. Records are available from August to November 1928, April 1929 to September 1950. The maximum discharge was 1,290 cfs (May 30, 1948) and the minimum, 4.5 cfs (October 18, 1934). The average discharge for 21 years (1929-50) was 191 cfs or 138,300 acre-feet per year. The highest annual runoff was 202,400 acre-feet (1934) and the lowest 73,990 acre-feet (1944). There were diversions for Whitefish municipal water supply and for irrigation of about 120 acres above the station. Some regulation by Whitefish Lake.

Flathead River at Demersville

The wire-weight gage was located at Demersville, 3 miles south of Kalispell. Records are available (gage heights only) from April 1909 to July 1912, April 1928 to September 1945. The maximum elevation observed was 2,904.94 feet (June 17, 1933) and the minimum elevation observed, 2,881.86 feet (December 18-26, 1936). Datum of gage is at mean sea level (Somers datum).

Ashley Creek near Kila

The staff gage was located on upstream end or right abutment of bridge, about 1½ miles downstream from Ashley Lake, and 7 miles northwest of Kila. The drainage area is 44.2 square miles. Records are available from August to November 1916. The maximum discharge observed during the period was 20 cfs (August 9) and the minimum observed, 4.2 cfs (September 29). There are no diversions above the station. Floodwater stored in Ashley Lake for release during irrigation season.

Ashley Creek near Kalispell

The wire-weight gage was located 2½ miles downstream from Smith Lake, and 5 miles west of Kalispell. The drainage area is 201 square miles. Records are available from May 1931 to February 1933, June 1934 to September 1950. The maximum discharge was 749 cfs (May 27, 1948) and the minimum, no flow at times. The average discharge for 17 years (1931-32, 1934-50) was 30.4 cfs or 22,010 acre-feet per year. The highest annual runoff was 78,940 acre-feet (1948) and the lowest 1,080 acre-feet (1941). There are diversions for irrigation of about 100 acres above the station. Floodwater stored in Ashley Lake for release during irrigation season.

Flathead River at Damon Ranch near Kalispell

The wire-weight gage was located at Damon Ranch, 7 miles southeast of Kalispell. Records are available (gage heights only) from April 1909 to July 1912, May 1928 to September 1945. The maximum elevation observed was 2,900.94 feet (June 17, 1933) and the minimum elevation observed, 2,881.55 feet (January 27-31, 1937). Datum of gage is at mean sea level (Somers datum).

Flathead River at Therriault Ferry near Kalispell

The staff gage was located at Therriault Ferry, 9 miles southeast of Kalispell. Records are available (gage heights only) from October 1934 to September 1945. The maximum elevation observed was 2,894.23 feet (May 16, 1936) and the minimum elevation observed, 2,881.28 feet (January 21-23, 1937). Datum of gage is at mean sea level (Somers datum).

Flathead River near Holt

The staff gage was located at Keller Ranch, 0.7 miles upstream from Holt. Records are available (gage heights only) from April 1909 to July 1912, June 1928 to September 1938, October 1939 to September 1945. The maximum elevation was 2,897.35 feet (May 29-30, 1928), from floodmark, and the minimum observed, 2,881.24 feet (January 25-28, 1930). Datum of gage is at mean sea level (Somers datum).

Little Bitterroot River near Marion

The staff gage was located at log bridge 70 feet downstream from outlet of Little Bitterroot Lake and 2 miles southwest of Marion. The drainage area is 31.8 square miles. Records are available from January 1910 to September 1916 (no winter records 1911-14). The maximum discharge observed was 53 cfs (April 27, 1916) and the minimum, no flow (January 19-23, 1915). There was natural storage in Little Bitterroot Lake with some regulation by temporary dams at lake outlet.

Little Bitterroot River near Hubbart

The staff gage was located upstream from the canyon leading to the second fall of Little Bitterroot River, 1½ miles west of Hubbart, and 15 miles south of Marion. The drainage area is 134 square miles. Records are available from April 1909 to September 1916 (no records most winter months). The maximum discharge observed was 340 cfs (May 6, 1916) and the minimum observed, 1.4 cfs (October 20-27, November 10, 1914). There were no diversions above the station. Natural storage in Little Bitterroot Lake with some regulation by temporary dams at lake outlet.

Partial Record Stations and Miscellaneous Discharge Measurements

In order to provide information on more streams than are covered by stream gaging stations, the U. S. Geological Survey has for several years been collecting some partial records. These are in addition to the miscellaneous discharge measurements which have always been reported. These partial records, when correlated with simultaneous discharges of nearby continuous-record stations give fair indications of available flow.

There are five crest-stage partial-record stations in the Flathead River Basin in Flathead County. Stations are now (1965) being operated on Skyland Creek near Essex (former continuous record site), Moccasin Creek near West Glacier, Middle Fork Flathead River tributary at West Glacier, and Rock Creek near Olney.

The partial-record stations as well as the miscellaneous discharge measurements are listed at the end of each U. S. Geological Survey Water-Supply Paper or Surface Water Records report.

RESERVOIRS

Details of operation records of the following reservoirs are available in U. S. Geological Survey publications.

Hungry Horse Reservoir near Hungry Horse*

The water-stage recorder is located in block 14 of Hungry Horse Dam, 3 miles southeast of Hungry Horse. The drainage area is 1,654 square miles. Records are available from September 1951 to date (1965). The maximum contents observed was 3,461,000 acre-feet (July 3-4, 1955, August 6, 1956) and the minimum contents observed since normal low operating level reached in May 1952, 607,700 acre-feet (January 13, 1953). Storage began September 21, 1951. The usable capacity is 3,428,000 acre-feet. Water is used for power, flood control, irrigation and recreation.

Flathead Lake near Holt

The staff gage was located 2 miles east of the mouth of the Flathead River near Holt. Records are available from April 24 to August 5, 1900. The maximum elevation observed was 12.60 feet (May 17) and the minimum elevation observed, 4.00 feet (August 4-5). Datum of gage is unknown.

Flathead Lake at Somers*

The water-stage recorder is at the steamboat dock at Somers. The drainage area is 7,086 square miles. Records are available from January 1910 to date (1965). They were published as "at Polson" prior to April 1923. Staff-gage readings were reported prior to 1924. Some supplemental readings were obtained in 1900, 1908 and 1909. The Polson readings were obtained at the south end of the lake at Polson in Lake County. The maximum contents was 2,208,000 acre-feet (June 19, 1933) and the minimum 347,000 acre-feet (December 5, 1936). The lake was nearly 4 feet higher during the flood of June 1894. Natural storage was increased by construction of Kerr Dam 4 miles downstream from natural lake outlet. Storage began April 11, 1938. The usable capacity is 1,791,000 acre-feet. Water is used for power, flood control, irrigation and recreation.

Little Bitterroot Lake near Marion*

The staff gage is at dam on Little Bitterroot River, 2 miles southwest of Marion. The drainage area is 31.8 square miles. Records of month-end contents are available for December 1939, April 1940, September 1940 to date (1965). The maximum month-end contents was 26,880 acre-feet (May 31, 1959) and the minimum, no storage at times (1939-46). The usable capacity is 26,400 acre-feet (24,000 acre-feet prior to 1960).

Hubbart Reservoir near Niarada*

The reservoir is located on Little Bitterroot River, 9 miles northwest of Niarada. The drainage area is 114 square miles. Records of month-end contents are available for December 1939, April 1940, September 1940 to date (1965). The maximum month-end contents was 13,050 acre-feet (May

31,1959) and the minimum, no storage September to December 1958. The usable capacity is 12,120 acre-feet.

*This gaging station is now in operation (1965).

ECONOMIC MINERAL RESOURCES

Mining

Flathead County occupies part of the Northern Rocky Mountain physiographic province, which fronts the Great Plains. Within the county, rugged and lofty mountain ranges are separated by linear intermontane valleys trending northwestward. Mountain ranges in the area include parts of the Salish and Whitefish Mountains in western Flathead County, the northern extremities of the Mission, Swan, Flathead, and Lewis and Clark Ranges in central and southeastern Flathead County, and the Livingston Range of Glacier National Park in the northeastern Flathead County. The western part of the county is traversed by the remarkably straight and narrow Rocky Mountain Trench, a structural depression several hundred miles in length which, south of the Canadian line, occupies the Stillwater and Flathead Valleys.

Sedimentary rocks ranging in age from Precambrian to Recent underlie the county. These include quartzite, argillite, and impure limestone and dolomite of Precambrian age, quartzite, shale, limestone, and dolomite of Cambrian, Devonian, and Mississippian age, and the Ellis Group (Jurassic) and Kootenai Formation (Cretaceous). Tertiary igneous rocks comprise flows and intrusive bodies in the Hog Heaven district in the southwest part of the county. Scattered metadiorite sills and dikes penetrate Precambrian sedimentary rocks.

The Lewis overthrust is the master structural feature of the region. It borders the northwestern edge of the Rocky Mountains in Glacier Park and swings southwestward in Theodore Roosevelt Pass to within 7 miles of the Middle Fork of the Flathead River, where it again swings to the southeast. Normal faults of large displacement parallel the edges of the major ranges.

Mining activity within the county commenced about 1890, when copper showings were discovered within the present boundaries of Glacier National Park and along tributaries of the South Fork Flathead River. The activity ceased when it was determined that the quantity of minerals was insufficient to be commercial.

By 1898, numerous prospects had been located at the head of Whitefish River in the Kintla Lakes area, at the head of McDonald Creek between Bear Creek and Java, and along the Middle Fork River, but no ore was shipped during the late 1890's.

Free-gold prospects were reported in the region of the South Fork Flathead River and the Swan Range, a gold placer being located on Willow Creek, now known as Danaher Creek, south of Big Prairie on the South Fork.

High-grade silver-lead ore was found in the Hog Heaven district in 1913, but development work was discontinued when the ore body pinched out. The Flathead Mine, discovered in 1928, produced during 1928-30 about 20,000 tons of ore yielding 1,500,000 ounces of silver. The mine was again active during the periods 1934-46 and 1958-64, accounting for most of the mineral produced in Flathead County.

Hog Heaven District

The Hog Heaven District lies 15 miles west of Flathead Lake in the Salish Mountains. Productive properties in the area include the Flathead, West Flathead, Ole, Birdseye, Martin, and Battle Butte mines.

Ore occurs as replacement deposits in volcanic flows and agglomerates, in dikes and plugs intruding volcanic rocks, in Belt Series (Precambrian) sedimentary rocks, and in fumarole holes penetrating Belt Series rocks adjacent to igneous bodies.

Total production from the district to date amounts to 248,804 tons of ore containing 8,433,912 ounces of silver and 23,637,398 pounds of lead having a gross value of $6,033,839. The Flathead and West Flathead properties produced most of the ore mined in the district.

Star Meadows District

The Star Meadows District, lying west of Tally Lake, northwest of Kalispell, was first prospected just prior to 1900; the first mine located in the district was the West Virginia, which produced about a carload (60 tons) of silver-gold-copper ore. Other properties that have produced small tonnages of copper ore are the Foolsberg and Blacktail mines.

Copper, silver, and gold are associated with quartz and siderite in east-striking veins occupying faults. The country rock in the area consists of banded argillite and calcareous argillite of the Belt Series (Precambrian).

COAL

North of Columbia Falls near the North Fork Flathead River are lignite beds in the lower part of the Kishenehn Formation (Tertiary). Small-scale mining operations were carried on during the 1930's and until the mine was closed at the beginning of World War II.

Black Lignite is interbedded with clay and sandstone in a zone 25 feet thick. The upper 6 to 8 feet of this zone was mined to exploit a 3-foot lignite seam.

The coal bed was developed through an adit on the west bank of the North Fork Flathead River.

OIL AND NATURAL GAS

Rare oil and gas seeps have been reported by several ranchers in Flathead Valley while drilling water wells. Two shallow exploration drill holes penetrated gravel, sand, and clay to depths of 700 and 1,475 feet.

Oil seepages were reported at Kintla and Bowman Lake, and in 1905 a small quantity of high-gravity oil was discovered during drilling operations on the North Fork Flathead River near Kintla Lake.

In the early 1960's the Shell Oil Company conducted a geophysical (seismic) survey along U. S. Highway 2 in the Theodore Roosevelt Pass area. The company subsequently dropped their leases without drilling. They were possibly looking for oil-bearing strata beneath the Lewis overthrust.

SAND AND GRAVEL

Heterogeneous mixtures of gravel and sand occur in moraines within Flathead Valley and as stream alluvium bordering Flathead River. Several companies are excavating gravel and sand for road construction and other uses.

SOIL AND WATER CONSERVATION DISTRICTS

Flathead County is served by the Flathead Soil and Water Conservation District which was organized in 1945. The area of Flathead County is 3,313,280 acres.

The district is governed by a board of five supervisors who are elected for 3-year terms by land occupiers of the district. They carry out a program of complete resource conservation including erosion control, water conservation, soil management, land improvement, wildlife management, recreation, and land adjustment to proper use. This program is accomplished by providing technical assistance to groups and individual farmers and ranchers, on a voluntary basis, the analyzing of all resources, and planning and applying of economically sound conservation treatment.

Under State law, the supervisors have the power to call upon local, state, and federal agencies to assist in carrying on a soil and water conservation program. The Flathead Soil and Water Conservation District has memoranda of understanding with the Soil Conservation Service, Extension Service, State Forestry Department, and the U. S. Forest Service to provide technical assistance to district co-operators in carrying out sound soil and water conservation programs. Close working relations are maintained with the Farmers Home Administration, Agricultural Stabilization and Conservation Service, State Fish and Game Department, and Technical Action Panel for rural area development.

The Soil Conservation Service assists the district by furnishing and interpreting basic data on soils and plant cover and other land features. Technical data is interpreted in terms of acceptable alternative land uses and treatments to help guide the farm and ranch operators in developing sound individual or group conservation plans. It also aids co-operators in performing operations requiring technical skills beyond the experience of the individuals involved.

The Office of the State Forester and the U. S. Forest Service co-operate with the district by co-ordinating the programs of timber management, tree planting, forest and range fire control, and watershed management on federal, state, and private lands.

The Extension Service assists the district with its education and information program. An important function of the district is to inform land owners and occupiers of the benefits derived from the wise use of the communities' soil and water resources.

Cost sharing for many conservation practices is available through the Agricultural Conservation Program and conservation loans are available through the Farmers Home Administration.

The State Fish and Game Department co-operate in matters involving streams, lakes, ponds, and other wildlife aspects of the program.

One of the major problems of the district is to acquaint the urban people, who comprise a large percentage of the total population of the district, with the need for soil and water conservation.

Technical phases of the district's program include detailed soil surveys, range site and condition classes, forest site and utilization investigations, ground water investigations, drainage studies, irrigation potentials, topographic and other engineering surveys. By a careful analysis of this basic resource information, proper land use and needed conservation treatment of each field can be determined. The technicians interpret the surveys and provide the district co-operator with alternatives in land use and treatment that will enable him to treat the hazards and limitations that occur on each tract of land. With this information and by counseling with technicians, the co-operator makes the final decisions. These decisions are recorded in the Conservation Plan. The co-operator determines what will be done on his farm or ranch and when the jobs will be carried out.

After the plan is completed the co-operator is given further technical assistance on design and layout work essential in establishing conservation practices on the land as called for in the Conservation Plan. This technical assistance is provided without cost to the co-operating farmer or rancher.

There are approximately 131,500 acres of cropland, 30,000 acres of seeded pasture and hay, 52,500 acres of rangeland, 681,000 acres of woodland, and 23,500 acres considered other lands such as water, roads, townsites, airports, and highways on which the district shares the conservation responsibility.

According to the State Engineer's Office, Water Resources Survey there are 27,725 acres irrigated and this may be increased to more than 35,000 acres by 1975. One irrigation project, Ashley Irrigation District, distributes water to about 2,658 acres. A large percentage of the irrigated acres in the valley are under sprinkler systems, with pumping plants from streams and rivers. Some flood irrigation is done from smaller streams beyond the valley proper.

There are 2,361,495 acres of federal lands (U. S. Forest Service, National Park Service, U. S. Bureau of Reclamation, and Bureau of Land Management), 131,304 acres of state land, and 8,000 acres of Bureau of Indian Affairs land. This land is largely woodland, Glacier National Park, Hungry Horse Reservoir area, and some rangeland.

The major enterprises on agricultural lands are grain and livestock production. Beef cattle, sheep, and swine are produced. Much of the range for beef-type cattle is provided through lease of forest lands owned by corporations, federal, and state. Cash crops besides grains are potatoes and sweet cherries.

Work done since the organization of the district on cropland consists largely of improved crop ping systems, improved management of crop residues, improvement and installation of irrigation systems—both sprinkler and flood, seeding of pastures and haylands to adapted grasses and legumes, installation of water and erosion control structures, farm drainage systems, soil management, and improvement of wildlife habitat. On dryland pasture, range, and grazed woodland the work has consisted of improvement of existing cover by deferred-rotation grazing, fencing, livestock water development, and improvement of wildlife habitat. On private woodlands emphasis has been toward stand improvement for long-term timber production plus production of high quality Christmas trees. Thinning, pruning, and weeding have been emphasized along with improved methods of harvest.

Since the district was organized, assistance has been given on proper cropping systems and residue management on 45,000 acres, 225 sprinkler systems including about 10 miles of permanently located mainline, 36 irrigation reservoirs and pits, 170 structures for water and erosion control, 26 miles of irrigation canal and field ditches, 6,000 acres of land cleared, 10,000 acres of hay and pasture planted, pasture and range management on 20,000 acres, 40 livestock water ponds constructed, 47 wells drilled, 47 springs developed, 110 miles of drain ditch constructed, 8 miles of tile drain installed, 53 acres of farmstead and feedlot windbreaks planted, 8 miles of field windbreaks established, 212 acres of trees planted, 32 ponds stocked with fish, wildlife habitat preservation (natural areas) and planting on 450 acres, and improved methods of managing woodlands on 16,000 acres.

A Conservation Needs Inventory was completed in 1959 for Flathead County as a part of a national inventory of needs. In Flathead County it was estimated that about 61 percent of dryland cropland, 36 percent of irrigated cropland, 78 percent of grasslands, and nearly all of the woodlands were in need of additional conservation treatment. One of the big problems on woodlands is an outlet for small, round, wood products which are a by-product of thinning operations.

A considerable amount of the conservation work has been accomplished through efforts of organized groups and this is encouraged wherever possible.

Co-operative efforts of land owners and operators; groups; local, state, and federal agencies; civic organizations; local businessmen; and news media have contributed to the overall success of the district.

FISH AND GAME

The terrain of Flathead County is greatly diversified, ranging from sheer mountains through timbered valleys into rich agricultural lowlands. The Flathead River is the major water course through this county. Both the main river and tributaries, many glacier-fed, offer sport fishing with backgrounds of unexcelled mountain beauty. A myriad of jewel-like lakes stud the mountain ranges. Hungry Horse Reservoir and Flathead Lake are the two largest bodies of water in western Montana.

In Flathead Lake and upstream in nearly all tributaries of this great drainage a variety of fishing and vacation pleasures are in store. Flathead Lake contains cutthroat, Dolly Varden, kokanee, bass, lake trout, and whitefish. Lake Mary Ronan, Whitefish Lake, and other smaller lakes situated near the Flathead should never be overlooked for a fishing outing.

Notable streams in the upper Flathead system are the North, South, and Middle Forks which are mainly cutthroat and Dolly Varden waters. The Swan River which also drains into the Flathead provides cutthroat, rainbow, Dolly Varden, and kokanee. Many lakes offer excellent cutthroat fishing, while a number have bass, Dolly Varden, lake trout, kokanee, and whitefish as well.

The county, like much of western Montana, is typically whitetailed deer habitat, though mulies are found in many areas. Black bear, too, are abundant here and the silver-tip or grizzly, monarch among bears, stalks the more remote hinterlands and wilderness. Some bighorn sheep still inhabit certain highlands of the Flathead, while still higher on the steep slopes and precipices of mountains that drain to the Swan and Flathead Rivers, some of Montana's finest mountain goat herds await hunters who have the stamina for climbing to their lofty domain. Elk range over a large part of the country while moose frequent the northern drainages.

Ring-necked pheasants thrive in some of the valley's agricultural lands and Hungarian partridge are found in some spots. The mountains are best suited to native grouse species, including ruffed, blue, and Franklin's grouse. Waterfowl find the many water areas to suit their needs and a variety of migratory birds, including ducks and geese, raise their broods here. Islands in Flathead Lake are especially important to reproduction of the regal Canada goose, or honker. The soaring bald eagle, the swift osprey, and the raucous raven are among the larger bird life commonly seen.

THE FLATHEAD NATIONAL FOREST

National Forest lands in Flathead County comprise 53 percent of the total acreage of the county; 1,778,795 out of 3,313,280 acres. Flathead National Forest and a small portion of the Kootenai and Lolo National Forests are located in Flathead County. These lands are managed by Forest Rangers at Whitefish, Big Creek, Hungry Horse, Spotted Bear, and Big Prairie on the Flathead National Forest, and Raven and Murphy Lake on the Kootenai National Forest, and Plains on the Lolo National Forest.

Roughly 80 percent of the land in Flathead County is classed as public domain. This includes National Forest, National Park, and state lands. A large portion of Glacier National Park is in Flathead County.

Originally almost all of Flathead County was within the boundaries of either the Lewis and Clark Forest Reserve or the Blackfoot Forest Reserve. The Lewis and Clark Forest Reserve covered the eastern half of the county including the part that is now Glacier National Park. The Blackfoot Forest Reserve covered the western half of the county.

These forest reserves were set aside by President Cleveland in 1897. The old forest reserves were broken into the National Forest system in 1908 by President Theodore Roosevelt. Glacier National Park was taken out of the forest reserve in 1910.

Explorers, fur traders, and prospectors first came into the Flathead area in the 1850's and 60's. Settlers came into the Flathead Valley in the 1870's. Many settlers came to the Flathead country after the Homestead Act of 1911. Most of these later homesteaders settled in the Flathead Valley and along the main forks of the Flathead River from the Canadian boundary on the North Fork to Danaher Meadows on the South Fork.

The terrain of the National Forest varies widely: hilly-timbered country in the Tally Lake area; broad U-shaped valleys in the North Fork; steep V-shaped valleys in the South Fork; hanging valleys in the Middle Fork; and subalpine basins in the Continental Divide country.

The Continental Divide forms the east boundary of Flathead County and the Flathead National Forest. Elevations in the forest range from 3,100 feet to 9,300 feet. Country along the Continental Divide is steep and very rugged.

Precipitation varies from 15 inches in the Flathead Valley to more than 60 inches in the higher elevations. Most of the precipitation is in the form of snow. A 10-foot snowpack is not uncommon at the higher levels. The wettest month is June, with an average of 2 inches of rain. Lower elevations are generally covered with snow from December through April; higher elevations are snow covered from November through June.

Water, forage, game, recreation, and wood resources of the National Forest make significant contributions to the Flathead County economy.

Grazing is a minor resource in National Forest land of Flathead County. Most of the National Forest range is of transistory nature.

Recreational use is increasing rapidly in the Flathead National Forest. The big attractions are Flathead Lake, Hungry Horse Reservoir, the Bob Marshall Wilderness, and the Big Mountain Ski Area. Skiing is becoming one of the fastest-growing winter sports; Big Mountain provides some of the finest skiing in the Northwest.

Many lakes and streams provide excellent fishing. Approximately 36,000 acres of lakes and miles of stream provide fishing. Hunting is a big attraction. Nowhere else in the continental United States is there hunting like there is in Flathead County. White-tail deer, mule deer, elk, moose, black bear, grizzly bear, and mountain goat are important big game animals. Pheasant, spruce grouse, ruffed grouse, blue grouse, ducks, and geese provide very good bird hunting. Hunter visits to the National Forest are increasing rapidly.

The major part of the Bob Marshall Wilderness and part of the Mission Mountains Primitive Area are within Flathead County. Both areas provide good hunting and fishing and outstanding scenery and opportunities for wilderness experience. Sightseeing and pack trips in these areas are increasing in popularity.

General camping and picnicking are increasing with the addition of new National Forest campgrounds, picnic areas, swimming and boating areas. The 22,500-acre Hungry Horse Reservoir provides excellent camping, picnicking, boating, and fishing. New campgrounds will add to the use of the Reservoir area.

Large stands of virgin timber cover the National Forest lands. Under sustained-yield management, mature trees being cut now will be replaced in one-hundred-forty years by a new crop of mature trees, thus providing an endless supply of timber. Considerable road construction and logging have taken place since World War II. Prior to this, logging was done in areas close to the valley.

Headrig capacity of the Flathead area timber mills is at present 300 million board feet. Flathead National Forest allowable annual cut is 136 million board feet. The remainder of the volume is cut in the Kootenai National Forest, State Forest lands, the Flathead Indian Reservation, and private land. The annual allowable cut from National Forest lands in Flathead County is 116 million board feet.

Water is still and always will be the most important National Forest resource. Because the Flathead is one of the headwaters of the Columbia River system, watershed management is very important. While water is one of the most difficult resources to place a dollar value on, water can be measured by: the recreationist, the farmer who irrigates, and by the power companies. Heavy snowfalls in the higher elevations store water for release into the Columbia River system in the summer. Hungry Horse Dam, operated by the Bureau of Reclamation, provides valuable storage for the South Fork's snow runoff. This water is used for power generation from December through May.

Soils within the forest boundary are quite stable, with a few exceptions. These exceptions are the soils at higher elevations, along the Continental Divide in the Middle Fork of the Flathead River. Timber is not cut and grazing is not allowed in areas of unstable soil. When timber is being cut or roads constructed in any soils, precautions are taken to prevent erosion or stream pollution.

The continuing wise use of the renewable natural resources in the National Forests of Flathead County is the management objective of the U. S. Forest Service. The five major resources of the land are: wood, water, forage, wildlife, and recreation. Each resource receives equal consideration in management planning in the National Forests.

SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE FOLLOWING COUNTIES COMPLETED TO DATE

Big Horn, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fallon, Flathead, Gallatin, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis & Clark, Lincoln, Madison, Meagher, Missoula, Musselshell, Park, Pondera, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wheatland, Wibaux and Yellowstone.

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
*Missouri River	107,339.50	24,787.33	132,126.83
Jefferson River	61,291.00	9,713.00	71,004.00
Beaverhead River	40,771.00	6,076.00	46,847.00
Big Hole River	23,775.00	1,950.00	25,725.00
Madison River	39,445.00	7,660.00	47,105.00
Gallatin River	111,914.00	21,097.00	133,011.00
Smith River	32,934.00	19,679.00	52,613.00
Sun River	124,474.58	4,385.00	128,859.58
Marias River	114,685.42	13,415.88	128,101.30
Teton River	74,653.00	15,882.33	90,535.33
Musselshell River	64,789.00	57,870.00	122,659.00
Milk River	2,334.00	2,595.33	4,929.33
Yellowstone River	303,501.00	96,148.00	399,649.00
Stillwater River	27,489.00	16,403.00	43,892.00
Clarks Fork River	91,768.00	24,195.00	115,963.00
Big Horn River	65,395.00	25,579.00	90,974.00
Tongue River	28,170.00	7,762.00	35,932.00
Powder River	35,948.00	2,299.00	38,247.00
Little Missouri River	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin	**1,393,189.50**	**358,995.87**	**1,752,185.37**
Columbia River Drainage Basin			
Columbia River	0	0	0
Kootenai (Kootenay) River	9,914.13	968.00	10,882.13
Clark Fork (Deer Lodge) (Hellgate) (Missoula) River	146,287.70	14,934.20	161,221.90
Bitterroot River	111,102.43	3,200.00	114,302.43
Flathead River	135,907.19	4,532.22	140,439.41
Grand Total Columbia River Basin	**403,211.45**	**23,634.42**	**426,845.87**
Grand Total in the Counties Completed to Date	**1,796,400.95**	**382,630.29**	**2,179,031.24**

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF FLATHEAD COUNTY BY RIVER BASINS

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
COLUMBIA RIVER BASIN			
*Columbia River	0	0	0
Kootenai (Kootenay) River	0	0	0
Fisher River	0	0	0
Loon Lake	0	0	0
Pleasant Valley Fisher River	1,685.00	0	1,685.00
Pearson Creek	102.00	0	102.00
Hammond Creek	44.00	0	44.00
Jakes Spring	42.00	0	42.00
Johnson Creek	20.00	0	20.00
Markus Creek	36.00	0	36.00
Carefull Creek	193.00	0	193.00
Pleasant Valley (Meadow) Creek	422.00	0	422.00
Willow (Nolan) Creek	32.00	0	32.00
Spring	10.00	0	10.00
Total Kootenai River and Tributaries	**2,586.00**	**0**	**2,586.00**
Clark Fork River	0	0	0
Flathead River	1,108.00	82.00	1,190.00
Abbott (Martin) (Gold) (E. Fk.) (N. Abbott) Creek	39.00	0	39.00
South Fork Flathead River	0	0	0
Well	23.00	0	23.00
Stanley Creek	62.00	0	62.00
Cedar (Crystal) (Bad Rock Canyon) (Trout) Creek	33.00	0	33.00
Well	3.00	0	2.00
Well	1.00	0	1.00
Well	7.00	0	7.00
Well	5.00	0	5.00
Slough	15.00	0	15.00
Well	20.00	0	20.00
Well	60.00	0	60.00
Spring	57.00	0	57.00
Slough	436.00	0	436.00
Well	15.00	0	15.00
Pressentine Slough	0	0	0
Unnamed Slough	0	0	0
Well	0	101.00	101.00
Well	77.00	0	77.00
Lake Everly Creek	0	0	0
Lake Everly	362.00	83.00	445.00
Well	2.00	0	2.00
Muskrat Lake	360.00	0	360.00
Slough	91.00	0	91.00
Well	17.00	0	17.00
Stillwater River	3,202.00	426.00	3,628.00
Bootjack Lake	0	0	0
Outlet of Bootjack Lake	50.00	40.00	90.00
North Lost (Little Lost) Creek	146.00	21.00	167.00

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF FLATHEAD COUNTY BY RIVER BASINS

RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Lost (Love) Lake	315.00	0	315.00
Spring	23.00	0	23.00
Merton Spring Creek	91.00	0	91.00
Spring	520.00	0	520.00
Moon Lake	77.00	0	77.00
Horntvedt Lake	246.00	0	246.00
Barta Lake	182.00	0	182.00
Whitefish River	1,765.00	136.00	1,901.00
Whitefish Lake	115.00	0	115.00
Snyder Creek	20.00	0	20.00
Well	2.00	0	2.00
Nigger Lake	43.00	0	43.00
Haskill (Cedar) (Second) Creek	240.00	0	240.00
Motichka Creek	0	0	0
Spring	1.00	0	1.00
Joyces Lake	30.00	20.00	50.00
Well	22.00	0	22.00
Well	78.00	0	78.00
Well	5.00	0	5.00
Well	5.00	0	5.00
Well	125.00	0	125.00
Well	2.00	0	2.00
Well	5.00	0	5.00
Total Whitefish River and Tributaries	**2,458.00**	**156.00**	**2,614.00**
(East) Spring Creek	1,757.00	2.00	1,759.00
Well	80.00	0	80.00
Well	76.00	0	76.00
Well	40.00	0	40.00
Trumbull Creek	644.00	10.00	654.00
Gangner (Lost) (Spring) Creek	284.00	0	284.00
Spring	90.00	0	90.00
Well or Sump	78.00	0	78.00
Well	5.00	0	5.00
Well	50.00	0	50.00
2 Wells	112.00	0	112.00
Well	80.00	75.00	155.00
Well	1.00	0	1.00
Well	53.00	0	53.00
Well	5.00	0	5.00
Well	18.00	0	18.00
Pond	56.00	0	56.00
Well	3.00	0	3.00
Well	73.00	0	73.00
Well	22.00	0	22.00
Well	99.00	0	99.00
Well	91.00	0	91.00
Spring	81.00	25.00	106.00
Well	2.00	0	2.00
Well	0	10.00	10.00
Well	3.00	0	3.00

IRRIGATION SUMMARY OF FLATHEAD COUNTY BY RIVER BASINS

RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Unnamed Slough	0	0	0
Well	25.00	0	25.00
Well	23.00	3.00	26.00
Total Stillwater River and Tributaries	**11,161.00**	**768.00**	**11,929.00**
Well	1.00	0	1.00
Bradley Channel	22.00	0	22.00
Well	183.00	61.00	244.00
Well	5.00	0	5.00
Ashley Creek	3,813.58	670.40	4,483.99
Middle Ashley Lake	56.00	0	56.00
West Branch Ashley (Meadow) Creek	0	50.00	50.00
Mount Creek	296.00	0	296.00
Riley Creek	194.00	0	194.00
Little Deer (West Bowser) Creek	49.00	130.00	179.00
Hadsel (Boorman) Creek	39.00	0	39.00
Weberg Creek	54.00	0	54.00
Little Lost Creek	53.00	15.00	68.00
Smiths Spring Creek	350.00	0	350.00
Branch of Smith Spring Creek	8.00	0	8.00
Big Lost (O'Neil) Creek	415.00	39.00	454.00
Browns Creek	48.00	0	48.00
Rhodes Creek	7.00	0	7.00
Spring	5.00	0	5.00
Bowser Spring Creek	910.00	46.00	956.00
Unnamed Creek	0	0	0
Pond	87.00	0	87.00
Unnamed Creek	3.00	0	3.00
Well	3.00	0	3.00
Unnamed Creek	0	0	0
Foy Lake	160.00	0	160.00
Middle Foy Lake	16.00	26.00	42.00
Well	26.00	0	26.00
Patrick (Deer) (Ingalls) (Spring) Creek	226.00	134.00	360.00
Bowland Spring (Jones) Creek	1.00	1.00	2.00
McCormack Slough	18.00	18.00	36.00
Wileys (Schoolhouse) Slough	143.00	10.00	153.00
Total Ashley Creek and Tributaries	**6,980.58**	**1,139.40**	**8,119.99**
Half Moon Slough	141.00	0	141.00
Egan Slough	61.00	0	61.00
Well	2.00	0	2.00
Church Slough	90.00	0	90.00
Unnamed Creek	77.00	0	77.00
Mill Creek	244.00	0	244.00
Bartells (Trail) Creek	24.00	0	24.00
Well	32.00	0	32.00
Browns (Mountain Brook) (Smith) Creek	33.00	0	33.00
Spring	3.00	0	3.00
Peters Creek	7.00	0	7.00
Well	43.00	0	43.00

IRRIGATION SUMMARY OF FLATHEAD COUNTY BY RIVER BASINS

RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Well	2.00	0	2.00
Blaine Creek	350.00	0	350.00
Mooring (Upper Blaine) (Lake Blaine) Creek	26.00	0	26.00
Lerch Creek	3.00	0	3.00
Well	1.00	0	1.00
Spring	13.00	0	13.00
Lake (Mooring Slough)	121.00	0	121.00
Well	4.00	0	4.00
Lost (Browns) Creek	11.00	0	11.00
Spring	2.00	0	2.00
Lake Blaine	0	0	0
Hemler Creek	0	0	0
South Hemler Creek	15.00	0	15.00
Well	0	11.00	11.00
Well	186.00	27.00	213.00
Well	2.00	0	2.00
Well	17.00	0	17.00
O'Connor (Mill) Creek	6.00	0	6.00
Rose (Therriaults) Creek	61.00	56.00	117.00
Pudro (Cummings) Creek	46.00	0	46.00
Well	1.00	0	1.00
Spring	71.00	0	71.00
Well	1.00	0	1.00
Well	2.00	0	2.00
Well	8.00	0	8.00
Slough	46.00	0	46.00
Spring	9.00	0	9.00
Fennon Slough	75.00	0	75.00
Swims Creek	287.00	10.00	297.00
Echo Lake	0	0	0
Olson Creek	5.00	0	5.00
Peter Sutter & Jacob Gibson Springs	1.00	0	1.00
Cherry (Echo) Creek	0	32.00	32.00
Krause Creek	28.00	0	28.00
Johnson Lakes	36.00	0	36.00
Well	4.00	0	4.00
Slough	95.00	0	95.00
Clark Lake	120.00	0	120.00
Flathead Lake	262.00	0	262.00
Blasdel Ponds	0	100.00	100.00
Altenburg Slough	0	0	0
Pond	2.00	0	2.00
McAffee Slough	53.00	17.00	70.00
Swan River	87.00	25.00	112.00
Wolf Creek	24.00	0	24.00
Mud Creek	0	0	0
Mud Lake	11.00	206.00	217.00
Well	1.00	0	1.00

IRRIGATION SUMMARY OF FLATHEAD COUNTY BY RIVER BASINS

RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Well	2.00	0	2.00
Total Swan River and Tributaries	**125.00**	**231.00**	**356.00**
Little (Cramers Spring) (First) Creek	0	0	0
Unnamed Creek	0	0	0
Christensen Springs	10.00	0	10.00
Spring	2.00	0	2.00
Spring	5.00	0	5.00
Big (Stoner) Creek	24.00	0	24.00
Spring	2.00	0	2.00
Little Bitterroot River	0	0	0
Little Bitterroot Lake	0	0	0
Unnamed Creek	10.00	38.00	48.00
Unnamed Creek	176.00	0	176.00
Unnamed Creek	233.00	0	233.00
Sullivan Creek	10.00	13.00	23.00
Crazy Creek	158.00	0	158.00
Deep (Cromwell) Creek	0	0	0
Vinson (Dip) Creek	8.00	0	8.00
Big Creek	0	60.00	60.00
Sullivan Springs	61.00	0	61.00
Total Little Bitterroot and Tributaries	**656.00**	**111.00**	**767.00**
Total Flathead River and Tributaries	**24,698.58**	**2,829.40**	**27,527.99**
Thompson River	7.00	0	7.00
McGregor Creek	410.00	0	410.00
McGregor Lake	0	0	0
Greenwood Spring Creek	0	0	0
Spring	24.00	0	24.00
Total Thompson River and Tributaries	**441.00**	**0**	**441.00**
Grand Total Columbia River and Tributaries—Flathead County	**27,725.58**	**2,829.40**	**30,554.99**

ASHLEY IRRIGATION DISTRICT

HISTORY

This irrigation project had its beginning in the year of 1897, when a group of farmers organized and established the Ashley Lake Irrigating Company. These men in their spare time constructed a diversion dam and ditch on Ashley Creek and in return for their labor, stock was issued to them in the company. Two water rights were filed on Ashley Creek for the Ashley Lake Irrigating Company by the water users under the project. The appropriators of water were: Walter P. Jaquette, George D. Hahn, Edmund L. Kelley, John Blose, Robert Nordtome, Milan Conant, William M. Thurman, Christofer C. Asher, George M. Fisher, James O'Boyle, Richard Asher, John Eisenhower, David A. Carpenter and Eugene E. Kelley.

In 1909, with the passage of the Irrigation District Law, steps were taken to organize the Ashley Irrigation District. On December 8, 1909, the District Court approved the issuance of $50,000 in bonds by the Commissioners of the district to be used for the purpose of purchasing the irrigation system, works and property of the Ashley Lake Irrigating Company.

The Ashley Irrigation District throughout the intervening years has floated four bond issues, and numerous repairs and improvements have been made to the system, but on each bond issue the costs have increased to the farmers in the district. As of the present date the Ashley Irrigation District has no bond indebtedness.

The head gate and location of the present Ashley Irrigation District Canal was obtained by the district through an agreement with the successors in interest of a prior water right and ditch diversion owned by N. P. Lagoni, Isabella Hartt, David A. Carpenter and I. L. Flinchpaugh. This agreement allows the successors in interest of the prior appropriation of water by Lagoni, Hartt, Carpenter and Flinchpaugh the right to carry 12.5 c.f.s. of their water from Ashley Creek through the district's canal in exchange for the original head gate and ditch.

PRESENT STATISTICS

Location: Ashley Lake is located in Sections 5 and 6 T. 28N., R. 23W., and Sections 1, 2, 10, 11, 12, 14, 15, 22 and 23 T. 28N., R. 24W. Storage water is released from the lake into Ashley Creek where it is divetred by the Ashley Irrigation District Canal in the NW¼NW¼ Section 21 T. 28N., R. 22W. Lands irrigated are located in T. 28N., R. 21W., T. 28N., R. 22W, T. 29N., R. 22W.

Length and Capacity of Canal: The district's canal is 11.75 miles long and has a capacity of 75 c.f.s.

Reservoirs: The surface area of Ashley Lake is 2,445 acres and has a usable storage capacity of approximately 10,000 acre-feet.

Operation and Maintenance: The total water charges under the district in 1964 were $4.50 per acre per year which included operation and maintenance. This water charge may vary from year to year.

Present Users: There were 48 water users in the district in 1964.

Acreage Irrigated: In 1964 there were 2,658.588 acres irrigated by the Ashley Irrigation District with a potential of 414.40 acres and a maximum of 3,072.988 acres.

WATER RIGHT DATA

The Ashley Irrigation District has the following water rights:

An appropriation by the Ashley Irrigation District from Ashley Creek, dated 8-15-10 for 5,000 miner's inches. (Ref. Book 71 Water Rights, page 426, Flathead County.)

An appropriation by the Ashley Irrigation District from Ashley Lake, dated 8-15-10 for 20,000 miner's inches. (Ref. Book 71 Water Rights, page 425, Flathead County.)

Also the two water right filings acquired from the Ashley Lake Irrigating Company appropriated by Walter P. Jaquette, George D. Hahn, Edmund L. Kelley, John Blose, Robert Nordtome, Milan Conant, William M. Thurman, Christofer C. Asher, George M. Fisher, James O'Boyle, Richard Asher, John Eisenhower, David A. Carpenter and Eugene E. Kelley from Ashley Creek, dated 3-6-97 for 5,000 miner's inches, (Ref. Book 16 Water Rights, page 312, Flathead County) and dated 2-1-97 for 20,000 miner's inches. (Ref. Book 16 Water Rights, page 313, Flathead County.)

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
COLUMBIA RIVER BASIN							
***Columbia River**	0	0	0				
Kootenai (Kootenay) River	0	0	0				
Tobacco River	0	0	0				
Fortine Creek	0	0	0				
Lime Creek	1	All	---				
Fisher River	0	0	0				
Loon Lake	0	0	0				
Pleasant Valley Fisher River	3	1,300.00	32.50				
Pearson Creek	1	960.00	24.00				
Hammond Creek	2	350.00	8.75				
Dry (Fisher) Creek	2	360.00	9.00				
Bear Spring	1	200.00	5.00				
Jakes Spring	1	100.00	2.50				
Johnson Creek	1	40.00	1.00				
Unnamed Spring	1	All	---				
Markus Creek	3	700.00	17.50				
Careful Creek	2	4,000.00	100.00				
Careless Creek	3	2,800.00	70.00				
Pleasant Valley (Meadow) Cr.	4	800.00	20.00				
Pine (Elbow) Creek	2	550.00	13.75				
Willow (Nolan) Creek	1	300.00	7.50				
Spring	0	0	0				
Island Creek	1	All	---				
Total Kootenai River and Tributaries	**29**	**12,460.00**	**311.50**				
Clark Fork of Columbia River	0	0	0				
Flathead River	42	3,127,000.00	78,175.00				
Colts Creek	0	0	0				
Clute Creek	1	800.00	20.00				
Yakinikak (Trail) Creek	2	200.00	5.00				
Ketchikan Creek	3	720.00	18.00				
Johnson Creek	2	240.00	6.00				
Spring Creek	1	All	---				
Tepee Creek	1	All	---				
Spring Creek	1	400.00	10.00				
Whale Creek	1	All	---				
Moose Creek	2	400.00	10.00				
Spring Creek	1	40.00	1.00				
Hawk Creek	3	720.00	18.00				
Spruce (Red Meadow) Creek	3	400.00	10.00				
So. Fork Spruce Creek	1	160.00	4.00				
Indian Creek	3	4,200.00	105.00				
Long Bow Creek	4	16,000.00	400.00				
Spring	1	25.00	.63				

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Bowman Creek	1	20,000.00	500.00				
Unnamed Creek	1	5.00	.13				
Charleys Creek	1	80.00	2.00				
Spring	1	160.00	4.00				
Hay Creek	5	20,000.00	500.00				
Moran (Beaver) Cr.	1	1,000.00	25.00				
Quartz Creek	3	101,300.00	2,532.50				
Banking (Hague) (Tulley) Creek	3	53,504.00	1,337.60				
Coal Creek	5	48,000.00	1,200.00				
So. Fork Coal Cr.	1	2,000.00	50.00				
Cyclone Creek	2	50.00	1.25				
Cyclone (Devill) Lake	1	50,000.00	1,250.00				
Jessie Creek	1	20,000.00	500.00				
Spring Creek	2	300.00	7.50				
Logging Creek	2	24,000.00	600.00				
Camas Creek	0	0	0				
Dutch Creek	1	114.00	2.85				
Big Creek	0	0	0				
Canal (Longford) Creek	1	10,000.00	250.00				
Canyon Creek	1	40.00	1.00				
So. Fork Canyon Creek	3	9,000.00	225.00				
Middle Fork Flathead River	4	4,280.00	107.00				
Bear Creek	8	3,432.00	85.80				
Paynes Gulch	1	1,000.00	25.00				
Unnamed Creek	1	80.00	2.00				
Giefer Creek	1	720.00	18.00				
West Fork Giefer Creek	1	160.00	4.00				
Spring	1	10.00	.25				
Unnamed Stream	2	40.40	1.01				
Falls Creek	1	1,000.00	25.00				
Deer Creek	1	200.00	5.00				
Unnamed Creek	1	All	---				
Spring	1	All	---				
Essex Creek	1	6 in. Pipe	---				
Spring	2	50.00	1.25				
Spring	3	96.00	2.40				
Spring	3	40.00	1.00				
Dickey Creek	4	8,340.00	208.50				
Paola (Pinnacle) Creek	1	200.00	5.00				
Forhan Spring	2	1,600.00	40.00				
Spring	2	20.00	.50				
Culvert (Tunnell) (Mitchell) Creek	3	2,440.00	61.00				
Forest Creek	1	400.00	10.00				
Stanton Creek	2	8,120.00	203.00				
Sawmill (Spring) Creek	1	400.00	10.00				
Coal Creek	1	All	---				
Skiumah Creek	3	804.00	20.10				
Spring	1	4.00	0.10				
Great Bear Creek	1	1,000.00	25.00				
Nyack Creek	2	All	---				
Deer Lick Creek	5	2,880.00	72.00				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Kootenai Creek	1	120.00	3.00				
Spring	1	20.00	.50				
Nelson (Beelar) Creek	3	510.00	12.75				
Belton Spring	9	313.00	7.83				
McDonald Creek	5	52,000.00	1,300.00				
North Fork Mc-Donald Cr.	1	2,000.00	50.00				
Middle Fk. No. Fk. McDon. Cr.	1	450.00	11.25				
South Fork Mc-McDonald Cr.	1	1,000.00	25.00				
Lake McDonald	1	200,000.00	5,000.00				
Kelley Creek	1	8.00	0.20				
Unnamed Creek	5	10.00	0.25				
Snyder Creek	1	3.92	0.10				
Sawmill Cr.	1	3.00	0.08				
Sprague Creek	1	16,000.00	400.00				
Apgar Creek	4	340.00	8.50				
Rubidoux Creek	1	51.20	1.28				
Hamilton Creek	1	40.00	1.00				
Unnamed Creek	0	0	0				
Lake Five	1	7 A.F.	---				
Roberts Coulee	1	280.00	7.00				
Spring	1	60.00	1.50				
Unnamed Creek	1	40.00	1.00				
Spring Creek	1	40.00	1.00				
Spring	1	4.00	0.10				
Ross Tway Lake	1	---	---				
Spring (Tunnell) Cr.	2	700.00	17.50				
Hellman Springs & Creek	1	400.00	10.00				
Unnamed Creek	1	400.00	10.00				
Blue Spring Creek	1	4.00	0.10				
Clearwater Creek	2	150.00	3.75				
Spring	1	8.00	0.20				
Coram Creek	1	300.00	7.50				
Spring Creek	5	440.00	11.00				
Lake	1	240.00	6.00				
Spring	1	40.00	1.00				
Spring	1	40.00	1.00				
Abbott (Martin) (Gold) (E. Fk.) (N. Abbott) Creek	10	12,420.00	310.50				
Unnamed Creek	1	100.00	2.50				
South Abbott (Smith) Creek	4	140.00	3.50				
Spring	2	80.00	2.00				
Unnamed Creek	1	All	---				
South Fork Flathead River	4	280,000.00	7,000.00				
Coal Creek	1	4,000.00	100.00				
Murray Creek	1	200.00	5.00				
Frank Creek	1	400.00	10.00				
Whelp Creek	0	0	0				
Lion Lake	1	120.00	3.00				
Spring	2	40.00	1.00				
Sand Creek	1	---	---				
Well	0	0	0				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Heller Creek	2	400.00	10.00				
Springs	2	1,000.00	25.00				
Butcher Creek	3	2,100.00	52.50				
Opalka Creek	1	500 gpm	---				
Cooper Creek	1	25.00	0.63				
Mengan Creek	3	720.00	18.00				
Spring	1	500.00	12.50				
Stanley Creek	6	1,800.00	45.00				
Spring	1	40,000.00	1,000.00				
Cedar (Crystal) (Bad Rock Canyon) (Trout) Creek	16	17,981.00	449.53				
Unnamed Creek	1	120.00	3.00				
Hamilton Creek	1	40.00	1.00				
Spring	1	120.00	3.00				
Spring	2	400.00	10.00				
Studt Creek	1	120.00	3.00				
Snow Creek	1	100.00	2.50				
Well	2	268 gpm	.60				
Well	1	100 gpm	.20				
Well	2	20 gpm	.04				
Spring	1	10.00	0.25				
Spring	1	20.00	0.50				
Spring	1	80.00	2.00				
Well	1	320 gpm	.71				
Pressentine Slough	1	100.00	2.50				
Unnamed Slough	1	100.00	2.50				
Well	2	1300 gpm	2.90				
Everly Lake Creek	1	80.00	2.00				
Lake Everly	6	1,315.00	32.88				
Spring	1	20.00	0.50				
Well	1	15 gpm	.33				
Muskrat Lake	2	480.00	12.00				
Well	1	3000 gph	.11				
Stillwater River	77	414,513.00	10,362.83				
Lost Creek	1	60.00	1.50				
Sunday Creek	2	80.00	2.00				
Spring Creek	2	20,080.00	502.00				
(Jack) Martin Creek	1	40.00	1.00				
Dog Creek	2	200.00	5.00				
Meadow Lake Cr.	1	All	---				
Spring Creek	1	- -	---				
Unnamed Creek	1	40.00	1.00				
Lower Stillwater Lake	3	72,000.00	1,800.00				
Mid'le Fk. Stillwater River (Good Cr.)	3	5,020.00	125.50				
Miller Creek	1	840.00	21.00				
Shattuck Creek	1	120.00	3.00				
So. Fk. Still. River (Logan Cr.)	7	65,785.00	1,644.63				
Griffin Creek	2	8,080.00	202.00				
Sullivan Cr.	1	40.00	1.00				
W. Fk. So. Fk. Stillwater (Sheppard Cr.)	1	200.00	5.00				
Sanko Creek	1	20.00	0.50				
Talley Lake	3	160,000.00	4,000.00				
Evers Creek	1	80.00	2.00				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

	APPROPRIATIONS (Filings of Record)			DECREED RIGHTS			
STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Creek	0	0	0				
Boyle (Loon) Lake	0	0	0				
Springs	1	240.00	6.00				
Tamarack Creek	2	200.00	5.00				
Mud Creek	1	40.00	1.00				
Bootjack Lake	3	500.00	12.50				
Outlet of Bootjack Lake	5	6,500.00	162.50				
Unnamed Creek (Outlet to Spencer Lake)	1	---	---				
Spencer Lake	1	All	---				
Skyles Lake outlet	2	240.00	6.00				
Spring	1	40.00	1.00				
Spring	3	520.00	13.00				
Bear (Tobie) (Bissel Moore) Creek	7	320.00	8.00				
Burton Springs	1	5.00	0.13				
Twin Lakes	1	120.00	3.00				
North Lost (Little Lost) Creek	11	3,140.00	78.50				
Springs	1	100.00	2.50				
Lost (Love) Lake	4	9,080.00	227.00				
Spring	1	All	---				
Spring	1	100.00	2.50				
Merton Spring Cr.	3	900.00	22.50				
Spring	1	100.00	2.50				
Moon Lake	2	29.00	0.73				
Horntvedt Lake	1	100.00	2.50				
Barta Lake	7	540.00	13.50				
Spring	1	2,000.00	50.00				
White Crystal Sp'g.	1	All	---				
Whitefish River	63	913,323.20	22,833.08				
Whitefish Lake	2	400.00	10.00				
Lazy Creek	0	0	0				
Spring Creek	1	80.00	2.00				
Jacobson Sp'g	1	All	---				
Smith Creek	3	280.00	7.00				
Spring	1	All	---				
Third (Collins) Creek	1	160.00	4.00				
Hellroaring Cr.	2	1,300.00	32.50				
Eagle Creek	3	320.00	8.00				
Spring	1	All	---				
Crystal Spring (Reeves Cr.)	1	200.00	5.00				
Quenton Creek	1	All	---				
Ritter Spring	1	All	---				
Jensen Spring	1	All	---				
Spring	1	100.00	2.50				
Spring	1	120.00	3.00				
Snyder Creek	2	280.00	7.00				
Unnamed Cr.	1	40.00	1.00				
Spring	1	800.00	20.00				
Unnamed Creek	1	40.00	1.00				
Spring	1	40.00	1.00				
Springs	1	All	---				
Well	1	50 gpm	.11				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Nigger Lake	1	80.00	2.00				
Butlers Creek	1	200.00	5.00				
Haskill (Cedar) (Second) Creek	15	4,448.00	111.20				
First (Walker) Cr.	4	2,532.00	63.30				
Sampson Lake	1	4,000.00	100.00				
Motichka Creek	2	70.00	1.75				
Well	1	2,000 gpm	4.46				
Blanchard Lake	2	400.00	10.00				
Joyces Lake	1	40.00	1.00				
Well	5	887.5 gpm	1.98				
Total Whitefish River and Tributaries	**125**	**929,253.20**	**23,237.88**				
Spring (East Spring) Creek	22	12,195.00	304.88				
Well	1	200.00	5.00				
Well	1	400 gpm	.89				
Trumbull Creek	23	36,614.00	915.35				
Gangner (Lost) (Sp'g) Cr.	17	15,540.00	388.50				
Lost Creek	1	5,000.00	125.00				
Spring	1	All	---				
Well or Sump	2	160.00	4.00				
Well	1	400 gpm	.89				
Well	1	86.00	2.15				
2 Wells	1	All	---				
Well	1	1200 gpm	2.68				
Spring	1	80.00	2.00				
Well	1	20 gpm	.04				
Slough	1	200.00	5.00				
Well	3	820 gpm	1.83				
Spring	1	120.00	3.00				
Well	7	7700 gpm	17.18				
Unnamed Slough	2	240.00	6.00				
Well	1	1000 gpm	2.23				
Dry Coulee	1	8.00	0.20				
Total Stillwater River and Tributaries	**390**	**1,771,708.20**	**44,325.21**				
Slough	1	All	---				
Unnamed Slough	2	All	---				
Well	1	20 gpm	.04				
Bradley Channel	1	80.00	2.00				
Unnamed Slough	1	449,000.00	11,225.00				
Ashley Creek	58	52,370.00	1,309.25				
Ashley Lake	1	20,000.00	500.00				
Spring	1	40.00	1.00				
Rand (Talley) Cr.	3	1,120.00	28.00				
Middle Ashley Lake	1	80.00	2.00				
West Branch Ashley (Meadow) Cr.	3	480.00	12.00				
Spring Creek	2	700.00	17.50				
Spring	1	All	---				
Rogers Creek	1	13.30	0.33				
Rogers Lake	2	500.00	12.50				
Spring	1	40.00	1.00				
Hunt Creek	1	500.00	12.50				
Mount Creek	4	1,300.00	32.50				
Daggett Creek	1	80.00	2.00				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Indian Creek	2	480.00	12.00				
Riley Creek	1	600.00	15.00				
Hodgson Creek	1	160.00	4.00				
Spring	1	All	---				
Pool Spring	1	40.00	1.00				
Truman (Deer) (Tripp) Creek	9	6,440.00	161.00				
Emmons Creek	2	60.00	1.50				
So. Fk. Truman			1.50				
(Wild Bill) Cr.	3	265.00	6.63				
Wilson Creek and Spring	1	80.00	2.00				
Smith Lake	0	0	0				
Dry Creek	2	400.00	10.00				
Spring	1	All	---				
Spring (Spruce) Creek	5	344.00	8.60				
Spring	1	144.00	3.60				
Hoffman Draw (Little Lost Cr.)	1	80.00	2.00				
Masters Creek	1	100.00	2.50				
Spring	2	80.00	2.00				
Little Deer (West Bowser) Creek	10	3,430.00	85.75	1278	2		Reservoir
Anders Creek	1	250.00	6.25				
Spring	1	All	---				
Spring	1	All	---				
Hadsell (Boorman) Creek	9	2,410.00	60.25				
Weberg Creek	4	412.00	10.30				
Spring	1	200.00	5.00				
Spring	1	All	---				
Unnamed Creek	0	0	0				
Spring	1	20.00	0.50				
Joes (Spring) Cr.	7	3,654.00	91.35				
Spring	1	100.00	2.50				
Unnamed Creek	1	160.00	4.00				
Unnamed Creek	2	140.00	3.50				
Spring	1	50.00	1.25				
Spring	1	40.00	1.00				
Little Lost Creek	11	8,519.00	212.98				
Spring	1	5.00	0.13				
Mountain Creek	1	100.00	2.50				
Smiths Spring Cr.	10	2,220.00	55.50				
Springs, Wells, Ponds	2	170.00	4.25				
Greigs Springs	1	100.00	2.50				
Branch Smith Spring Cr.	1	1½-in. pipe					
Spring	1	All	---				
Big Lost (O'Neil) Creek	18	8,440.00	211.00				
Browns Creek	2	All	---				
Rhodes Creek	1	80.00	2.00				
Spring	1	40.00	1.00				
Bowser Spring Cr.	30	22,869.00	571.73	*9749	12	360.00	9.00
Spring	1	40.00	1.00				

*Ditch Decree

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Creek	0	0	0				
Pond	1	80.00	2.00				
Unnamed Cr.	1	80.00	2.00				
Well	1	30 gpm	.06				
Unnamed Creek	3	1,075.00	26.88				
Foy Lake	16	3,720.00	93.00				
Middle Foy Lake	5	960.00	24.00				
Lower Foy Lake	1	500.00	12.50				
Sewage Drain	1	All	---				
Well	1	40.00	1.00				
Springs	1	80.00	2.00				
Springs	1	40.00	1.00				
Well	1	0	0				
Patrick (Deer) (Ingalls) (Spring) Creek	14	3,400.00	85.00				
Spring	1	½ the water					
Bowland Spring (Jones) Creek	2	380.00	9.50				
Bowland Sp'g	1	300.00	7.50				
Spring	1	120.00	3.00				
Spring	1	All	---				
Spring	1	All	---				
Gregg (Birch) (Spring) (Schumaker Slough) (Lonneau) Cr.	7	1,480.00	37.00				
Spring	1	60.00	1.50				
Spring	1	40.00	1.00				
Spring	1	---	---				
McCormack Slough	3	10 A. F.					
Wileys (Schoolhouse) Slough	5	360.00	9.00				
Total Ashley Creek and Tributaries	**307**	**152,660.30**	**3,816.50**				
Half Moon Slough	1	100.00	2.50				
Unnamed Creek	1	800.00	20.00				
Egan Slough	3	400.00	10.00				
Well	1	100 gpm	.22				
Church Slough	1	---	---				
Unnamed Creek	4	160.00	4.00				
Springs	3	160.00	4.00				
Lane Creek	1	180.00	4.50				
Mill Creek	7	14,700.00	367.50				
Bartells (Trail) Cr.	4	3,050.00	76.25				
Browns (Mountain Brook) (Smith) Creek	2	1,160.00	29.00				
Springs	1	266.00	6.65				
Spring	1	50.00	1.25				
Spring	1	240.00	6.00				
Peters Creek	9	3,200.00	80.00				
Well	1	10,100 gpm	22.54				
Blaine Creek	14	7,390.00	184.75				
Mooring (Upper Blaine) (Lake Blaine) Cr.	7	2,325.00	58.13				
Lerch Creek	3	250.00	6.25				
Well	1	50 gpm	.11				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Spring	1	500.00	12.50				
Spring	1	40.00	1.00				
Bernetts Spring	2	1,040.00	26.00				
Spring	1	40.00	1.00				
Hall Lake	1	80.00	2.00				
Lake (Mooring Slough)	3	240.00	6.00				
Well	1	25 gpm	.05				
Spring Creek	3	450.00	11.25				
Spring	1	50.00	1.25				
Lost (Browns) Creek	2	1,100.00	27.50				
Spring	2	4,000.00	100.00				
Lake Blaine	3	700.00	17.50				
Hemler Creek	4	540.00	13.50				
N. Hemler Cr.	7	110.00	2.75				
S. Hemler Cr.	1	40.00	1.00				
Honeysuckle Spring	1	---	---				
Handkerchief Creek	1	All	---				
Well	4	2,365 gpm	5.28				
O'Conner (Mill) Creek	4	274.00	6.85				
Bellefleur Spring Creek	2	16.50	0.41				
Spring	1	--	---				
Rose (Therriaults) Cr.	2	1,480.00	37.00				
Pudro (Cummings) Creek	2	312.00	7.80				
Well	1	50 gpm	.11				
Spring	1	All	---				
Well	2	35 gpm	.08				
Slough	0	0	0				
Fox (Spring) Creek	2	300.00	7.50				
Fox Spring	3	900.00	22.50				
Spring	1	All	---				
Spring	2	40.00	1.00				
Fennon Slough	3	560.00	14.00				
Swims Creek	2	1,600.00	40.00				
Echo Lake	0	0	0				
Olson Creek	1	200.00	5.00				
Peter Sutter & Jacob Gibson Springs	2	1,250.00	31.25				
Cherry (Echo) Creek	3	190.00	4.75				
Krause Creek	8	760.00	19.00				
Rocky Mountain Spring	2	80.00	2.00				
Johnson Lakes	0	0	0				
Cabin Lake	1	All	---				
Well	1	17 gpm	.04				
Slough	1	80.00	2.00				
Clark Lake	1	1,000 gpm					
Flathead Lake	9	13,780.00	344.50				
Blasdel Ponds	1	125.00	3.13				
Altenburg Slough	2	200.00	5.00				
Pond	0	0	0				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
McAfee Slough	2	40.00	1.00				
Spring	1	2.00	0.05				
Swan River	18	698,260.00	17,456.50				
Patterson Creek	2	700.00	17.50				
Meadow Creek	1	1,000.00	25.00				
Peterson (Deer) Creek	3	140.00	3.50				
South Trib. of Peterson Cr.	1	40.00	1.00				
Bear Creek	1	60.00	1.50				
Wolf Creek	8	2,210.00	55.25				
Mud Creek	1	100.00	2.50				
Mud Lake	1	5 A. F.					
Noisey Creek	2	120.00	3.00				
Rock Creek	1	80.00	2.00				
Station Creek	1	80.00	2.00				
Deer Creek	2	360.00	9.00				
Unnamed Cr.	1	120.00	3.00				
Hopkins Creek	1	200.00	5.00				
Beaver Creek	4	350.00	8.75				
Well	1	50 gpm	.11				
Unnamed Stream	1	10.00	0.25				
Well	1	600 gpm	1.33				
Total Swan River and Tributaries	**51**	**703,830.00**	**17,597.19**				
Little (Cramers Spring) (First) Creek	6	2,480.00	62.00				
Unnamed Creek	1	50.00	1.25				
Christensen Springs	1	80.00	2.00				
Ganzers Branch	2	100.00	2.50				
Spring	1	20.00	0.50				
Spring	1	400.00	10.00				
Big (Stoner) Creek	17	8,820.00	220.50				
Spring	1	35.00	0.88				
Spring	1	80.00	2.00				
1st South Branch (Tachland) Cr.	5	8,080.00	202.00				
Spring	1	16.00	0.40				
So. Fork Big Cr.	1	300.00	7.50				
Unnamed Creek	0	0	0				
Spring	1	40.00	1.00				
Little Bitterroot River	5	160,240.00	4,006.00				
Little Bit'root Lake	0	0	0				
Unnamed Lake	1	---	---				
Unnamed Creek	1	80.00	2.00				
Sickler Creek	1	800.00	20.00				
Spring	1	120.00	3.00				
Holmes Spring	1	40.00	1.00				
Unnamed Creek	2	140.00	3.50				
Unnamed Creek	1	All	---				
Dry Creek	1	144.00	3.60				
No Name Creek	1	All	---				
Spring	1	40.00	1.00				
Sullivan Creek	2	160.00	4.00				
West Branch Sullivan Creek	1	80.00	2.00				
Crazy Creek	1	320.00	8.00				

WATER RIGHT DATA—FLATHEAD COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Deep (Cromwell) Creek	4	100.00	2.50				
Spring	1	80.00	2.00				
Vinson (Dip) Creek	3	610.00	15.25				
Dry Gulch	3	600.00	15.00				
Radel Spring	1	All	---				
Rock Spring Cr.	1	600.00	15.00				
Spring	1	All	---				
Big Creek	5	1,075.00	26.88				
Pine Spring	1	40.00	1.00				
Willow Sp'gs	1	80.00	2.00				
Spring	3	260.00	6.50				
Unnamed Creek	1	160.00	4.00				
Spring	1	160.00	4.00				
Spring	1	300 gph	---				
Sullivan Springs	1	80.00	2.00				
Lost Spring Cr.	1	40.00	1.00				
Spring	1	All	---				
Spring	1	All	---				
Spring	1	All	---				
Malteen Spring	1	All	---				
Total Little Bitterroot and Tributaries	**53**	**166,049.00**	**4,151.23**				
Thompson River	2	580.00	14.50				
McGregor Creek	3	600.00	15.00				
McGregor Lake	0	0	0				
Greenwood Spring Creek	1	200.00	5.00				
Spring	1	40.00	1.00				
Lang Creek	4	200.00	5.00				
Spring	1	30.00	0.75				
Pinched Out Creek	1	All	---				
Murr Creek	1	400.00	10.00				
Total Thompson River and Tributaries	**14**	**2,050.00**	**51.25**				
Grand Total Flathead County	**1,387**	**7,533,209.52**	**188,397.45**				

DRAINAGES IN FLATHEAD COUNTY NOT LOCATED

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Little Bear Creek	1	4,000.00	100.00
Big Creek	1	5,000.00	125.00
Columbia Creek	1	400.00	10.00
Deer Creek	2	2,000.00	50.00
Miller Creek	1	100.00	2.50
Morrow Creek	1	300.00	7.50
Otter Creek	1	2,000.00	50.00
Renullard Creek	1	All	
Spring	1	120.00	3.00
Duck Lake	1	500.00	12.50
John Flynn Lake	1	200.00	5.00
Lake Wisdom	1	20,000.00	500.00
Unnamed Lake	1	3,000.00	75.00
Unnamed Creek	1	120.00	3.00
Unnamed Creek	1	2,000.00	50.00
Unnamed Spring	1	500.00	12.50
Total	**17**	**40,240.00**	**1,006.00**

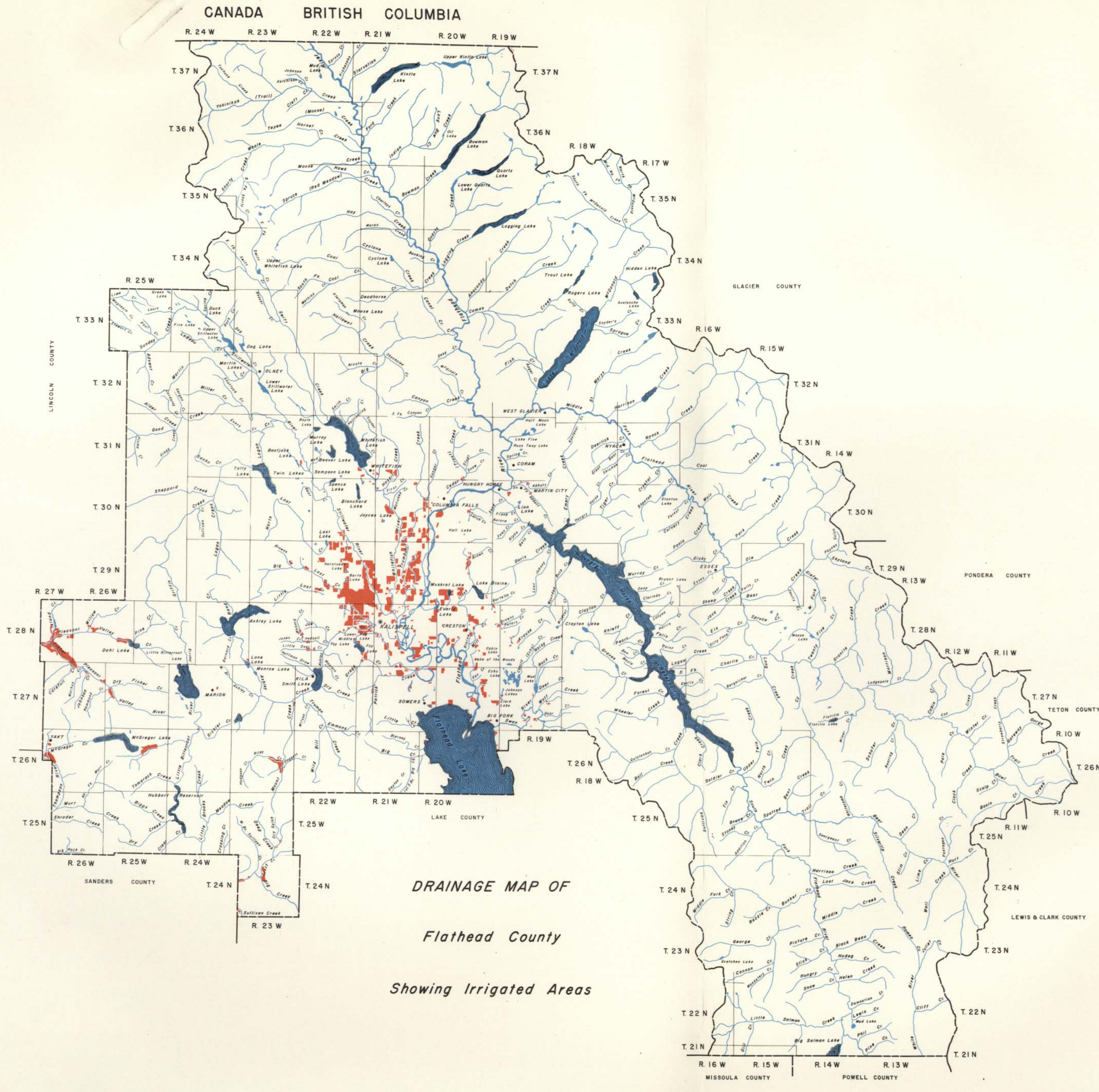
WATER RESOURCES SURVEY

Flathead County, Montana

PART II

Maps Showing Irrigated Areas

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1965



DRAINAGE MAP OF

Flathead County

Showing Irrigated Areas

MAP INDEX

Township	Range	Page
24 North	23 West	1
25 North	23 West	2
26 North	19 West	3
26 North	20 West	3
26 North	21 West	3
26 North	23 West	4
26 North	25 West	5
26 North	26 West	6
27 North	19 West	7
27 North	20 West	8
27 North	21 West	9
27 North	23 West	10
27 North	24 West	11
27 North	25 West	12
27 North	26 West	12
28 North	19 West	13
28 North	20 West	14
28 North	21 West	15
28 North	22 West	16
28 North	23 West	17
28 North	24 West	17
28 North	26 West	18
28 North	27 West	19
29 North	19 West	13
29 North	20 West	20
29 North	21 West	21
29 North	22 West	22
29 North	23 West	23
30 North	19 West	24
30 North	20 West	25
30 North	21 West	26
30 North	22 West	27
31 North	20 West	25
31 North	21 West	26
31 North	22 West	28
31 North	23 West	28

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

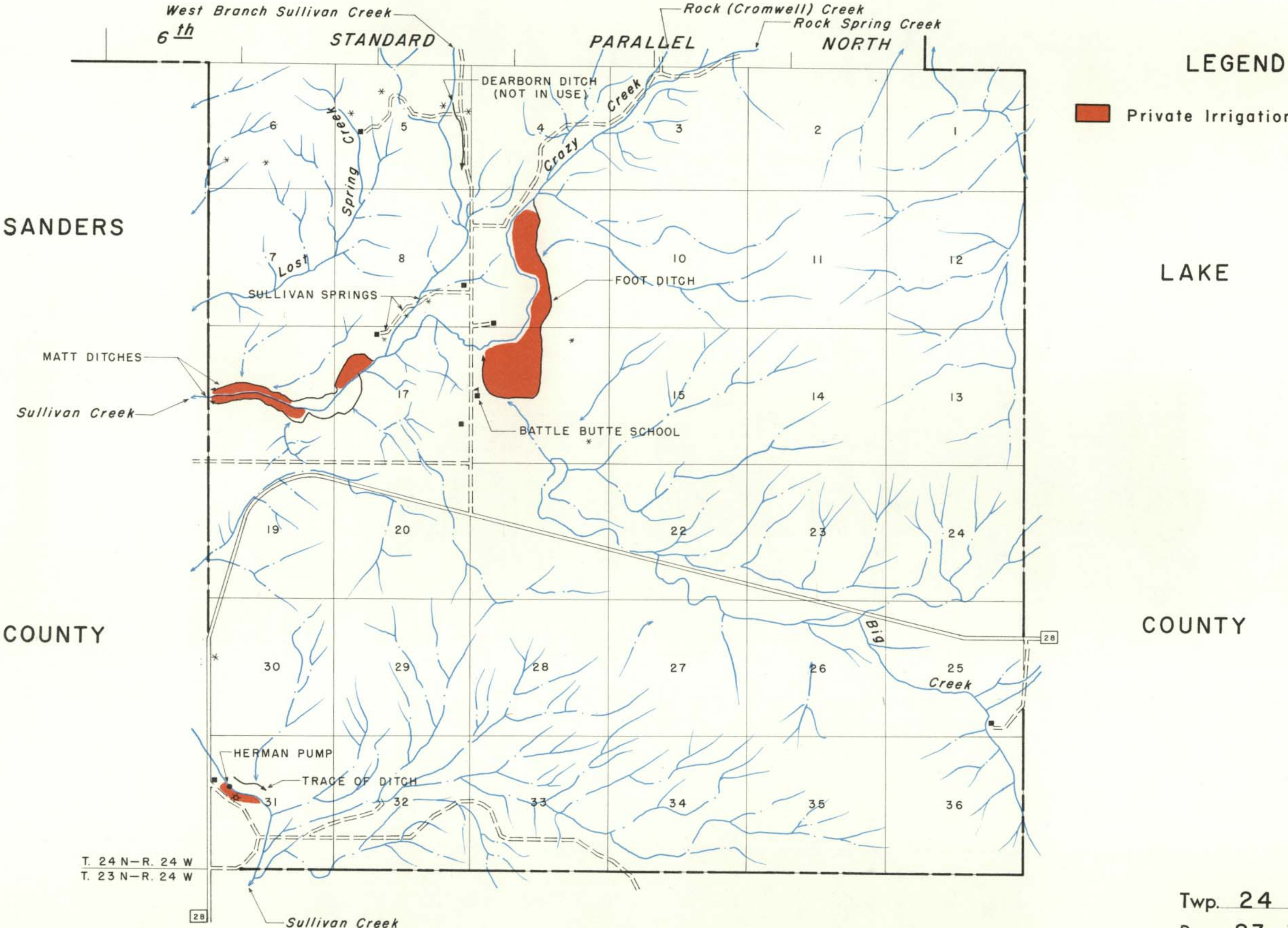
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

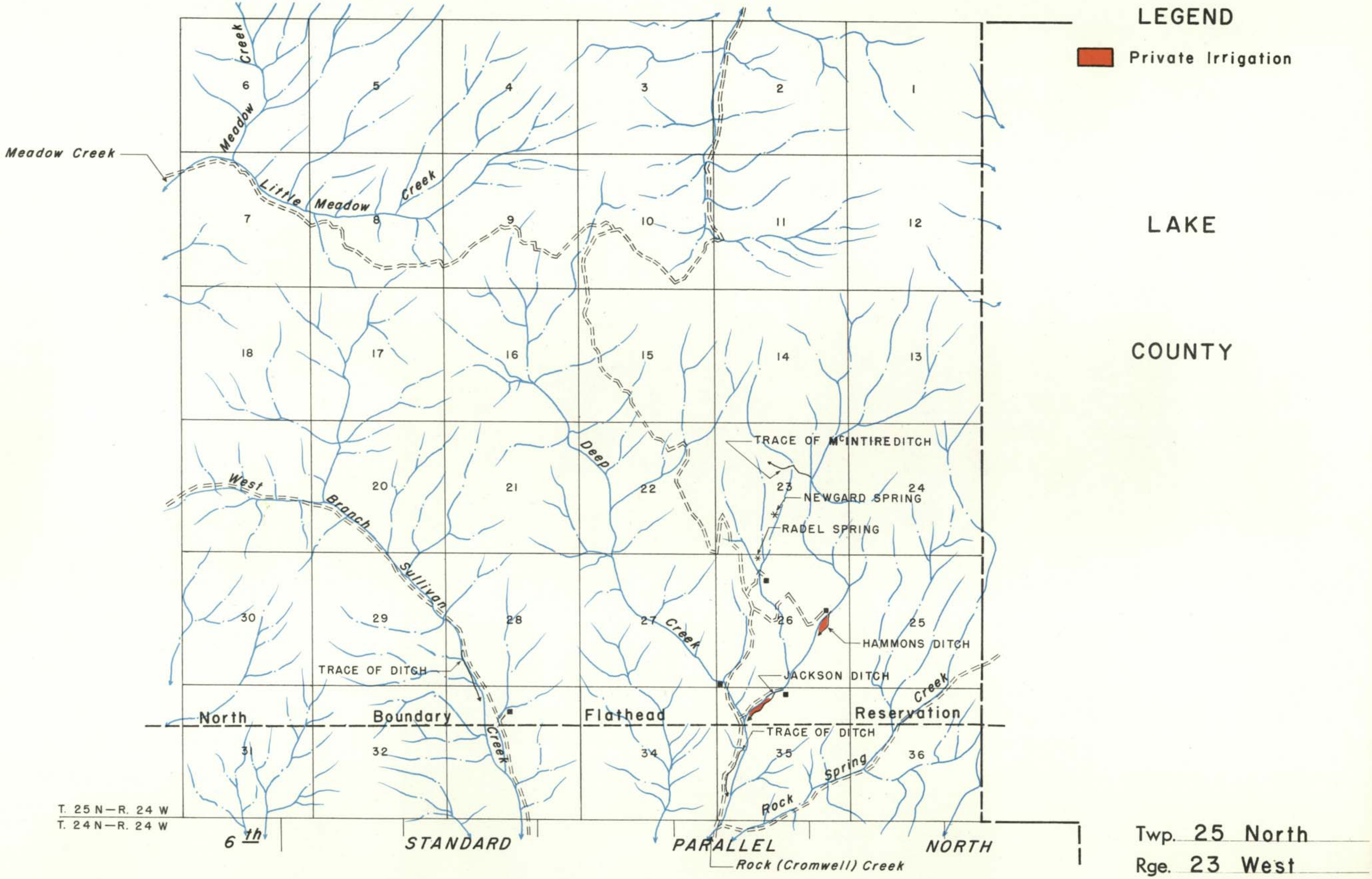
- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U. S. HIGHWAY
- AIRPORT

STRUCTURES & UNITS

- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT



Twp. 24 North
Rge. 23 West



LEGEND
Private Irrigation
LAKE
COUNTY
Meadow Creek
Meadow Creek
Little Meadow Creek
1
2
3
4
5
6
7
8
9
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11
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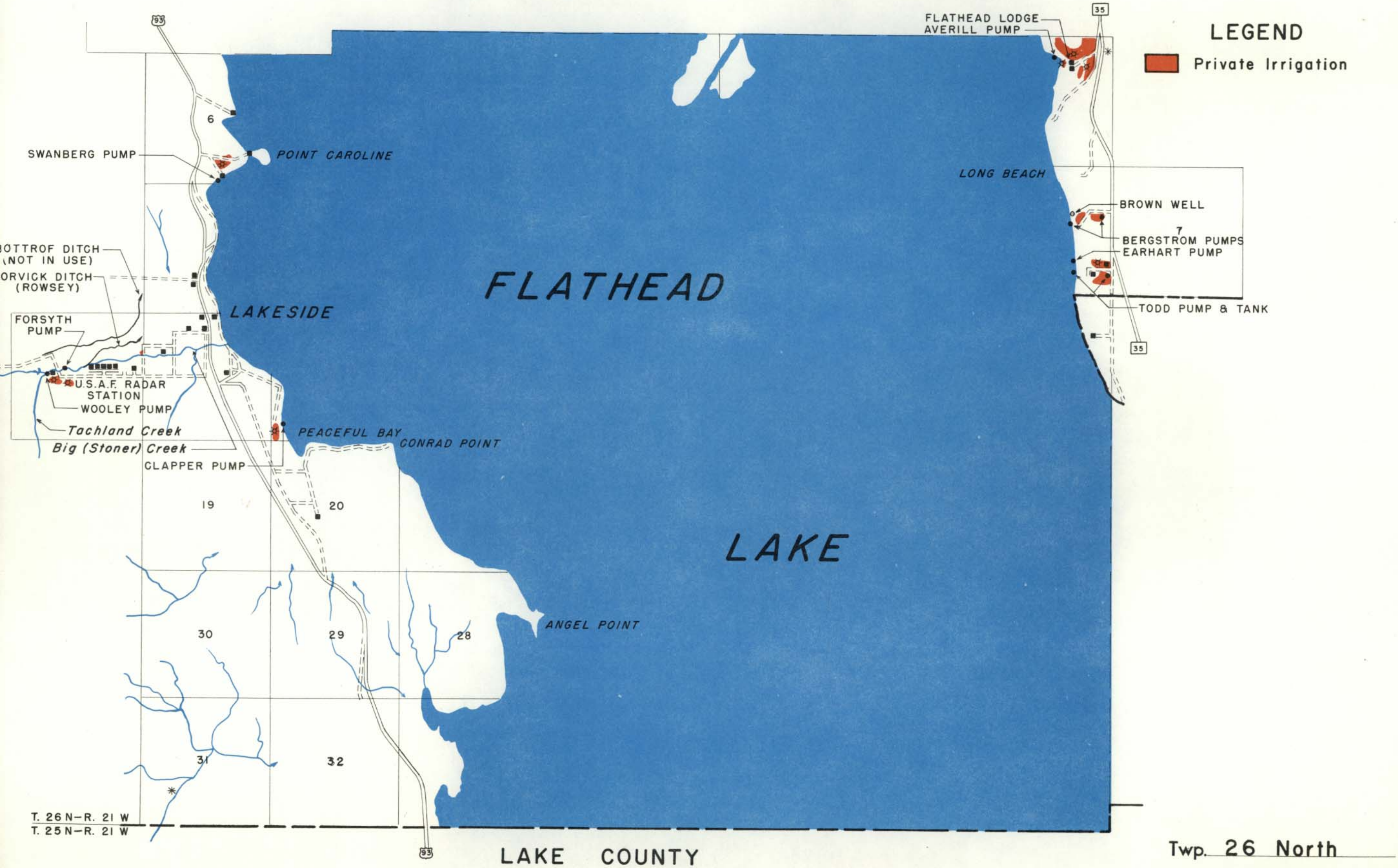
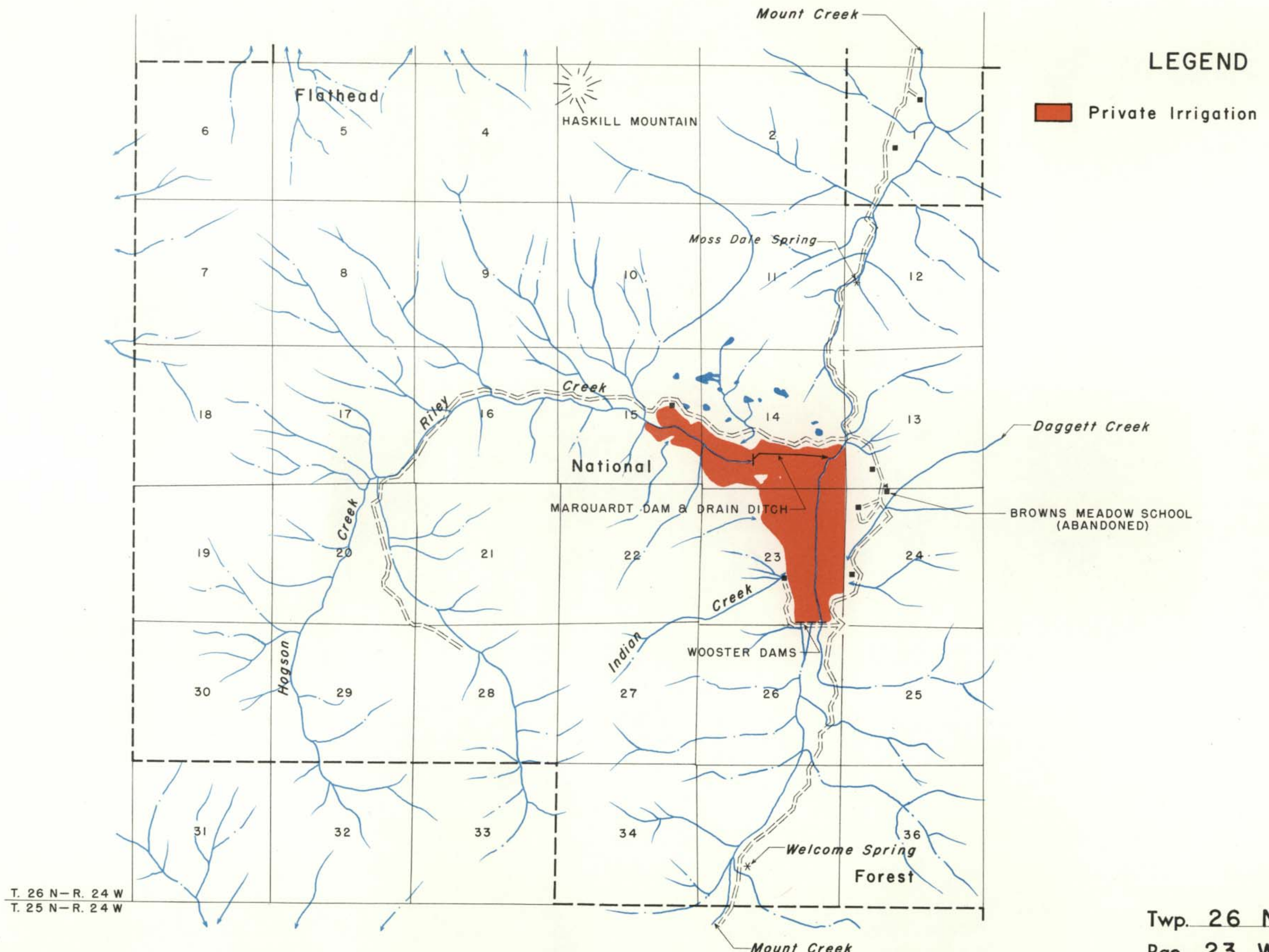
32
34
35
36
Deep Creek
West Branch Sullivan Creek
TRACE OF McINTIRE DITCH
NEWGARD SPRING
RADEL SPRING
HAMMONS DITCH
JACKSON DITCH
TRACE OF DITCH
TRACE OF DITCH
North Boundary Flathead Reservation
Creek
Spring Creek
Rock Spring Creek
T. 25 N—R. 24 W
T. 24 N—R. 24 W
6 th STANDARD PARALLEL NORTH
Rock (Cromwell) Creek
Twp. 25 North
Rge. 23 West

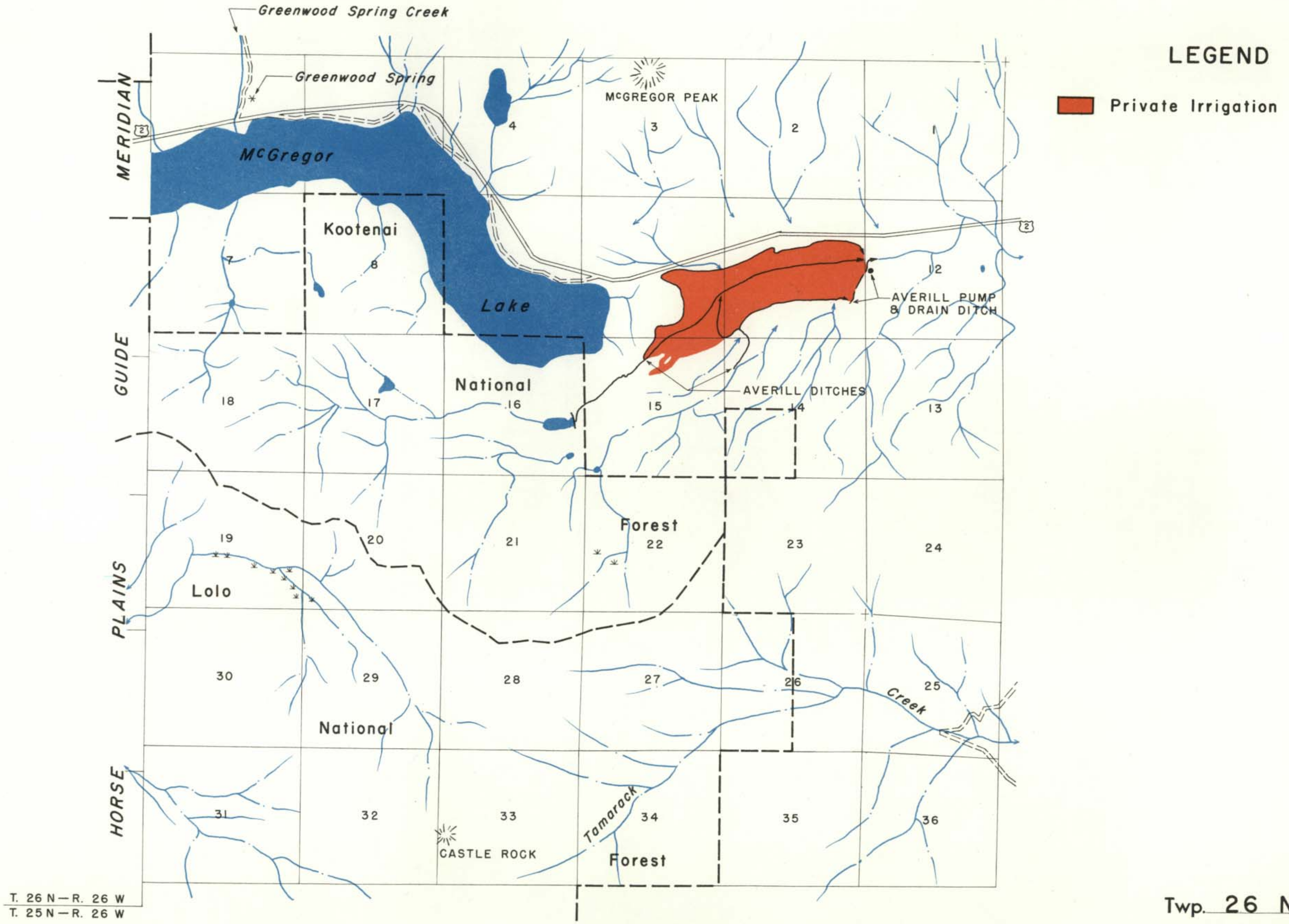


Twp. 26 North
Rge. 19, 20 & 21 West



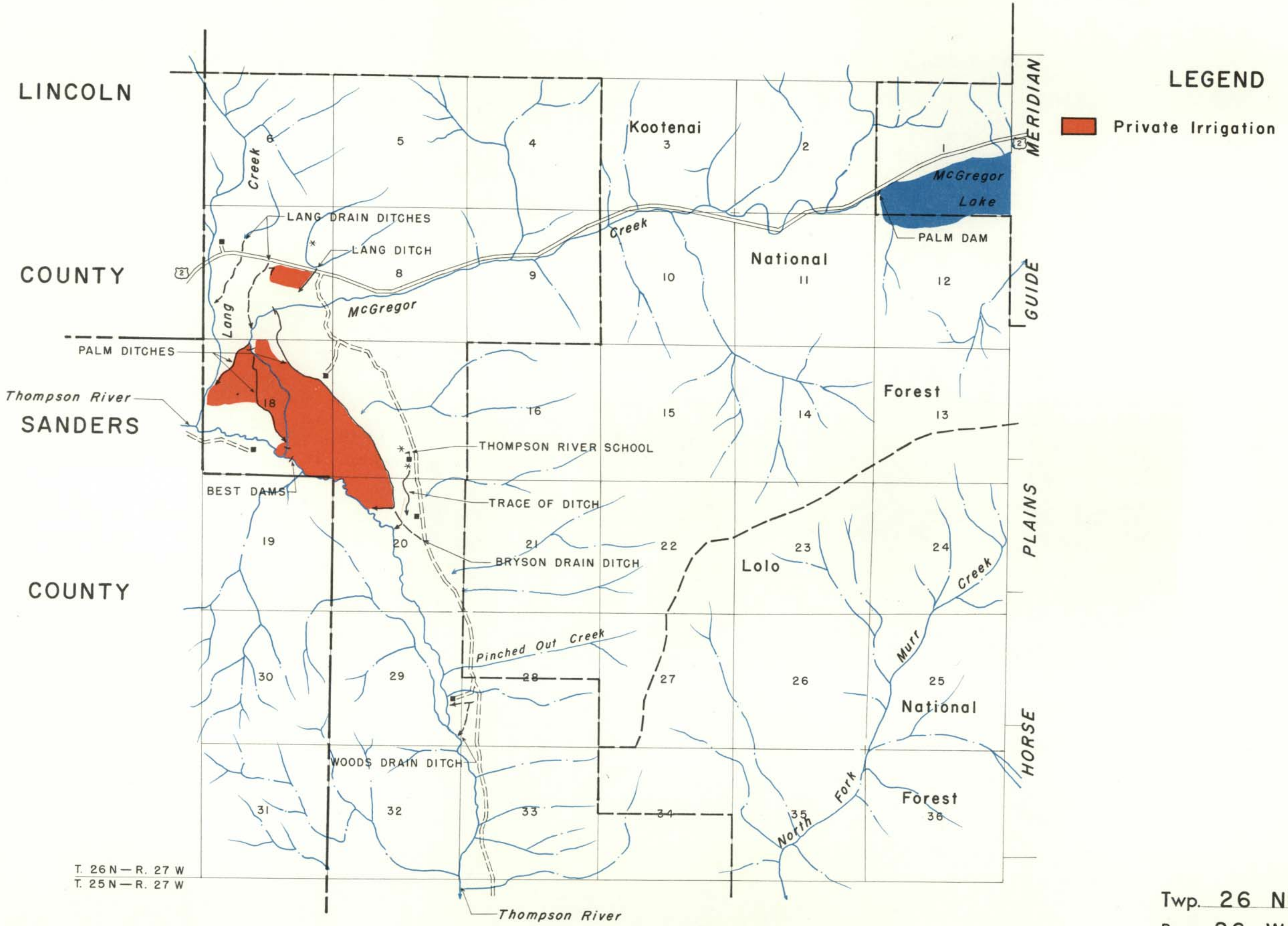
Twp. 26 North

Rge. 23 West



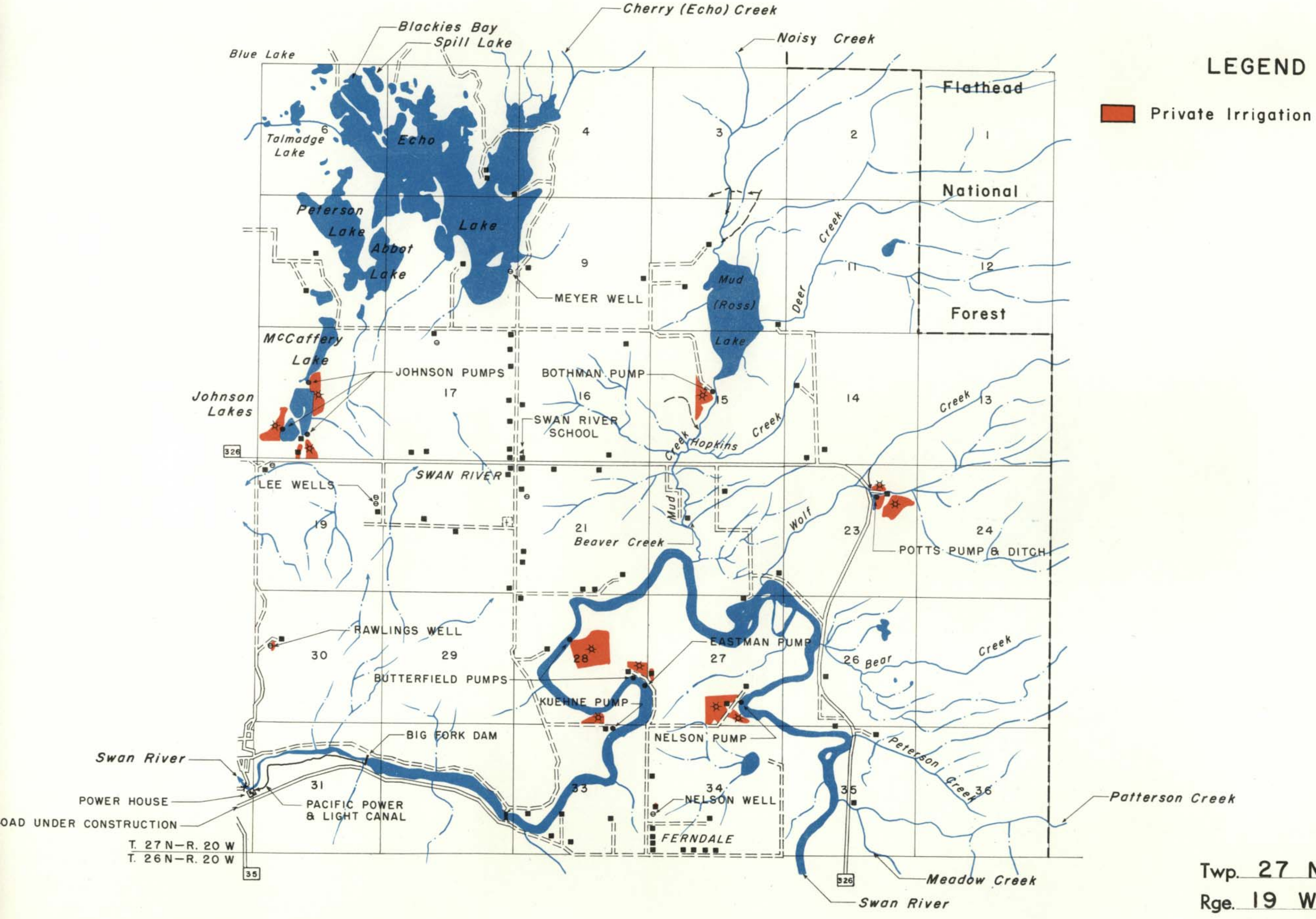
Twp. 26 North

Rge. 25 West



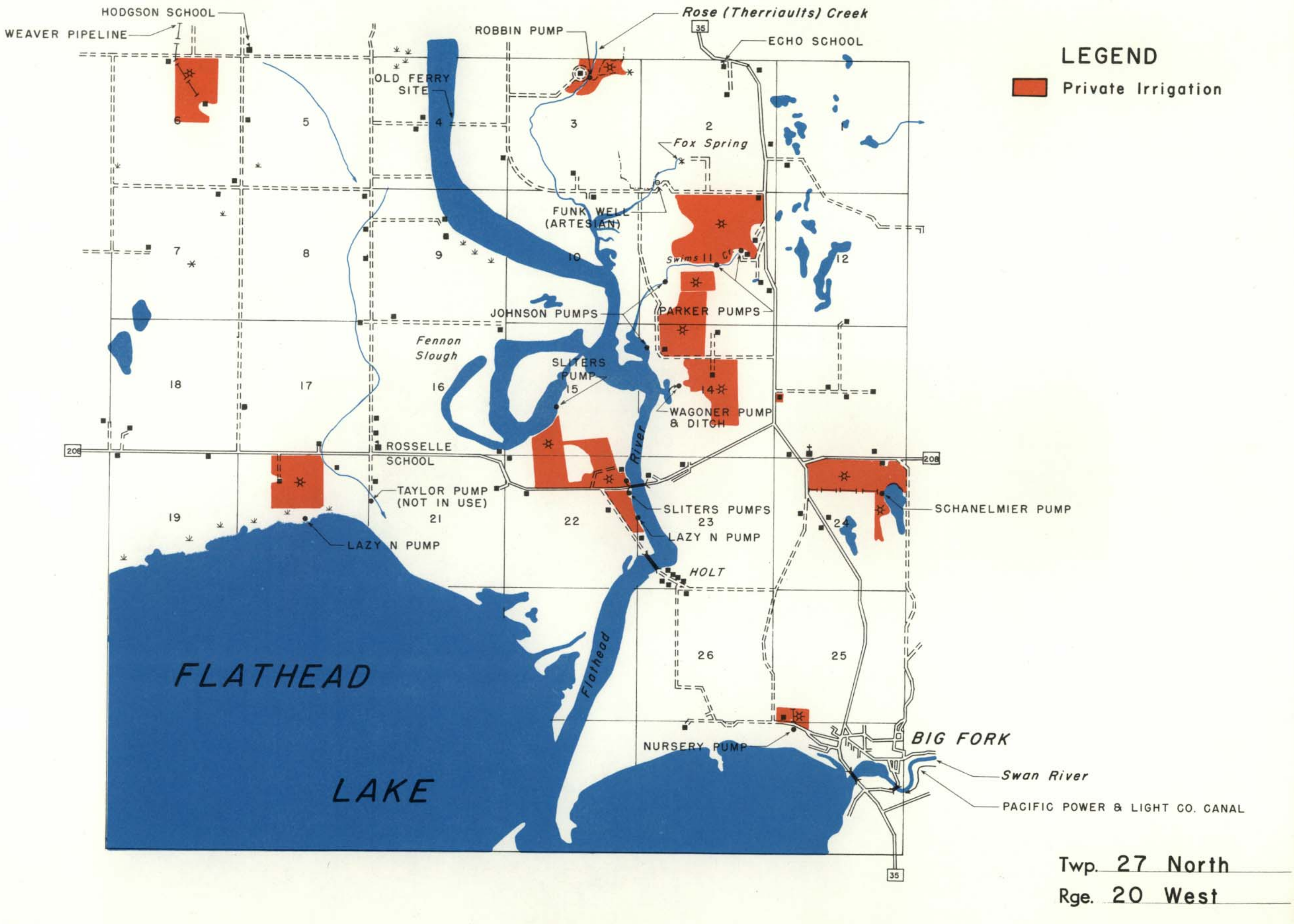
Twp. 26 North

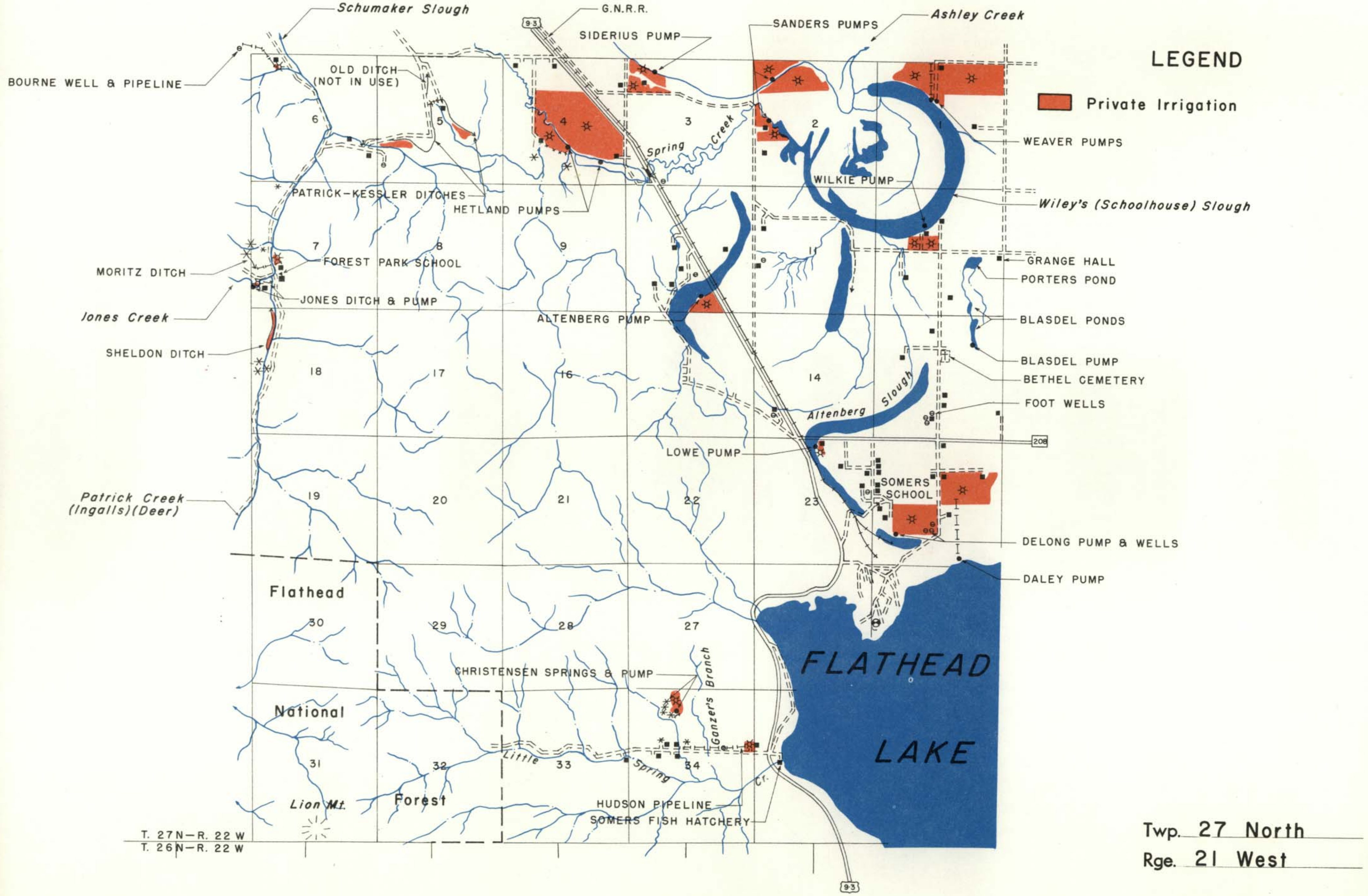
Rge. 26 West



Twp. 27 North

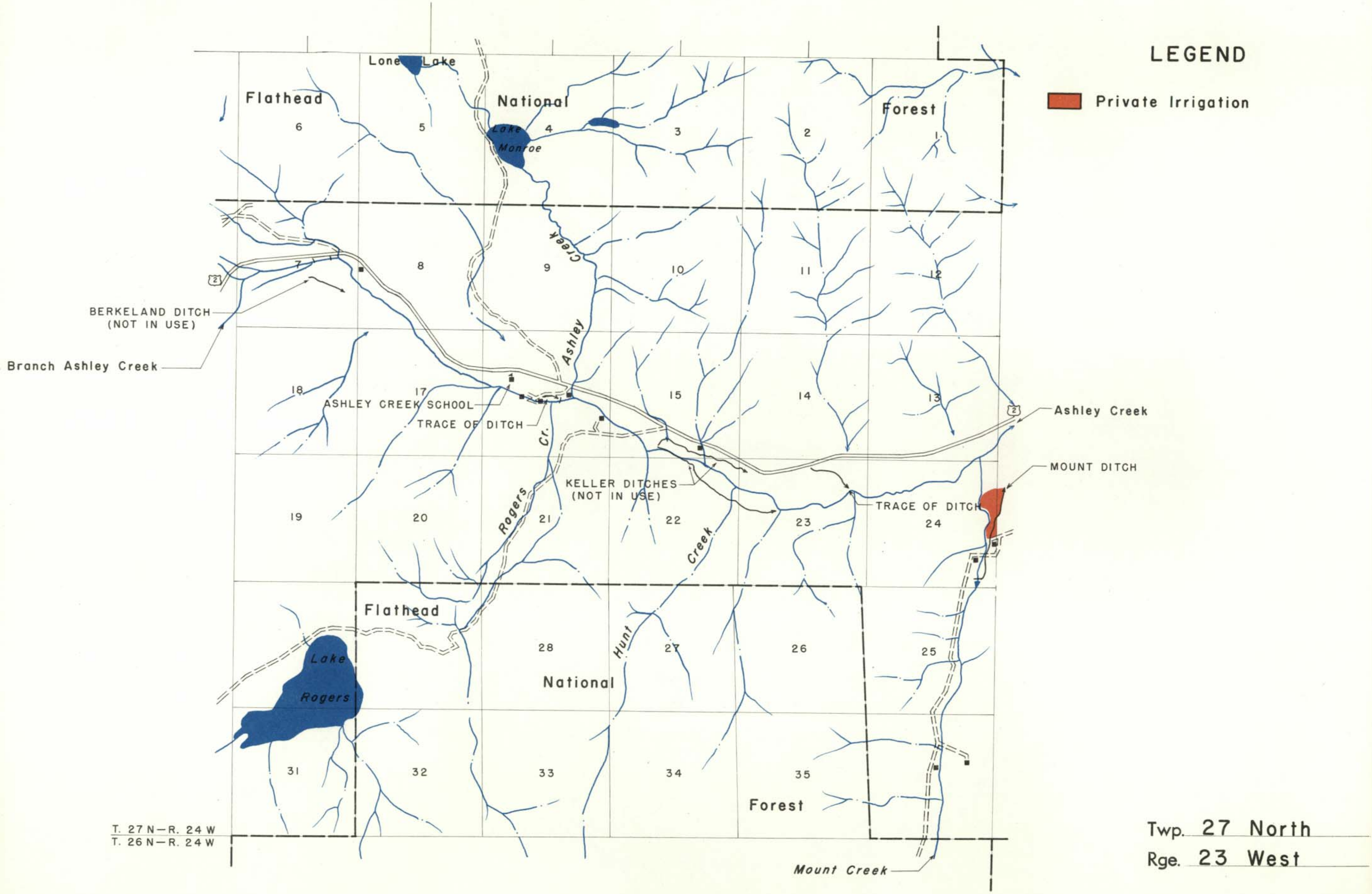
Rge. 19 West


HODGSON SCHOOL
WEAVER PIPELINE
ROBBIN PUMP
Rose (Therriaults) Creek
ECHO SCHOOL
OLD FERRY SITE
Fox Spring
FUNK WELL (ARTESIAN)
Swims
JOHNSON PUMPS
PARKER PUMPS
Fennon Slough
SLITERS PUMP
WAGONER PUMP & DITCH
ROSSELLE SCHOOL
TAYLOR PUMP (NOT IN USE)
SLITERS PUMPS
LAZY N PUMP
LAZY N PUMP
SCHANELMIER PUMP
HOLT
River
Flathead
FLATHEAD
LAKE
NURSERY PUMP
BIG FORK
Swan River
PACIFIC POWER & LIGHT CO. CANAL
LEGEND
Private Irrigation
Twp. 27 North
Rge. 20 West



Twp. 27 North

Rge. 21 West


LEGEND
Private Irrigation
Flathead
National
Forest
Lone Lake
Lake Monroe
Ashley Creek
BERKELAND DITCH
(NOT IN USE)
Branch Ashley Creek
ASHLEY CREEK SCHOOL
TRACE OF DITCH
Rogers Cr.
KELLER DITCHES
(NOT IN USE)
Creek
Ashley Creek
MOUNT DITCH
TRACE OF DITCH
Flathead
Lake Rogers
National
Hunt Creek
Forest
Mount Creek
T. 27 N—R. 24 W
T. 26 N—R. 24 W
Twp. 27 North
Rge. 23 West
6
5
4
3
2
1
7
8
9
10
11
12
18
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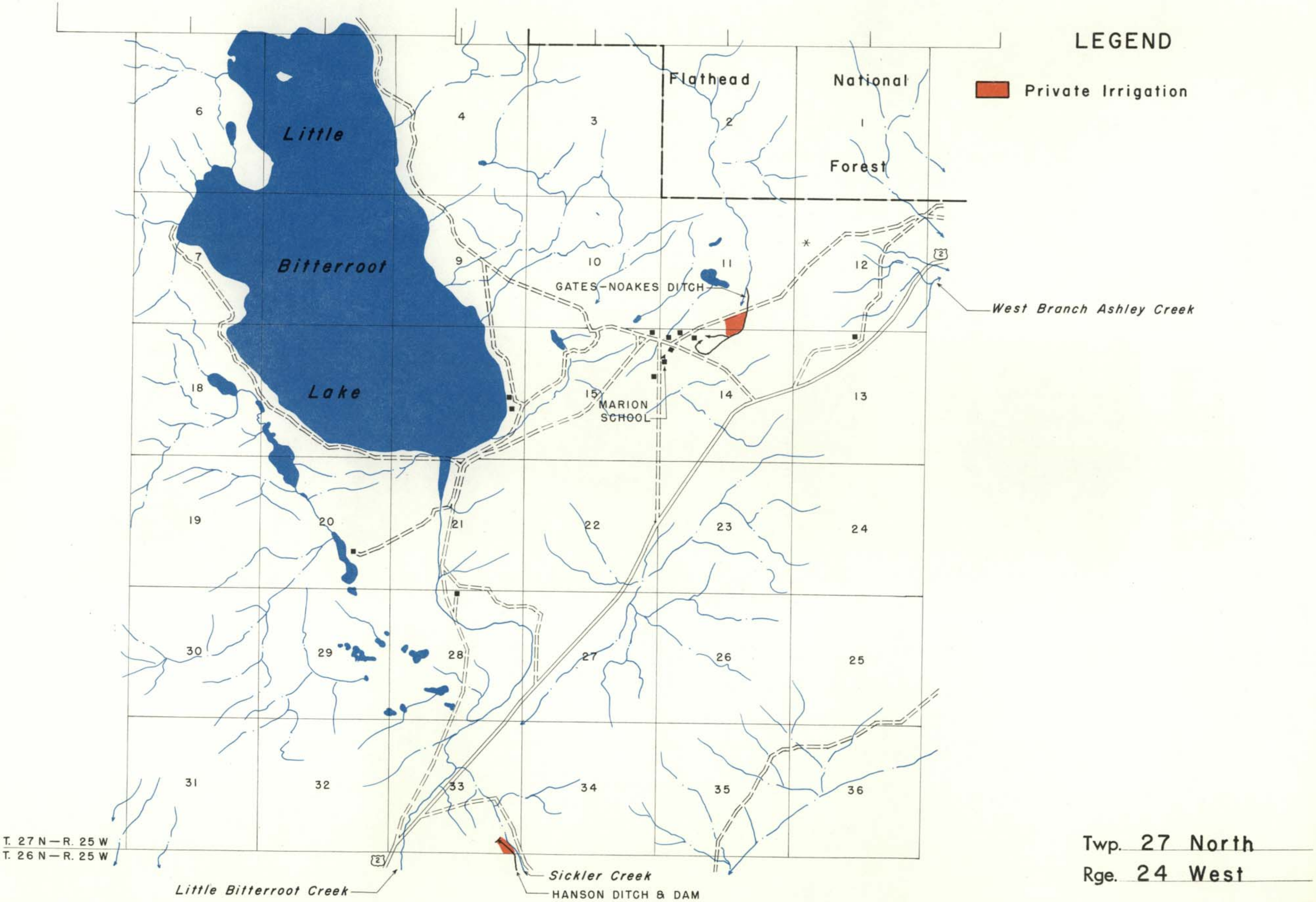
LEGEND
Private Irrigation
Flathead National Forest
Little Bitterroot Lake
GATES-NOAKES DITCH
MARION SCHOOL
West Branch Ashley Creek
Little Bitterroot Creek
Sickler Creek
HANSON DITCH & DAM
T. 27 N — R. 25 W
T. 26 N — R. 25 W
Twp. 27 North
Rge. 24 West
6
4
3
2
1
7
9
10
11
12
18
15
14
13
19
20
21
22
23
24
30
29
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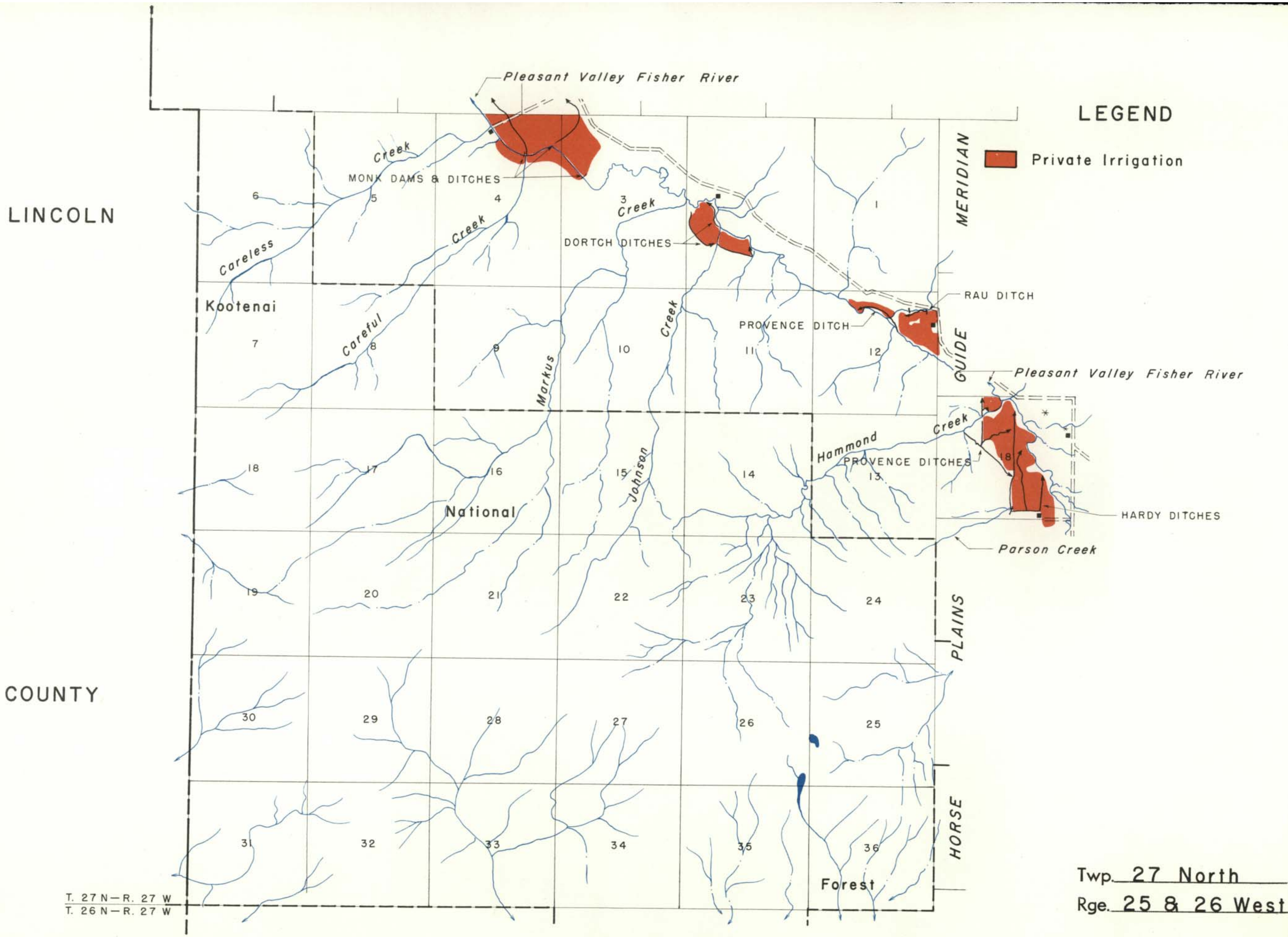
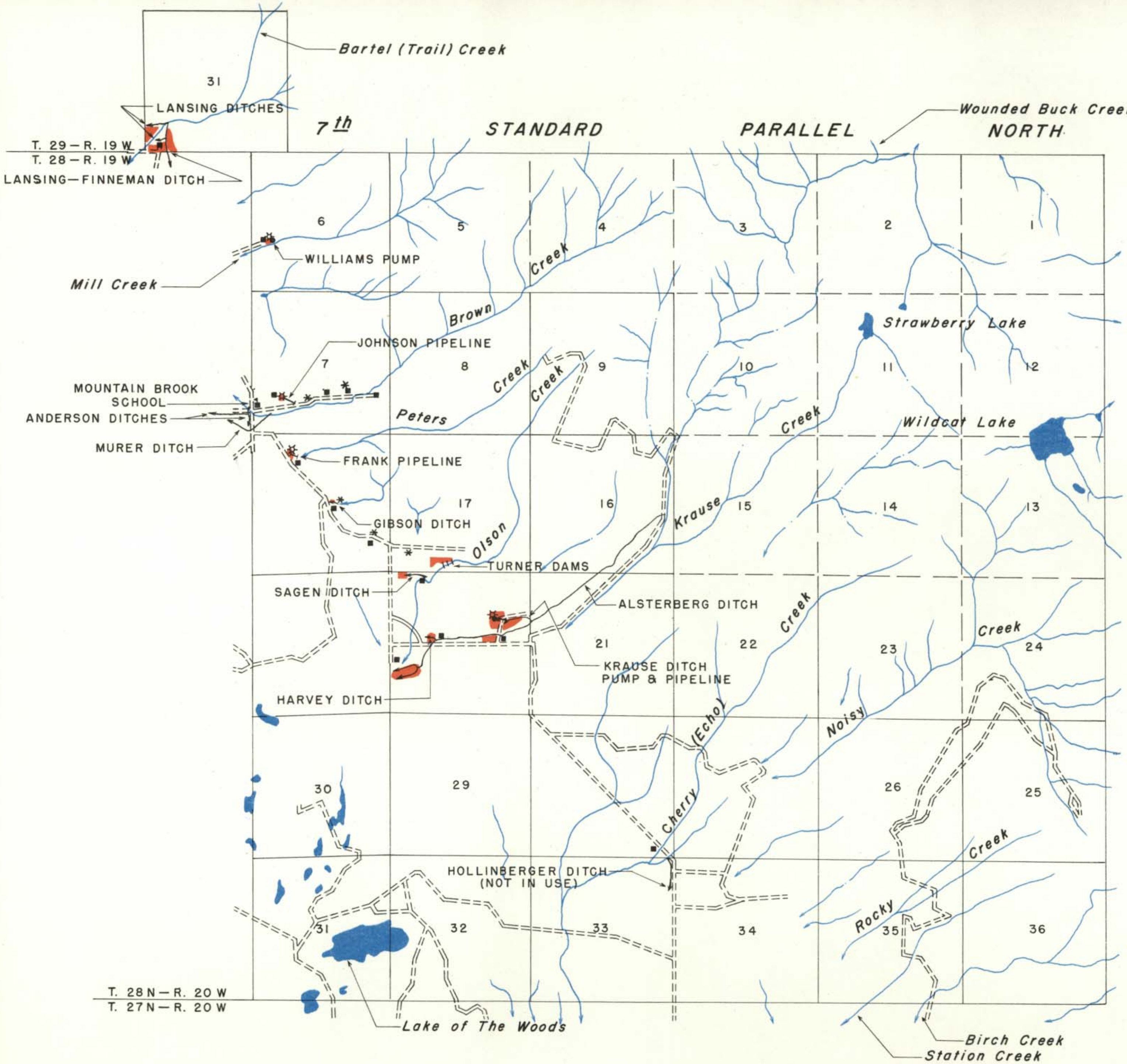
36



LEGEND
Private Irrigation
Pleasant Valley Fisher River
LINCOLN
COUNTY
Kootenai
National
Forest
MERIDIAN
GUIDE
PLAINS
HORSE
Creek
MONK DAMS & DITCHES
Careless
Creek
Careful
Creek
Markus
DORTCH DITCHES
Creek
Johnson
RAU DITCH
PROVENCE DITCH
Pleasant Valley Fisher River
Hammond
Creek
PROVENCE DITCHES
HARDY DITCHES
Parson Creek
T. 27 N — R. 27 W
T. 26 N — R. 27 W
Twp. 27 North
Rge. 25 & 26 West

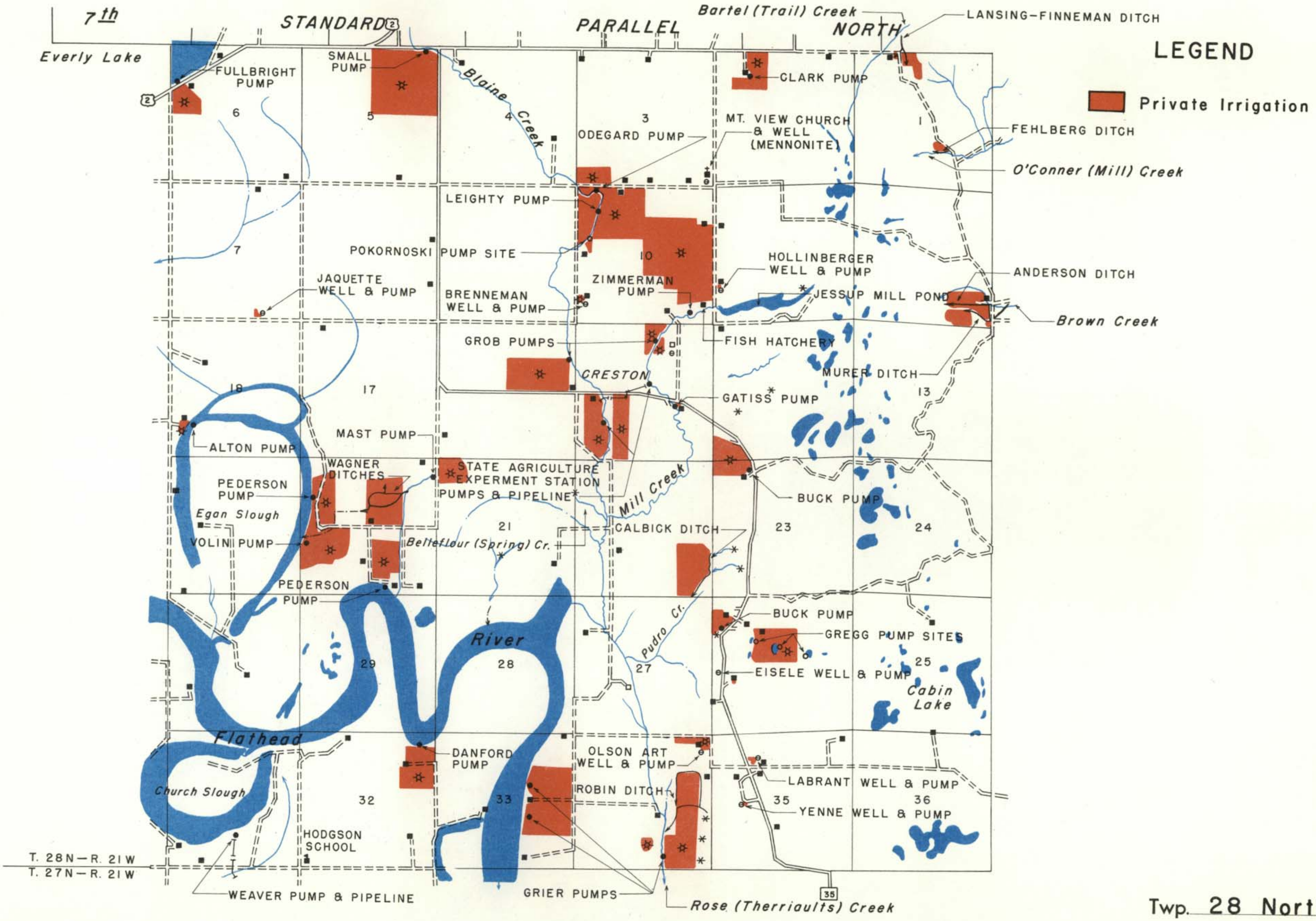


LEGEND

Private Irrigation

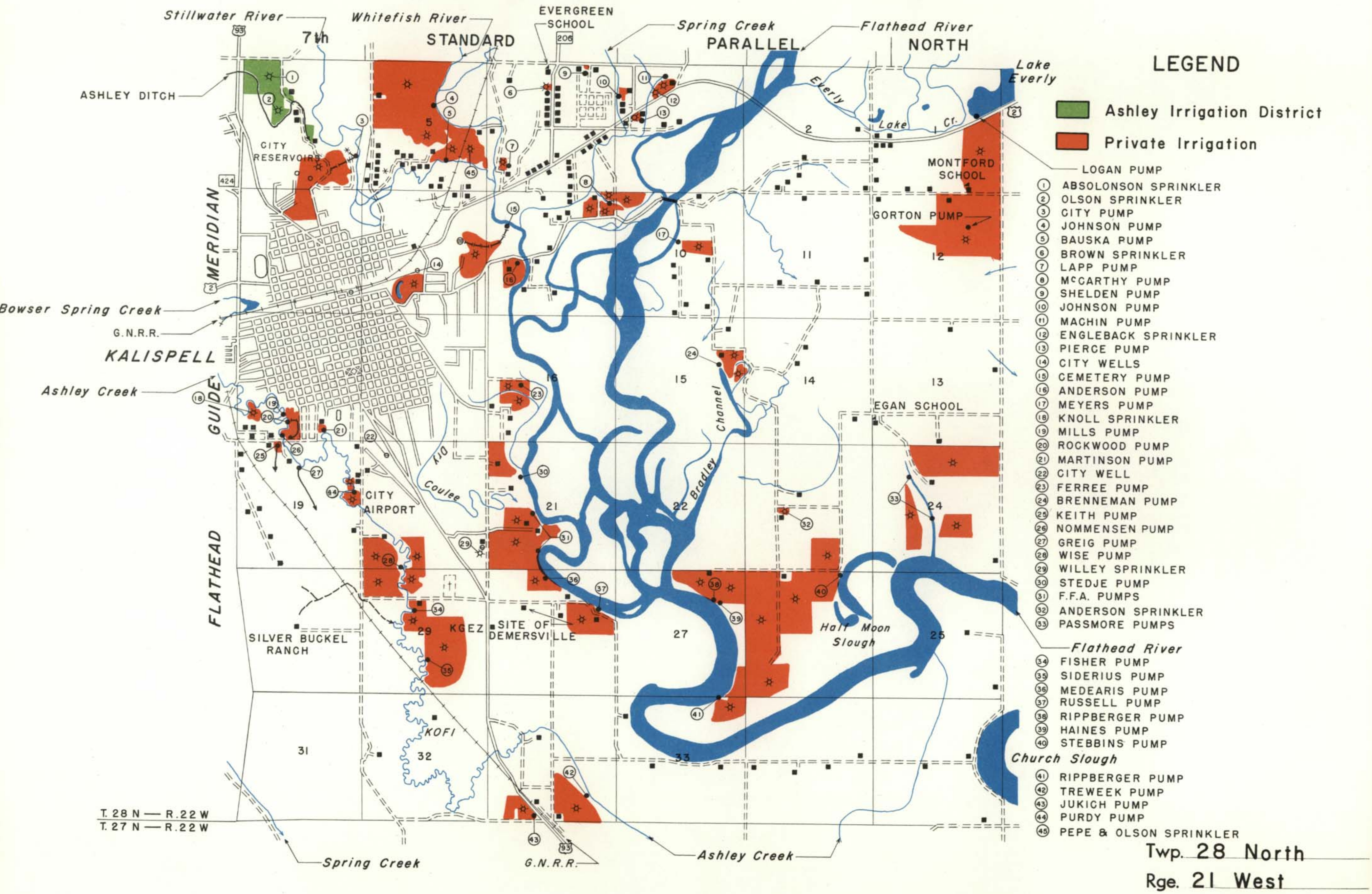
Twp. 28 & 29 North

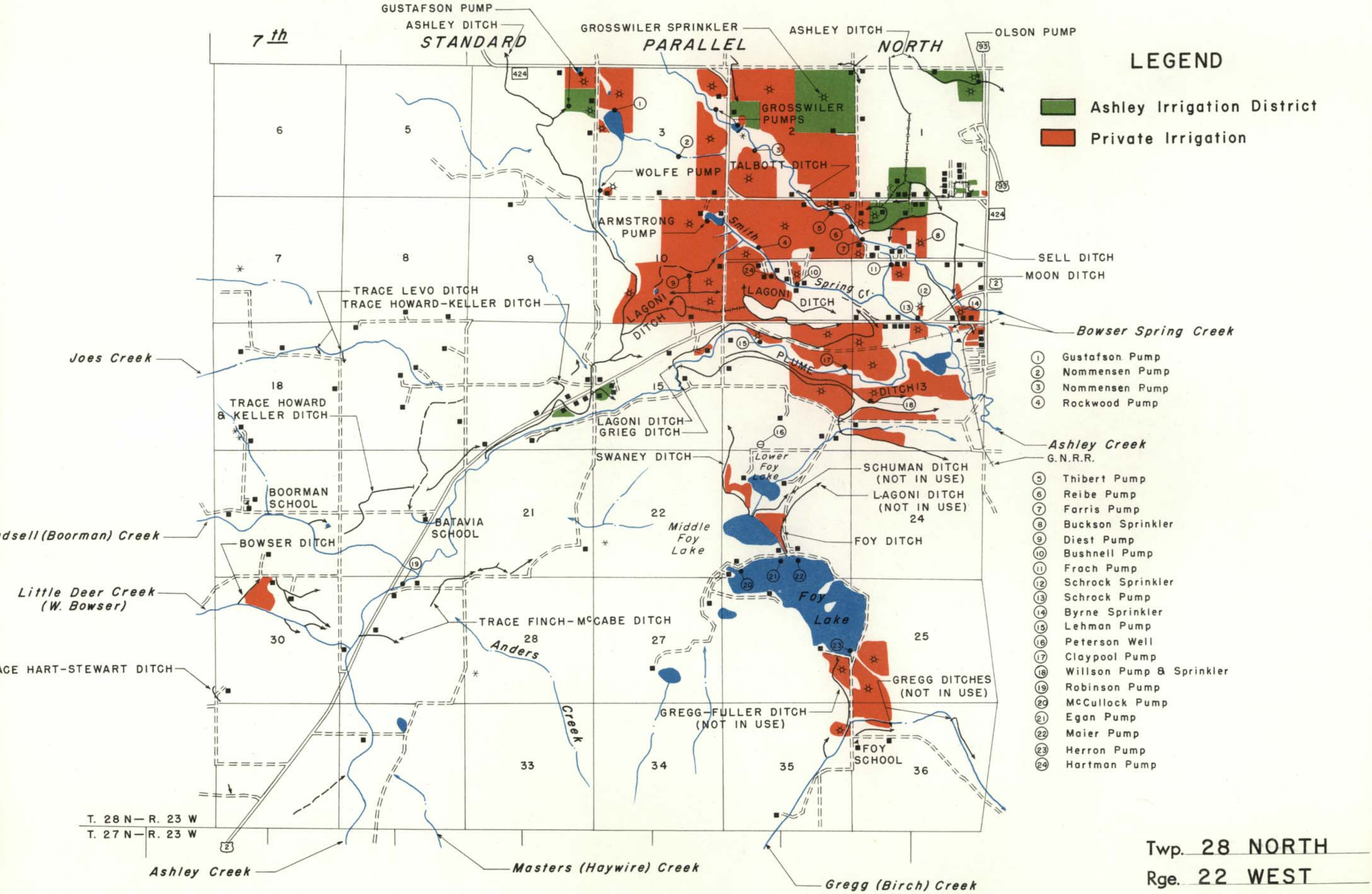
Rge. 19 West



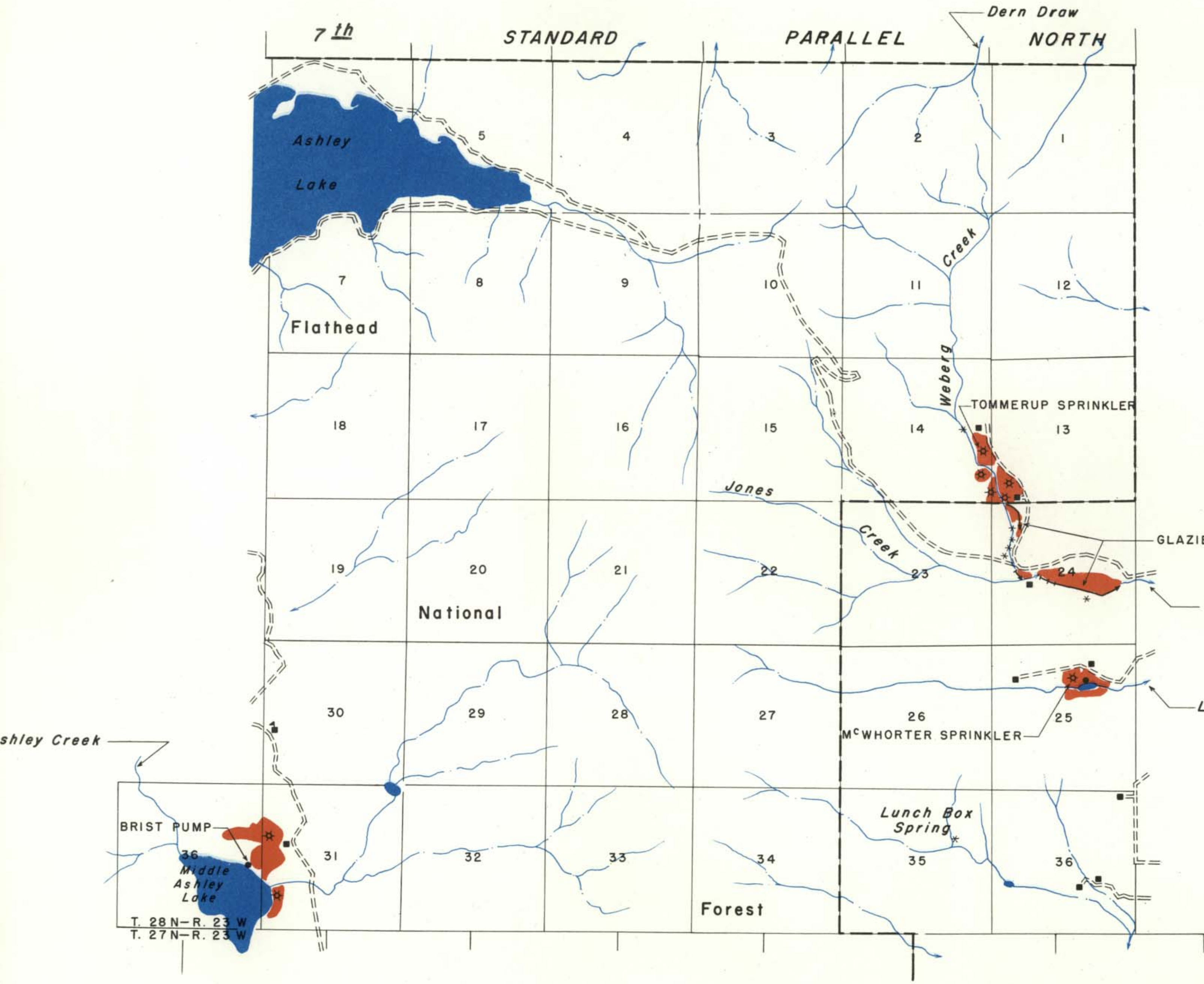
Twp. 28 North

Rge. 20 West


LEGEND
Ashley Irrigation District
Private Irrigation
LOGAN PUMP
1 ABSOLONSON SPRINKLER
2 OLSON SPRINKLER
3 CITY PUMP
4 JOHNSON PUMP
5 BAUSKA PUMP
6 BROWN SPRINKLER
7 LAPP PUMP
8 McCARTHY PUMP
9 SHELDEN PUMP
10 JOHNSON PUMP
11 MACHIN PUMP
12 ENGLEBACK SPRINKLER
13 PIERCE PUMP
14 CITY WELLS
15 CEMETERY PUMP
16 ANDERSON PUMP
17 MEYERS PUMP
18 KNOLL SPRINKLER
19 MILLS PUMP
20 ROCKWOOD PUMP
21 MARTINSON PUMP
22 CITY WELL
23 FERREE PUMP
24 BRENNEMAN PUMP
25 KEITH PUMP
26 NOMMENSEN PUMP
27 GREIG PUMP
28 WISE PUMP
29 WILLEY SPRINKLER
30 STEDJE PUMP
31 F.F.A. PUMPS
32 ANDERSON SPRINKLER
33 PASSMORE PUMPS
Flathead River
34 FISHER PUMP
35 SIDERIUS PUMP
36 MEDEARIS PUMP
37 RUSSELL PUMP
38 RIPPBERGER PUMP
39 HAINES PUMP
40 STEBBINS PUMP
Church Slough
41 RIPPBERGER PUMP
42 TREWEEK PUMP
43 JUKICH PUMP
44 PURDY PUMP
45 PEPE & OLSON SPRINKLER
Stillwater River
Whitefish River
EVERGREEN SCHOOL
Spring Creek
Flathead River
7th STANDARD PARALLEL NORTH
Lake Everly
Everly Lake Cr.
ASHLEY DITCH
CITY RESERVOIRS
MONTFORD SCHOOL
GORTON PUMP
MERIDIAN
Bowser Spring Creek
G.N.R.R.
KALISPELL
Ashley Creek
GUIDE
EGAN SCHOOL
Channel
Bradley
Dry Coulee
CITY AIRPORT
FLATHEAD
SILVER BUCKEL RANCH
KGEZ
SITE OF DEMERSVILLE
Half Moon Slough
KOFI
T. 28 N — R. 22 W
T. 27 N — R. 22 W
Spring Creek
G.N.R.R.
Ashley Creek
Twp. 28 North
Rge. 21 West



7th STANDARD PARALLEL NORTH
GUSTAFSON PUMP
ASHLEY DITCH
GROSSWILER SPRINKLER
ASHLEY DITCH
OLSON PUMP
LEGEND
Ashley Irrigation District
Private Irrigation
GROSSWILER PUMPS
WOLFE PUMP
TALBOTT DITCH
ARMSTRONG PUMP
Smith
LAGONI DITCH
LAGONI DITCH
Spring Cr.
SELL DITCH
MOON DITCH
Bowser Spring Creek
TRACE LEVO DITCH
TRACE HOWARD-KELLER DITCH
Joes Creek
TRACE HOWARD & KELLER DITCH
PLUME DITCH
LAGONI DITCH
GRIEG DITCH
SWANEY DITCH
Lower Foy Lake
Ashley Creek
G.N.R.R.
SCHUMAN DITCH (NOT IN USE)
LAGONI DITCH (NOT IN USE)
BOORMAN SCHOOL
BATAVIA SCHOOL
Middle Foy Lake
FOY DITCH
dsell (Boorman) Creek
BOWSER DITCH
Little Deer Creek (W. Bowser)
Foy Lake
TRACE FINCH-McCABE DITCH
Anders Creek
CE HART-STEWART DITCH
GREGG DITCHES (NOT IN USE)
GREGG-FULLER DITCH (NOT IN USE)
FOY SCHOOL
T. 28 N — R. 23 W
T. 27 N — R. 23 W
Ashley Creek
Masters (Haywire) Creek
Gregg (Birch) Creek
1 Gustafson Pump
2 Nommensen Pump
3 Nommensen Pump
4 Rockwood Pump
5 Thibert Pump
6 Reibe Pump
7 Farris Pump
8 Buckson Sprinkler
9 Diest Pump
10 Bushnell Pump
11 Frach Pump
12 Schrock Sprinkler
13 Schrock Pump
14 Byrne Sprinkler
15 Lehman Pump
16 Peterson Well
17 Claypool Pump
18 Willson Pump & Sprinkler
19 Robinson Pump
20 McCullock Pump
21 Egan Pump
22 Maier Pump
23 Herron Pump
24 Hartman Pump
Twp. 28 NORTH
Rge. 22 WEST

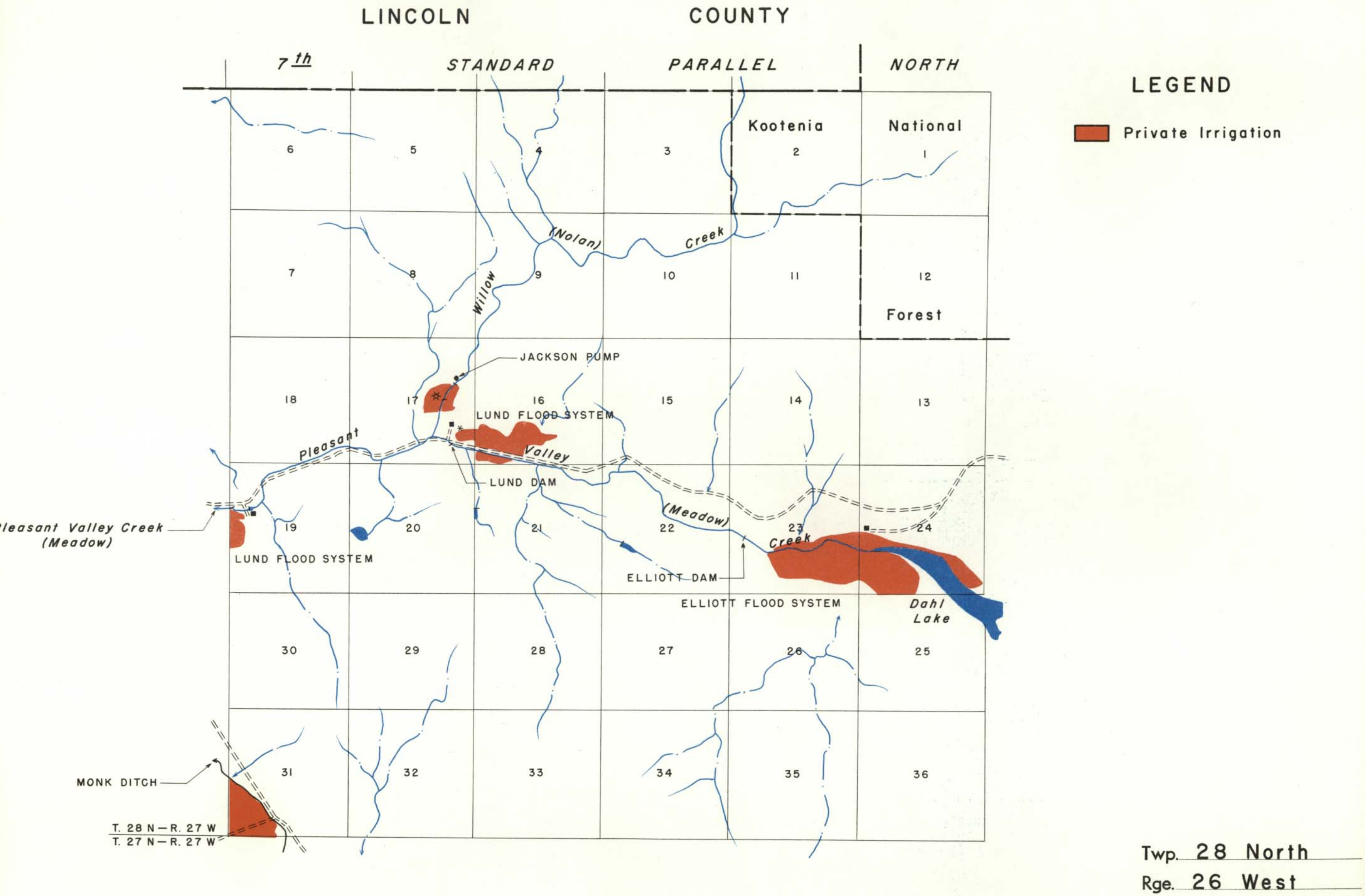


LEGEND

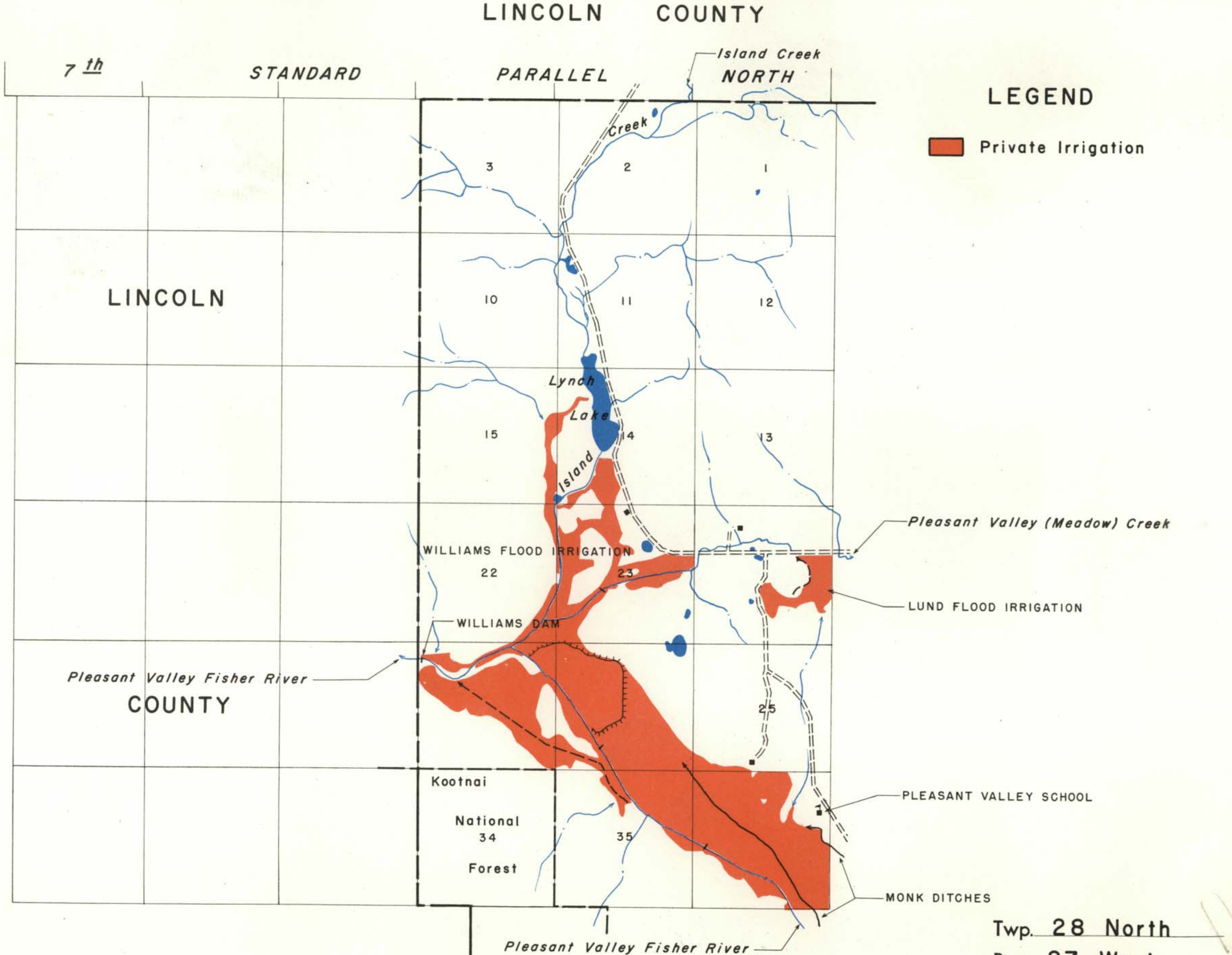
Private Irrigation

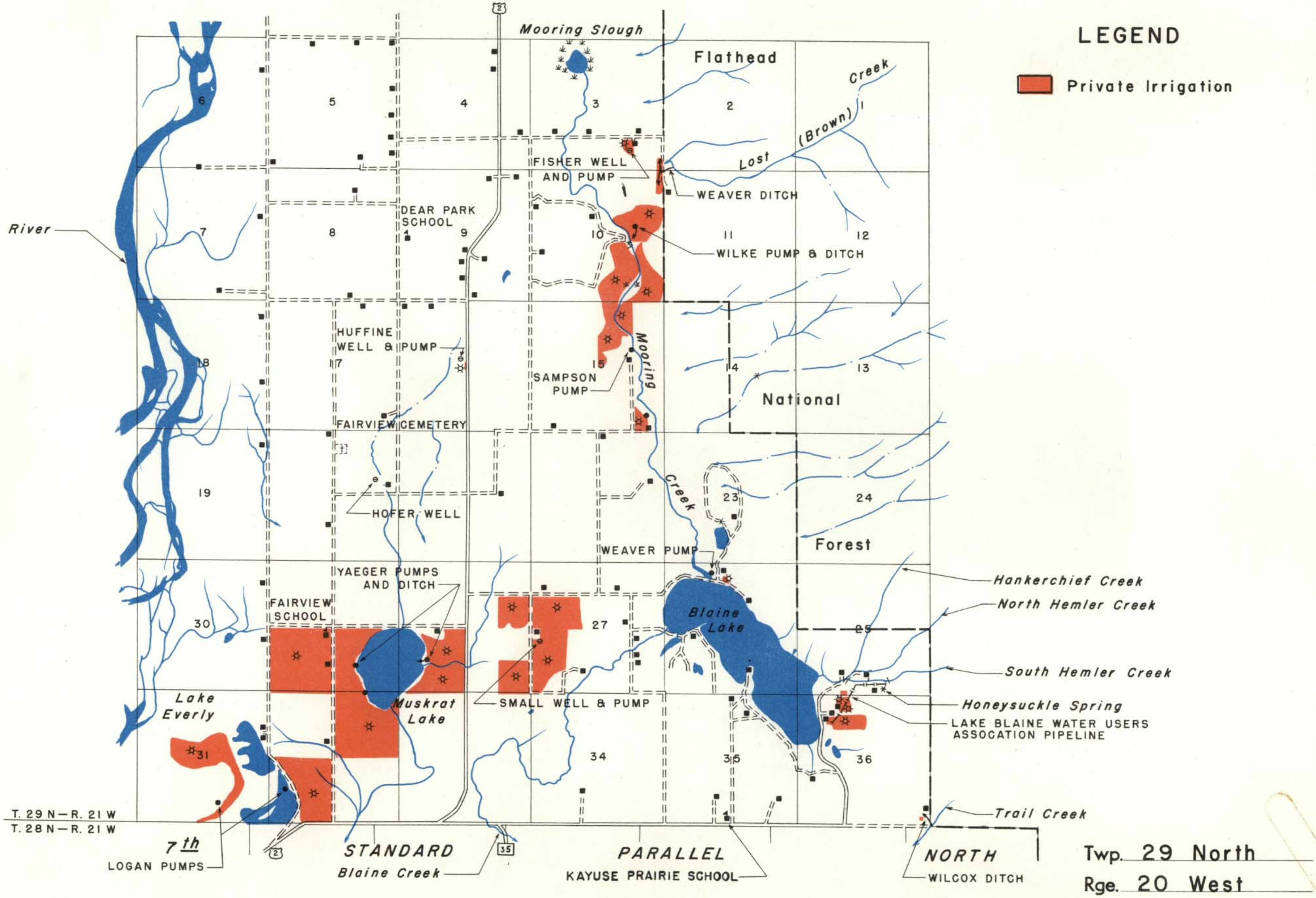
Twp. 28 North

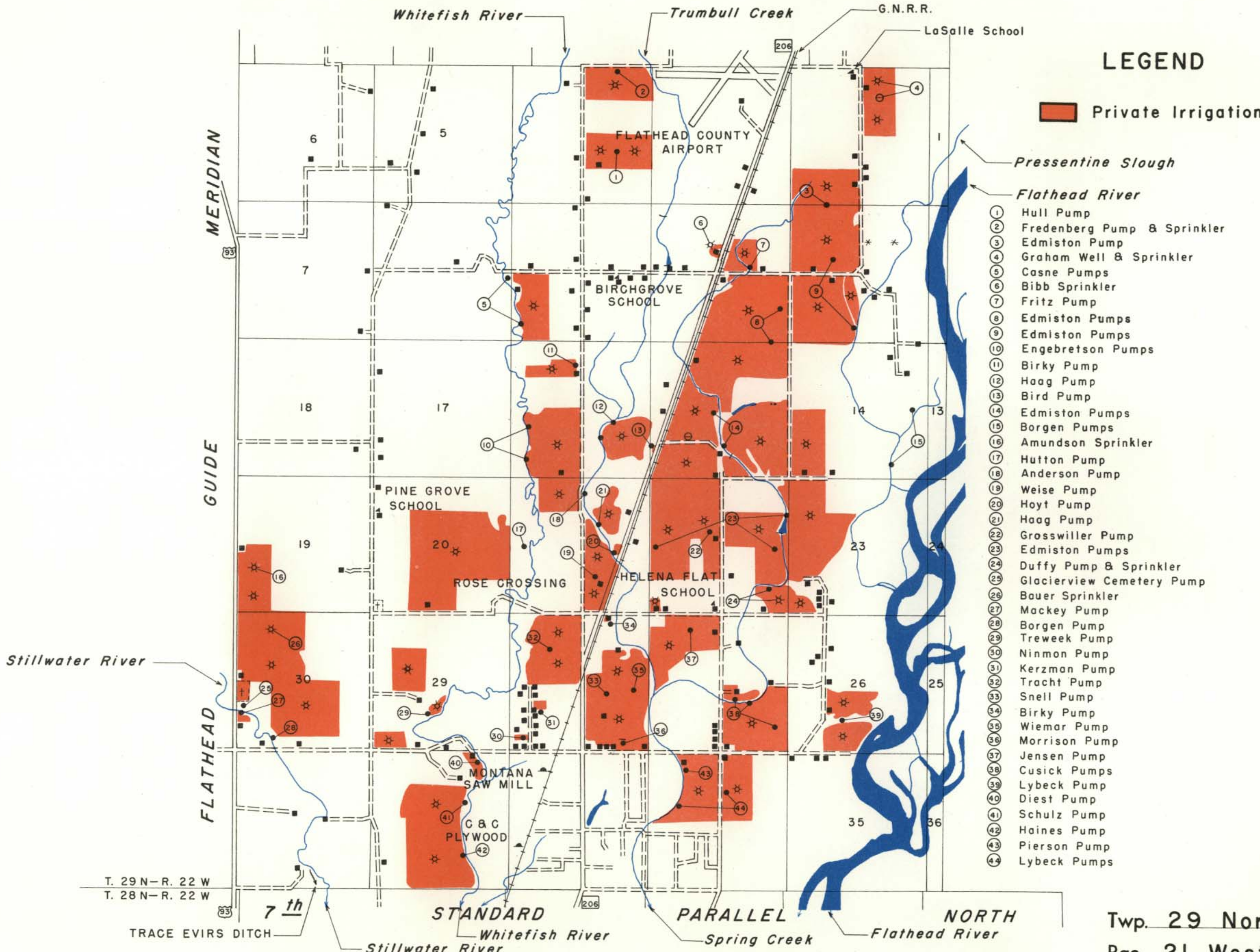
Rge. 23 & 24 West



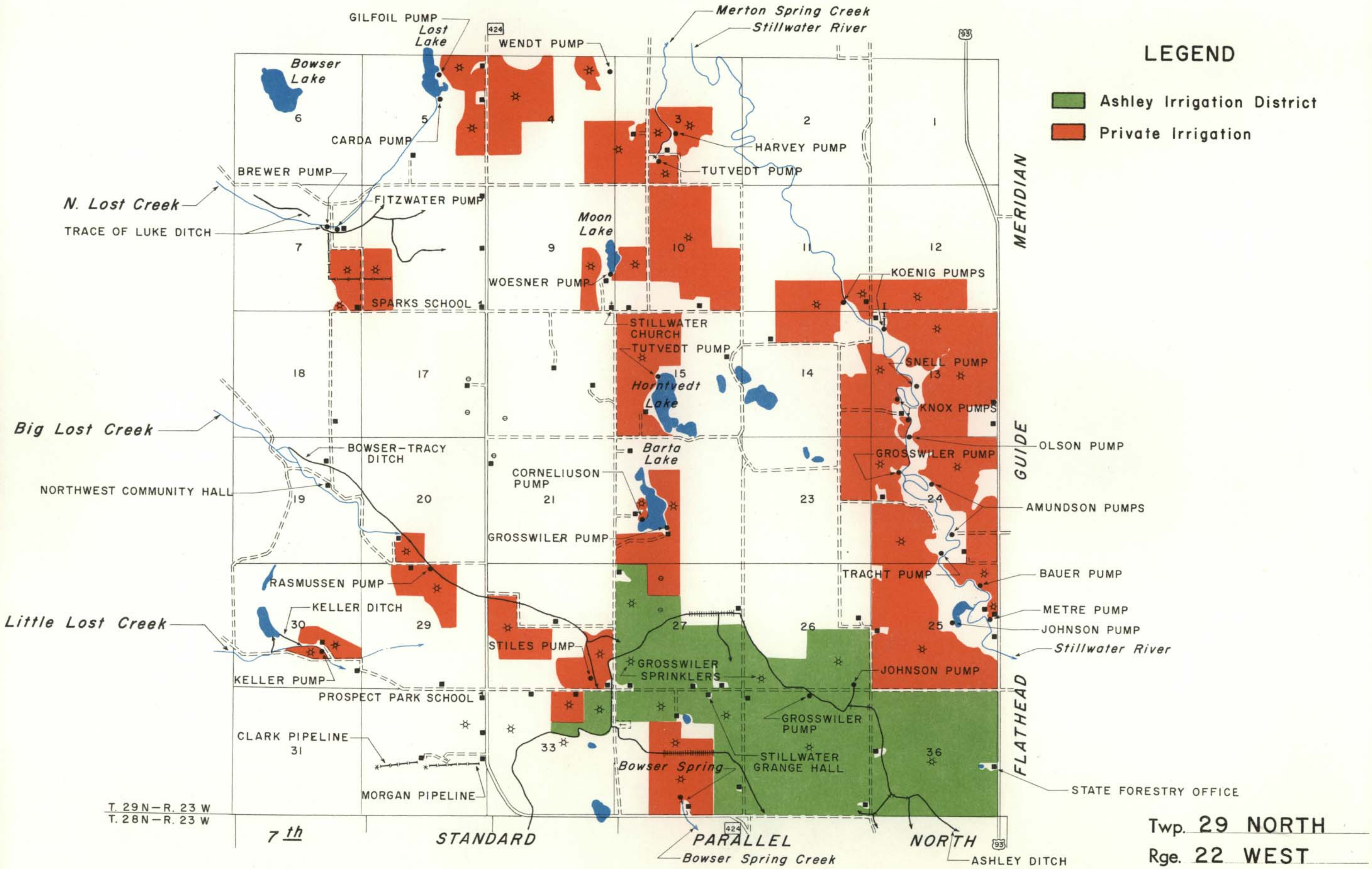
LINCOLN COUNTY
7th STANDARD PARALLEL NORTH
Kootenia National Forest
LEGEND
Private Irrigation
(Nolan) Creek
Willow
JACKSON PUMP
LUND FLOOD SYSTEM
Pleasant Valley
LUND DAM
(Meadow) Creek
leasant Valley Creek
(Meadow)
LUND FLOOD SYSTEM
ELLIOTT DAM
ELLIOTT FLOOD SYSTEM
Dahl Lake
MONK DITCH
T. 28 N – R. 27 W
T. 27 N – R. 27 W
6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
19 20 21 22 23 24
30 29 28 27 26 25
31 32 33 34 35 36
Twp. 28 North
Rge. 26 West

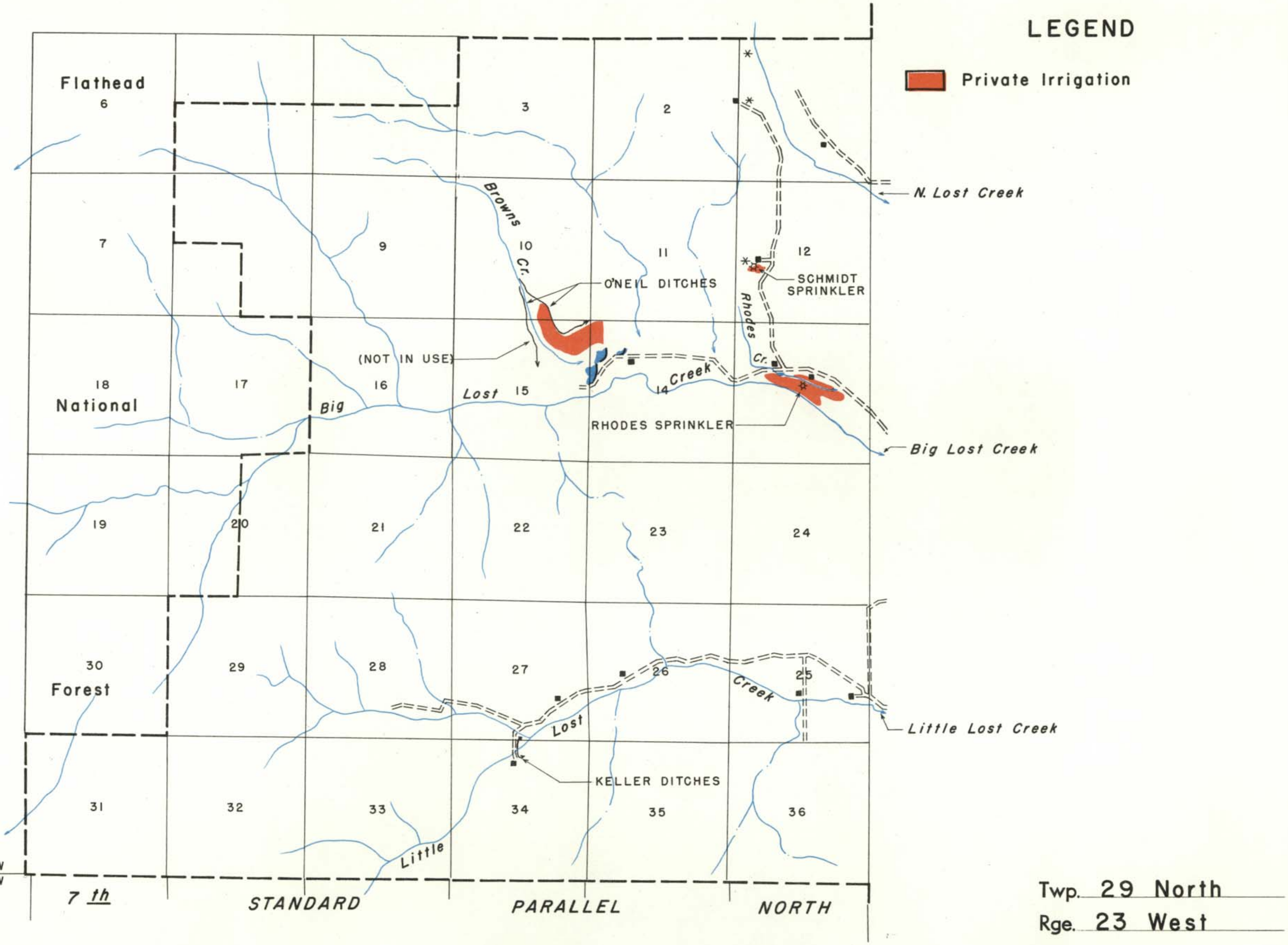

LINCOLN COUNTY
7 th STANDARD PARALLEL NORTH
Island Creek
LEGEND
Private Irrigation
Creek
3
2
1
LINCOLN
10
11
12
Lynch Lake
Island
15
14
13
Pleasant Valley (Meadow) Creek
WILLIAMS FLOOD IRRIGATION
22
23
LUND FLOOD IRRIGATION
WILLIAMS DAM
Pleasant Valley Fisher River
COUNTY
25
Kootnai National Forest
34
35
PLEASANT VALLEY SCHOOL
MONK DITCHES
Pleasant Valley Fisher River
Twp. 28 North
Rge. 27 West


LEGEND
Private Irrigation
Mooring Slough
Flathead
Creek
Lost (Brown)
Flathead River
FISHER WELL AND PUMP
WEAVER DITCH
DEAR PARK SCHOOL
WILKE PUMP & DITCH
HUFFINE WELL & PUMP
SAMPSON PUMP
Mooring
National
FAIRVIEW CEMETERY
Creek
HOFER WELL
Forest
WEAVER PUMP
YAEGER PUMPS AND DITCH
Hankerchief Creek
North Hemler Creek
FAIRVIEW SCHOOL
Blaine Lake
South Hemler Creek
Lake Everly
Muskrat Lake
SMALL WELL & PUMP
Honeysuckle Spring
LAKE BLAINE WATER USERS ASSOCATION PIPELINE
Trail Creek
T. 29 N—R. 21 W
T. 28 N—R. 21 W
7 th
STANDARD
PARALLEL
NORTH
LOGAN PUMPS
Blaine Creek
KAYUSE PRAIRIE SCHOOL
WILCOX DITCH
Twp. 29 North
Rge. 20 West

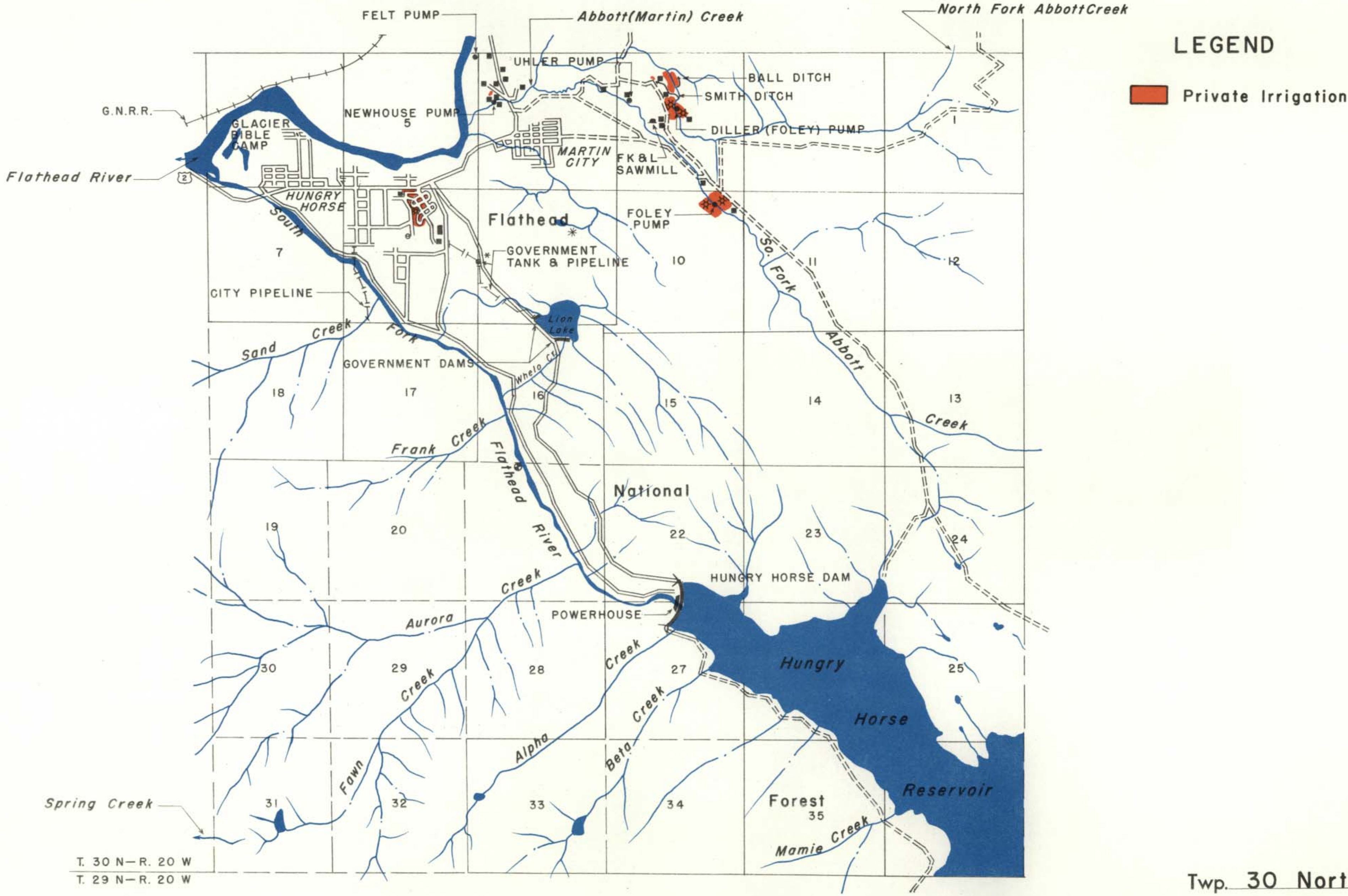


Twp. 29 North
Rge. 21 West


LEGEND
Ashley Irrigation District
Private Irrigation
GILFOIL PUMP
Lost Lake
Bowser Lake
WENDT PUMP
Merton Spring Creek
Stillwater River
CARDA PUMP
BREWER PUMP
HARVEY PUMP
TUTVEDT PUMP
N. Lost Creek
TRACE OF LUKE DITCH
FITZWATER PUMP
Moon Lake
WOESNER PUMP
SPARKS SCHOOL
KOENIG PUMPS
STILLWATER CHURCH
TUTVEDT PUMP
Horntvedt Lake
SNELL PUMP
KNOX PUMPS
OLSON PUMP
GROSSWILER PUMP
Big Lost Creek
BOWSER-TRACY DITCH
NORTHWEST COMMUNITY HALL
Barta Lake
CORNELIUSON PUMP
AMUNDSON PUMPS
GROSSWILER PUMP
RASMUSSEN PUMP
TRACHT PUMP
BAUER PUMP
KELLER DITCH
METRE PUMP
JOHNSON PUMP
Little Lost Creek
STILES PUMP
Stillwater River
GROSSWILER SPRINKLERS
JOHNSON PUMP
KELLER PUMP
PROSPECT PARK SCHOOL
GROSSWILER PUMP
CLARK PIPELINE
STILLWATER GRANGE HALL
Bowser Spring
MORGAN PIPELINE
STATE FORESTRY OFFICE
MERIDIAN
GUIDE
FLATHEAD
T. 29 N – R. 23 W
T. 28 N – R. 23 W
7 th STANDARD PARALLEL NORTH
Bowser Spring Creek
ASHLEY DITCH
Twp. 29 NORTH
Rge. 22 WEST

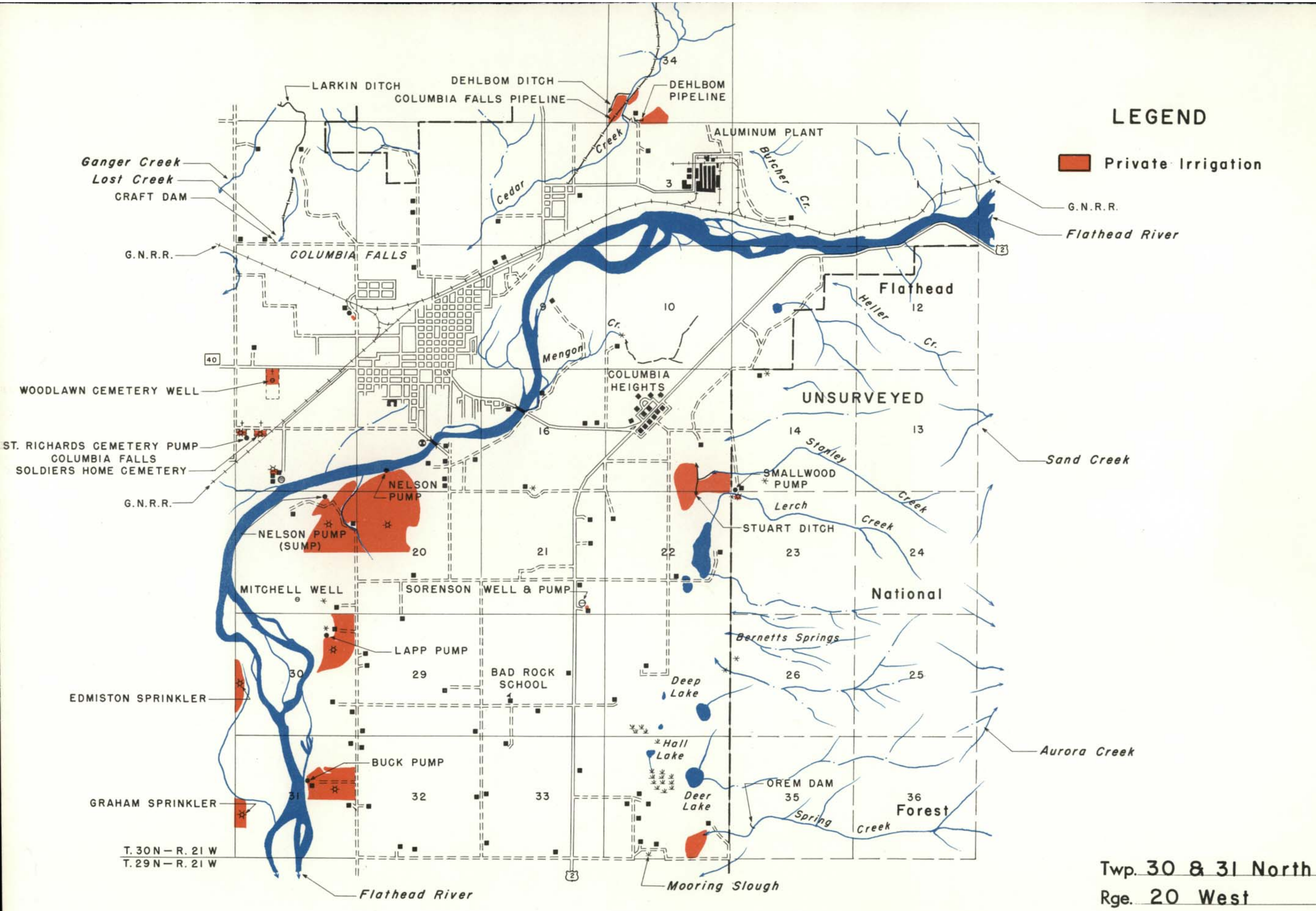


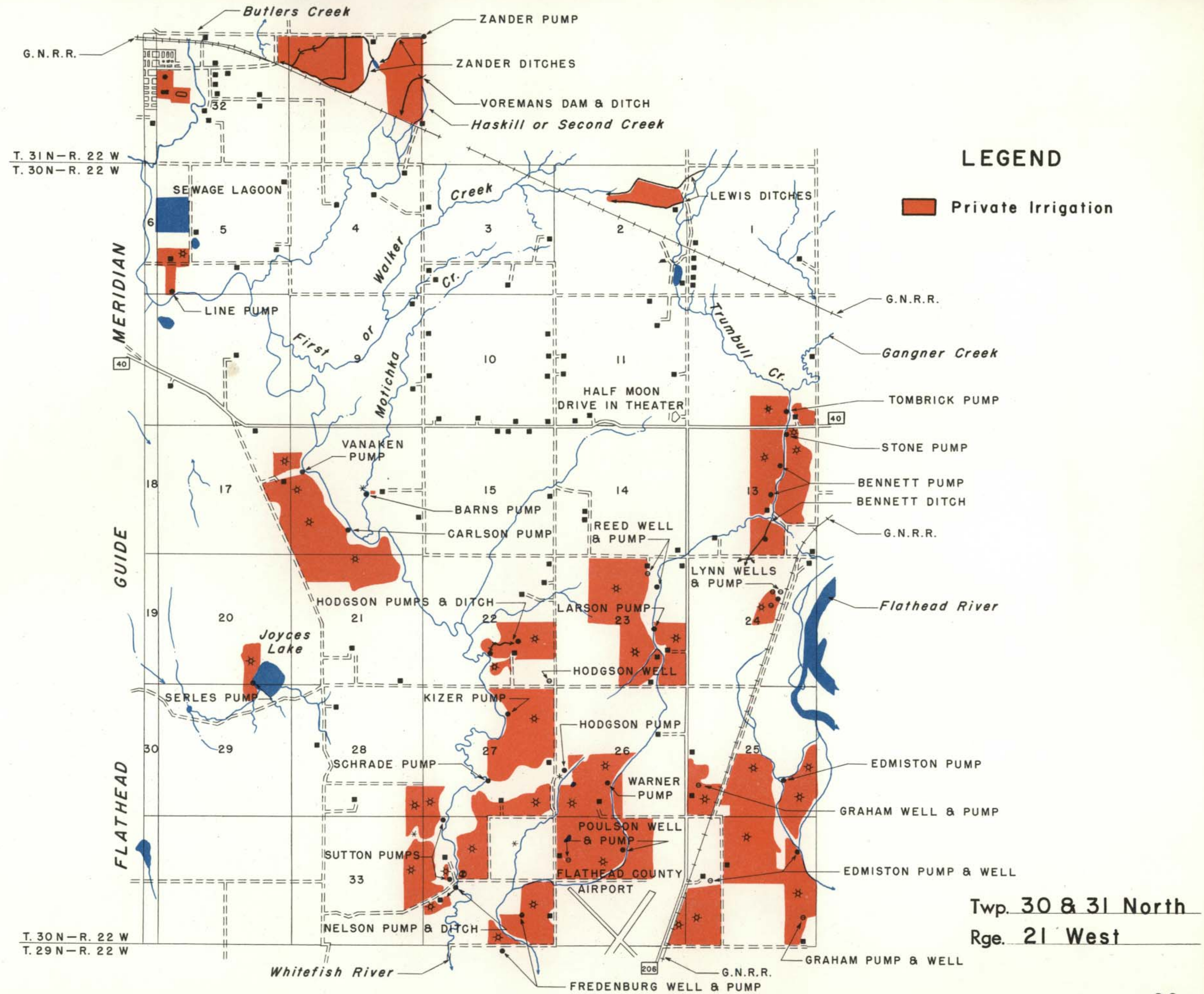
Twp. 29 North
Rge. 23 West

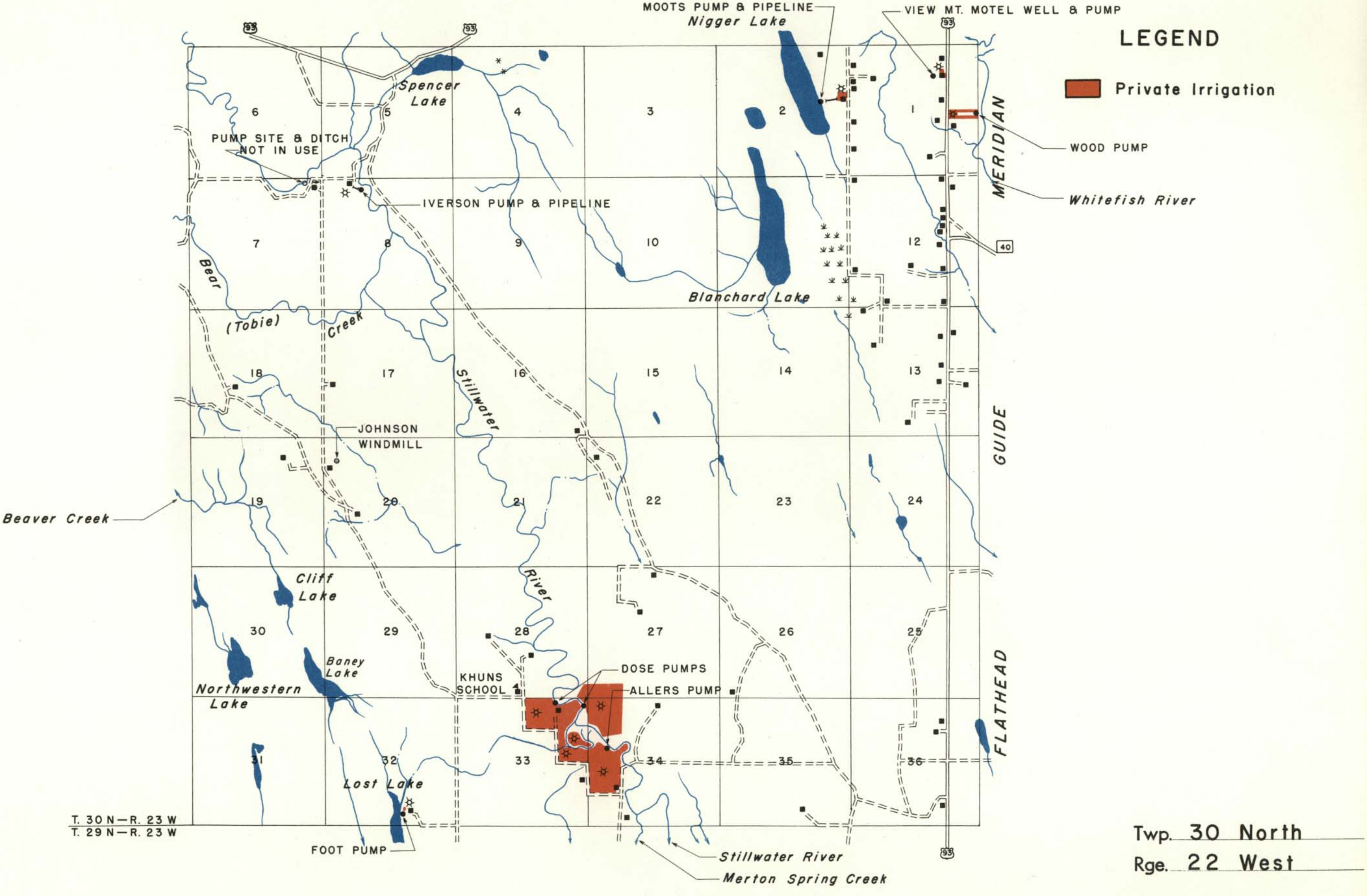


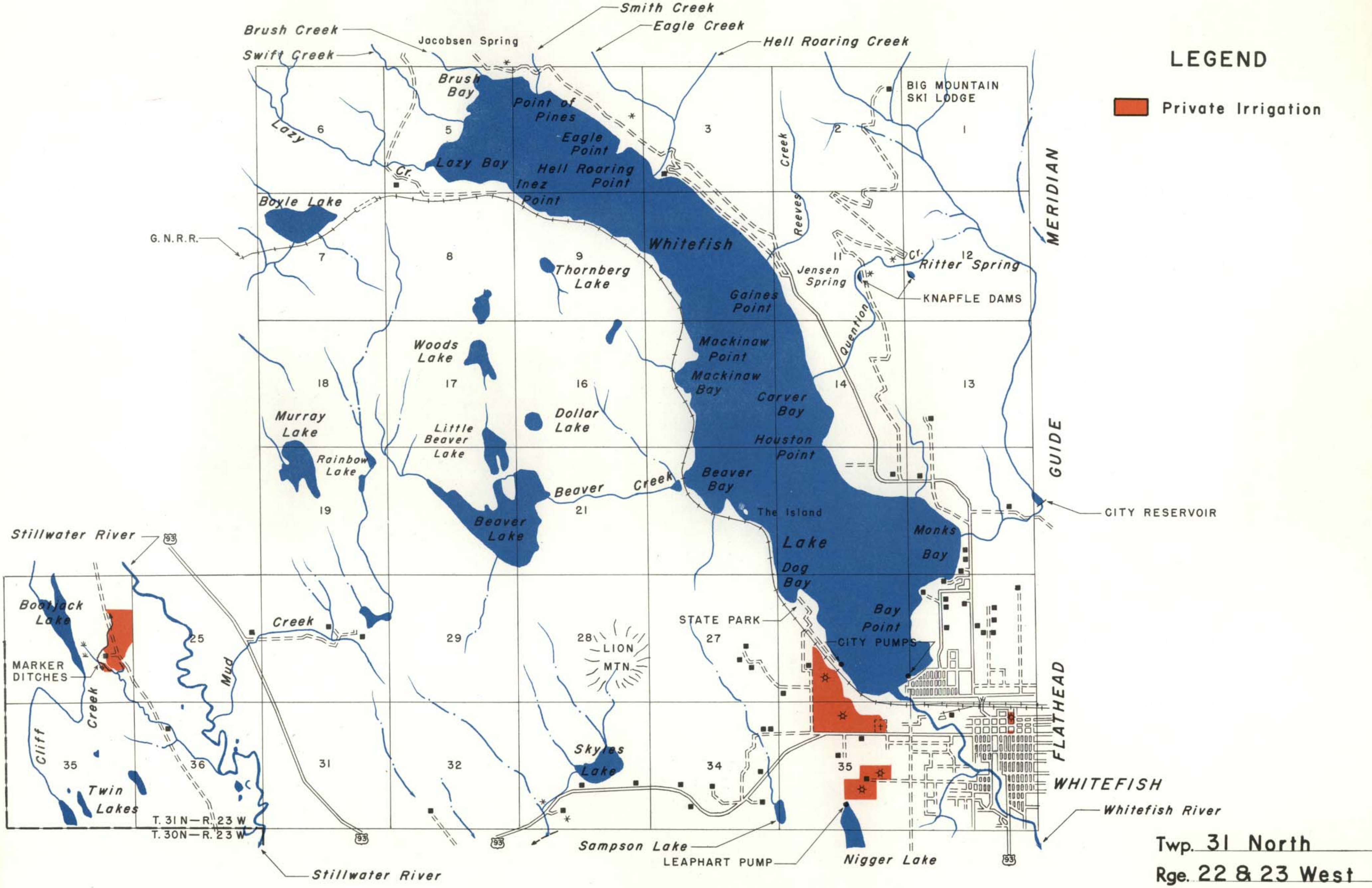
Twp. 30 North

Rge. 19 West


LEGEND
Private Irrigation
LARKIN DITCH
DEHLBOM DITCH
COLUMBIA FALLS PIPELINE
DEHLBOM PIPELINE
ALUMINUM PLANT
Butcher Cr.
Cedar Creek
Ganger Creek
Lost Creek
CRAFT DAM
G.N.R.R.
Flathead River
COLUMBIA FALLS
Flathead
Heller Cr.
Mengon Cr.
COLUMBIA HEIGHTS
UNSURVEYED
WOODLAWN CEMETERY WELL
ST. RICHARDS CEMETERY PUMP
COLUMBIA FALLS SOLDIERS HOME CEMETERY
Sand Creek
Stanley Creek
SMALLWOOD PUMP
NELSON PUMP
Lerch Creek
STUART DITCH
NELSON PUMP (SUMP)
MITCHELL WELL
SORENSON WELL & PUMP
National
LAPP PUMP
Bernetts Springs
BAD ROCK SCHOOL
Deep Lake
EDMISTON SPRINKLER
Hall Lake
Aurora Creek
BUCK PUMP
OREM DAM
Deer Lake
GRAHAM SPRINKLER
Spring Creek
Forest
T. 30 N — R. 21 W
T. 29 N — R. 21 W
Flathead River
Mooring Slough
Twp. 30 & 31 North
Rge. 20 West


Butlers Creek
ZANDER PUMP
G.N.R.R.
ZANDER DITCHES
VOREMANS DAM & DITCH
Haskill or Second Creek
T. 31 N — R. 22 W
T. 30 N — R. 22 W
LEGEND
Private Irrigation
SEWAGE LAGOON
Creek
LEWIS DITCHES
First or Walker Cr.
Motichka Cr.
Trumbull Cr.
LINE PUMP
Gangner Creek
HALF MOON DRIVE IN THEATER
TOMBRICK PUMP
STONE PUMP
VANAKEN PUMP
BENNETT PUMP
BENNETT DITCH
BARNS PUMP
CARLSON PUMP
REED WELL & PUMP
LYNN WELLS & PUMP
HODGSON PUMPS & DITCH
LARSON PUMP
Flathead River
Joyces Lake
HODGSON WELL
SERLES PUMP
KIZER PUMP
HODGSON PUMP
SCHRADE PUMP
WARNER PUMP
EDMISTON PUMP
GRAHAM WELL & PUMP
POULSON WELL & PUMP
SUTTON PUMPS
FLATHEAD COUNTY AIRPORT
EDMISTON PUMP & WELL
NELSON PUMP & DITCH
GRAHAM PUMP & WELL
Whitefish River
FREDENBURG WELL & PUMP
T. 30 N — R. 22 W
T. 29 N — R. 22 W
FLATHEAD GUIDE MERIDIAN
Twp. 30 & 31 North
Rge. 21 West


LEGEND
Private Irrigation
MOOTS PUMP & PIPELINE
Nigger Lake
VIEW MT. MOTEL WELL & PUMP
Spencer Lake
PUMP SITE & DITCH NOT IN USE
IVERSON PUMP & PIPELINE
WOOD PUMP
Whitefish River
Blanchard Lake
Bear (Tobie) Creek
Stillwater River
JOHNSON WINDMILL
Beaver Creek
Cliff Lake
Baney Lake
Northwestern Lake
KHUNS SCHOOL
DOSE PUMPS
ALLERS PUMP
Lost Lake
FOOT PUMP
Stillwater River
Merton Spring Creek
FLATHEAD GUIDE MERIDIAN
T. 30 N — R. 23 W
T. 29 N — R. 23 W
Twp. 30 North
Rge. 22 West


LEGEND
Private Irrigation
Smith Creek
Eagle Creek
Hell Roaring Creek
Brush Creek
Swift Creek
Jacobsen Spring
Brush Bay
Point of Pines
Eagle Point
Lazy Bay
Hell Roaring Point
Inez Point
Lazy
Cr.
Boyle Lake
G. N. R. R.
BIG MOUNTAIN SKI LODGE
Reeves Creek
Whitefish
Thornberg Lake
Jensen Spring
Ritter Spring
Cr.
KNAPFLE DAMS
Gaines Point
Question
Woods Lake
Mackinaw Point
Mackinaw Bay
Carver Bay
Dollar Lake
Murray Lake
Little Beaver Lake
Houston Point
Rainbow Lake
Beaver Creek
Beaver Bay
The Island
Beaver Lake
Lake
Monks Bay
Dog Bay
CITY RESERVOIR
MERIDIAN
GUIDE
Stillwater River
Bootjack Lake
Creek
STATE PARK
Bay Point
CITY PUMPS
LION MTN.
MARKER DITCHES
Mud
Cliff Creek
Twin Lakes
Skyles Lake
FLATHEAD
WHITEFISH
Whitefish River
T. 31 N—R. 23 W
T. 30N—R. 23 W
Stillwater River
Sampson Lake
LEAPHART PUMP
Nigger Lake
93
1
2
3
5
6
7
8
9
11
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18
19
21
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28
29
31
32
34
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35
36
Twp. 31 North
Rge. 22 & 23 West

US 93 POLSON-SOMERS CORRIDOR STUDY

ENVIRONMENTAL SCAN

Appendix C

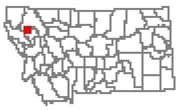
MTHNP Environmental Summary

Environmental Summary

MONTANA STATE LIBRARY

NATURAL HERITAGE PROGRAM **mtnhp.org**

1201 11th Ave ◦ P.O. Box 201800 ◦ Helena, MT 59620-1800 ◦ fax 406-444-0266 ◦ phone 406-444-3989



Latitude	Longitude
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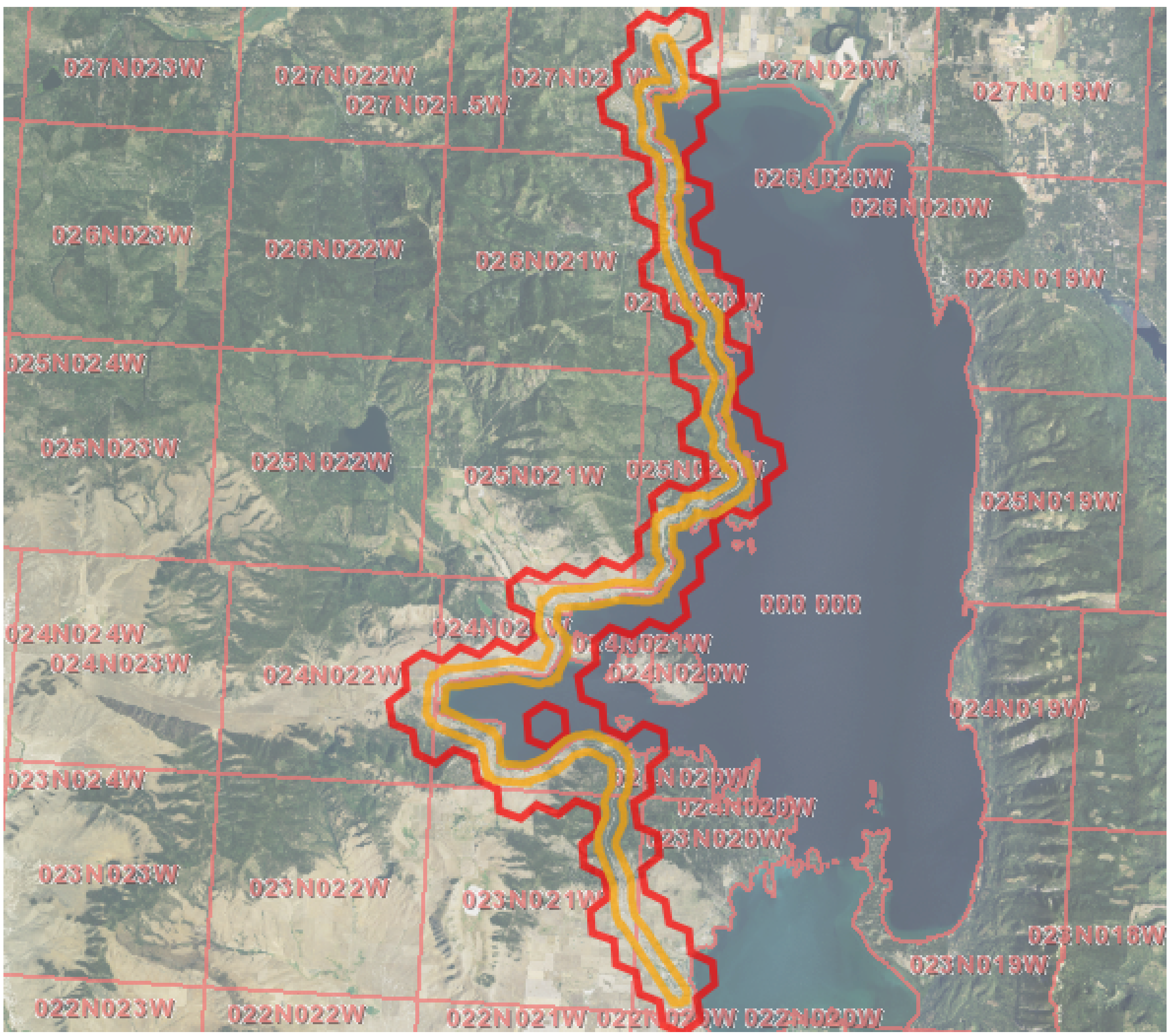
48.11399	-114.36547

Summarized by:
24MT0014
(Custom Area of Interest)



Suggested Citation
Montana Natural Heritage Program. Environmental Summary Report.
for Latitude 47.68965 to 48.11399 and Longitude -114.16693 to -114.36547. Retrieved on 4/17/2024.

The Montana Natural Heritage Program is part of the Montana State Library's Natural Resource Information System. Since 1985, it has served as a neutral and non-regulatory provider of easily accessible information on Montana's species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. The program is part of the NatureServe network that is composed of over 60 member programs across North America that work to provide current and comprehensive distribution and status information on species and biological communities.

MONTANA STATE LIBRARY NATURAL HERITAGE PROGRAM NATURESERVE

Table of Contents

- Species Report
- Structured Surveys
- Land Cover
- Wetland and Riparian
- Land Management
- Biological Reports
- Invasive and Pest Species
- Introduction to Montana Natural Heritage Program
- Data Use Terms and Conditions
- Suggested Contacts for Natural Resource Agencies
- Introduction to Native Species
- Introduction to Land Cover
- Introduction to Wetland and Riparian
- Introduction to Land Management
- Introduction to Invasive and Pest Species
- Additional Information Resources

Introduction to Environmental Summary Report

Environmental Summary Reports from the Montana Natural Heritage Program (MTNHP) provide information on species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. For information on environmental permits in Montana, please see permitting overviews by the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, the Index of Environmental Permits for Montana and our Suggested Contacts for Natural Resource Management Agencies. The report for your area of interest consists of introductory and related materials in this PDF and an Excel workbook with worksheets summarizing information managed in the MTNHP databases for: (1) species occurrences; (2) other observed species without species occurrences; (3) other species potentially present based on their range, presence of associated habitats, or predictive distribution model output if available; (4) structured surveys that follow a protocol capable of detecting one or more species; (5) land cover mapped as ecological systems; (6) wetland and riparian mapping; (7) land management categories; and (8) biological reports associated with plant and animal observations. If your area of interest corresponds to a statewide polygon layer (e.g., watersheds, counties, or public land survey sections) information summaries in your report will exactly match those boundaries. However, if your report is for a custom area, users should be aware that summaries do not correspond to the exact boundaries of the polygon they have specified, but instead are a summary across a layer of hexagons intersected by the polygon they specified as shown on the report cover. Summarizing by these hexagons which are one square mile in area and approximately one kilometer in length on each side allows for consistent and rapid delivery of summaries based on a uniform grid that has been used for planning efforts across North America.

In presenting this information, MTNHP is working towards assisting the user with rapidly assessing the known or potential species and biological communities, land management categories, and biological reports associated with the report area. Users are reminded that this information is likely incomplete and may be inaccurate as surveys to document species are lacking in many areas of the state, species' range polygons often include regions of unsuitable habitat, methods of predicting the presence of species or communities are constantly improving, and information is constantly being added and updated in our databases. **Field verification by professional biologists of the absence or presence of species and biological communities in a report area will always be an important obligation of users of our data. Users are encouraged to only use this environmental summary report as a starting point for more in depth analyses and are encouraged to contact state, federal, and tribal resource management agencies for additional data or management guidelines relevant to your efforts. Please see the Appendix for introductory materials to each section of the report, additional information resources, and a list of relevant agency contacts.**

MONTANA STATE LIBRARY
NATURAL HERITAGE PROGRAM
A program of the **Montana State Library's Natural Resource Information System**

Legend

Model Icons	Habitat Icons	Range Icons	Num Obs
N Suitable (native range)	C Common	Y Native / Year-round	Count of obs with 'good precision' (<=1000m)
O Optimal Suitability	O Occasional	S Summer	+ indicates additional 'poor precision' obs (1001m-10,000m)
M Moderate Suitability		W Winter	
L Low Suitability		M Migratory	
I Suitable (introduced range)		N Non-native	
		H Historical	

Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Native Species

Summarized by: **24MT0014** *(Custom Area of Interest)*
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Map not shown for scales greater than 1:80,000

Species Occurrences

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
F - Bull Trout *(Salvelinus confluentus)* SOC	7	1	1 +		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2** USFWS: **LT; CH** BLM: **THREATENED** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species is believed to be present based on the professional judgement of a fisheries biologist, potentially supported by habitat assessment, direct capture, or confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 19, 2024)

Predicted Models: N 64% Suitable (native range) (deductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
F - Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)* SOC		1	+		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5T4** State: **S2**
USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)**
Species of Conservation Concern in Forests (CG, HLC) BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 08, 2024)

Predicted Models: N 64% Suitable (native range) (deductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
F - Pygmy Whitefish *(Prosopium coulterii)* SOC		1	1		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGCN3, SGIN**

Delineation Criteria Standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 19, 2024)

Predicted Models: N 63% Suitable (native range) (deductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
V - Oxytropis campestris var. columbiana *(Columbia Locoweed)* SOC		10	8 +		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5T2** State: **S1** Plant Threat Score: **Very High** CCVI: **Extremely Vulnerable**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Sep 06, 2017)

Predicted Models: N 12% Suitable (native range) (deductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
B - Yellow-billed Cuckoo *(Coccyzus americanus)* SOC	7	1	+		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **PS: LT; MBTA** BLM: **THREATENED** FWP SWAP: **SGCN3, SGIN** PIF: **2**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to encompass the maximum foraging area size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 28, 2023)

Predicted Models: O 40% Optimal (inductive), M 56% Moderate (inductive), L 4% Low (inductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
V - Cypripedium parviflorum *(Small Yellow Lady's-slipper)* PSOC		1	+		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S3S4** USFS: **Sensitive - Known in Forests (LOLO)** **Species of Conservation Concern in Forests (CG, HLC)**

Predicted Models: O 22% Optimal (inductive), M 27% Moderate (inductive), L 49% Low (inductive)

	USFWS Sec7	# SO	# Obs	Predicted Model	Range
B - Bald Eagle *(Haliaeetus leucocephalus)* SSS		32	327 +		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Special Status Species - Native Species Global: **G5** State: **S4** USFWS: **BGEPA; MBTA** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** PIF: **2**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for renesting. Only nesting observations with a locational uncertainty of 1,000 meters or less will be used to delineate a nesting area. (Last Updated: Apr 01, 2024)

Predicted Models: O 11% Optimal (inductive), M 49% Moderate (inductive), L 29% Low (inductive)

⊟ **M - Long-legged Myotis** *(Myotis volans)* SOC | 2 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4G5** State: **S3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 2,000 meters in order to encompass the average distances traveled from capture locations to roosts in Washington, Oregon, and in the Black Hills of South Dakota and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 2,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 06, 2023)

Predicted Models: M 73% Moderate (inductive), L 26% Low (inductive)

⊟ **R - Western Skink** *(Plestiodon skiltonianus)* SOC | 1 | 1 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGCN3, SGIN**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 200 meters in order to encompass habitats supporting other individuals in adjacent territories. Otherwise the point observation is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Mar 22, 2024)

Predicted Models: M 70% Moderate (inductive), L 22% Low (inductive)

⊟ **B - Evening Grosbeak** *(Coccothraustes vespertinus)* SOC | 12 | 38 + | Y | W M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 1,000 meters in order to encompass the maximum foraging distance from nests reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: M 56% Moderate (inductive), L 30% Low (inductive)

⊟ **M - Hoary Bat** *(Lasiurus cinereus)* SOC | 2 | S M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G3G4** State: **S3B** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles during the active season. Point observation location is buffered by a minimum distance of 3,500 meters in order to be conservative about encompassing the maximum reported foraging distance for the congeneric Lasiurus borealis and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Mar 22, 2024)

Predicted Models: M 55% Moderate (inductive), L 44% Low (inductive)

⊟ **M - Fringed Myotis** *(Myotis thysanodes)* SOC | 1 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S3** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 2,000 meters in order to encompass the range of distances traveled from capture locations to roosts in the Black Hills of South Dakota and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 2,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 21, 2022)

Predicted Models: M 53% Moderate (inductive), L 41% Low (inductive)

⊟ **B - Cassin's Finch** *(Haemorhous cassinii)* SOC | 15 | 48 + | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing the courtship and foraging distance from nesting areas and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 30, 2023)

Predicted Models: M 42% Moderate (inductive), L 44% Low (inductive)

⊟ **B - Pileated Woodpecker** *(Dryocopus pileatus)* SOC | 20 | 55 + | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 1,500 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: M 41% Moderate (inductive), L 40% Low (inductive)

⊟ **M - Little Brown Myotis** *(Myotis lucifugus)* SOC | 2 | + | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G3G4** State: **S3** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT)** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, or definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a distance of 1,600 meters in order to encompass the greater than 1,500 meters foraging distance reported for the species in New Brunswick, Canada and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 1,600 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 06, 2023)

Predicted Models: M 34% Moderate (inductive), L 63% Low (inductive)

⊟ **M - Townsend's Big-eared Bat** *(Corynorhinus townsendii)* SOC | 2 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a distance of 4,500 meters in order to encompass the 95% confidence interval for nightly foraging distance reported for the species in California and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 4,500 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 06, 2023)

Predicted Models: M 29% Moderate (inductive), L 55% Low (inductive)

B - Trumpeter Swan *(Cygnus buccinator)* SOC | 1 | 118 + | Y | M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S3** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **1**

Delineation Criteria Standing water bodies with confirmed nesting areas buffered by 100 meters in order to reflect importance of adjacent terrestrial habitats to breeding success. (Last Updated: Dec 22, 2023)

Predicted Models: M 27% Moderate (inductive), L 38% Low (inductive)

B - Common Tern *(Sterna hirundo)* SOC | 1 | 5 | S | M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Standing water bodies with evidence of nesting buffered by 100 meters in order to reflect importance of adjacent terrestrial habitats to breeding success. (Last Updated: Jan 03, 2023)

Predicted Models: M 19% Moderate (inductive), L 34% Low (inductive)

B - Long-billed Curlew *(Numenius americanus)* SOC | 6 | 2 + | S | M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC11** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 200 meters in order to approximate the breeding territory size reported for the species in Idaho and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 03, 2024)

Predicted Models: M 15% Moderate (inductive), L 42% Low (inductive)

R - Northern Alligator Lizard *(Elgaria coerulea)* SOC | 3 | 3 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGCN3, SGIN**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 200 meters in order to encompass habitats supporting other individuals and probable maximum home range sizes. Otherwise the point observation is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Mar 22, 2024)

Predicted Models: M 14% Moderate (inductive), L 86% Low (inductive)

B - Lewis's Woodpecker *(Melanerpes lewis)* SOC | 8 | 9 | S | M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S2B** USFWS: **MBTA; BCC10; BCC17** USFS: **Species of Conservation Concern in Forests (HLC)** BLM: **SENSITIVE** FWP SWAP: **SGCN2** PIF: **2**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the likely foraging area used by breeding adults around the nest tree and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: M 14% Moderate (inductive), L 67% Low (inductive)

B - Great Gray Owl *(Strix nebulosa)* SOC | 1 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3, SGIN** PIF: **3**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 3,200 meters in order to encompass the known foraging distance and area likely to be used for renesting and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jan 04, 2023)

Predicted Models: M 12% Moderate (inductive), L 41% Low (inductive)

M - Long-eared Myotis *(Myotis evotis)* SOC | 1 | 1 | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 1,000 meters in order to encompass the average distances traveled from capture locations to roosts and between roosts in western Montana, Alberta, and Oregon and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 1,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Mar 22, 2023)

Predicted Models: M 11% Moderate (inductive), L 86% Low (inductive)

A - Western Toad *(Anaxyrus boreas)* SOC | 2 | 11 + | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S2** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Delineation Criteria Standing water bodies or portions of large water bodies with confirmed evidence of reproduction (calling adults, eggs, larvae or new metamorphs) buffered by 100 meters in order to reflect importance of adjacent terrestrial habitats to survival of breeding adults and newly metamorphosed juveniles. (Last Updated: Mar 20, 2024)

Predicted Models: M 5% Moderate (inductive), L 70% Low (inductive)

B - Great Blue Heron *(Ardea herodias)* SOC | 5 | 17 + | Y S | M

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 6,500 meters in order to be conservative about encompassing the areas commonly used for foraging near the breeding colony and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 03, 2024)

Predicted Models: M 4% Moderate (inductive), L 85% Low (inductive)

B - Brown Creeper *(Certhia americana)* SOC | 2 | 33 + | Y

View in Field Guide **View Predicted Models** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **1**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 29, 2023)

Predicted Models: M 4% Moderate (inductive), L 10% Low (inductive)

M - Fisher *(Pekania pennanti)* SOC | 1 | Y

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence of adults or juveniles within tracking regions containing core habitat for the species. Outer boundaries of tracking regions are defined by areas of forest cover on individual mountain ranges or clusters of adjacent mountain ranges with continuous forest cover. (Last Updated: Dec 21, 2022)

Predicted Models: M 3% Moderate (inductive), L 51% Low (inductive)

B - Clark's Nutcracker *(Nucifraga columbiana)* SOC | 8 | 45 + | Y

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3** USFWS: **MBTA** USFS: **Species of Conservation Concern in Forests (FLAT)** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Observations with direct evidence of breeding activity or indirect evidence of breeding activity between early March and mid-July within forested habitats containing Whitebark Pine (Pinus albicaulis), Limber Pine (Pinus flexilis), or Ponderosa Pine (Pinus ponderosa). Observations are buffered by a minimum distance of 1,000 meters in order to encompass the spring/summer breeding territory size reported for the species or the locational uncertainty of the observation to a maximum distance of 10,000 meters. (Last Updated: Apr 03, 2024)

Predicted Models: M 3% Moderate (inductive), L 34% Low (inductive)

B - Veery *(Catharus fuscescens)* SOC | 2 | 3 | S | M

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: L 85% Low (inductive)

M - Grizzly Bear *(Ursus arctos)* SOC | 7 | 2 | 1 + | Y | H

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G4** State: **S2S3** USFWS: **LT** BLM: **THREATENED** FWP SWAP: **SGCN2-3**

Delineation Criteria Species Occurrence polygons represent areas delineated by the U.S. Fish and Wildlife Service (USFWS) that encompass both home ranges and potential transitory movements based on verified sightings. Within these areas, the USFWS wants project proponents to consider whether the species â€œmay be presentâ€ when evaluating the potential impacts of a project and to work with the USFWS to develop and implement best management practices to minimize or eliminate project effects on the species. (Last Updated: Dec 22, 2023)

Predicted Models: L 56% Low (inductive)

B - Bobolink *(Dolichonyx oryzivorus)* SOC | 1 | 1 + | S | M

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 150 meters in order to conservatively encompass male territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: L 19% Low (inductive)

B - Varied Thrush *(Ixoreus naevius)* SOC | 2 | 10 + | S | M

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 225 meters in order to encompass the reported minimum stand size occupied by breeding pairs and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023)

Predicted Models: L 10% Low (inductive)

V - Atriplex truncata *(Wedge-leaf Saltbush)* SOC | 1 | 1 | Y

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3** Plant Threat Score: **Unknown**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Jan 20, 2023)

Predicted Models: L 1% Low (inductive)

I - Oxyloma nuttallianum *(Oblique Ambersnail)* SOC | 1 | + | Not Assessed | Y

View in Field Guide | View Range Maps

Species of Concern - Native Species   Global: **G2G4** State: **S2**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 100 meters in order to encompass the home range of the individual as well as adjacent habitat likely to support other individuals and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 22, 2022)

I - Zacoleus idahoensis *(Sheathed Slug)* SOC | 2 | 1 + | Not Assessed | Y

View in Field Guide | View Range Maps

Species of Concern - Native Species   Global: **G3G4** State: **S2S3**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 100 meters in order to encompass the home range of the individual as well as adjacent habitat likely to support other individuals and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Aug 07, 2017)

V - Clarkia rhomboidea *(Diamond Clarkia)* SOC | 1 | Not Assessed | Y

View in Field Guide | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3** USFS: **Sensitive - Known in Forests (LOLO)** Plant Threat Score: **Low** CCVI: **Less Vulnerable**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Mar 07, 2024)

B - Brewer's Sparrow *(Spizella breweri)* SOC | 1 | 1 | Not Assessed | S | M

View in Field Guide | View Range Maps

Species of Concern - Native Species   Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 100 meters in order to encompass the maximum territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Mar 21, 2024)

V - Sphenopholis intermedia *(Slender Wedgegrass)* **PSOC** | 1 | Not Assessed

View in Field Guide

Potential Species of Concern - Native Species Global: **G5** State: **S3S4** Plant Threat Score: **Unknown**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Aug 23, 2017)

O - Bat Roost (Cave) *(Bat Roost (Cave))* **IAH** | 1 | Not Assessed

View in Field Guide

Important Animal Habitat - Native Species Global: **GNR** State: **SNR**

Delineation Criteria Confirmed occupancy of a cave based on the documented presence of adults or juveniles of any bat species. Point observation locations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 4,500 meters in order to encompass the 95% confidence interval for nightly foraging distance reported for Townsendâ€™s Big-eared Bat (a resident Montana bat Species of Concern) and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Sep 05, 2017)

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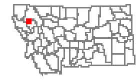
Legend

Model Icons	Habitat Icons	Range Icons	Num Obs
N Suitable (native range)	C Common	Y Native / Year-round	Count of obs with 'good precision' (<=1000m)
O Optimal Suitability	O Occasional	S Summer	+ indicates additional 'poor precision' obs (1001m-10,000m)
M Moderate Suitability		W Winter	
L Low Suitability		M Migratory	
I Suitable (introduced range)		N Non-native	
		H Historical	



Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Native Species

Summarized by: **24MT0014** *(Custom Area of Interest)*
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Observed Species

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Black Tern *(Chlidonias niger)* SOC		1 +		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Predicted Models: O 21% Optimal (inductive), M 19% Moderate (inductive), L 25% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Rufous Hummingbird *(Selasphorus rufus)* PSOC		64 +		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G4** State: **S4B** USFWS: **MBTA; BCC10** PIF: **3**
Predicted Models: O 18% Optimal (inductive), M 71% Moderate (inductive), L 11% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Hooded Merganser *(Lophodytes cucullatus)* PSOC		108 +		Y M

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **2**
Predicted Models: O 15% Optimal (inductive), M 30% Moderate (inductive), L 42% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Caspian Tern *(Hydroprogne caspia)* SOC		6		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN2** PIF: **2**
Predicted Models: O 4% Optimal (inductive), M 32% Moderate (inductive), L 23% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Black-necked Stilt *(Himantopus mexicanus)* SOC		2		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**
Predicted Models: O 1% Optimal (inductive), M 25% Moderate (inductive), L 42% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - American Goshawk *(Accipiter atricapillus)* SOC		7		Y WM

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**
Predicted Models: O 1% Optimal (inductive), M 8% Moderate (inductive), L 23% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Barrow's Goldeneye *(Bucephala islandica)* PSOC		43 +		Y WM

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **2**
Predicted Models: M 41% Moderate (inductive), L 37% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Horned Grebe *(Podiceps auritus)* SOC		86		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Predicted Models: M 29% Moderate (inductive), L 40% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
M - North American Porcupine *(Erethizon dorsatum)* PSOC		+		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S3S4** FWP SWAP: **SGIN**
Predicted Models: M 26% Moderate (inductive), L 73% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
M - Silver-haired Bat *(Lasionycteris noctivagans)* PSOC		1		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G3G4** State: **S4**
Predicted Models: M 23% Moderate (inductive), L 75% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Black-backed Woodpecker *(Picoides arcticus)* SOC		2		Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **1**
Predicted Models: M 16% Moderate (inductive), L 42% Low (inductive)

Species	USFWS Sec7	# Obs	Predicted Model	Range
B - Forster's Tern *(Sterna forsteri)* SOC		4		S M

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Predicted Models: M 14% Moderate (inductive), L 37% Low (inductive)

B - Common Poorwill *(Phalaenoptilus nuttallii)* PSOC | 5 | S M

View in Field Guide View Predicted Models View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S4B** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**
Predicted Models: M 11% Moderate (inductive), L 77% Low (inductive)

B - Short-eared Owl *(Asio flammeus)* PSOC | + | Y

View in Field Guide View Predicted Models View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA; BCC11; BCC17** PIF: **3**
Predicted Models: M 7% Moderate (inductive), L 22% Low (inductive)

B - Tennessee Warbler *(Leiothlypis peregrina)* PSOC | 1 | S M

View in Field Guide View Predicted Models View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4B** USFWS: **MBTA**
Predicted Models: M 4% Moderate (inductive), L 77% Low (inductive)

B - American White Pelican *(Pelecanus erythrorhynchos)* SOC | 8 + | S M

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**
Predicted Models: M 3% Moderate (inductive), L 68% Low (inductive)

B - Pacific Wren *(Troglodytes pacificus)* SOC | 1 | Y

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**
Predicted Models: M 1% Moderate (inductive), L 8% Low (inductive)

A - Northern Leopard Frog *(Lithobates pipiens)* SOC | 3 + | Y H

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G5** State: **S1,S4** USFS: **Sensitive - Suspected in Forests (KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN1**
Predicted Models: L 34% Low (inductive)

B - Common Loon *(Gavia immer)* SOC | 70 + | S M

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** USFS: **Sensitive - Known in Forests (LOLO)** FWP SWAP: **SGCN3** PIF: **1**
Predicted Models: L 32% Low (inductive)

B - Black Swift *(Cypseloides niger)* SOC | 20 | S M

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G4** State: **S1B** USFWS: **MBTA; BCC10** USFS: **Sensitive - Known in Forests (BRT, KOOT) Species of Conservation Concern in Forests (FLAT)** FWP SWAP: **SGCN1, SGIN** PIF: **2**
Predicted Models: L 27% Low (inductive)

B - Golden Eagle *(Aquila chrysaetos)* SOC | 10 | Y

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **BGEPA; MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3**
Predicted Models: L 1% Low (inductive)

F - Brook Stickleback *(Culaea inconstans)* PSOC | 1 | N

View in Field Guide View Predicted Models View Range Maps
Potential Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5** State: **S4**
Predicted Models: I 63% Suitable (introduced range) (deductive)

F - Lake Trout *(Salvelinus namaycush)* SOC | 1 + | N

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5** State: **S2** FWP SWAP: **SGCN2**
Predicted Models: I 36% Suitable (introduced range) (deductive)

B - Gray-crowned Rosy-Finch *(Leucosticte tephrocotis)* SOC | 1 | Not Assessed | Y W M

View in Field Guide View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2** USFWS: **MBTA** FWP SWAP: **SGCN2, SGIN**

I - Orophe cabinetus *(A Millipede)* PSOC | 1 | Not Assessed | Y

View in Field Guide View Range Maps
Potential Species of Concern - Native Species Global: **GH** State: **SNR**

B - Clark's Grebe *(Aechmophorus clarkii)* SOC | 3 + | Not Assessed | M

View in Field Guide View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11** FWP SWAP: **SGCN3** PIF: **3**

B - Ferruginous Hawk *(Buteo regalis)* SOC | 1 + | Not Assessed | M

View in Field Guide View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

B - Franklin's Gull *(Leucophaeus pipixcan)* SOC | 5 | Not Assessed | M

View in Field Guide View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

B - White-faced Ibis *(Plegadis chihi)* SOC | 1 | Not Assessed | M

View in Field Guide View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

B - Chimney Swift *(Chaetura pelagica)* **PSOC** | 1 | Not Assessed

View in Field Guide
Potential Species of Concern - Native Species Global: **G4G5** State: **S3S4B** USFWS: **MBTA; BCC11** FWP SWAP: **SGIN** PIF: **3**

B - Pinyon Jay *(Gymnorhinus cyanocephalus)* **SOC** | 5 | Not Assessed

View in Field Guide
Species of Concern - Native Species Global: **G3** State: **S3** USFWS: **MBTA; BCC10; BCC17** FWP SWAP: **SGCN3**

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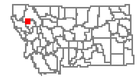
Legend

Model Icons
- N Suitable (native range)
- O Optimal Suitability
- M Moderate Suitability
- L Low Suitability
- I Suitable (introduced range)

Habitat Icons
- C Common
- O Occasional

Range Icons
- Y Native / Year-round
- S Summer
- W Winter
- M Migratory
- N Non-native
- H Historical

Num Obs
Count of obs with 'good precision' (<=1000m)
+ indicates additional 'poor precision' obs (1001m-10,000m)



Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Native Species

Summarized by: **24MT0014** *(Custom Area of Interest)*
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Potential Species

USFWS Sec7 | Predicted Model | Range

V - Carex scoparia *(Pointed Broom Sedge)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S1S2** USFS: **Sensitive - Known in Forests (BD, BRT)** Plant Threat Score: **No Known Threats**
Predicted Models: O 53% Optimal (inductive), M 45% Moderate (inductive), L 1% Low (inductive)

V - Dichanthelium acuminatum *(Panic Grass)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2S3** Plant Threat Score: **Unknown**
Predicted Models: O 47% Optimal (inductive), M 47% Moderate (inductive), L 5% Low (inductive)

V - Dichanthelium oligosanthes var. scribnerianum *(Scribner's Panic Grass)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5T5** State: **S1S2** Plant Threat Score: **Low**
Predicted Models: O 25% Optimal (inductive), M 41% Moderate (inductive), L 27% Low (inductive)

R - Snapping Turtle *(Chelydra serpentina)* SOC
Range: N

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5** State: **S3** BLM: **SENSITIVE** FWP SWAP: **SGCN3, SGIN**
Predicted Models: O 12% Optimal (inductive), M 37% Moderate (inductive), L 40% Low (inductive)

B - Western Screech-Owl *(Megascops kennicottii)* PSOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G4G5** State: **S3S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**
Predicted Models: O 7% Optimal (inductive), M 70% Moderate (inductive), L 23% Low (inductive)

V - Wolffia columbiana *(Columbia Water-meal)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2S3** Plant Threat Score: **No Known Threats**
Predicted Models: O 7% Optimal (inductive), M 34% Moderate (inductive), L 10% Low (inductive)

I - Danaus plexippus *(Monarch)* SOC
Range: S

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4** State: **S2S3** USFWS: **C** USFS: **Sensitive - Migratory in Forests (BD, BRT, KOOT)**
Predicted Models: O 4% Optimal (inductive), M 44% Moderate (inductive), L 32% Low (inductive)

V - Isoetes echinospora *(Spiny-spore Quillwort)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S3** Plant Threat Score: **No Known Threats** CCVI: **Less Vulnerable**
Predicted Models: O 4% Optimal (inductive), M 23% Moderate (inductive), L 23% Low (inductive)

V - Utricularia intermedia *(Flatleaf Bladderwort)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known in Forests (KOOT)** Plant Threat Score: **No Known Threats**
Predicted Models: M 92% Moderate (inductive), L 8% Low (inductive)

I - Bombus suckleyi *(Suckley Cuckoo Bumble Bee)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G2G3** State: **S1**
Predicted Models: M 85% Moderate (inductive), L 12% Low (inductive)

V - Mimulus breviflorus *(Short-flowered Monkeyflower)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4** State: **S1S2** USFS: **Sensitive - Known in Forests (KOOT)** **Species of Conservation Concern in Forests (FLAT)** Plant Threat Score: **Unknown**
CCVI: **Moderately Vulnerable**
Predicted Models: M 75% Moderate (inductive), L 7% Low (inductive)

V - Mimulus floribundus *(Floriferous Monkeyflower)* SOC
Range: Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **SH** Plant Threat Score: **No Known Threats** CCVI: **Highly Vulnerable**
Predicted Models: M 63% Moderate (inductive), L 30% Low (inductive)

V - **Botrychium simplex** *(Least Moonwort)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT)** CCVI: **Less Vulnerable**

Predicted Models: M 49% Moderate (inductive), L 41% Low (inductive)

V - **Carex crawei** *(Crawe's Sedge)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2S3** Plant Threat Score: **Low**

Predicted Models: M 45% Moderate (inductive), L 22% Low (inductive)

B - **Meesia triquetra** *(Meesia Moss)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT)**
Sensitive - Suspected in Forests (LOLO)
Species of Conservation Concern in Forests (CG, FLAT)

Predicted Models: M 42% Moderate (inductive), L 53% Low (inductive)

V - **Eleocharis rostellata** *(Beaked Spikerush)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFS: **Species of Conservation Concern in Forests (CG, FLAT, HLC)** Plant Threat Score: **Unknown** CCVI: **Less Vulnerable**

Predicted Models: M 41% Moderate (inductive), L 37% Low (inductive)

M - **Western Pygmy Shrew** *(Sorex eximius)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3** FWP SWAP: **SGCN3**

Predicted Models: M 40% Moderate (inductive), L 58% Low (inductive)

V - **Psilocarphus brevissimus** *(Dwarf woolly-heads)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2S3** Plant Threat Score: **No Known Threats**

Predicted Models: M 37% Moderate (inductive), L 55% Low (inductive)

V - **Schoenoplectus subterminalis** *(Water Bulrush)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFS: **Sensitive - Known in Forests (LOLO)**
Species of Conservation Concern in Forests (HLC) Plant Threat Score: **Unknown**

Predicted Models: M 34% Moderate (inductive), L 30% Low (inductive)

V - **Impatiens aurella** *(Pale-yellow Jewel-weed)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3** Plant Threat Score: **No Known Threats**

Predicted Models: M 33% Moderate (inductive), L 8% Low (inductive)

V - **Elodea bifoliata** *(Long-sheath Waterweed)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4G5** State: **S2?** Plant Threat Score: **No Known Threats**

Predicted Models: M 32% Moderate (inductive), L 47% Low (inductive)

V - **Trichophorum cespitosum** *(Tufted Club-rush)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Species of Conservation Concern in Forests (FLAT)** Plant Threat Score: **No Known Threats** CCVI: **Moderately Vulnerable**

Predicted Models: M 27% Moderate (inductive), L 38% Low (inductive)

V - **Lobelia kalmii** *(Kalm's Lobelia)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** Plant Threat Score: **No Known Threats**

Predicted Models: M 25% Moderate (inductive), L 53% Low (inductive)

V - **Brasenia schreberi** *(Watershield)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1S2** USFS: **Sensitive - Known in Forests (KOOT, LOLO)** Plant Threat Score: **Unknown** CCVI: **Less Vulnerable**

Predicted Models: M 18% Moderate (inductive), L 36% Low (inductive)

B - **American Bittern** *(Botaurus lentiginosus)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **3**

Predicted Models: M 18% Moderate (inductive), L 36% Low (inductive)

V - **Idahoa scapigera** *(Scalepod)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1S2** USFS: **Sensitive - Known in Forests (BRT)**
Sensitive - Suspected in Forests (LOLO)
Species of Conservation Concern in Forests (FLAT) Plant Threat Score: **High - Medium** CCVI: **Moderately Vulnerable**

Predicted Models: M 16% Moderate (inductive), L 60% Low (inductive)

V - **Botrychium ascendens** *(Upward-lobed Moonwort)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Sensitive - Known in Forests (BD, KOOT)** CCVI: **Less Vulnerable**

Predicted Models: M 15% Moderate (inductive), L 71% Low (inductive)

V - Drosera rotundifolia *(Roundleaf Sundew)* PSOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S3S4** Plant Threat Score: **Unknown**
Predicted Models: M 12% Moderate (inductive), L 33% Low (inductive)

B - Scorpidium scorpioides *(A Scorpidium Moss)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known in Forests (KOOT, LOLO)** **Species of Conservation Concern in Forests (FLAT, HLC)**
Predicted Models: M 8% Moderate (inductive), L 60% Low (inductive)

V - Allium acuminatum *(Tapertip Onion)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2S3** USFS: **Sensitive - Known in Forests (BRT, KOOT, LOLO)** **Sensitive - Suspected in Forests (BD)** Plant Threat Score: **High - Medium**
CCVI: **Moderately Vulnerable**
Predicted Models: M 8% Moderate (inductive), L 26% Low (inductive)

V - Botrychium lineare *(Linearleaf Moonwort)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G3** State: **S1S2** USFS: **Sensitive - Known in Forests (KOOT)** CCVI: **Less Vulnerable**
Predicted Models: M 8% Moderate (inductive), L 19% Low (inductive)

V - Botrychium hesperium *(Western Moonwort)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4** State: **S3** CCVI: **Less Vulnerable**
Predicted Models: M 7% Moderate (inductive), L 75% Low (inductive)

B - Ovenbird *(Seiurus aurocapilla)* PSOC S M

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G5** State: **S4B** USFWS: **MBTA** PIF: **3**
Predicted Models: M 5% Moderate (inductive), L 47% Low (inductive)

V - Epipactis gigantea *(Giant Helleborine)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4** State: **S2S3** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)** **Species of Conservation Concern in Forests (FLAT, HLC)** Plant Threat Score: **Low**
CCVI: **Moderately Vulnerable**
Predicted Models: M 4% Moderate (inductive), L 64% Low (inductive)

I - Margaritifera falcata *(Western Pearlshell)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)** **Species of Conservation Concern in Forests (CG, HLC)** BLM: **SENSITIVE** FWP SWAP: **SGCN2**
Predicted Models: M 4% Moderate (inductive), L 59% Low (inductive)

I - Rhyacophila betteni *(A Caddisfly)* SSS Y

View in Field Guide **View Predicted Models** **View Range Maps**
Special Status Species - Native Species Global: **G2G4** State: **S3S4**
Predicted Models: M 4% Moderate (inductive), L 56% Low (inductive)

V - Botrychium crenulatum *(Wavy Moonwort)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Sensitive - Known in Forests (BD, KOOT, LOLO)** **Species of Conservation Concern in Forests (HLC)** CCVI: **Less Vulnerable**
Predicted Models: M 4% Moderate (inductive), L 36% Low (inductive)

V - Madia minima *(Small-headed Tarweed)* PSOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G4** State: **S3S4** Plant Threat Score: **No Known Threats**
Predicted Models: M 4% Moderate (inductive), L 16% Low (inductive)

V - Silene spaldingii *(Spalding's Catchfly)* SOC 7 Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G2** State: **S2** USFWS: **LT** Plant Threat Score: **Very High** CCVI: **Extremely Vulnerable**
Predicted Models: M 4% Moderate (inductive), L 16% Low (inductive)

V - Allium geyeri var. geyeri *(Geyer's Onion)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G4G5T4** State: **S3** Plant Threat Score: **No Known Threats** CCVI: **Extremely Vulnerable**
Predicted Models: M 4% Moderate (inductive)

V - Heteranthera dubia *(Water Star-grass)* SOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Species of Concern - Native Species Global: **G5** State: **S1S2** USFS: **Sensitive - Known in Forests (KOOT)** Plant Threat Score: **Unknown**
Predicted Models: M 3% Moderate (inductive), L 53% Low (inductive)

V - Botrychium montanum *(Mountain Moonwort)* PSOC Y

View in Field Guide **View Predicted Models** **View Range Maps**
Potential Species of Concern - Native Species Global: **G3G4** State: **S3S4** Plant Threat Score: **Unknown**
Predicted Models: M 3% Moderate (inductive), L 25% Low (inductive)

V - Eriophorum gracile *(Slender Cottongrass)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   USFS: **Species of Conservation Concern in Forests (FLAT)**   Plant Threat Score: **Unknown**
CCVI: **Moderately Vulnerable**

Predicted Models: M 3% Moderate (inductive), L 25% Low (inductive)

V - Botrychium paradoxum *(Peculiar Moonwort)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G3G4**   State: **S3**   USFS: **Sensitive - Known in Forests (BD, KOOT)**
Sensitive - Suspected in Forests (LOLO)
Species of Conservation Concern in Forests (CG, FLAT, HLC)   BLM: **SENSITIVE**
CCVI: **Moderately Vulnerable**

Predicted Models: M 3% Moderate (inductive), L 21% Low (inductive)

V - Botrychium pedunculosum *(Stalked Moonwort)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G3G4**   State: **S2**   USFS: **Sensitive - Known in Forests (BD, KOOT)**
Species of Conservation Concern in Forests (FLAT)   CCVI: **Less Vulnerable**

Predicted Models: M 3% Moderate (inductive), L 18% Low (inductive)

V - Carex lacustris *(Lake-bank Sedge)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S1S2**   USFS: **Species of Conservation Concern in Forests (FLAT)**   Plant Threat Score: **Low**
CCVI: **Moderately Vulnerable**

Predicted Models: M 3% Moderate (inductive), L 16% Low (inductive)

V - Potamogeton obtusifolius *(Blunt-leaved Pondweed)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   USFS: **Sensitive - Suspected in Forests (LOLO)**
Species of Conservation Concern in Forests (HLC)   Plant Threat Score: **Low**

Predicted Models: M 1% Moderate (inductive), L 44% Low (inductive)

V - Botrychium lanceolatum *(Lanceleaf Moonwort)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   USFS: **Sensitive - Known in Forests (BRT, KOOT)**   CCVI: **Less Vulnerable**

Predicted Models: M 1% Moderate (inductive), L 29% Low (inductive)

V - Dryopteris cristata *(Crested Shieldfern)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   USFS: **Sensitive - Known in Forests (BRT, KOOT, LOLO)**
Species of Conservation Concern in Forests (FLAT)   Plant Threat Score: **Low**
CCVI: **Moderately Vulnerable**

Predicted Models: M 1% Moderate (inductive), L 23% Low (inductive)

V - Gaultheria ovatifolia *(Slender Wintergreen)* PSOC

View in Field Guide   View Predicted Models   View Range Maps

Potential Species of Concern - Native Species   Global: **G5**   State: **S3S4**   Plant Threat Score: **No Known Threats**

Predicted Models: M 1% Moderate (inductive), L 16% Low (inductive)

B - Flammulated Owl *(Psiloscops flammeolus)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G4**   State: **S3B**   USFWS: **MBTA; BCC10**   USFS: **Sensitive - Known in Forests (LOLO)**
Species of Conservation Concern in Forests (FLAT, HLC)   BLM: **SENSITIVE**
FWP SWAP: **SGCN3**   PIF: **1**

Predicted Models: M 1% Moderate (inductive), L 16% Low (inductive)

B - Harlequin Duck *(Histrionicus histrionicus)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G4**   State: **S2B**   USFWS: **MBTA**   USFS: **Sensitive - Known in Forests (BD, KOOT, LOLO)**
Sensitive - Migratory in Forests (BRT)   FWP SWAP: **SGCN2**   PIF: **1**

Predicted Models: L 63% Low (inductive)

V - Stellaria crassifolia *(Fleshy Stitchwort)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S2**   Plant Threat Score: **No Known Threats**

Predicted Models: L 41% Low (inductive)

V - Lycopodium inundatum *(Northern Bog Clubmoss)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S2**   USFS: **Sensitive - Suspected in Forests (KOOT)**
Species of Conservation Concern in Forests (FLAT)   Plant Threat Score: **Unknown**   CCVI: **Highly Vulnerable**

Predicted Models: L 30% Low (inductive)

M - Yuma Myotis *(Myotis yumanensis)* SOC

View in Field Guide   View Predicted Models   View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   FWP SWAP: **SGIN**

Predicted Models: L 29% Low (inductive)

V - Geocaulon lividum *(Northern Toadflax)* PSOC

View in Field Guide   View Predicted Models   View Range Maps

Potential Species of Concern - Native Species   Global: **G5**   State: **S3S4**   Plant Threat Score: **No Known Threats**

Predicted Models: L 29% Low (inductive)

M - Canada Lynx *(Lynx canadensis)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G5**   State: **S3**   USFWS: **LT; CH**   BLM: **THREATENED**   FWP SWAP: **SGCN3**

Predicted Models: L 25% Low (inductive)

M - Wolverine *(Gulo gulo)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species   Global: **G4**   State: **S3**   USFWS: **LT**   USFS: **Sensitive - Known in Forests (LOLO)**   BLM: **SENSITIVE**   FWP SWAP: **SGCN3**

Predicted Models: L 1% Low (inductive)

MONTANA STATE LIBRARY
NATURAL HERITAGE PROGRAM
A program of the **Montana State Library's Natural Resource Information System**

Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Structured Surveys

Summarized by: **24MT0014** *(Custom Area of Interest)*

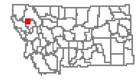
The Montana Natural Heritage Program (MTNHP) records information on the locations where more than 80 different types of well-defined repeatable survey protocols capable of detecting an animal species or suite of animal species have been conducted by state, federal, tribal, university, or private consulting biologists. Examples of structured survey protocols tracked by MTNHP include: visual encounter and dip net surveys for pond breeding amphibians, point counts for birds, call playback surveys for selected bird species, visual surveys of migrating raptors, kick net stream reach surveys for macroinvertebrates, visual encounter cover object surveys for terrestrial mollusks, bat acoustic or mist net surveys, pitfall and/or snap trap surveys for small terrestrial mammals, track or camera trap surveys for large mammals, and trap surveys for turtles. Whenever possible, photographs of survey locations are stored in MTNHP databases.

MTNHP does not typically manage information on structured surveys for plants; surveys for invasive species may be a future exception.

Within the report area you have requested, structured surveys are summarized by the number of each type of structured survey protocol that has been conducted, the number of species detections/observations resulting from these surveys, and the most recent year a survey has been conducted.

B-Bald Eagle Nest *(Bald Eagle Nest Survey)*	**Survey Count**: 93	**Obs Count**: 78	**Recent Survey**: 2021
B-Owl Banding *(ORI Owl Nest Survey and Banding)*	**Survey Count**: 3	**Obs Count**: 3	**Recent Survey**: 2007
B-Point Count *(Bird Point Count)*	**Survey Count**: 24	**Obs Count**: 89	**Recent Survey**: 2002
B-Raptor nest *(Raptor Nest Survey)*	**Survey Count**: 2	**Obs Count**: 2	**Recent Survey**: 2008
E-Eastern Heath Snail *(Eastern Heath Snail Survey)*	**Survey Count**: 15	**Obs Count**:	**Recent Survey**: 2012
E-Eurasian Water-milfoil Rake *(Rake tows/pulls for Eurasian Water-milfoil)*	**Survey Count**: 309	**Obs Count**: 218	**Recent Survey**: 2023
E-Invasive Mussel eDNA *(eDNA for Invasive Mussels)*	**Survey Count**: 72	**Obs Count**:	**Recent Survey**: 2018
E-Invasive Mussel Plankton Tow *(Plankton tows for veligers of Invasive Mussels)*	**Survey Count**: 822	**Obs Count**:	**Recent Survey**: 2023
E-Kicknet *(Kicknet Collection Survey for Invasive Mussels and Snails)*	**Survey Count**: 155	**Obs Count**: 8	**Recent Survey**: 2023
E-Noxious Weed, Road-based *(Noxious Weed Road-based Visual Surveys)*	**Survey Count**: 52	**Obs Count**: 231	**Recent Survey**: 2005
E-Noxious Weed, Visual *(Noxious Weed Visual Surveys)*	**Survey Count**: 2	**Obs Count**: 31	**Recent Survey**: 2008
E-Visual Aquatic Invasives *(Visual Encounter Surveys for Aquatic Invasives on Shorelines or Underwater)*	**Survey Count**: 174	**Obs Count**: 166	**Recent Survey**: 2023
F-Fish Other Survey *(Fish Other Survey (FWP Survey Type))*	**Survey Count**: 7	**Obs Count**: 11	**Recent Survey**: 1997
I-Bumble Bee *(Bumble Bee Collection Surveys)*	**Survey Count**: 2	**Obs Count**: 4	**Recent Survey**: 2014
I-Mosquito Traps *(Montana Mosquito Surveillance Project)*	**Survey Count**: 15	**Obs Count**: 84	**Recent Survey**: 2017
M-Bat Mistnet *(Bat Mistnet Survey)*	**Survey Count**: 2	**Obs Count**: 3	**Recent Survey**: 2009

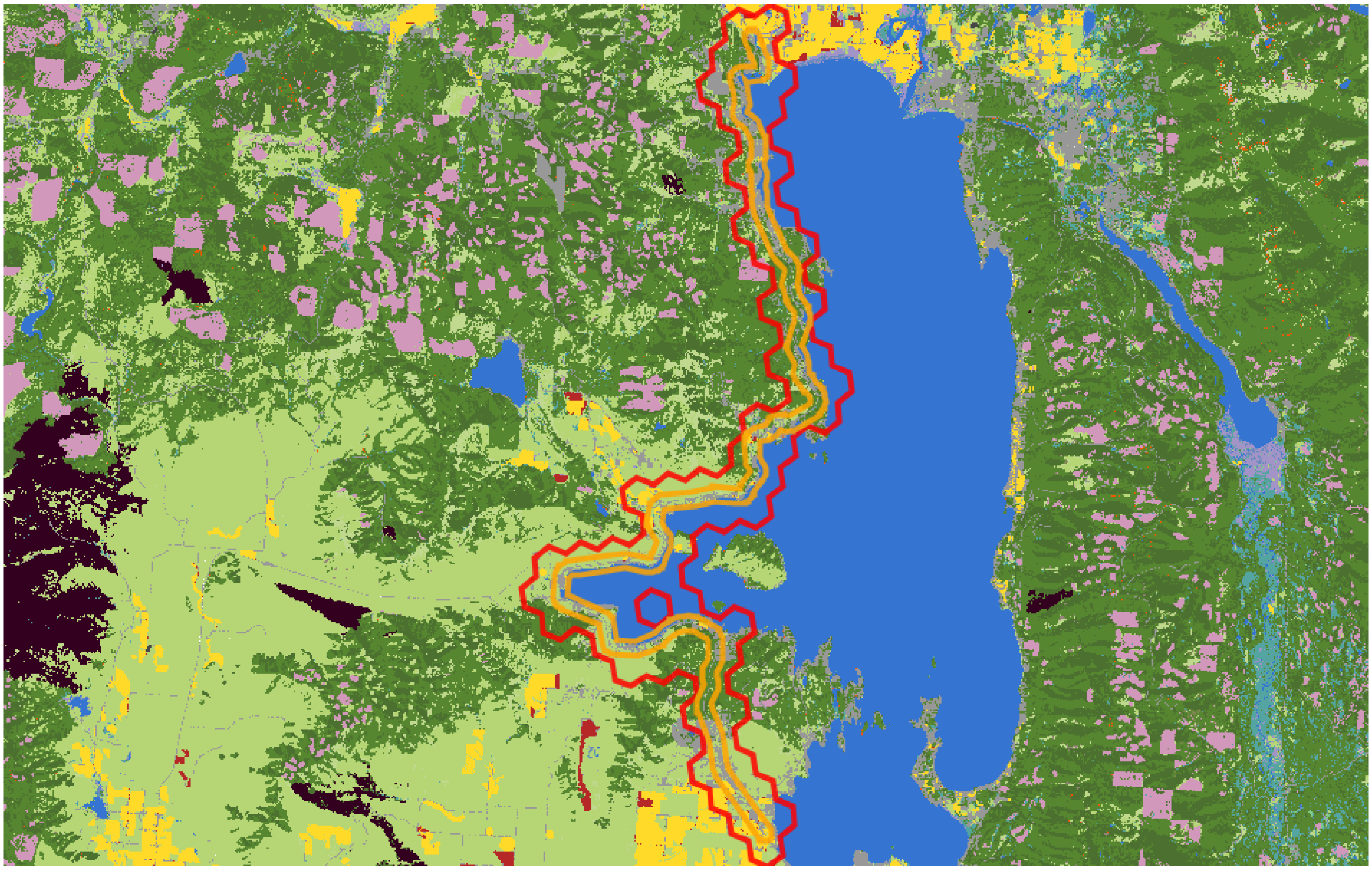
MONTANA STATE LIBRARY
NATURAL HERITAGE PROGRAM
A program of the **Montana State Library's Natural Resource Information System**



Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Land Cover

Summarized by: **24MT0014** *(Custom Area of Interest)*



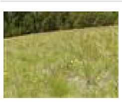
29%
(*13,415* Acres)

Wetland and Riparian Systems

Open Water

Open Water

All areas of open water, generally with less than 25% cover of vegetation or soil



22%
(*10,049* Acres)

Grassland Systems

Montane Grassland

Rocky Mountain Lower Montane, Foothill, and Valley Grassland

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

19% (*8,846 Acres*)

Forest and Woodland Systems
Conifer-dominated forest and woodland (xeric-mesic)
Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest

This ecological system, composed of highly variable montane conifer forests, is found throughout Montana. It is associated with a submesic climate regime with annual precipitation ranging from 250 to 1,000 millimeters (10-39 inches), with most precipitation occurring during winter, and April through June. Winter snowpacks typically melt off in early spring at lower elevations. Elevations range from valley bottoms to 1,676 meters (5,500 feet) in northwestern Montana and up to 2,286 meters (7,500 feet) on warm aspects in southern Montana. In northwestern and west-central Montana, this ecosystem forms a forest belt on warm, dry to slightly moist sites. It generally occurs on gravelly soils with good aeration and drainage and a neutral to slightly acidic pH. In the western part of the state, it is seen mostly on well drained mountain slopes and valleys from lower treeline to up to 1,676 meters (5,500 feet). Immediately east of the Continental Divide, in north-central Montana, it occurs at montane elevations. Douglas-fir (*Pseudotsuga menziesii*) is the dominant conifer both as a seral and climax species. West of the Continental Divide, occurrences can be dominated by any combination of Douglas-fir and long-lived, seral western larch (*Larix occidentalis*), grand fir (*Abies grandis*), ponderosa pine (*Pinus ponderosa*) and lodgepole pine (*Pinus contorta*). Aspen (*Populus tremuloides*) and western white pine (*Pinus monticola*) have a minor status, with western white pine only in extreme western Montana. East of the Continental Divide, larch is absent and lodgepole pine is the co-dominant. Engelmann spruce (*Picea engelmannii*), white spruce, (*Picea glauca*)or their hybrid, become increasingly common towards the eastern edge of the Douglas-fir forest belt.

6% (*2,869 Acres*)

Human Land Use
Developed
Developed, Open Space

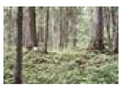
Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. This category often includes highway and railway rights of way and graveled rural roads.

No Image

5% (*2,509 Acres*)

Human Land Use
Developed
Other Roads

County, city and or rural roads generally open to motor vehicles.



5% (*2,133 Acres*)

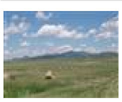
Forest and Woodland Systems
Conifer-dominated forest and woodland (mesic-wet)
Rocky Mountain Mesic Montane Mixed Conifer Forest

These forests are generally dominated by western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and grand fir (*Abies grandis*). They are found in areas influenced by incursions of mild, wet, Pacific maritime air masses west of the Continental Divide in Montana. Occurrences are found on all slopes and aspects but grow best on sites with high soil moisture, such as toeslopes and bottomlands. At the periphery of its distribution, this system is confined to moist canyons and cooler, moister aspects. Generally, these are moist, non-flooded or upland forest sites that are not saturated yearlong. In northwestern Montana, western hemlock and western red cedarforests occur on bottomland and northerly exposures between 609-1,585 meters (2,000-5,200 feet) on sites with an average annual precipitation of 635 millimeters (25 inches). These forests are common in extreme northwestern Montana, and extend eastward to the Continental Divide in the Lake McDonald drainage of Glacier National Park. Isolated stands of western hemlock occur in the Swan Valley, but are found most commonly in the Libby and Thompson Falls vicinities, west to the Idaho border. Western red cedaroccurs extensively in the Mission Mountain ranges south to Missoula, and on lower flanks of the Swan Range north of Lion Creek. It is confined to the riparian zone of major streams on the east face of the Bitterroot Mountain Range. Grand fir, being less moisture dependent, occurs in more southerly and easterly sites than western red cedar and western hemlock. This system is similar to Rocky Mountain Dry-Mesic Mixed Montane Conifer Forest, which can be described as a seral phase of this system on appropriate sites west of the Continental Divide.

4% (*1,796 Acres*)

Human Land Use
Developed
Low Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units in rural and suburban areas. Paved roadways may be classified into this category.



3% (*1,313 Acres*)

Human Land Use
Agriculture
Pasture/Hay

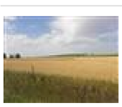
These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type.

No Image

2% (*860 Acres*)

Shrubland, Steppe and Savanna Systems
Deciduous Shrubland
Rocky Mountain Montane-Foothill Deciduous Shrubland

This system is found in the lower montane and foothill regions of western Montana, and north and east into the northern Rocky Mountains. These shrublands typically occur below treeline, within the matrix of surrounding low-elevation grasslands and sagebrush shrublands. They are usually found on steep slopes of canyons, on toeslopes and occasionally on valley bottom lands. These communities can occur on all aspects. In northwestern and west-central Montana, this system forms within Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa)* forests and adjacent to fescue grasslands and big sagebrush (*Artemisia tridentata*) shrublands. In northwestern Montana, these shrublands commonly occur within the upper montane grasslands and forests along the Rocky Mountain Front. Immediately east of the Continental Divide, this system is found within montane grasslands and steep canyon slopes. Most sites have shallow soils that are either loess deposits or volcanic clays. Common ninebark (*Physocarpus malvaceus*), bittercherry (*Prunus emarginata*), common chokecherry (*Prunus virginiana*), rose (*Rosa* spp.), smooth sumac (*Rhus glabra*), Rocky Mountain maple (*Acer glabrum*), serviceberry (*Amelanchier alnifolia*), and oceanspray (*Holodiscus discolor*) are the most common dominant shrubs.



2% (*842 Acres*)

Human Land Use
Agriculture
Cultivated Crops

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.

Additional Limited Land Cover

1% (*637 Acres*) Major Roads

1% (*272 Acres*)		Commercial / Industrial
1% (*234 Acres*)		Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland
<1% (*221 Acres*)		Rocky Mountain Ponderosa Pine Woodland and Savanna
<1% (*174 Acres*)		High Intensity Residential
<1% (*152 Acres*)		Rocky Mountain Subalpine-Montane Mesic Meadow
<1% (*121 Acres*)		Introduced Upland Vegetation - Annual and Biennial Forbland
<1% (*120 Acres*)		Alpine-Montane Wet Meadow
<1% (*38 Acres*)		Harvested forest-tree regeneration
<1% (*24 Acres*)		Insect-Killed Forest
<1% (*23 Acres*)		Emergent Marsh
<1% (*13 Acres*)		Harvested forest-shrub regeneration
<1% (*5 Acres*)		Harvested forest-grass regeneration
<1% (*4 Acres*)		Aspen Forest and Woodland
<1% (*2 Acres*)		Rocky Mountain Cliff, Canyon and Massive Bedrock
<1% (*1 Acres*)		Aspen and Mixed Conifer Forest
<1% (*1 Acres*)		Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
<1% (*0 Acres*)		Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland

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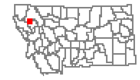
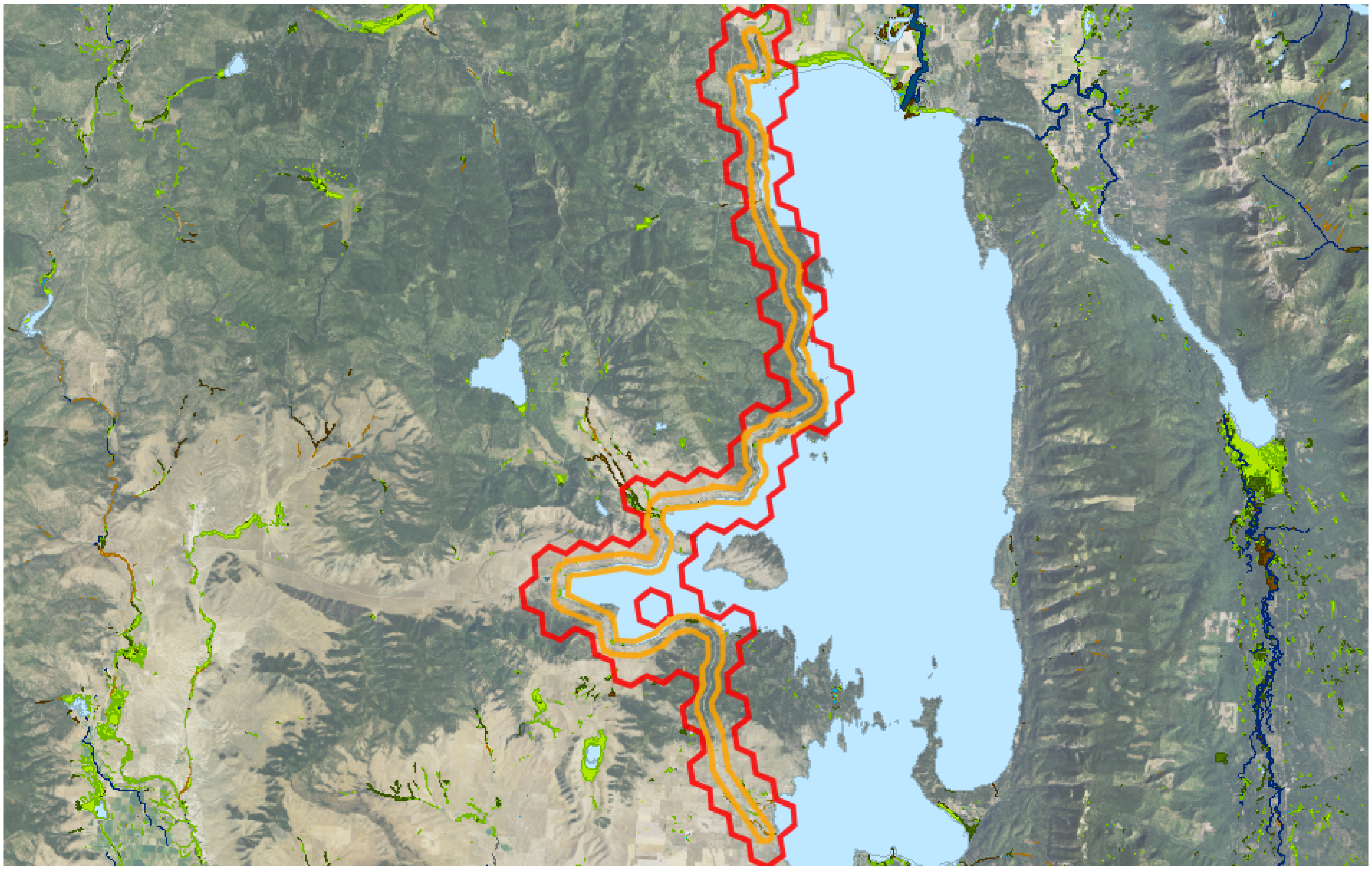


Latitude	Longitude
47.68965	-114.16693
48.11399	-114.36547

Wetland and Riparian

Summarized by: **24MT0014** *(Custom Area of Interest)*



Wetland and Riparian Mapping

P - Palustrine

UB - Unconsolidated Bottom

F - Semipermanently Flooded	21 Acres	
x - Excavated	**21 Acres**	**PUBFx**
H - Permanently Flooded	<1 Acres	
(no modifier)	**<1 Acres**	**PUBH**
x - Excavated	**<1 Acres**	**PUBHx**
K - Artificially Flooded	3 Acres	
h - Diked/Impounded	**3 Acres**	**PUBKh**

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

AB - Aquatic Bed

F - Semipermanently Flooded	41 Acres	
(no modifier)	**15 Acres**	**PABF**
h - Diked/Impounded	**22 Acres**	**PABFh**
x - Excavated	**4 Acres**	**PABFx**
G - Intermittently Exposed	1 Acres	
(no modifier)	**1 Acres**	**PABG**
H - Permanently Flooded	5 Acres	
(no modifier)	**1 Acres**	**PABH**
h - Diked/Impounded	**4 Acres**	**PABHh**
x - Excavated	**<1 Acres**	**PABHx**
K - Artificially Flooded	2 Acres	
h - Diked/Impounded	**2 Acres**	**PABKh**

P - Palustrine, AB - Aquatic Bed
Wetlands with vegetation growing on or below the water surface for most of the growing season.

US - Unconsolidated Shore

C - Seasonally Flooded	3 Acres	
(no modifier)	**3 Acres**	**PUSC**
h - Diked/Impounded	**<1 Acres**	**PUSCh**
K - Artificially Flooded	2 Acres	
h - Diked/Impounded	**2 Acres**	**PUSKh**

P - Palustrine, US - Unconsolidated Shore
Wetlands with less than 75% areal cover of stones, boulders, or bedrock. AND with less than 30% vegetative cover AND the wetland is irregularly exposed due to seasonal or irregular flooding and subsequent drying.

EM - Emergent

P - Palustrine, EM - Emergent
Wetlands with erect, rooted herbaceous vegetation present during most of the growing season.

A - Temporarily Flooded	148 Acres	
(no modifier)	**119 Acres**	**PEMA**
f - Farmed	**15 Acres**	**PEMAf**
h - Diked/Impounded	**12 Acres**	**PEMAh**
x - Excavated	**2 Acres**	**PEMAx**

B - Saturated	5 Acres	
(no modifier)	**5 Acres**	**PEMB**

C - Seasonally Flooded	107 Acres	
(no modifier)	**61 Acres**	**PEMC**
d - Partially Drained/Ditched	**6 Acres**	**PEMCd**
h - Diked/Impounded	**34 Acres**	**PEMCh**
x - Excavated	**6 Acres**	**PEMCx**

F - Semipermanently Flooded	20 Acres	
(no modifier)	**1 Acres**	**PEMF**
h - Diked/Impounded	**19 Acres**	**PEMFh**
x - Excavated	**<1 Acres**	**PEMFx**

SS - Scrub-Shrub

P - Palustrine, SS - Scrub-Shrub
Wetlands dominated by woody vegetation less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

A - Temporarily Flooded	55 Acres	
(no modifier)	**47 Acres**	**PSSA**
h - Diked/Impounded	**8 Acres**	**PSSAh**

C - Seasonally Flooded	23 Acres	
(no modifier)	**22 Acres**	**PSSC**
h - Diked/Impounded	**1 Acres**	**PSSCh**

FO - Forested

P - Palustrine, FO - Forested
Wetlands dominated by woody vegetation greater than 6 meters (20 feet) tall.

A - Temporarily Flooded	46 Acres	
(no modifier)	**45 Acres**	**PFOA**
h - Diked/Impounded	**1 Acres**	**PFOAh**

L - Lacustrine (Lakes)

1 - Limnetic

UB - Unconsolidated Bottom

L - Lacustrine (Lakes), 1 - Limnetic, UB - Unconsolidated Bottom
Deep waterbodies with mud or silt covering at least 25% of the bottom.

H - Permanently Flooded	13,145 Acres	
h - Diked/Impounded	**13,145 Acres**	**L1UBHh**

2 - Littoral

UB - Unconsolidated Bottom

L - Lacustrine (Lakes), 2 - Littoral, UB - Unconsolidated Bottom
Shorelines where mud, silt or other fine particles comprise at least 25% of the substrate.

F - Semipermanently Flooded	1 Acres	
h - Diked/Impounded	**1 Acres**	**L2UBFh**
x - Excavated	**<1 Acres**	**L2UBFx**

H - Permanently Flooded	7 Acres	
(no modifier)	**7 Acres**	**L2UBH**

AB - Aquatic Bed

L - Lacustrine (Lakes), 2 - Littoral, AB - Aquatic Bed
Shorelines with vegetation growing on or below the water surface for most of the growing season.

F - Semipermanently Flooded	16 Acres	
h - Diked/Impounded	**16 Acres**	**L2ABFh**

G - Intermittently Exposed	65 Acres	
h - Diked/Impounded	**65 Acres**	**L2ABGh**

H - Permanently Flooded	10 Acres	
h - Diked/Impounded	**10 Acres**	**L2ABHh**

US - Unconsolidated Shore

L - Lacustrine (Lakes), 2 - Littoral, US - Unconsolidated Shore
Shorelines where there is less than 75% areal cover of stones, boulders, or bedrock, and less than 30% vegetation cover. The area is also irregularly exposed due to seasonal or irregular flooding and subsequent drying.

C - Seasonally Flooded	1 Acres	
h - Diked/Impounded	**1 Acres**	**L2USCh**

EM - Emergent

L - Lacustrine (Lakes), 2 - Littoral, EM - Emergent
Shorelines that have nonpersistent, erect, rooted herbaceous vegetation during most of the growing season.

F - Semipermanently Flooded	5 Acres	
h - Diked/Impounded	**5 Acres**	**L2EMFh**

R - Riverine (Rivers)

3 - Upper Perennial

UB - Unconsolidated Bottom

R - Riverine (Rivers), 3 - Upper Perennial, UB - Unconsolidated Bottom
Stream channels where the substrate is at least 25% mud, silt or other fine particles.

H - Permanently Flooded	1 Acres	
(no modifier)	**1 Acres**	**R3UBH**

Rp - Riparian

1 - Lotic

SS - Scrub-Shrub

(no modifier)	**29 Acres**	**Rp1SS**

Rp - Riparian, 1 - Lotic, SS - Scrub-Shrub
This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

FO - Forested
(no modifier) **2 Acres** **Rp1FO**

Rp - Riparian, 1 - Lotic, FO - Forested
This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.

2 - Lentic

SS - Scrub-Shrub
(no modifier) **1 Acres** **Rp2SS**

Rp - Riparian, 2 - Lentic, SS - Scrub-Shrub
This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

FO - Forested
(no modifier) **7 Acres** **Rp2FO**

Rp - Riparian, 2 - Lentic, FO - Forested
This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.

EM - Emergent
(no modifier) **1 Acres** **Rp2EM**

Rp - Riparian, 2 - Lentic, EM - Emergent
Riparian areas that have erect, rooted herbaceous vegetation during most of the growing season.

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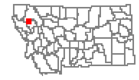

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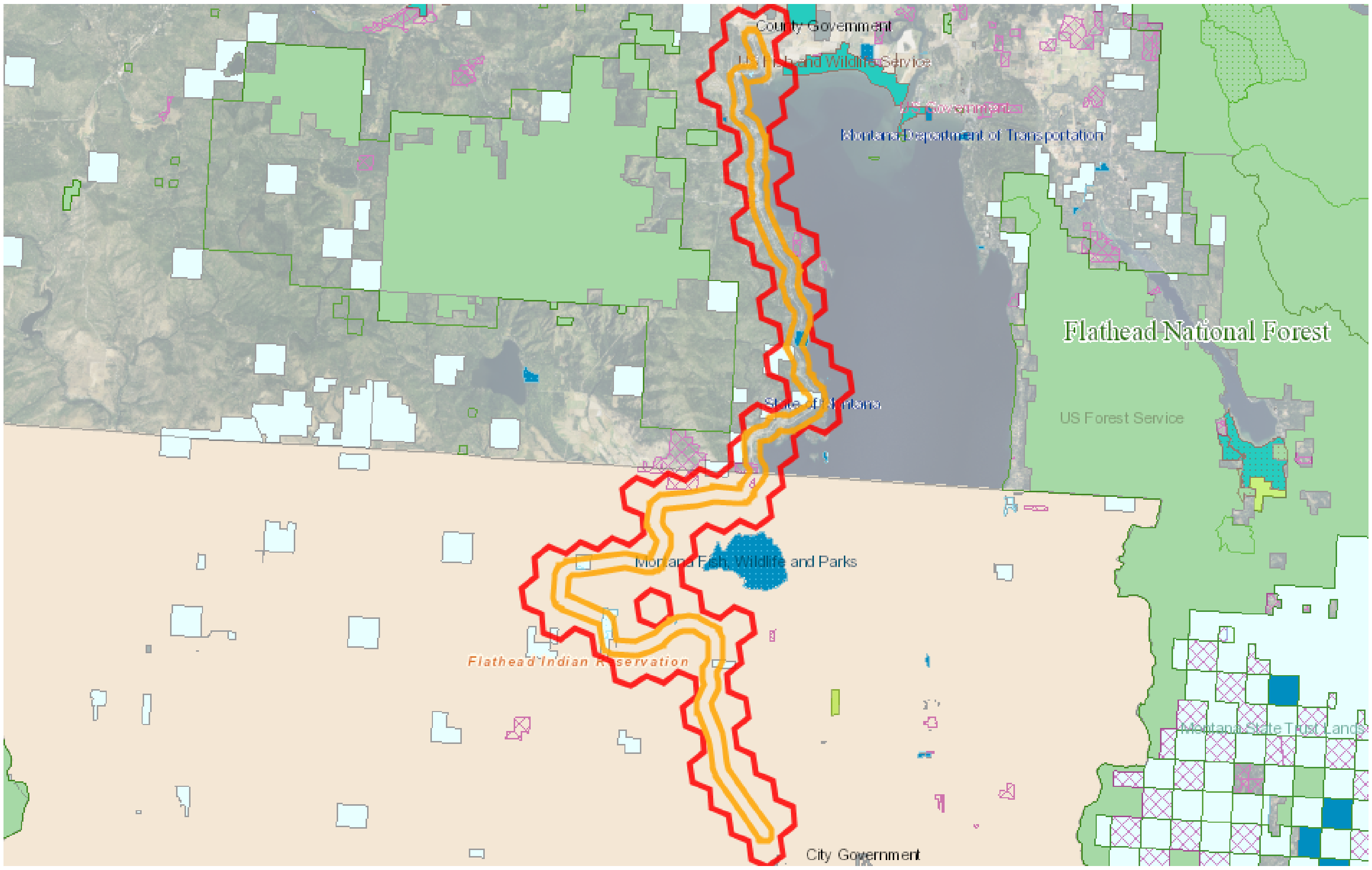
Land Management

Summarized by: **24MT0014** *(Custom Area of Interest)*



Land Management Summary

	Ownership	Tribal	Easements	Other Boundaries (possible overlap)
Public Lands	**2,103 Acres (5%)**			
Federal	66 Acres (<1%)			
US Fish and Wildlife Services	66 Acres (<1%)			
USFWS Owned	66 Acres (<1%)			
USFWS Wetland Management Districts				67 Acres
Northwest Montana Wetland Management District				67 Acres
State	1,925 Acres (4%)			
Montana State Trust Lands	1,763 Acres (4%)			
MT State Trust Owned	1,763 Acres (4%)			
Montana Fish, Wildlife and Parks	159 Acres (<1%)			
MTFWP Owned	159 Acres (<1%)			
MTFWP State Parks				360 Acres
Flathead Lake/Big Arm State Park				226 Acres
Flathead Lake/West Shore State Park				134 Acres
MTFWP Fishing Access Sites				19 Acres
Elmo Fishing Access Site				14 Acres
Somers Fishing Access Site				4 Acres
Walstad Fishing Access Site				1 Acres
MTFWP Wildlife Habitat Protection Areas				1 Acres
Flathead Lake Wildlife Habitat Protection Area				1 Acres
State of Montana	3 Acres (<1%)			
State of Montana Owned	3 Acres (<1%)			
Local	112 Acres (<1%)			
Local Government	112 Acres (<1%)			
Local Government Owned	112 Acres (<1%)			
Reservation Boundaries		**27,166 Acres (58%)**		
Flathead Indian Reservation		27,166 Acres (58%)		
Conservation Easements			**545 Acres (1%)**	
Private			545 Acres (1%)	

Land Management Summary

	Ownership	Tribal	Easements	Other Boundaries (possible overlap)
Montana Land Reliance			506 Acres (1%)	
The Nature Conservancy			39 Acres (<1%)	
Private Lands or Unknown Ownership	**16,861 Acres (36%)**			

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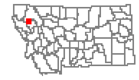

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Biological Reports

Summarized by: **24MT0014** *(Custom Area of Interest)*

Within the report area you have requested, citations for all reports and publications associated with plant or animal observations in Montana Natural Heritage Program (MTNHP) databases are listed and, where possible, links to the documents are included.

The MTNHP plans to include reports associated with terrestrial and aquatic communities in the future as allowed for by staff resources. If you know of reports or publications associated with species or biological communities within the report area that are not shown in this report, please let us know: mtnhp@mt.gov

- Anderson, M.E. 1977. Aspects of the ecology of two sympatric species of Thamnophis and heavy metal accumulation with the species. M.S. thesis, University of Montana, Missoula. 147 pp.
- Duncan, Celestine. 2014. ***Flathead Lake Curyleaf Pondweed (Potamogeton crispus) Post-Removal Monitoring of Lakeside and Big Fork Condominium Dock Sites***. Report to MT DNRC. Weed Management Services. Helena, MT. 2pp.
- Halvorson, C.H., R.M. Engleman. 1983. Survival Analysis for a Red Squirrel Population. Journal of Mammalogy. 64(2): 332-336.
- Loomis, H.F. and Rupert Schmitt. 1971. ***The ecology, distribution, and taxonomy of the millipeds of Montana west of the continental divide***. Northwest Science. Vol. 45 No. 2:107-131.
- Miller, J. D. 1975. Interspecific food relationships of anurans in northwestern Montana and fluoride accumulation in amphibians and reptiles in northwestern Montana. M.S. thesis. University of Montana, Missoula, MT. 105 p.
- Rogers, Ralph and Jay Sumner. 2004. Montana Peregrine Falcon Survey. Centmont Bioconsultants. Winifred, Montana. 32 pp plus appendix.

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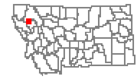
Legend

Model Icons
- N Suitable (native range)
- O Optimal Suitability
- M Moderate Suitability
- L Low Suitability
- I Suitable (introduced range)

Habitat Icons
- C Common
- O Occasional

Range Icons
- N Non-native

Num Obs
Count of obs with 'good precision' (<=1000m)
+ indicates additional 'poor precision' obs (1001m-10,000m)



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Invasive and Pest Species

Summarized by: **24MT0014** *(Custom Area of Interest)*

	# Obs	Predicted Model	Range

Aquatic Invasive Species

V - Iris pseudacorus *(Yellowflag Iris)* N2A/AIS — # Obs: | Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: O 59% Optimal (inductive), M 27% Moderate (inductive), L 12% Low (inductive)

V - Butomus umbellatus *(Flowering-rush)* N2A/AIS — # Obs: 60 | Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species   Global: **G5** State: **SNA**
Predicted Models: O 29% Optimal (inductive), M 25% Moderate (inductive), L 15% Low (inductive)

V - Potamogeton crispus *(Curly-leaf Pondweed)* N2B/AIS — # Obs: 11 | Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 2B - Aquatic Invasive Species - Non-native Species   Global: **G5** State: **SNA**
Predicted Models: M 15% Moderate (inductive), L 66% Low (inductive)

V - Myriophyllum spicatum *(Eurasian Water-milfoil)* N2A/AIS — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: M 3% Moderate (inductive), L 55% Low (inductive)

V - Nymphaea odorata *(American Water-lily)* AIS — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Aquatic Invasive Species - Non-native Species   Global: **G5** State: **SNA**
Predicted Models: I 75% Suitable (introduced range) (deductive)

I - Faxonius virilis *(Virile Crayfish)* AIS — # Obs: 8 | Predicted Model: Not Assessed | Range: N

View in Field Guide | View Range Maps
Aquatic Invasive Species - Native/Non-native Species - (depends on location or taxa)   Global: **G5** State: **S5**

Noxious Weeds: Priority 1A

V - Centaurea solstitialis *(Yellow Starthistle)* N1A — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1A - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: O 40% Optimal (inductive), M 44% Moderate (inductive), L 11% Low (inductive)

V - Taeniatherum caput-medusae *(Medusahead)* N1A — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1A - Non-native Species   Global: **G4G5** State: **SNA**
Predicted Models: O 4% Optimal (inductive), M 10% Moderate (inductive), L 75% Low (inductive)

V - Isatis tinctoria *(Dyer's Woad)* N1A — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1A - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: M 38% Moderate (inductive), L 56% Low (inductive)

Noxious Weeds: Priority 1B

V - Lythrum salicaria *(Purple Loosestrife)* N1B — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1B - Non-native Species   Global: **G5** State: **SNA**
Predicted Models: O 64% Optimal (inductive), M 19% Moderate (inductive), L 8% Low (inductive)

V - Chondrilla juncea *(Rush Skeletonweed)* N1B — # Obs: 12 | Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1B - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: O 36% Optimal (inductive), M 49% Moderate (inductive), L 15% Low (inductive)

V - Cytisus scoparius *(Scotch Broom)* N1B — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1B - Non-native Species   Global: **GNR** State: **SNA**
Predicted Models: O 29% Optimal (inductive), M 21% Moderate (inductive), L 30% Low (inductive)

V - Polygonum cuspidatum *(Japanese Knotweed)* N1B — Range: N

View in Field Guide | View Predicted Models | View Range Maps
Noxious Weed: Priority 1B - Non-native Species   Global: **GNRTNR** State: **SNA**
Predicted Models: O 21% Optimal (inductive), M 55% Moderate (inductive), L 24% Low (inductive)

V - Echium vulgare *(Blueweed)* N1B

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 5% Optimal (inductive), M 55% Moderate (inductive), L 40% Low (inductive)

V - Polygonum x bohemicum *(Bohemian Knotweed)* N1B

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNA** State: **SNA**
Predicted Models: O 1% Optimal (inductive), M 4% Moderate (inductive), L 64% Low (inductive)

Noxious Weeds: Priority 2A

V - Rhamnus cathartica *(Common Buckthorn)* N2A

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 64% Optimal (inductive), M 33% Moderate (inductive), L 3% Low (inductive)

V - Iris pseudacorus *(Yellowflag Iris)* N2A/AIS

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 59% Optimal (inductive), M 27% Moderate (inductive), L 12% Low (inductive)

V - Hieracium praealtum *(Kingdevil Hawkweed)* N2A

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 55% Optimal (inductive), M 40% Moderate (inductive), L 4% Low (inductive)

V - Butomus umbellatus *(Flowering-rush)* N2A/AIS 60

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **G5** State: **SNA**
Predicted Models: O 29% Optimal (inductive), M 25% Moderate (inductive), L 15% Low (inductive)

V - Hieracium aurantiacum *(Orange Hawkweed)* N2A 7

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 15% Optimal (inductive), M 51% Moderate (inductive), L 34% Low (inductive)

V - Ranunculus acris *(Tall Buttercup)* N2A 11

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **G5** State: **SNA**
Predicted Models: O 10% Optimal (inductive), M 33% Moderate (inductive), L 51% Low (inductive)

V - Hieracium caespitosum *(Meadow Hawkweed)* N2A 5

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 7% Optimal (inductive), M 59% Moderate (inductive), L 34% Low (inductive)

V - Ventenata dubia *(Ventenata)* N2A

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 1% Optimal (inductive), M 67% Moderate (inductive), L 18% Low (inductive)

V - Myriophyllum spicatum *(Eurasian Water-milfoil)* N2A/AIS

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 3% Moderate (inductive), L 55% Low (inductive)

V - Senecio jacobaea *(Tansy Ragwort)* N2A

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 3% Moderate (inductive), L 40% Low (inductive)

Noxious Weeds: Priority 2B

V - Hypericum perforatum *(Common St. John's-wort)* N2B 17

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 21% Optimal (inductive), M 71% Moderate (inductive), L 8% Low (inductive)

V - Tanacetum vulgare *(Common Tansy)* N2B 18

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 19% Optimal (inductive), M 75% Moderate (inductive), L 5% Low (inductive)

V - Leucanthemum vulgare *(Oxeye Daisy)* N2B 24

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 14% Optimal (inductive), M 74% Moderate (inductive), L 12% Low (inductive)

V - Linaria dalmatica *(Dalmatian Toadflax)* N2B 30

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **G5** State: **SNA**
Predicted Models: O 12% Optimal (inductive), M 81% Moderate (inductive), L 7% Low (inductive)

V - Centaurea stoebe *(Spotted Knapweed)* N2B 88 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 95% Moderate (inductive), L 5% Low (inductive)

V - Cynoglossum officinale *(Common Hound's-tongue)* N2B 42 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 95% Moderate (inductive), L 5% Low (inductive)

V - Potentilla recta *(Sulphur Cinquefoil)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 45% Moderate (inductive), L 55% Low (inductive)

V - Lepidium draba *(Whitetop)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 38% Moderate (inductive), L 41% Low (inductive)

V - Linaria vulgaris *(Yellow Toadflax)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 37% Moderate (inductive), L 62% Low (inductive)

V - Cirsium arvense *(Canada Thistle)* N2B 76 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **G5** State: **SNA**
Predicted Models: M 16% Moderate (inductive), L 84% Low (inductive)

V - Potamogeton crispus *(Curly-leaf Pondweed)* N2B/AIS 11 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Aquatic Invasive Species - Non-native Species Global: **G5** State: **SNA**
Predicted Models: M 15% Moderate (inductive), L 66% Low (inductive)

V - Centaurea diffusa *(Diffuse Knapweed)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 12% Moderate (inductive), L 77% Low (inductive)

V - Acroptilon repens *(Russian Knapweed)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 5% Moderate (inductive), L 70% Low (inductive)

V - Convolvulus arvensis *(Field Bindweed)* N2B 5 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 3% Moderate (inductive), L 78% Low (inductive)

V - Euphorbia virgata *(Leafy Spurge)* N2B 1 N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: L 97% Low (inductive)

V - Berteroa incana *(Hoary False-alyssum)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: L 77% Low (inductive)

V - Tamarix ramosissima *(Salt Cedar)* N2B N

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: L 63% Low (inductive)

Regulated Weeds: Priority 3

V - Bromus tectorum *(Cheatgrass)* R3 N

View in Field Guide View Predicted Models View Range Maps
Regulated Weed: Priority 3 - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 45% Moderate (inductive), L 55% Low (inductive)

V - Elaeagnus angustifolia *(Russian Olive)* R3 N

View in Field Guide View Predicted Models View Range Maps
Regulated Weed: Priority 3 - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: L 23% Low (inductive)

Biocontrol Species

I - Cyphocleonus achates *(Knapweed Root Weevil)* BIOCNTRL N

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 71% Optimal (inductive), M 29% Moderate (inductive)

I - Oberea erythrocephala *(Red-headed Leafy Spurge Stem Borer)* BIOCNTRL N

View in Field Guide **View Predicted Models** **View Range Maps**
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 32% Optimal (inductive), M 37% Moderate (inductive), L 26% Low (inductive)

I - Mecinus janthiniformis *(Dalmatian Toadflax Stem-boring Weevil)* BIOCNTRL N

View in Field Guide **View Predicted Models** **View Range Maps**
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: O 4% Optimal (inductive), M 33% Moderate (inductive), L 60% Low (inductive)

I - Aphthona lacertosa *(Brown-legged Leafy Spurge Flea Beetle)* BIOCNTRL N

View in Field Guide **View Predicted Models** **View Range Maps**
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 58% Moderate (inductive), L 41% Low (inductive)

I - Aphthona nigriscutis *(Black Dot Leafy Spurge Flea Beetle)* BIOCNTRL N

View in Field Guide **View Predicted Models** **View Range Maps**
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 19% Moderate (inductive), L 56% Low (inductive)

I - Mecinus janthinus *(Yellow Toadflax Stem-boring Weevil)* BIOCNTRL N

View in Field Guide **View Predicted Models** **View Range Maps**
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predicted Models: M 1% Moderate (inductive), L 70% Low (inductive)

I - Hyles euphorbiae *(Spurge Hawkmoth)* BIOCNTRL 1 Not Assessed N

View in Field Guide **View Range Maps**
Biocontrol Species - Non-native Species Global: **G5** State: **SNA**

Introduction to Montana Natural Heritage Program

PO Box 201800 • 1201 11th Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • phone 406.444.3989 • mtnhp.org

Introduction

The Montana Natural Heritage Program (MTNHP) is Montana's source for reliable and objective information on Montana's native species and habitats, emphasizing those of conservation concern. MTNHP was created by the Montana legislature in 1983 as part of the Natural Resource Information System (NRIS) at the Montana State Library (MSL). MTNHP is "a program of information acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana" (MCA 90-15-102). MTNHP's activities are guided by statute as well as through ongoing interaction with, and feedback from, principal data source agencies such as Montana Fish, Wildlife, and Parks, the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, the Montana University System, the US Forest Service, and the US Bureau of Land Management. Since the first staff was hired in 1985, the Program has logged a long record of success, and developed into a highly respected, service-oriented program. MTNHP is widely recognized as one of the most advanced and effective of over 60 natural heritage programs that are distributed across North America.

Vision

Our vision is that public agencies, the private sector, the education sector, and the general public will trust and rely upon MTNHP as the source for information and expertise on Montana's species and habitats, especially those of conservation concern. We strive to provide easy access to our information to allow users to save time and money, speed environmental reviews, and make informed decisions.

Core Values

- We endeavor to be a single statewide source of accurate and up-to-date information on Montana's plants, animals, and aquatic and terrestrial biological communities.
- We actively listen to our data users and work responsively to meet their information and training needs.
- We strive to provide neutral, trusted, timely, and equitable service to all of our information users.
- We make every effort to be transparent to our data users in setting work priorities and providing data products.

Confidentiality

All information requests made to the Montana Natural Heritage Program are considered library records and are protected from disclosure by the Montana Library Records Confidentiality Act (MCA 22-1-11).

Information Managed

Information managed at the Montana Natural Heritage Program is botanical, zoological, and ecological information that describes the distribution (e.g., observations, structured surveys, range polygons, predicted habitat suitability models), conservation status (e.g., global and state conservation status ranks, including threats), and other supporting information (e.g., accounts and references) on the biology and ecology of species and biological communities.

Data Use Terms and Conditions

- Montana Natural Heritage Program (MTNHP) products and services are based on biological data and the objective interpretation of those data by professional scientists. MTNHP does not advocate any particular philosophy of natural resource protection, management, development, or public policy.
- MTNHP has no natural resource management or regulatory authority. Products, statements, and services from MTNHP are intended to inform parties as to the state of scientific knowledge about certain natural resources, and to further develop that knowledge. The information is not intended as natural resource management guidelines or prescriptions or a determination of environmental impacts. MTNHP recommends consultation with appropriate state, federal, and tribal resource management agencies and authorities in the area where your project is located.
- Information on the status and spatial distribution of biological resources produced by MTNHP are intended to inform parties of the state-wide status, known occurrence, or the likelihood of the presence of those resources. **These products are not intended to substitute for field-collected data, nor are they intended to be the sole basis for natural resource management decisions.**
- MTNHP does not portray its data as exhaustive or comprehensive inventories of rare species or biological communities. **Field verification of the absence or presence of sensitive species and biological communities will always be an important obligation of users of our data.**
- MTNHP responds equally to all requests for products and services, regardless of the purpose or identity of the requester.
- Because MTNHP constantly updates and revises its databases with new data and information, products will become outdated over time. Interested parties are encouraged to obtain the most current information possible from MTNHP, rather than using older products. We add, review, update, and delete records on a daily basis. Consequently, we strongly advise that you update your MTNHP data sets at a minimum of every four months for most applications of our information.
- MTNHP data require a certain degree of biological expertise for proper analysis, interpretation, and application. Our staff is available to advise you on questions regarding the interpretation or appropriate use of the data that we provide. See Contact Information for MTNHP Staff
- The information provided to you by MTNHP may include sensitive data that if publicly released might jeopardize the welfare of threatened, endangered, or sensitive species or biological communities. This information is intended for distribution or use only within your department, agency, or business. Subcontractors may have access to the data during the course of any given project, but should not be given a copy for their use on subsequent, unrelated work.
- MTNHP data are made freely available. Duplication of hard-copy or digital MTNHP products with the intent to sell is prohibited without written consent by MTNHP. Should you be asked by individuals outside your organization for the type of data that we provide, please refer them to MTNHP.
- MTNHP and appropriate staff members should be appropriately acknowledged as an information source in any third-party product involving MTNHP data, reports, papers, publications, or in maps that incorporate MTNHP graphic elements.
- Sources of our data include museum specimens, published and unpublished scientific literature, field surveys by state and federal agencies and private contractors, and reports from knowledgeable individuals. MTNHP actively solicits and encourages additions, corrections and updates, new observations or collections, and comments on any of the data we provide.
- MTNHP staff and contractors do not enter or cross privately-owned lands without express permission from the landowner. However, the program cannot guarantee that information provided to us by others was obtained under adherence to this policy.

Suggested Contacts for Natural Resource Management Agencies

As required by Montana statute (MCA 90-15), the Montana Natural Heritage Program works with state, federal, tribal, nongovernmental organizations, and private partners to ensure that the latest animal and plant distribution and status information is incorporated into our databases so that it can be used to inform a variety of permitting and planning processes and management decisions. We encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located and review the permitting overviews by the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation and the Index of Environmental Permits for Montana for guidelines relevant to your efforts. In particular, we encourage you to contact the Montana Department of Fish, Wildlife, and Parks for the latest data and management information regarding hunted and high-profile management species and to use the U.S. Fish and Wildlife Service's Information Planning and Consultation (IPAC) website regarding U.S. Endangered Species Act listed Threatened, Endangered, or Candidate species.

For your convenience, we have compiled a list of relevant agency contacts and links below:

Montana Fish, Wildlife, and Parks

Fish Species	Zachary Shattuck zshattuck@mt.gov (406) 444-1231 or Eric Roberts eroberts@mt.gov (406) 444-5334
American Bison Black-footed Ferret Black-tailed Prairie Dog Bald Eagle Golden Eagle Common Loon Least Tern Piping Plover Whooping Crane	Kristina Smucker KSmucker@mt.gov (406) 444-5209
Grizzly Bear Greater Sage Grouse Trumpeter Swan Big Game Upland Game Birds Furbearers	Brian Wakeling brian.wakeling@mt.gov (406) 444-3940
Managed Terrestrial Game Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095
Fisheries Data and Nongame Animal Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095
Wildlife and Fisheries Scientific Collector's Permits	https://fwp.mt.gov/buyandapply/commercialwildlifeandscientificpermits/scientific Kristina Smucker for Wildlife ksmucker@mt.gov (406) 444-5209 Dave Schmetterling for Fisheries dschmetterling@mt.gov (406) 542-5514
Fish and Wildlife Recommendations for Subdivision Development	Stevie Burton stevie.burton@mt.gov (406) 594-7354 See https://fwp.mt.gov/conservation/living-with-wildlife/subdivision-recommendations
Regional Contacts 	Region 1 (Kalispell) (406) 752-5501 fwprg12@mt.gov Region 2 (Missoula) (406) 542-5500 fwprg22@mt.gov Region 3 (Bozeman) (406) 577-7900 fwprg3@mt.gov Region 4 (Great Falls) (406) 454-5840 fwprg42@mt.gov Region 5 (Billings) (406) 247-2940 fwprg52@mt.gov Region 6 (Glasgow) (406) 228-3700 fwprg62@mt.gov Region 7 (Miles City) (406) 234-0900 fwprg72@mt.gov

Montana Department of Agriculture
General Contact Information: https://agr.mt.gov/About/Office-Locations/Office-Locations-and-Field-Offices
Noxious Weeds: https://agr.mt.gov/Noxious-Weeds

Montana Department of Environmental Quality
Permitting and Operator Assistance for all Environmental Permits: https://deq.mt.gov/Permitting

Montana Department of Natural Resources and Conservation
Overview of, and contacts for, licenses and permits for state lands, water, and forested lands:
https://dnrc.mt.gov/Permits-Services

Stream Permitting (310 permits) and an overview of various water and stream related permits (e.g., Stream Protection Act 124, Federal Clean Water Act 404, Federal Rivers and Harbors Act Section 10, Short-term Water Quality Standard for Turbidity 318 Authorization, etc.).
https://dnrc.mt.gov/Licenses-and-Permits/Stream-Permitting

Wildfire Resources: https://dnrc.mt.gov/Forestry/Wildfire

Bureau of Land Management

Montana Field Office Contacts:

Billings	(406) 896-5013
Butte	(406) 533-7600
Dillon	(406) 683-8000
Glasgow	(406) 228-3750
Havre	(406) 262-2820
Lewistown	(406) 538-1900
Malta	(406) 654-5100
Miles City	(406) 233-2800
Missoula	(406) 329-3914

United States Army Corps of Engineers
Montana Regulatory Office for federal permits related to construction in water and wetlands
https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Montana/ (406) 441-1375

United States Environmental Protection Agency
Environmental information, notices, permitting, and contacts https://www.epa.gov/mt
Gateway to state resource locators https://www.envcap.org/srl/index.php

United States Fish and Wildlife Service
Information Planning and Conservation (IPAC) website: https://ipac.ecosphere.fws.gov
Montana Ecological Services Field Office: https://www.fws.gov/office/montana-ecological-services (406) 449-5225

United States Forest Service

Regional Office – Missoula, Montana Contacts			
Wildlife Program Leader	Tammy Fletcher	tammy.fletcher2@usda.gov	(406) 329-3086
Wildlife Ecologist	Cara Staab	cara.staab@usda.gov	(406) 329-3677
Aquatic Ecologist	Justin Jimenez	justin.jimenez@usda.gov	(435) 370-6830
TES Program	Lydia Allen	lydia.allen@usda.gov	(406) 329-3558
Interagency Grizzly Bear Coordinator	Scott Jackson	scott.jackson@usda.gov	(406) 329-3664
Regional Botanist	Amanda Hendrix	amanda.hendrix@usda.gov	(651) 447-3016
Regional Vegetation Ecologist	Mary Manning	marry.manning@usda.gov	(406) 329-3304
Invasive Species Program Manager	Michelle Cox	michelle.cox2@usda.gov	(406) 329-3669

Tribal Nations

[Assiniboine & Gros Ventre Tribes – Fort Belknap Reservation](#)
[Assiniboine & Sioux Tribes – Fort Peck Reservation](#)
[Blackfeet Tribe - Blackfeet Reservation](#)
[Chippewa Creek Tribe - Rocky Boy's Reservation](#)
[Crow Tribe – Crow Reservation](#)
[Little Shell Chippewa Tribe](#)
[Northern Cheyenne Tribe – Northern Cheyenne Reservation](#)
[Salish & Kootenai Tribes - Flathead Reservation](#)

Natural Heritage Programs and Conservation Data Centers in Surrounding States and Provinces

[Alberta Conservation Information Management System](#)
[British Columbia Conservation Data Centre](#)
[Idaho Natural Heritage Program](#)
[North Dakota Natural Heritage Program](#)
[Saskatchewan Conservation Data Centre](#)
[South Dakota Natural Heritage Program](#)
[Wyoming Natural Diversity Database](#)

Invasive Species Management Contacts and Information

Aquatic Invasive Species
[Montana Fish, Wildlife, and Parks Aquatic Invasive Species staff](#)
[Montana Department of Natural Resources and Conservation's Aquatic Invasive Species Grant Program](#)
[Montana Invasive Species Council (MISC)](#)
[Western Montana Conservation Commission](#)

Noxious Weeds
[Montana Weed Control Association Contacts Webpage](#)
[Montana Biological Weed Control Coordination Project](#)
[Montana Department of Agriculture - Noxious Weeds](#)
[Montana Weed Control Association](#)
[Montana Fish, Wildlife, and Parks - Noxious Weeds](#)
[Montana State University Integrated Pest Management Extension](#)
[Integrated Noxious Weed Management after Wildfires](#)
[Fire Management and Invasive Plants](#)

Introduction to Native Species

Within the report area you have requested, separate summaries are provided for: (1) Species Occurrences (SO) for plant and animal Species of Concern, Special Status Species (SSS), Important Animal Habitat (IAH) and some Potential Plant Species of Concern; (2) other observed non Species of Concern or Species of Concern without suitable documentation to create Species Occurrence polygons; and (3) other non-documented species that are potentially present based on their range, predicted suitable habitat model output, or presence of associated habitats. Each of these summaries provides the following information when present for a species: (1) the number of Species Occurrences and associated delineation criteria for construction of these polygons that have long been used for considerations of documented Species of Concern in environmental reviews; (2) the number of observations of each species; (3) the geographic range polygons for each species that the report area overlaps; (4) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (5) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the Montana Field Guide; and (6) a variety of conservation status ranks and links to species accounts in the Montana Field Guide. Details on each of these information categories are included under relevant section headers below or are defined on our Species Status Codes page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document native and introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are restricted by budgets, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species and biological communities will always be an important obligation of users of our data.**

If you are aware of observation datasets that the MTNHP is missing, please report them to the Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos:
https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx

Observations

The MTNHP manages information on several million animal and plant observations that have been reported by professional biologists and private citizens from across Montana. The majority of these observations are submitted in digital format from standardized databases associated with research or monitoring efforts and spreadsheets of incidental observations submitted by professional biologists and amateur naturalists. At a minimum, accepted observation records must contain a credible species identification (i.e. appropriate geographic range, date, and habitat and, if species are difficult to identify, a photograph and/or notes on key identifying features), a date or date range, observer name, locational information (ideally with latitude and longitude in decimal degrees), notes on numbers observed, and species behavior or habitat use (e.g., is the observation likely associated with reproduction). Bird records are also required to have information associated with date-appropriate breeding or overwintering status of the species observed. MTNHP reviews observation records to ensure that they are mapped correctly, occur within date ranges when the species is known to be present or detectable, occur within the known seasonal geographic range of the species, and occur in appropriate habitats. MTNHP also assigns each record a locational uncertainty value in meters to indicate the spatial precision associated with the record's mapped coordinates. Only records with locational uncertainty values of 10,000 meters or less are included in environmental summary reports and number summaries are only provided for records with locational uncertainty values of 1,000 meters or less.

Species Occurrences

The MTNHP evaluates plant and animal observation records for species of higher conservation concern to determine whether they are worthy of inclusion in the Species Occurrence (SO) layer for use in environmental reviews; observations not worthy of inclusion in this layer include long distance dispersal events, migrants observed away from key migratory stopover habitats, and winter observations. An SO is a polygon depicting what is known about a species occupancy from direct observation with a defined level of locational uncertainty and any inference that can be made about adjacent habitat use from the latest peer-reviewed science. If an observation can be associated with a map feature that can be tracked (e.g., a wetland boundary for a wetland associated plant) then this polygon feature is used to represent the SO. Areas that can be inferred as probable occupied habitat based on direct observation of a species location and what is known about the foraging area or home range size of the species may be incorporated into the SO. Species Occurrences generally belong to one of the following categories:

Plant Species Occurrences

A documented location of a specimen collection or observed plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and their spatial proximity likely allows them to interbreed). Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Plant SO's are only created for Species of Concern and Potential Species of Concern.

Animal Species Occurrences

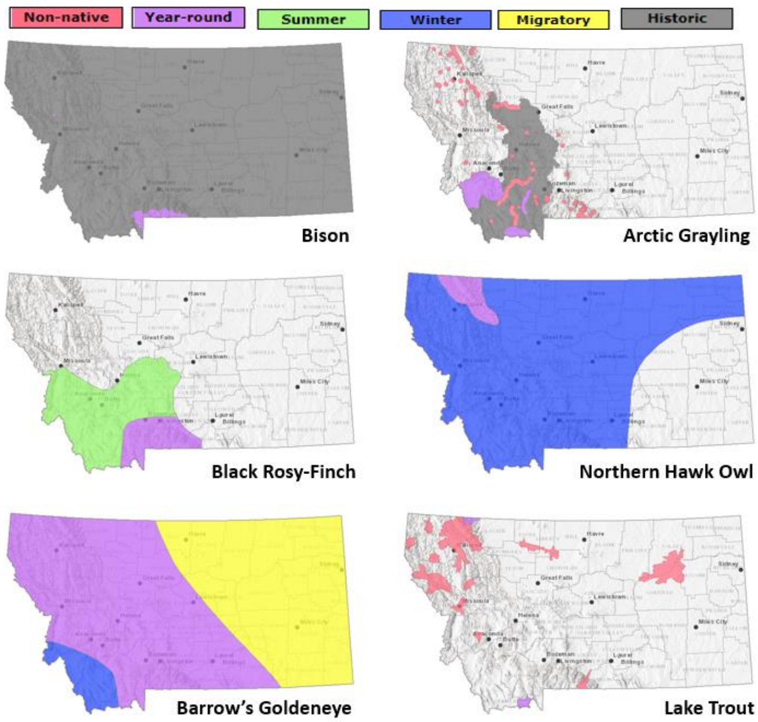
The location of a verified observation or specimen record typically known or assumed to represent a breeding population or a portion of a breeding population. Animal SO’s are generally: (1) buffers of terrestrial point observations based on documented species’ home range sizes; (2) buffers of stream segments to encompass occupied streams and immediate adjacent riparian habitats; (3) polygonal features encompassing known or likely breeding populations (e.g., a wetland for some amphibians or a forested portion of a mountain range for some wide-ranging carnivores); or (4) combinations of the above. Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Species Occurrence polygons may encompass some unsuitable habitat in some instances in order to avoid heavy data processing associated with clipping out habitats that are readily assessed as unsuitable by the data user (e.g., a point buffer of a terrestrial species may overlap into a portion of a lake that is obviously inappropriate habitat for the species). Animal SO's are only created for Species of Concern and Special Status Species (e.g., Bald Eagle).

Other Occurrence Polygons

These include significant biological features not included in the above categories, such as Important Animal Habitats like bird rookeries and bat roosts, and peatlands or other wetland and riparian communities that support diverse plant and animal communities.

Geographic Range Polygons

Geographic range polygons are still under development for most plant and invertebrate species. Native year-round, summer, winter, migratory and historic geographic range polygons as well as polygons for introduced populations have been defined for most vertebrate animal species for which there are enough observations, surveys, and knowledge of appropriate seasonal habitat use to define them (see examples to left). These native or introduced range polygons bound the extent of known or likely occupied habitats for non-migratory and relative sedentary species and the regular extent of known or likely occupied habitats for migratory and long-distance dispersing species; polygons may include unsuitable intervening habitats. For most species, a single polygon can represent the year-round or seasonal range, but breeding ranges of some colonial nesting water birds and some introduced species are represented more patchily when supported by data. Some ranges are mapped more broadly than actual distributions in order to be visible on statewide maps (e.g., fish).



Predicted Suitable Habitat Models

Predicted habitat suitability models have been created for plant and animal Species of Concern and are undergoing development for non-Species of Concern. For species for which models have been completed, the environmental summary report includes simple rule-based associations with streams for aquatic species and seasonal habitats for game species as well as mathematically complex Maximum Entropy models (Phillips et al. 2006, Ecological Modeling 190:231-259) constructed from a variety of statewide biotic and abiotic layers and presence only data for individual species for most terrestrial species. For the Maximum Entropy models, we reclassified 90 x 90-meter continuous model output into suitability classes (unsuitable, low, moderate, and optimal) then aggregated that into the one square mile hexagons used in the environmental summary report; this is the finest spatial scale we suggest using this information in management decisions and survey planning. Full model write ups for individual species that discuss model goals, inputs, outputs, and evaluation in much greater detail are posted on the MTNHP's Predicted Suitable Habitat Models webpage. Evaluations of predictive accuracy and specific limitations are included with the metadata for models of individual species. **Model outputs should not be used in place of on-the-ground surveys for species. Instead model outputs should be used in conjunction with habitat evaluations to determine the need for on-the-ground surveys for species.** We suggest that the percentage of predicted optimal and moderate suitable habitat within the report area be used in conjunction with geographic range polygons and the percentage of commonly associated habitats to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning.

Associated Habitats

Within the boundary of the intersected hexagons, we provide the approximate percentage of commonly or occasionally associated habitat for vertebrate animal species that regularly breed, overwinter, or migrate through the state; a detailed list of commonly and occasionally associated habitats is provided in individual species accounts in the Montana Field Guide We assigned common or occasional use of each of the ecological systems mapped in Montana by: (1) using personal knowledge and reviewing literature that summarizes the breeding, overwintering, or migratory habitat requirements of each species; (2) evaluating structural characteristics and distribution of each ecological system relative to the species' range and habitat requirements; (3) examining the observation records for each species in the state-wide point observation database associated with each ecological system; and (4) calculating the percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system to get a measure of numbers of observations versus availability of habitat. Species that breed in Montana were only evaluated for breeding habitat use, species that only overwinter in Montana were only evaluated for overwintering habitat use, and species that only migrate through Montana were only evaluated for migratory habitat use. In general, species were listed as associated with an ecological system if structural characteristics of used habitat documented in the literature were present in the ecological system or large numbers of point observations were associated with the ecological system. However, species were not listed as associated with an ecological system if there was no support in the literature for use of structural characteristics in an ecological system, even if point observations were associated with that system. Common versus occasional association with an ecological system was assigned based on the degree to which the structural characteristics of an ecological system matched the preferred structural habitat characteristics for each species as represented in the scientific literature. The percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system was also used to guide assignment of common versus occasional association.

We suggest that the percentage of commonly associated habitat within the report area be used in conjunction with geographic range polygons and the percentage of predicted optimal and moderate suitable habitat from predictive models to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning. Users of this information should be aware that land cover mapping accuracy is particularly problematic when the systems occur as small patches or where the land cover types have been altered over the past decade. Thus, particular caution should be used when using the associations in assessments of smaller areas (e.g., evaluations of public land survey sections).

Introduction to Land Cover

Land Use/Land Cover is one of 15 Montana Spatial Data Infrastructure framework layers considered vital for making statewide maps of Montana and understanding its geography. The layer records all Montana natural vegetation, land cover and land use, classified from satellite and aerial imagery, mapped at a scale of 1:100,000, and interpreted with supporting ground-level data. The baseline map is adapted from the Northwest ReGAP (NWGAP) project land cover classification, which used 30m resolution multi-spectral Landsat imagery acquired between 1999 and 2001. Vegetation classes were drawn from the Ecological System Classification developed by NatureServe (Comer et al. 2003). The land cover classes were developed by Anderson et al. (1976). The NWGAP effort encompasses 12 map zones. Montana overlaps seven of these zones. The two NWGAP teams responsible for the initial land cover mapping effort in Montana were Sanborn and NWGAP at the University of Idaho. Both Sanborn and NWGAP employed a similar modeling approach in which Classification and Regression Tree (CART) models were applied to Landsat ETM+ scenes. The Spatial Analysis Lab within the Montana Natural Heritage Program was responsible for developing a seamless Montana land cover map with a consistent statewide legend from these two separate products. Additionally, the Montana land cover layer incorporates several other land cover and land use products (e.g., MSDI Structures and Transportation themes and the Montana Department of Revenue Final Land Unit classification) and reclassifications based on plot-level data and the latest NAIP imagery to improve accuracy and enhance the usability of the theme. Updates are done as partner support and funding allow, or when other MSDI datasets can be incorporated. Recent updates include fire perimeters and agricultural land use (annually), energy developments such as wind, oil and gas installations (2014), roads, structures and other impervious surfaces (various years): and local updates/improvements to specific ecological systems (e.g., central Montana grassland and sagebrush ecosystems). Current and previous versions of the Land Use/Land Cover layer with full metadata are available for download from the Montana State Library's GIS Data List More information on the land cover layer is available at: https://msl.mt.gov/geoinfo/msdi/land_use_land_cover/

Within the report area you have requested, land cover is summarized by acres of Level 1, Level 2, and Level 3 Ecological Systems.

Literature Cited

Anderson, J.R. E.E. Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. U.S. Geological Survey Professional Paper 964.

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological systems of the United States: A working classification of U.S. terrestrial systems. NatureServe, Arlington, VA.

Introduction to Wetland and Riparian

Within the report area you have requested, wetland and riparian mapping is summarized by acres of each classification present. Summaries are only provided for modern MTNHP wetland and riparian mapping and not for outdated (NWI Legacy) or incomplete (NWI Scalable) mapping efforts; described here. MTNHP has made all three of these datasets and associated metadata available for separate download on the Montana Wetland and Riparian Framework web page.

Wetland and Riparian mapping is one of 15 Montana Spatial Data Infrastructure framework layers considered vital for making statewide maps of Montana and understanding its geography. The wetland and riparian framework layer consists of spatial data representing the extent, type, and approximate location of wetlands, riparian areas, and deep water habitats in Montana.

Wetland and riparian mapping is completed through photointerpretation of 1-m resolution color infrared aerial imagery acquired from 2005 or later. A coding convention using letters and numbers is assigned to each mapped wetland. These letters and numbers describe the broad landscape context of the wetland, its vegetation type, its water regime, and the kind of alterations that may have occurred. Ancillary data layers such as topographic maps, digital elevation models, soils data, and other aerial imagery sources are also used to improve mapping accuracy. Wetland mapping follows the federal Wetland Mapping Standard and classifies wetlands according to the Cowardin classification system of the National Wetlands Inventory (NWI) (Cowardin et al. 1979, FGDC Wetlands Subcommittee 2013). Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands differently than the NWI. Similar coding, based on U.S. Fish and Wildlife Service conventions, is applied to riparian areas (U.S. Fish and Wildlife Service 2009). These are mapped areas where vegetation composition and growth is influenced by nearby water bodies, but where soils, plant communities, and hydrology do not display true wetland characteristics. **These data are intended for use at a scale of 1:12,000 or smaller. Mapped wetland and riparian areas do not represent precise boundaries and digital wetland data cannot substitute for an on-site determination of jurisdictional wetlands.**

See detailed overviews, with examples, of both wetland and riparian classification systems and associated codes as a storymap and companion guide

Literature Cited

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31. Washington, D.C. 103pp.

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

U.S. Fish and Wildlife Services. 2009. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

Introduction to Land Management

Within the report area you have requested, land management information is summarized by acres of federal, state, and local government lands, tribal reservation boundaries, private conservation lands, and federal, state, local, and private conservation easements. Acreage for "Owned", "Tribal", or "Easement" categories represents non-overlapping areas that may be totaled. However, "Other Boundaries" represents managed areas such as National Forest boundaries containing private inholdings and other mixed ownership which may cause boundaries to overlap (e.g. a wilderness area within a forest). Therefore, acreages may not total in a straight-forward manner.

Because information on land stewardship is critical to effective land management, the Montana Natural Heritage Program (MTNHP) began compiling ownership and management data in 1997. The goal of the Montana Land Management Database is to manage a single, statewide digital data set that incorporates information from both public and private entities. The database assembles information on public lands, private conservation lands, and conservation easements held by state and federal agencies and land trusts and is updated on a regular basis. Since 2011, the Information Management group in the Montana State Library's Digital Library Division has led the Montana Land Management Database in partnership with the MTNHP.

Public and private conservation land polygons are attributed with the name of the entity that owns it. The data are derived from the statewide Montana Cadastral Parcel layer Conservation easement data shows land parcels on which a public agency or qualified land trust has placed a conservation easement in cooperation with the landowner. The dataset contains no information about ownership or status of the mineral estate. For questions about the dataset or to report errors, please contact the Montana Natural Heritage Program at (406) 444-5363 or mtnhp@mt.gov. You can download various components of the Land Management Database and view associated metadata at the Montana State Library's GIS Data List at the following links:

Public Lands
Conservation Easements
Private Conservation Lands
Managed Areas

Map features in the Montana Land Management Database or summaries provided in this report are not intended as a legal depiction of public or private surface land ownership boundaries and should not be used in place of a survey conducted by a licensed land surveyor. Similarly, map features do not imply public access to any lands. The Montana Natural Heritage Program makes no representations or warranties whatsoever with respect to the accuracy or completeness of this data and assumes no responsibility for the suitability of the data for a particular purpose. The Montana Natural Heritage Program will not be liable for any damages incurred as a result of errors displayed here. Consumers of this information should review or consult the primary data and information sources to ascertain the viability of the information for their purposes.

Introduction to Invasive and Pest Species

Within the report area you have requested, separate summaries are provided for: Aquatic Invasive Species, Noxious Weeds, Agricultural Pests, Forest Pests, and Biocontrol species that have been documented or potentially occur there based on the predicted suitability of habitat. Definitions for each of these invasive and pest species categories can be found on our Species Status Codes page.

Each of these summaries provides the following information when present for a species: (1) the number of observations of each species; (2) the geographic range polygons for each species, if developed, that the report area overlaps; (3) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (4) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the Montana Field Guide; and (5) links to species accounts in the Montana Field Guide. Details on each of these information categories are included under relevant section headers under the Introduction to Native Species above or are defined on our Species Status Codes page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what invasive and pest species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are limited, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species will always be an important obligation of users of our data.**

If you are aware of observation or survey datasets for invasive or pest species that the MTNHP is missing, please report them to the Program Coordinator bmaxell@mt.gov Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos:
https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx

Additional Information Resources

MTNHP Staff Contact Information

Montana Field Guide

MTNHP Species of Concern Report - Animals and Plants

MTNHP Species Status Codes - Explanation

MTNHP Predicted Suitable Habitat Models (for select Animals and Plants)

MTNHP Request Information page

Montana Cadastral

Montana Code Annotated

Montana Fisheries Information System

Montana Fish, Wildlife, and Parks Subdivision Recommendations

Montana GIS Data Layers

Montana GIS Data Bundler

Montana Greater Sage-Grouse Project Submittal Site

Montana Ground Water Information Center

Montana Index of Environmental Permits, 21st Edition (2018)

Montana Environmental Policy Act (MEPA)

Montana Environmental Policy Act Analysis Resource List

Laws, Treaties, Regulations, and Agreements on Animals and Plants

Montana Spatial Data Infrastructure Layers

Montana State Historic Preservation Office Review and Compliance

Montana Stream Permitting: a guide for conservation district supervisors and others

Montana Water Information System

Montana Web Map Services

National Environmental Policy Act

Penalties for Misuse of Fish and Wildlife Location Data (MCA 87-6-222)

U.S. Fish and Wildlife Service Information for Planning and Consultation (Section 7 Consultation)

Web Soil Survey Tool

US 93
POLSON-SOMERS
CORRIDOR STUDY

ENVIRONMENTAL SCAN

Appendix D

EJSCREEN Report

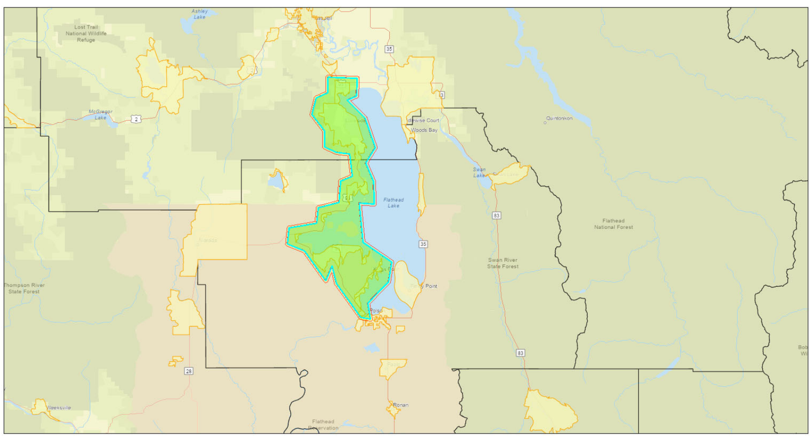
EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Lake County, MT

0.25 miles Ring around the Area
Population: 9,112
Area in square miles: 168.45

A3 Landscape



April 18, 2024
US 93 Polson-Somers
City Boundary
Counties

1:577,791
0 5 10 20 mi
0 5 10 20 km

Montana State Library, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS, EPA OEI

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	96%
Spanish	2%
French, Haitian, or Cajun	1%
Other Indo-European	1%
Other and Unspecified	1%
Total Non-English	4%

COMMUNITY INFORMATION

Low income: 26 percent

People of color: 18 percent

Less than high school education: 10 percent

Limited English households: 0 percent

Unemployment: 4 percent

Persons with disabilities: 16 percent

Male: 48 percent

Female: 52 percent

81 years
Average life expectancy

$33,579
Per capita income

Number of households: 3,872

Owner occupied: 72 percent

BREAKDOWN BY RACE

White: 82%

Black: 0%

American Indian: 11%

Asian: 0%

Hawaiian/Pacific Islander: 0%

Other race: 0%

Two or more races: 4%

Hispanic: 4%

BREAKDOWN BY AGE

From Ages 1 to 4	6%
From Ages 1 to 18	19%
From Ages 18 and up	81%
From Ages 65 and up	26%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	100%
Speak Other Indo-European Languages	0%
Speak Asian-Pacific Island Languages	0%
Speak Other Languages	0%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

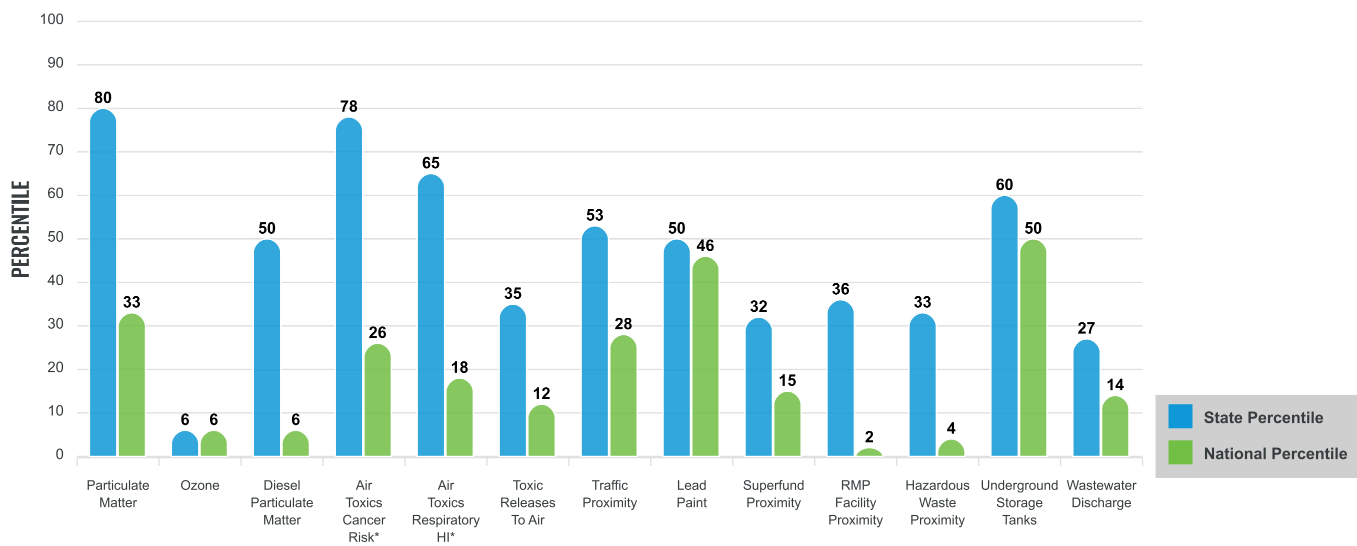
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

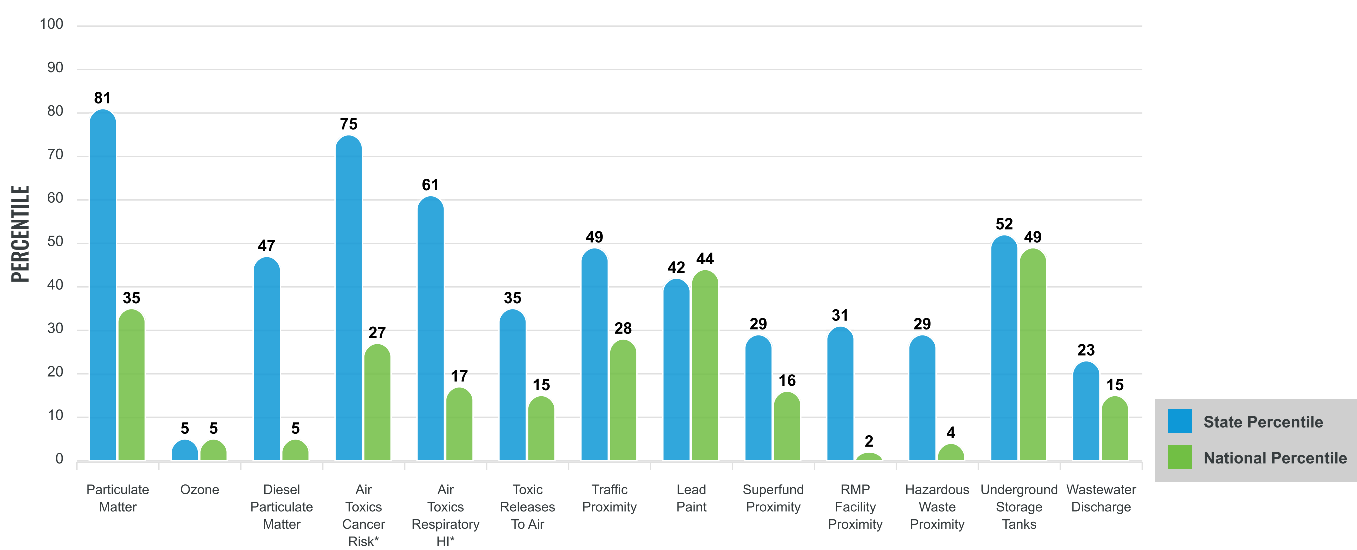
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for 0.25 miles Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu g/m^3$)	7.46	5.24	91	8.08	31
Ozone (ppb)	52.5	54.5	6	61.6	4
Diesel Particulate Matter ($\mu g/m^3$)	0.0502	0.086	45	0.261	4
Air Toxics Cancer Risk* (lifetime risk per million)	20	15	55	25	5
Air Toxics Respiratory HI*	0.2	0.18	39	0.31	4
Toxic Releases to Air	91	590	55	4,600	23
Traffic Proximity (daily traffic count/distance to road)	22	67	47	210	25
Lead Paint (% Pre-1960 Housing)	0.18	0.3	42	0.3	45
Superfund Proximity (site count/km distance)	0.019	0.15	28	0.13	16
RMP Facility Proximity (facility count/km distance)	0.021	0.22	32	0.43	2
Hazardous Waste Proximity (facility count/km distance)	0.03	0.65	28	1.9	4
Underground Storage Tanks (count/km^2)	3.6	5.1	69	3.9	71
Wastewater Discharge (toxicity-weighted concentration/m distance)	2E-05	1.7	27	22	21
SOCIOECONOMIC INDICATORS					
Demographic Index	22%	23%	55	35%	36
Supplemental Demographic Index	11%	12%	48	14%	43
People of Color	18%	15%	77	39%	35
Low Income	26%	32%	38	31%	47
Unemployment Rate	4%	4%	64	6%	52
Limited English Speaking Households	0%	0%	88	5%	57
Less Than High School Education	10%	6%	81	12%	56
Under Age 5	6%	5%	61	6%	58
Over Age 64	26%	20%	75	17%	83
Low Life Expectancy	17%	19%	25	20%	26

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund 0
Hazardous Waste, Treatment, Storage, and Disposal Facilities 0
Water Dischargers 57
Air Pollution 0
Brownfields 3
Toxic Release Inventory 0

Other community features within defined area:

Schools 5
Hospitals 4
Places of Worship 12

Other environmental data:

Air Non-attainment .... Yes
Impaired Waters .... Yes

Selected location contains American Indian Reservation Lands* .... Yes
Selected location contains a "Justice40 (CEJST)" disadvantaged community .... Yes
Selected location contains an EPA IRA disadvantaged community .... Yes

Report for 0.25 miles Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	17%	19%	25	20%	26
Heart Disease	7.1	6.5	64	6.1	71
Asthma	10	10.4	41	10	55
Cancer	7.8	6.9	69	6.1	84
Persons with Disabilities	15.7%	14.4%	61	13.4%	69

CLIMATE INDICATORS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	12%	15%	51	12%	73
Wildfire Risk	23%	44%	44	14%	83

CRITICAL SERVICE GAPS					
INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	23%	16%	76	14%	79
Lack of Health Insurance	10%	9%	74	9%	69
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Report for 0.25 miles Ring around the Area