South Dickey Lake Picnic Area

Source Water Delineation and Assessment Report (SWDAR)

South Dickey Lake Picnic Area
United States Forest Service
Public Water Supply

State of Montana Public Water Supply ID# MT0062345

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INTRODUCTION

The Safe Drinking Water Act (SDWA) Amendments of 1996 require states to develop and implement Source Water Assessment Programs (SWAP) to analyze existing and potential threats to the quality of the public drinking water supplies throughout the state. The US Environmental Protection Agency (EPA) formally approved the Montana SWAP, prepared and administered by the Montana Department of Environmental Quality (MDEQ), in November 1999. The Montana SWAP was developed from the former Wellhead Protection Program, but includes surface water sources and requires a more rigorous inventory of potential contaminant sources.

SWAP addresses only public water systems (PWS) regulated according to the Federal Safe Drinking Water Act. A public water supply system is defined, according to Federal and Montana regulations, as a system that supplies water for human consumption. A public water supply system has at least 15 service connections or regularly provides water to at least 25 persons daily for a minimum of 60 days in a calendar year. There are three types of public water supply systems:

- Community water systems provide water on a year-round basis, and have a minimum of 15 service connections or regularly serve at least 25 residents. In addition to incorporated towns, community systems may serve smaller areas such as housing subdivisions or trailer courts.
- Non-transient non-community systems do not serve communities, but provide water regularly to a minimum of 25 of the same people for at least 6 months of a year. These systems serve public buildings such as schools and hospitals, where people are employed but do not reside.
- Transient non-community systems do not serve communities, and do not regularly serve a minimum of 25 of the same people for at least 6 months of the year. These systems are usually seasonal, and are located in areas such as campgrounds and parks. The South Dickey Lake Picnic Area PWS is a transient non-community system.

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to help public drinking water supplies protect their water source from contamination. The United States Forest Service (USFS) works with the Montana DEQ to complete delineation and assessment reports for USFS managed public water supplies in Montana. The Source Water Delineation and Assessment Report (SWDAR) compiles the appropriate data and other technical information about an area to allow the USFS to develop source water protection plans for potable water supplies. Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water, called source water protection areas, are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. Assessment involves identifying potential contaminant sources in delineated source water protection areas, and evaluating the potential for contamination of drinking water from these sources under "worst-case" conditions such as a flood, fire or human error.

Scope and Purpose

This report presents the source water delineation and assessments for the public water supply for the South Dickey Lake Picnic Area located southeast of Eureka, in eastern Lincoln County, Montana. This report is intended to meet the technical requirements for the completion of the delineation and assessment report for this PWS, as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

Acknowledgements

This report was prepared by James Swierc, hydrogeologist with the USFS Region 1 office, as part of a cooperative agreement with the United States Environmental Protection Agency. The Kootenai National Forest Engineer, Frank Votapka, provided information on well location and the inventory of potential contaminant sources.

Limitations

This report was prepared to assess threats to the South Dickey Lake Picnic Area public water supply and is based on published information. The terms "drinking water supply" or "drinking water source" refer specifically to sources for regulated public water supplies, and not any other type of water supply. The inventory of potential contaminant sources focuses on the management areas delineated for the public water supply in this report. As a result, other potential sources of contamination to surface and ground water in the area may not be identified.

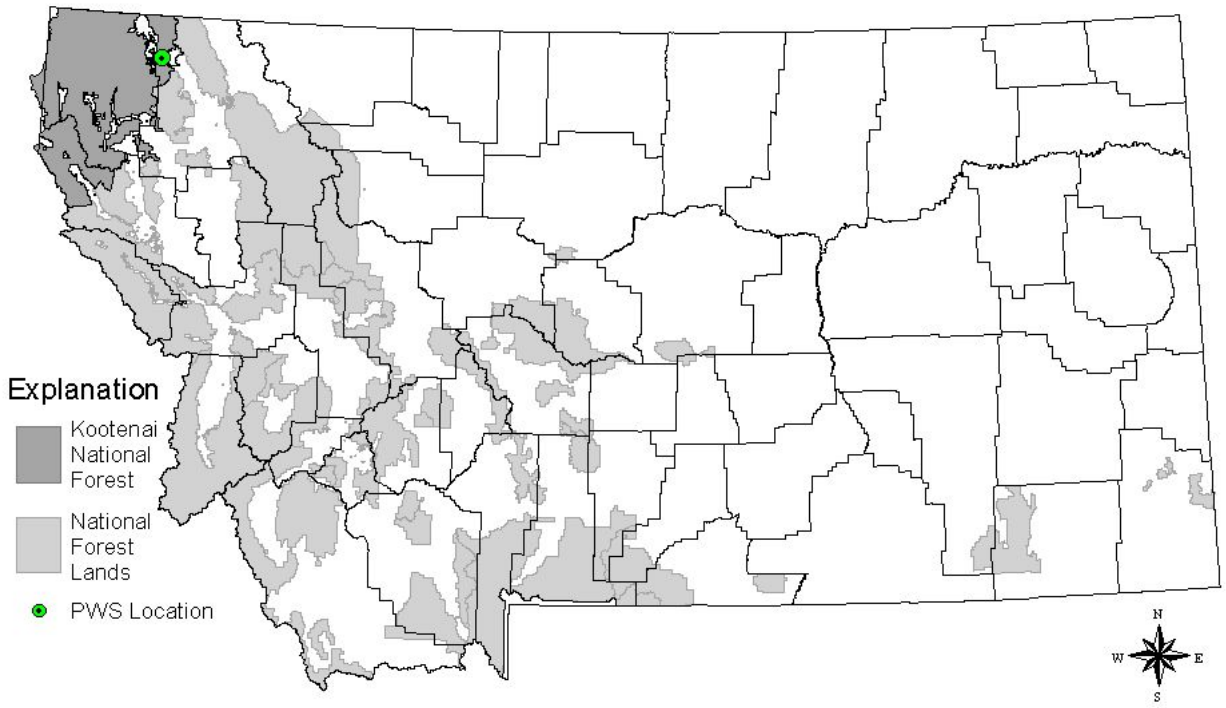

Figure 1 – South Dickey Lake Picnic Area Location

BACKGROUND AND DELINEATION

The South Dickey Lake Picnic Area is located within the Kootenai National Forest in Lincoln County, approximately 14 miles southeast of Eureka. The picnic area is located along a National Forest access road from US Highway 93 to the Dickey Lake area. The picnic area is a transient, non-community public water supply. The South Dickey Lake Picnic Area and is located at approximately 48.71º North latitude and 114.81º West longitude, in Section 15 of Township 34 North, Range 25 West. The location of the PWS in the Kootenai National Forest is shown in Figure 1, with a more detailed location shown in Figure 2. The South Dickey Lake Picnic Area well provides water for patrons of the picnic area. The sanitary survey for the system (Appendix A) indicates an estimated population of 33 people is served daily by the PWS during the summer months when the area is open.

The public water supply uses one well (Source 002), installed to an approximate depth of 68 feet. Well information is summarized in Table 1. Information from the well records indicates the well was completed on June 24, 1965 and has static water level of 50 feet. The well is drilled through 22 feet of clay, 8 feet of sand and gravel, 28 feet of hard pan and 10 feet of hard shale with water. Bedrock was reached at 68 feet. The well has a MBMG-GWIC Classification number of 171237. The water right number listed for the well in DNRC files is W052033-00. Water is obtained from the well using a hand pump. There is no treatment of the water prior to use.

Hydrogeologic Assessment

The evaluation of the hydrogeology of the area is based predominantly on standard principles of hydrogeology. There are no readily available references specific to the hydrology of the Dickey Lake watershed in this area. References are available regarding the geology and hydrogeology of the region, but not specific to this area. Ground water for the well occurs in a shallow unconfined aquifer near the contact of clay-rich glacial strata over PreCambrian Metasedimentary bedrock of the Ravalli Group.

Table 1. Source Well Information Summary.

Well	Well 1
Source ID	002
MBMG-GWIC ID#	171237
DNRC Water Right	W052033-00
Location	48.7071°N Lat 114.8129°W Long
	T34N, R25W, Section 15 DBCB
Total Depth	68 feet
Completion Date	24 June 1965
Perforated Interval	--
Static Water Level	50 feet
Pumping Water Level	53 feet
Pump Test Rate	25 gpm
Drawdown/Yield	3 ft / 8.3 gpm/ft

Ground water in the area near Dickey Lake is present in a locally confined glacial aquifer present across the base of the valley. A geologic map of the region is shown in Figure 3. The aquifer is bounded by bedrock present near the surface along the margins of the valley. The South Dickey Lake Picnic Area is located near the southern boundary of glacial strata against bedrock. Ground water in glacial areas typically flows through discontinuous glacial outwash seams encased within clay-rich glacial tills. Ground water flow in the aquifer generally follows topography, with flow towards the stream in sections where stream flow increases or gains. Flow is away from the stream in areas where stream flow decreases due to discharge to ground water. Ground water flow across the South Dickey Lake Picnic Area is interpreted to flow towards Dickey Lake, a natural lake present on top of glacial strata. The well for the PWS is approximately 68 feet deep, interpreted to draw water from below the base of Dickey Lake. Recharge to the well is interpreted to occur along the area where bedrock is exposed against glacial strata. However, recharge may be derived from leakage from the base of Dickey Lake. Based on the hydrogeologic setting, the South Dickey Lake Picnic Area water source is a confined aquifer in unconsolidated glacial sediments, which is considered to have a ***high*** source water sensitivity to contamination according to the Montana SWAP Program (DEQ, 1999).

Source Water Protection Management Zones

The source water protection areas for the South Dickey Lake Picnic Area PWS are identified based on the criteria for a transient non-community PWS as defined in the Montana SWAP Program (DEQ, 1999). For the PWS source, two primary management areas are identified within the source water protection area; the control zone and the inventory region. The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the well. The inventory region for the well is delineated as the area within a 1,000-foot radius around the well. The inventory zone for the well and the surrounding area is depicted in Figure 4.

Since the aquifer may be in communication with surface water in Dickey Lake, a surface water buffer zone is delineated as a secondary management zone. The surface water buffer zone represents the area of one-half mile around Dickey Lake. The surface water buffer zone is shown in Figure 4.

South Dickey Lake Picnic Area Sampling Results and Water Quality

Every PWS is required to perform monitoring for contamination to their water supply. The monitoring parameters for transient non-community systems typically include coliforms (as an indicator of pathogenic organisms), and nitrates as an acute health risk. A review of DEQ and USFS databases of monitoring results for the South Dickey Lake Picnic Area PWS indicates no detections of any contaminants. The detected level of nitrates has been consistently less than the drinking water standard of 10 mg/L.

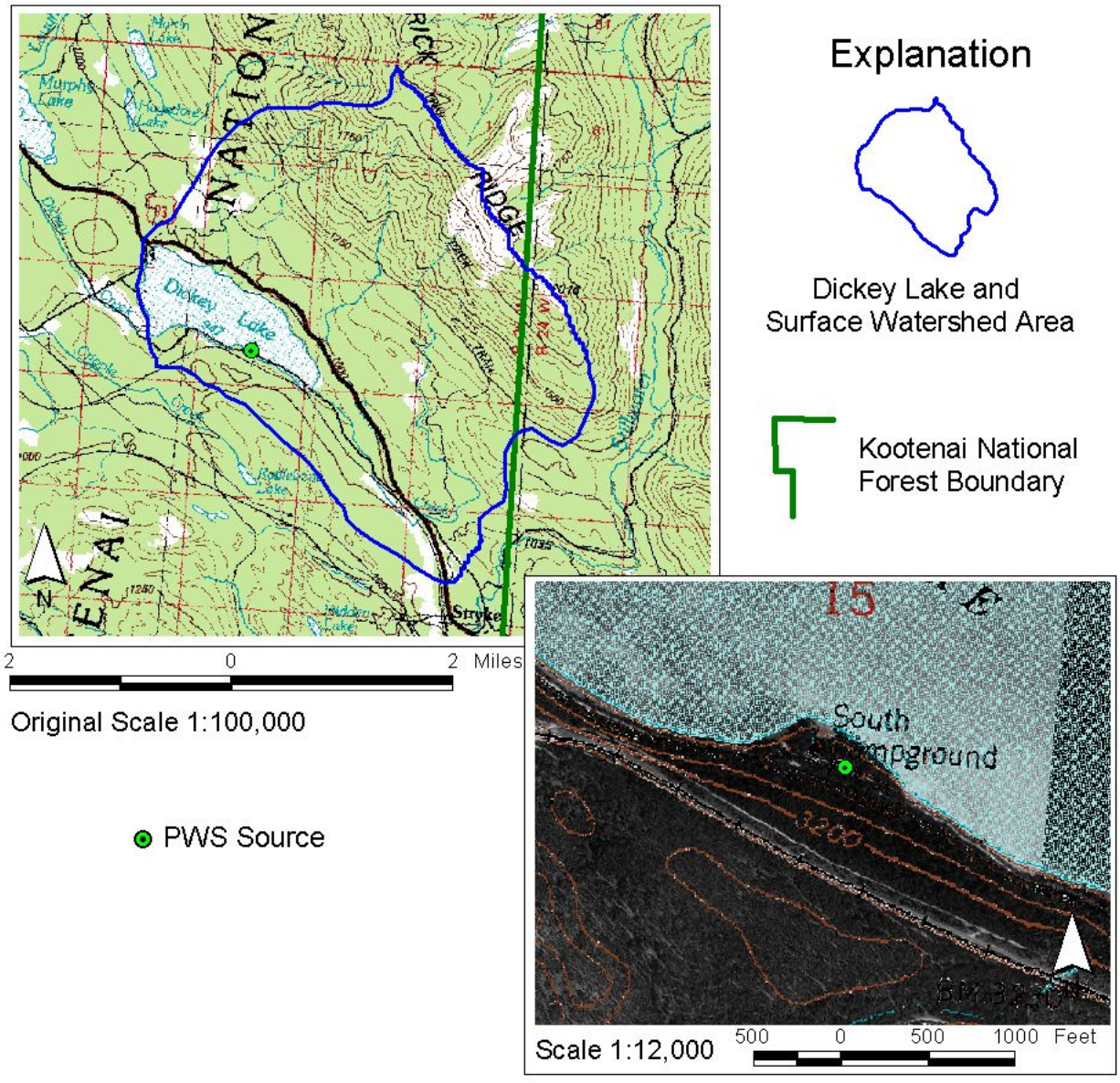

Figure 2 – South Dickey Lake Picnic Area Watershed and Well Location

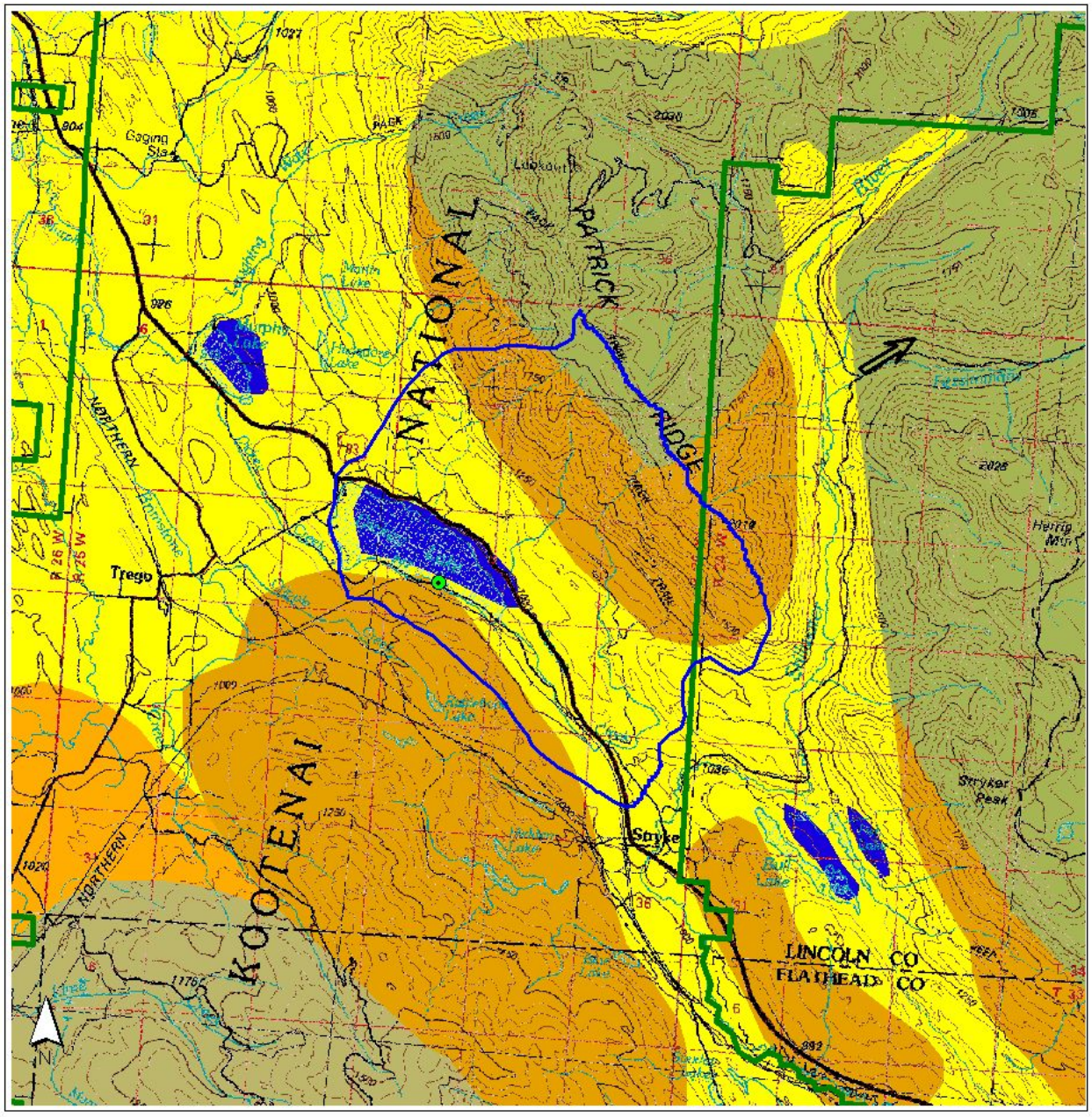

Figure 3 – South Dickey Lake Picnic Area Area Geology

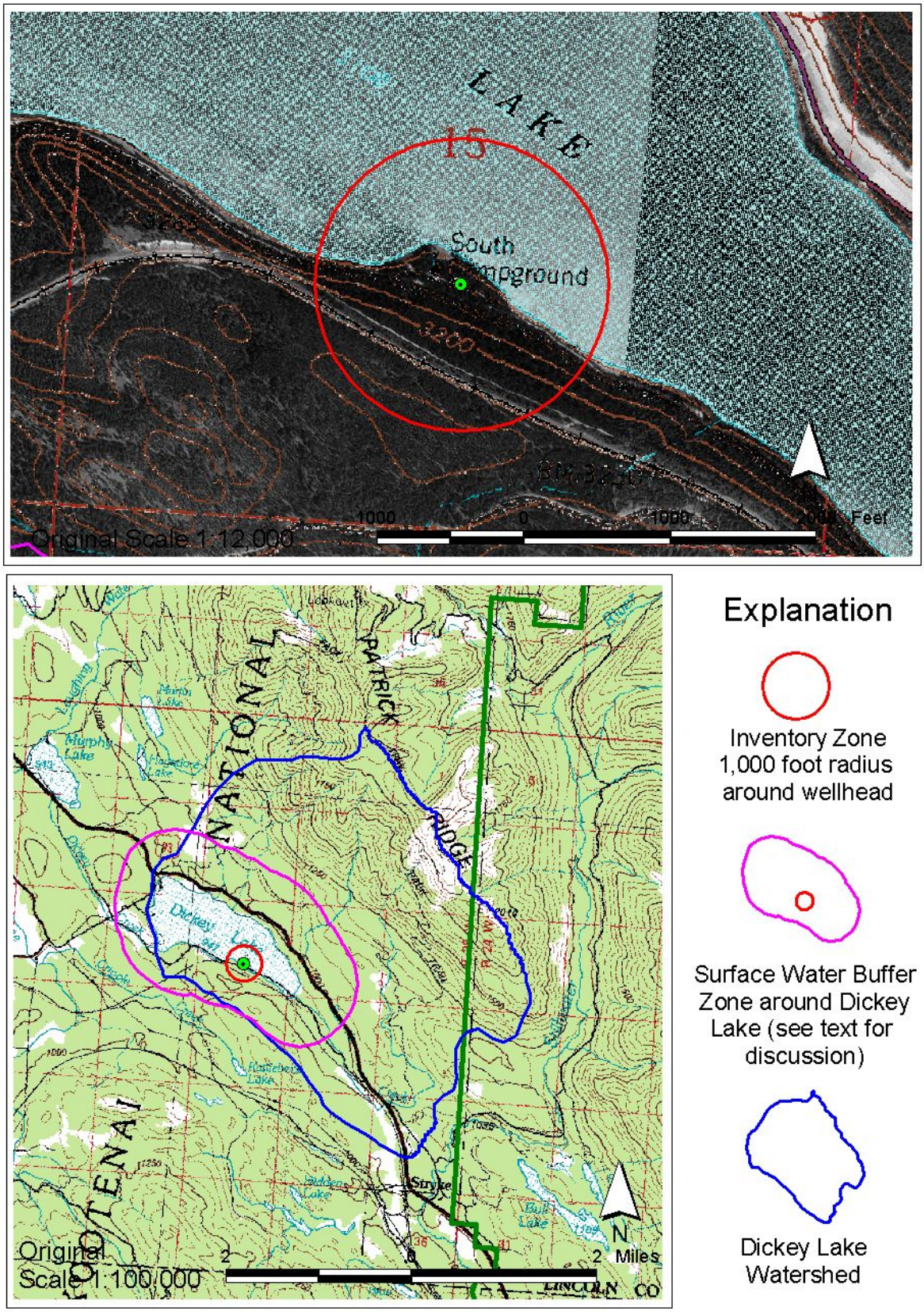

Figure 4 – South Dickey Lake Picnic Area Source Water Management Zones

INVENTORY

An inventory of potential sources of acute health hazards was conducted for the South Dickey Lake Picnic Area PWS source within the control and inventory zones. The contaminants in this category represent nitrates and pathogens, as required by the Montana Source Water Protection Program (DEQ, 1999). Potential sources include areas with septic systems and agricultural areas where nitrogen fertilizers may be used. Land use for the area is shown in Figure 5. While additional sources of contamination may be present, this assessment only focuses on the above listed potential contaminants.

Inventory Results/Control Zone
The control zone represents the most critical point to protecting the integrity of a wellhead for ground water sources. The land around the control zone for the well includes the loop road and part of campsites for the campground. There are two sealed vault toilets for the campground, located 125 and 175 feet upgradient from the well in the control zone. The control zone around the wellhead is not fenced or otherwise protected from access.

Inventory Results/Inventory Region
The inventory region represents the area near the source well where any contamination spilled onto the ground or subsurface has the potential to migrate directly into the PWS source aquifer. A vault toilet for the South Dickey Lake Picnic Area represents the only potential contaminant source identified within the inventory zone. Land use within the inventory region is classified as non-agricultural and non-urban; primarily forest as shown in Figure 5. The area is primarily undeveloped. The access road to the campground and railroad tracks are present in the inventory zone.

Inventory Results/Surface Water Buffer Zone and Watershed Regions
Land use within the surface water buffer zone and watershed region is classified as non-agricultural and non-urban. A small number of private residences with septic systems at a low hazard density are present in the region, as shown in Figure 6.

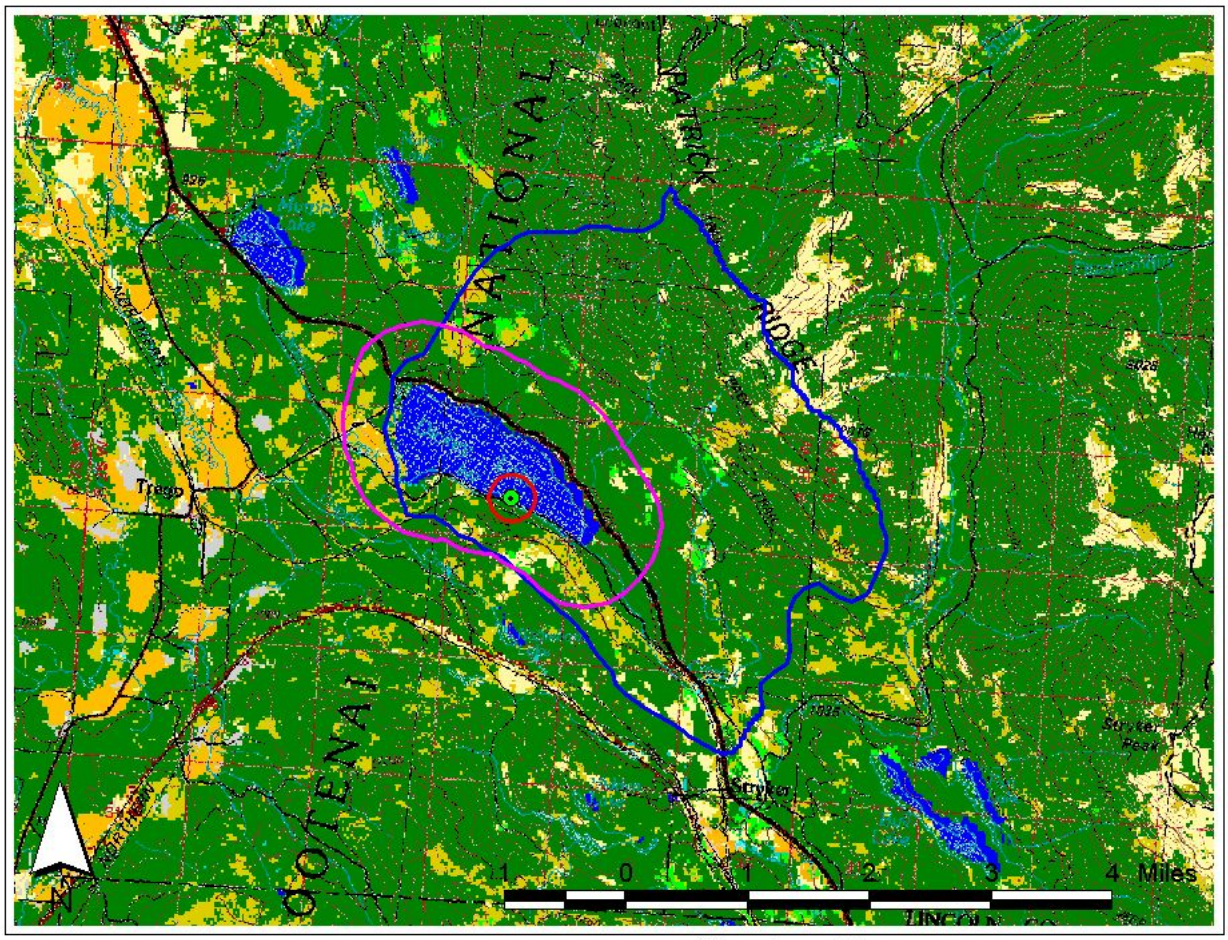

Figure 5 – South Dickey Lake Picnic Area Watershed Area Land Cover Classification

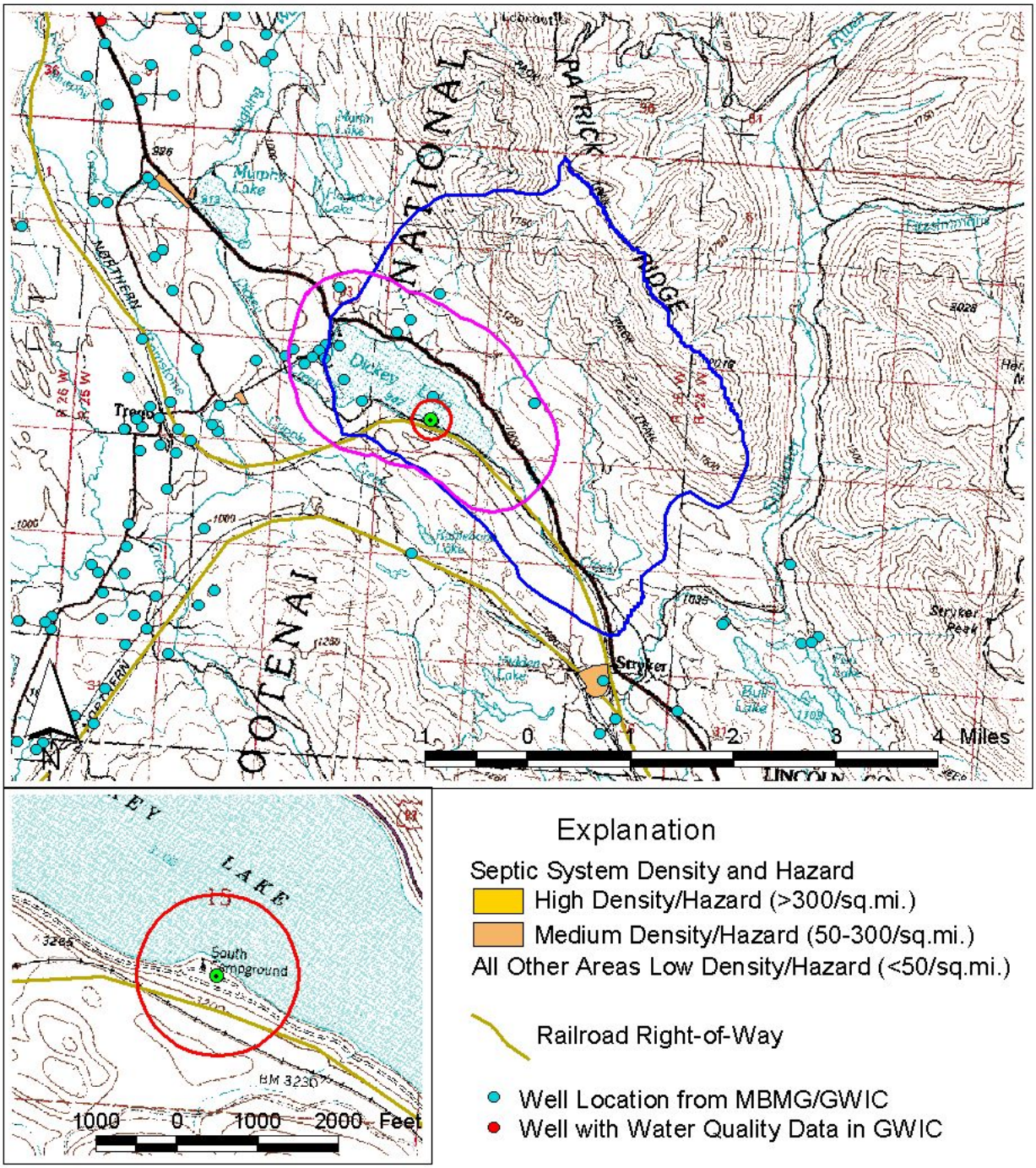

Figure 6 – South Dickey Lake Picnic Area Septic System Density and Well Locations

SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by the Kootenai National Forest, in this case the South Dickey Lake Picnic Area PWS.

The goal of Source Water Management is to protect the source water by controlling activities in the control zones and managing significant potential contaminant sources in the Inventory Regions. Management priorities in the Inventory Regions are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by the Kootenai National Forest for the South Dickey Lake Picnic Area PWS to reduce susceptibility are recommended.

For point sources, the relative hazard for the potential contaminant sources is assigned based on the type of aquifer. For confined aquifers, hazards for point sources are assigned based on the presence of other wells in the inventory zone, and how the PWS well and other wells in the area are constructed. If the PWS well does not have a proper seal through the confining layer, then the relative hazard for any potential contaminant source within the 1,000-foot inventory area is assigned a relative hazard of high, and those within the one-mile inventory zone are assigned a relative hazard of moderate. If the PWS well has a seal through the confining layer, but other wells are present in the 1,000-foot inventory zone that do not have a seal, then the relative hazard is moderate for point sources in this area and low for potential sources within the remainder of the inventory zone. If all wells in the inventory region have effective seals through the confining layer, then the relative hazard is considered low for point sources within the 1,000-foot inventory area, and very low for other sources within the inventory zone.

After the relative hazard of a potential contaminant source is assigned, the relative susceptibility is determined based on the presence of barriers that may mitigate the potential for a contaminant source to impact a water source. Barriers may represent natural conditions, engineered barriers or management actions. Natural barriers include anything that can be demonstrated as effective in mitigating the migration of any chemicals released at the surface, such as thick clay-rich soils or surface flowing artesian conditions. Engineered barriers represent man-made structure to contain chemicals if they are released, such as spill containment for underground storage tanks. Management barriers are plans that prohibit or control potentially polluting activities, but only if there is a plan or approach that has been formally implemented. For the South Dickey Lake Picnic Area PWS source, a management barrier is noted for the vault toilets, representing the proper maintenance of the facilities.

Susceptibility Assessment Results

The results of the susceptibility assessment for the South Dickey Lake Picnic Area PWS are listed in Table 1. Since there is no information available on the construction of the PWS well, the vault toilet is given a hazard ranking of high. The primary threats identified are the vault toilet for the campground, and the access road. The summary information in Table 1 reviews the relative hazard, barriers and susceptibility ranking of each potential source. Management alternatives are recommended that can help reduce the relative susceptibility of each identified potential contaminant source to the PWS sources.

Table 2. Susceptibility assessment of significant potential contaminant sources.

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
Control Zone						
Vault Toilet (If present)	Nitrates and Pathogens	Infiltration and Runoff	High	Management	High	Maintain proper operation and maintenance protocols
Inventory Zone						
Vault Toilet	Nitrates and Pathogens	Infiltration and Runoff	High	Management	High	Maintain proper operation and maintenance protocols
Campground Access Road	Various Chemicals	Spills	High	None	Very High	Develop emergency response plan
Railroad Tracks	Various Chemicals	Spills	High	None	Very High	Develop emergency response plan

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