

5.0 GROUNDWATER USE DATA ANALYSIS

This section includes a discussion and analysis of the available information and data that describe current water use within the WRIA 53 watershed. Water use in WRIA 53 is documented as being used for seven basic purposes: 1) irrigation, 2) municipal (Group A water purveyors), 3) industry, 4) stockwatering, 5) domestic rural, 6) wildlife, and 7) instream flow. An analysis was conducted using the existing WRATS database and current land use and management conditions to interpret how much water is being used by the local residents and stakeholders.

5.1 ESTIMATE OF GROUND WATER USE

A review of Ecology's well database for that portion of WRIA 53 in Lincoln County reveals approximately 600 well log records in the area. Lincoln County tax records indicate that there are 935 rural home addresses in the WRIA. Of the Ecology well records, approximately 344 were located (Figure 46) for use in this assessment. These located wells are deemed usable because: (1) they have a clear description of location, (2) they are legible, and (3) the descriptions of well geology and construction appear to be complete and interpreted to be representative of actual conditions. Well locations as reported on the well logs are assumed to be correct as most wells were not field located for this project.

Of the approximately 344 wells used in this assessment, all but 29 are listed as domestic wells. Basic well geology and construction for these wells is summarized on Table 5.1-1 in Appendix D. Table 24 gives one an idea of the distribution these wells in the WRIA. Given that we used well records for approximately 311 wells compared to the 935 tax records we assume that the following discussion encompasses approximately one-third of the domestic wells in the WRIA.

A map presenting the wells used in this analysis for WRIA 53 is presented in PLATE 1, attached to this report. The map shows the location, strata in which groundwater is withdrawn, and the type of use for each of the wells. Detailed description of the wells is provided in the Table included in Appendix D.

Ground Water Use – Domestic Wells

The largest concentrations of domestic wells in the WRIA are located in and near the Hawk Creek drainage (63%) with smaller concentrations of wells occurring near Grand Coulee (26%) in the west end of the WRIA and above Lake Roosevelt near Sterling Valley Road (11%) predominantly in T27N R34E in the Brody Creek subbasin. Reviewing geology, construction, and location information summarized in Table 5.1-1 in Appendix D approximately 17 percent of the domestic wells in the WRIA are pumping from the alluvial aquifer system, 19 percent from the pre-basalt basement aquifer system, and 64 percent from the basalt aquifer system.

The alluvial wells are predominantly located on Pleistocene Cataclysmic Flood gravel and sand bars near Lake Roosevelt and likely display a high degree of hydrologic continuity with the Lake. These wells appear to usually be capable of supporting single family domestic uses, and several of them seem to be capable of supporting larger pumping demands. A small number of these wells though may not be in direct connection with the Lake for a variety of local geologic

reasons, including the presence of buried bedrock highs and the presence of landslide blocks truncating or restricting that connection. In such cases, wells in these settings may experience water level declines and decreased pumping capacity if the local use outpaces the local recharge. Further site specific assessment would be needed to better delineate areas such as these.

TABLE 24: DISTRIBUTION OF WELLS IN WRIA 53				
TN/RE	Area comments	Total wells	Non-domestic wells	Hydrogeology
25/35		1	0	
25/36	Upper Hawk Creek	39	11	1 basement
25/37	Davenport	39	7	All bslt, 1 art.
25/38		2	0	Bslt
26/34	NE of Creston	4	0	Bslt
26/35	W of Hawk Creek	31	1	1 sed
26/36	Middle Hawk Creek	49	0	1 base, 1 sed, 3 sed/bslt
26/37		13	0	4 base, 1 bslt/sed
27/32-27/33	Above Lake R.	3	0	2 bslt, 1 base
27/34		27	1	Most basement
27/35	Lower Hawk Creek	48	4	5 base; 7 sed
27/36	East of Hawk Creek	22	1	6 base; 10 sed/bslt
27/37		17	0	9 base, rest mixed
28/31	Coulee City	33	1	Mix
28/33-28/36	Col R. highlands	16	3	Mix
	Totals	344	29	

Basalt domestic wells generally fall into two basic groups. A small number of these wells located near the mouth of Hawk Creek appear to be in hydrologic connection with Lake Roosevelt. One would assume that pumping limitations on these wells will only be controlled by the capacity of these basalts to transmit water from the Lake to the well. Most basalt wells however are not in direct connection to the Lake. As discussed earlier, these wells are in a part of the aquifer system where modern recharge is derived solely from modern precipitation. In areas of low well density, it generally appears that such recharge is keeping pace with domestic demand and can be sustained (based on relatively stable water levels in the few regional monitoring wells available). However, in areas of greater well density this should not be assumed. Although we do not have any direct water level measurements to call upon, the anecdotal observations reported by WRIA participants suggest water level declines in the basalt aquifer system are occurring in these areas. If such a situation is occurring, it would clearly indicate that pumping demand (whatever that is, and we do not know as there are no records) is exceeding the ability of that portion of the aquifer system to supply that water.

Domestic wells in pre-basalt basement are universally reported to be very low volume producers, commonly capable of only providing a few gallons, or less, per minute. It seems likely that few if any wells in the pre-basalt basement aquifer system produce more than a few gallons per minute. Pumping demands on the domestic wells are very difficult to quantify as there are few pumping records available and it seems likely that not all domestic wells in the WRIA are represented in the records we reviewed (as suggested by our use of 311 well logs, but County record indicating 935 rural homes). Assuming we are looking at approximately one-third of the total domestic wells in the WRIA (311 well logs vs. 935 tax records) we estimate there are approximately 600 domestic wells in the Hawk Creek area, 250 in the Brody Creek subbasin, and 100 in the vicinity of Grand Coulee. If each well uses approximately 800 gallons per day (gpd) total estimated pumping, and pumping within the 3 subbasins is as follows:

- Total pumping, 760,000 gpd
- Hawk Creek, 480,000 gpd
- Brody Creek, 200,000 gpd
- Coulee Dam, 80,000 gpd

A more definite evaluation of actual pumping by area and aquifer system would require field verification of well use and location.

Ground Water Use – Non-Domestic Wells

Within the databases, we found 29 non-domestic wells with usable well records. Uses for these wells are reported to include a mix of irrigation, stock watering, municipal supply, small water systems, industrial applications, and recreational sites.

The greatest concentrations of non-domestic wells are found in the same basic areas as the domestic wells. Most of the non-domestic wells are located in the area around the lower reaches of Hawk Creek and around Davenport. The lower Hawk Creek wells consist predominantly of a mix of irrigation and small water system wells. Those near Davenport consist predominantly of municipal (City of Davenport) and irrigation wells. Location of the municipal and Group A water purveyors are identified in Figure 46. As of this writing we do not have records describing water use in any of these wells except for the City of Davenport. Verbal communications from City staff indicate an average daily use of approximately 1.2 million gallons per day for all wells in the City system. The water rights review in Section 4.3 probably gives the best estimate of potential use from wells for which water rights have been issued. Except for the wells having records, any further estimate of groundwater use will not be based on real data and should be considered a data gap that needs to be filled for future WRIA planning.

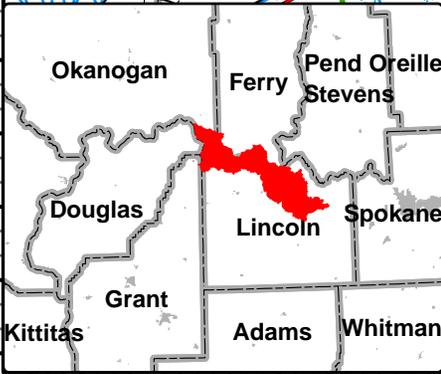
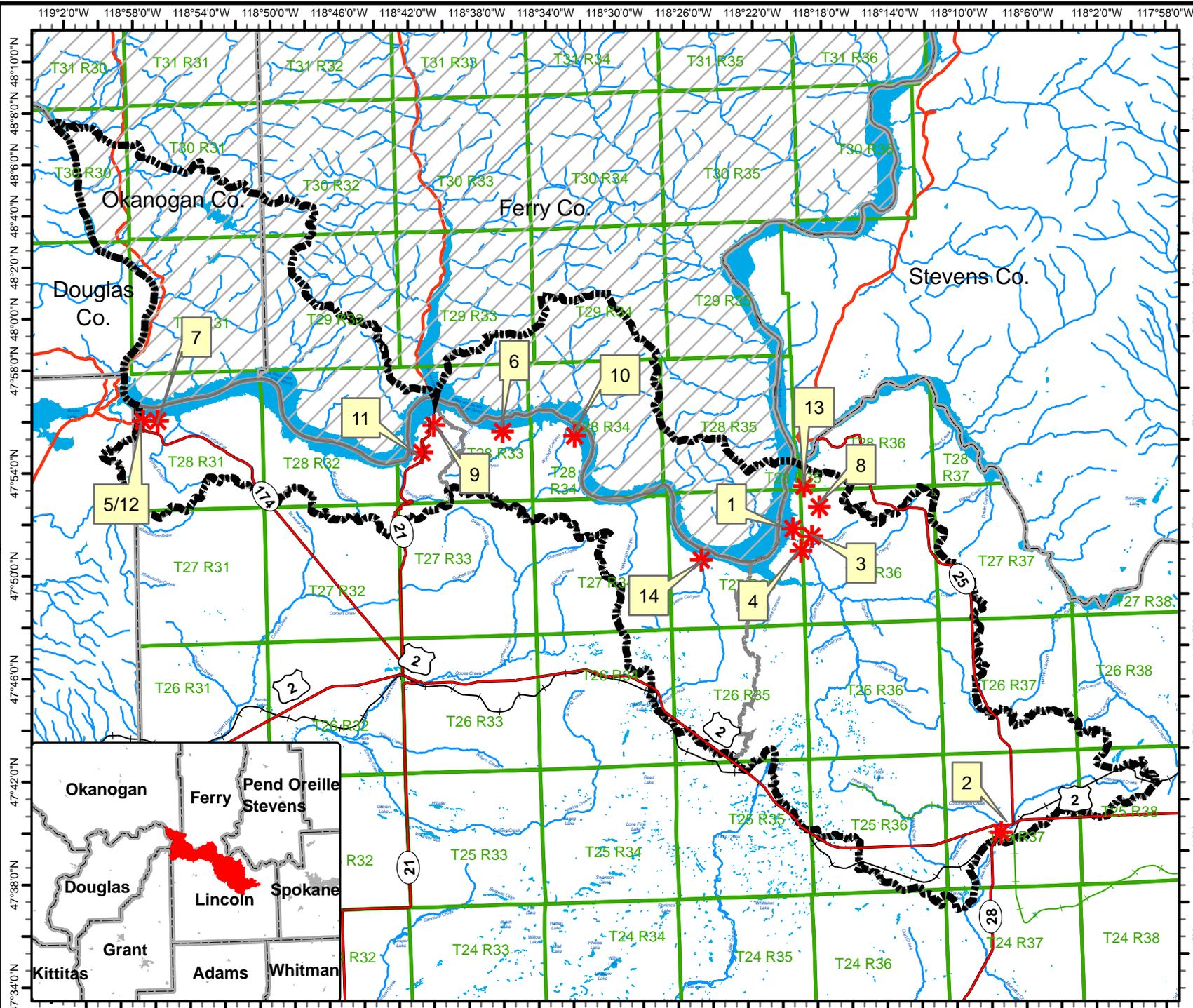
Figure 46

Location of Water Purveyors in WRIA 53

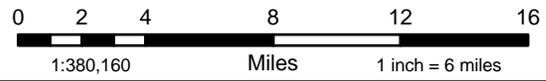


- Water Purveyors
- WRIA 53 Bnd.
- American Indian Reservation
- Sub-Basins

1	Seven Bays
2	City of Davenport
3	Lakeview Heights
4	Ridgeview
5/12	Columbia Springs
6	Hanson Harbor
7	FDR Estates
8	Rocky Top Estates
9	Lakeview Subdivision
10	Rantz Marine Park
11	Roosevelt Views
13	Deer Meadows
14	Lincoln



Actual relationships and distances between features may be different from those depicted on this map. Data was compiled from multiple sources. The data sources do not guarantee these data are accurate or complete. This map is for informational purposes only.



In order to determine the approximate quantity of water used in WRIA 53, a secondary analysis was conducted utilizing the WRATS database, Lincoln County Planning E911 database, and GIS layers to estimate irrigable acreage. In order to estimate the quantity of water used, the following assumptions were made:

- Municipal Group A water purveyors: quantities were recorded as presented in the WRIA 53 WRATS database and summarized in Table 12. Water purveyor demand is estimated at 6918.36 acre-feet (Davenport = 2,503 AF; Group A's = 4,415.36 AF) as defined by papered water rights;
 - City of Davenport is currently using approximately 1,344 acre-feet per year;
 - Other Group A system are currently at approximately 23% build-out, therefore 23% of the papered water rights would be an actual use of approximately 1,015 acre-feet per year.
- Eight Group B water systems are located in the watershed (Table 25, Figure 47). Assuming 5,000 gpd, an estimated 44.8 AF of water is used by Group B systems.
- Irrigation: quantities estimated using GIS layers to estimate irrigable lands (those farmlands/fields as visible from aerial photographs that appear to be irrigated, or could be irrigated) and assuming a water duty of 4 feet per acre resulted in an estimated 2,000 acres of irrigable land for 8,000 AF);
- Industrial/Commercial Use: quantities estimated from WRATS database (five users were identified using 1,531.9 acre-feet);
- Domestic Rural: quantities were estimated using the E911 data base and assuming an average use of 800 gallons per day per home (estimated at 935 rural homes using 837.9 acre-feet). The 800 gpd value was derived from RCW 90.44.105 and DOH guidance;
- Twenty four (24) of the rural homes are farms, which are assumed to use more than the 800 gpd. The Planning Unit estimated these farms use close to the full exempt amount (5,000 gpd) for farm uses. Therefore, an additional 4,200 gpd was added for these 24 farms for a total of 112.9 AF.
- Stockwatering: stockwatering is the highest claimed and certificated use in the watershed. In order to estimate a reasonable use of stockwatering, one acre foot of water was allocated for each rural home (estimated 935 acre-feet);
- Wildlife: wildlife allocations was based on DNR water rights in the WRATS database (documented at 33.5 acre-feet); and
- One trust water right for instream flow is in the WRATS database. This is identified as a groundwater right (documented at 24.7 acre-feet).

Using the above outlined estimates of water use in the watershed, an estimated annual use of approximately 18,439 acre-feet per year is being used by the residents and stakeholders in WRIA 53 (assuming the full papered water rights for the Group A water systems). If the estimated actual use of the Group A water systems is used (1344 AF for Davenport and 1015 AF for the remaining Group A systems), an estimated annual water use of approximately 13,879 acre-feet is being used by the water users in WRIA 53.

TABLE 25: GROUP B WATER SYSTEMS IDENTIFIED IN DEPARTMENT OF HEALTH DATABASE	
System Name	Comment
Brougher Ranch 2 Well 1	Group B System
Brougher Ranch 3 Well 1	Group B System
Brougher Ranch Spring	Group B System
Campbell Bay Farms	Group B System
Char-Donnie Water System	Group B System
Columbia Springs Estate Well 1	System has a water right and is grouped in the Group A
Columbia Springs Estate Well 2	System has a water right and is grouped in the Group A
FDR Estates Well 1	System has a water right and is grouped in the Group A
FDR Estates Well 2	System has a water right and is grouped in the Group A
FDR Estates Well 3	System has a water right and is grouped in the Group A
FDR Estates Well 4	System has a water right and is grouped in the Group A
FDR Estates Well 5	System has a water right and is grouped in the Group A
Lake Roosevelt Hideaway	Group B System
Lakeview Catering	Group B System
Lakeview Heights Water System	System has a water right and is grouped in the Group A
Livingston Water System	System has a water right and is grouped in the Group A
Sterling Acres Water System	Group B System

Figure 47

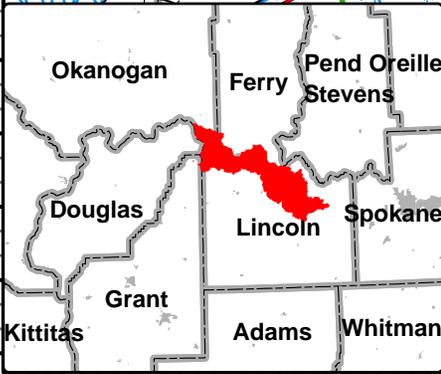
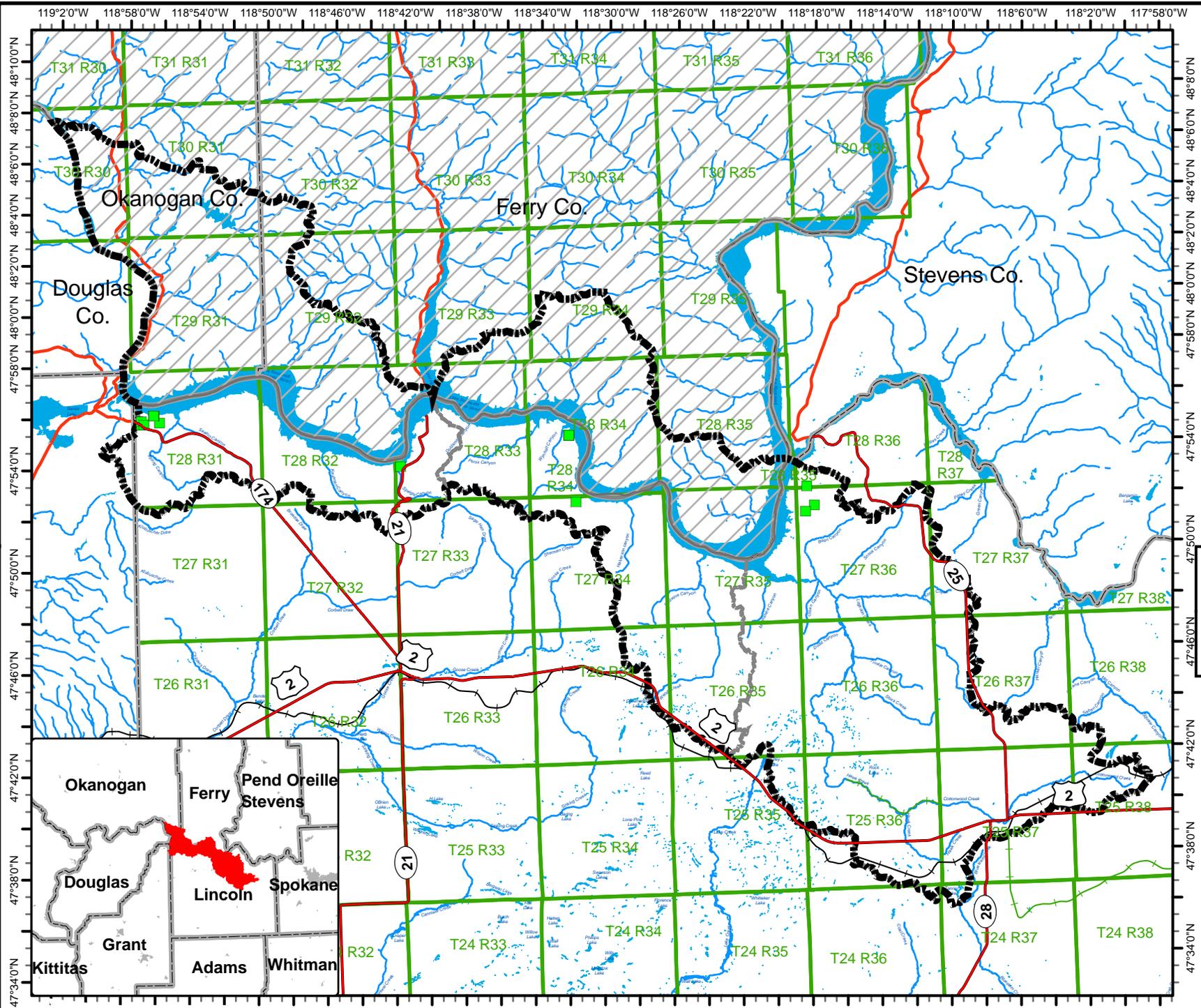
Group B
Water
Systems

WRIA 53



COMMENTS

- Group B System
- WRIA 53 Bnd.
- American Indian Reservation
- Sub-Basins



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