

Little Salmon River Watershed: Climate, Geology, and Soils

The Little Salmon River Watershed has a very diverse climate, geology, and soil composition that influences the wide range of organisms, ecosystems, habitats and land-uses present in the valleys, canyons and mountains of the watershed. The following highlights provide insight into this diversity and complexity. Most of this information is derived from the Little Salmon River Subbasin and TMDL document (DEQ 2006), which contains further details on the characteristics of the watershed (beginning on page 3).

- The Little Salmon River (LSR) watershed encompasses over 570 square miles (364,000 acres).
- The LSR originates at 6,280 feet above sea level, with several tributaries originating at elevations above 7,000 feet, including Rapid River sourced at 9,000 feet.
- The LSR basin is characterized by warm, dry summers and cold, moist winters. Climate varies with altitude. The lower elevations (i.e. the area near Riggins) are semi-arid while the higher elevations are sub-humid. Elevations in the watershed range from 9,393 feet to 1,760 feet. The mean elevation is 5,430.
- Most of the precipitation falls as snow with the greatest amounts of snow occurring on the eastern side of the basin. Average annual precipitation ranges from less than 20 inches at Riggins to more than 50 inches near Brundage Mountain.
- The LSR watershed includes two dominant and very different geologies: The east side is mainly the Idaho Batholith, a Cretaceous (75-100 million years ago) rock formation formed by upwelling magma that cooled as granite. The west side is dominated by the Columbia Basin basalt flows, which are 14-17 million years old. The Little Salmon River is essentially the boundary between the two geologies and marks the boundary between an ancient North American continental plate and an ancient oceanic plate.
- The topography in the western part of the watershed is a result of block faulting and glacial erosion. In the east, volcanic processes and subsequent faulting and erosion created the landscape of high mountains and deep intermontane valleys. The central portion of the watershed is filled with sheets of Columbia Basin basalt. These sheets have also undergone significant folding and faulting. Alluvial sediments and gravels fill the fault valleys (New Meadows Valley and Little Salmon River Canyon).
- The soils associated with the upper Meadows Valley tend to have seasonally high water

tables. Some soils may remain wet due to irrigation while others naturally stay wet. Shallow soils in the valley are alluvial gravels, clay and boulders. These meadow alluvial soils are very deep and poorly drained. There are also soils that are well drained. Infiltration rates for all soils range from moderate to very slow.

- Alluvial soils range in depth from a few feet to about 30 feet before reaching bedrock material.
- The most common soils within the Little Salmon River subbasin are derived from border zone rocks and volcanic geologic materials.
 - Border zone geologic groups occur on the borders of the Idaho Batholith with scattered outcrops throughout the region, consisting of granitic rocks, gneisses, schists, quartzites, and other metamorphic rocks throughout the region. These soil textures are medium to coarse and are generally highly erodible.
 - Volcanic soils consist of various basalt formations that occur throughout the subbasin. Basalt produces a medium-to-fine textured soils with low to-medium erodibility.
 - Topsoils in many forested areas of the watershed are influenced by very fine textured wind-deposited material from volcanic ash sources several hundred miles away. The dominant source of this volcanic ash was a 12,000 foot volcano in the Cascade Mountains of southwestern Oregon that erupted approximately 7,700 years ago (now the location of Crater Lake). The large, explosive eruption deposited volcanic ash across the Pacific Northwest. Soils derived from this material have high water- and nutrient-holding capacity, but can be very sensitive to compaction and erosion.

See Figure 3, Table 2, and Figure 4 from pages 8-10 of the Little Salmon River Subbasin and TMDL document (DEQ 2006) for geologic characteristics and major soil types found in Little Salmon River watershed.

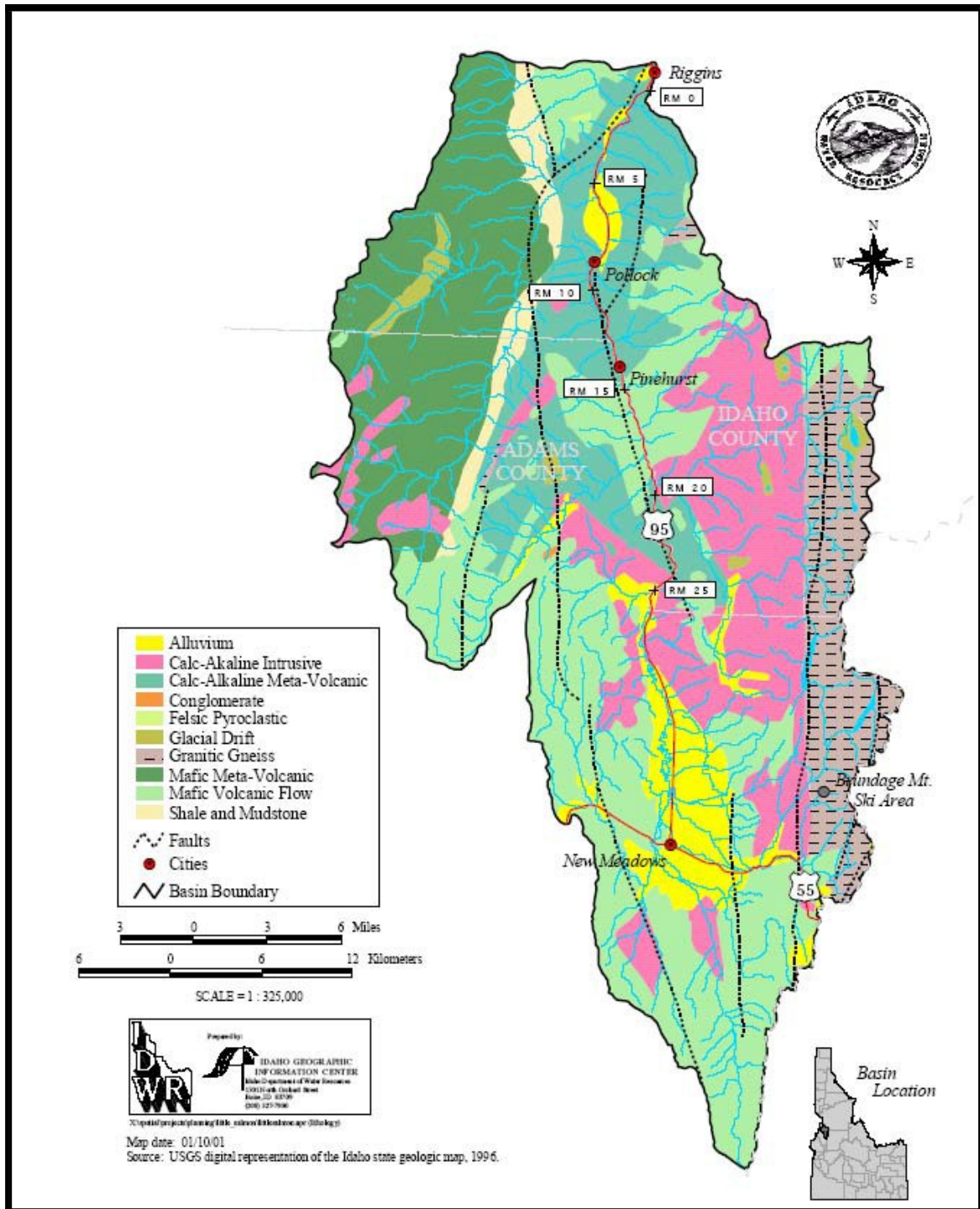


Figure 3. Little Salmon River Basin Geology.

Table 2. Soil characteristics of the Little Salmon River Basin.

Component Name	Texture ¹	Drainage ²	Infiltration ³
Andic Cryochrepts	SIL	W	B
Archabal	L	W	B
Blackwell	CL	VP	D
Bluebell	CB-L	W	C
Bluesprin	CBV-L	W	C
Demast	L	W	B
Dystic Cryochrepts	GR-L	W	B
Gaib	GRV-L	W	D
Gestrin	L	MW	B
Jugson	COSL	SE	C
Klickson	CB-L	W	B
Lithic Haploxerolls	GR-LS	W	D
McCall	CBV-SL	SE	B
Naz	SL	W	B
Quartzburg	COSL	SE,E	C
Rock Outcrop	UWB	⁴	D
Suloaf	CB-SIL	W	B
Swede	L	W	B
Tannahill	CB-L	W	B
Ticanot	CBV-L	W	D
Typic Dystrochrepts	L	W	⁴
Vay Family	SIL	W	B

Texture¹: CB-cobbly, CBV-very cobbly, CL-clay loam, COSL-coarse sandy loam, GR-gravelly, GRV-very gravelly, L-loam, LS- loamy sand, SIL-silt loam, SL-sandy loam, UWB-unweathered bedrock
 Drainage²: E-excessively, SE-somewhat excessively, W-well, MW-moderately well, P-poor, VP-very poor. Infiltration Rate³: B-moderate, C-slow, D-very slow
⁴Values not available or not applicable.

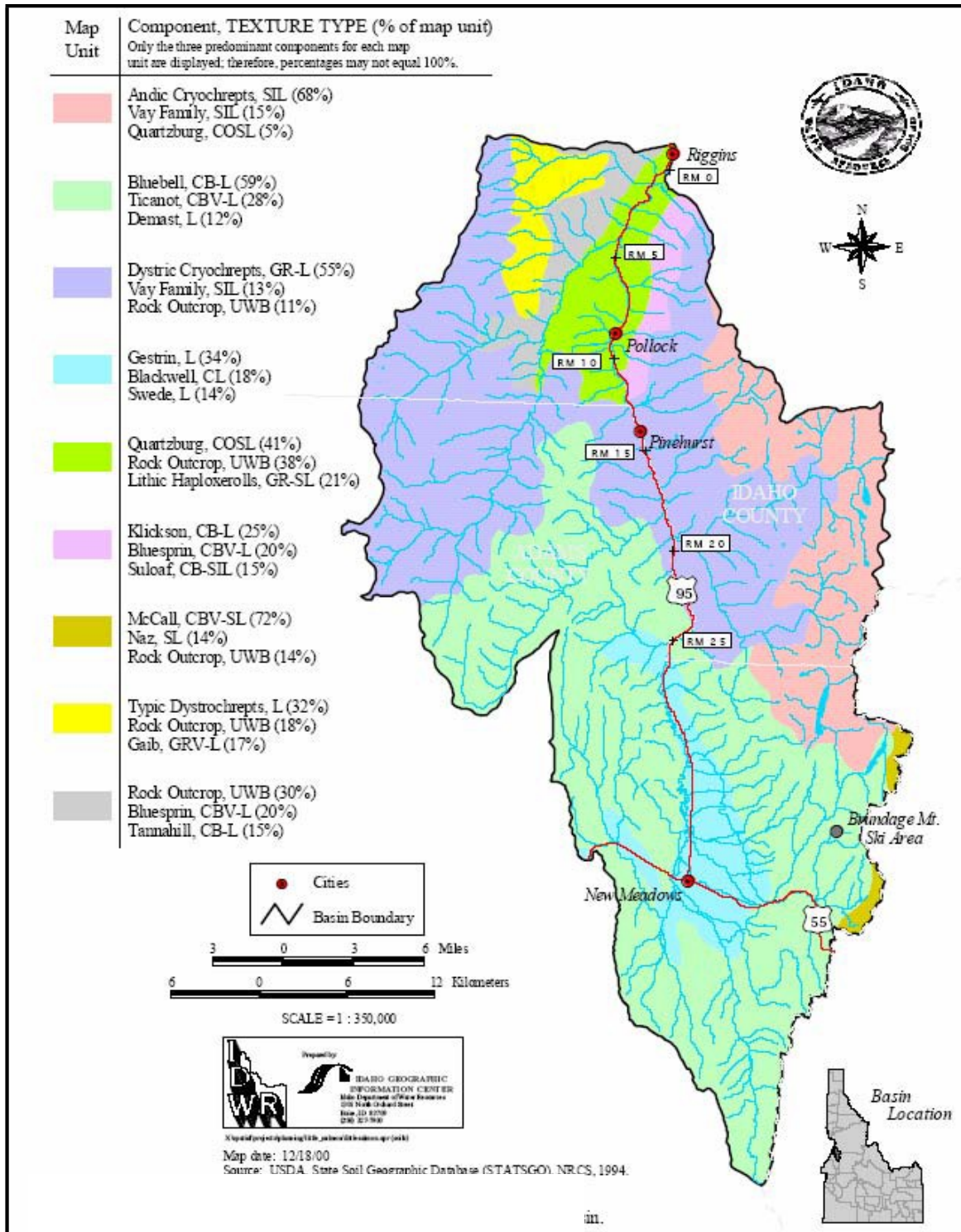


Figure 4. Little Salmon River Basin Soils.

DEQ (Idaho Department of Environmental Quality). 2006. Little Salmon River Subbasin Assessment and TMDL. Boise, ID: DEQ. <https://www2.deq.idaho.gov/admin/LEIA/api/document/download/11886>