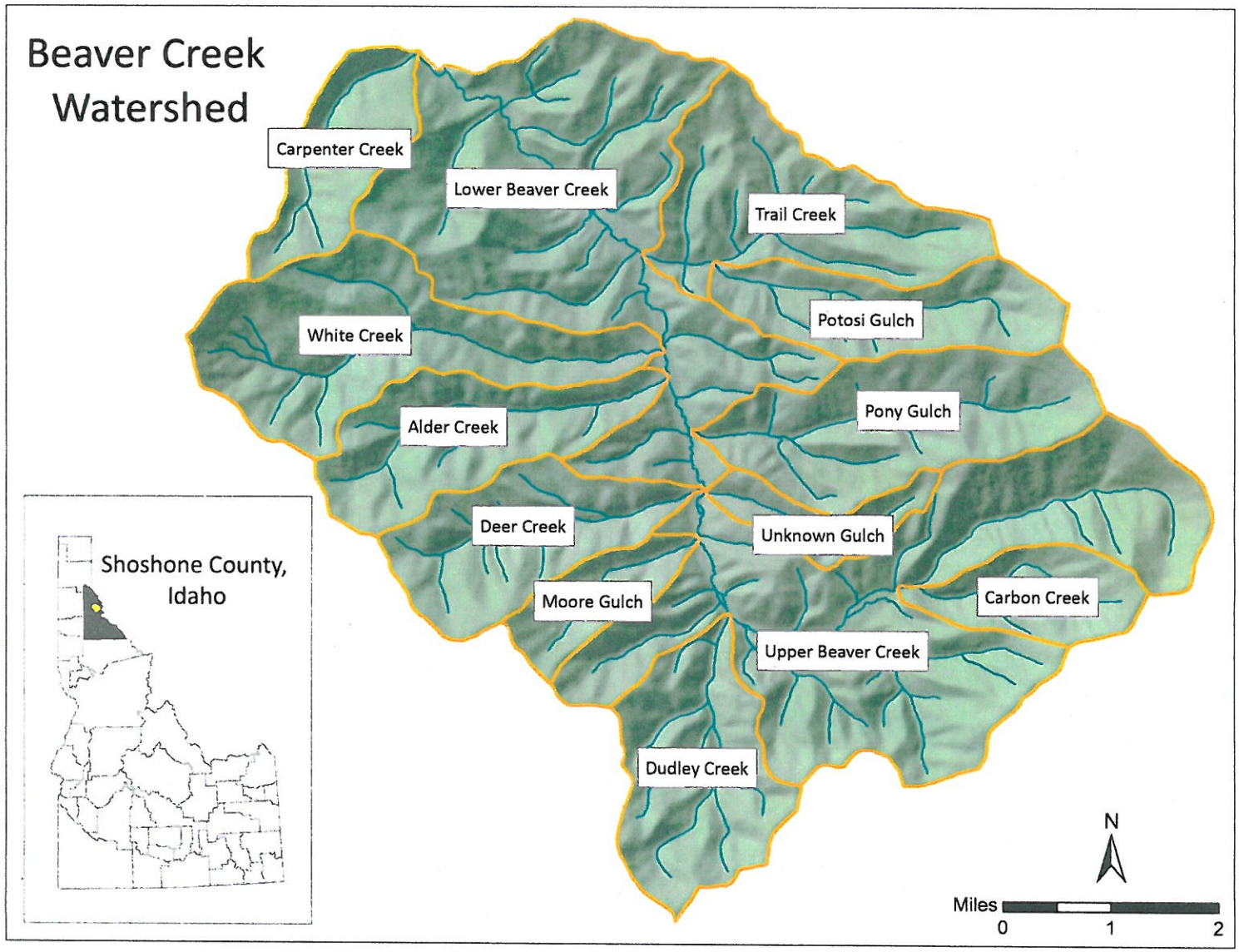

Figure 2. Subwatersheds delineated in the Beaver Creek Watershed

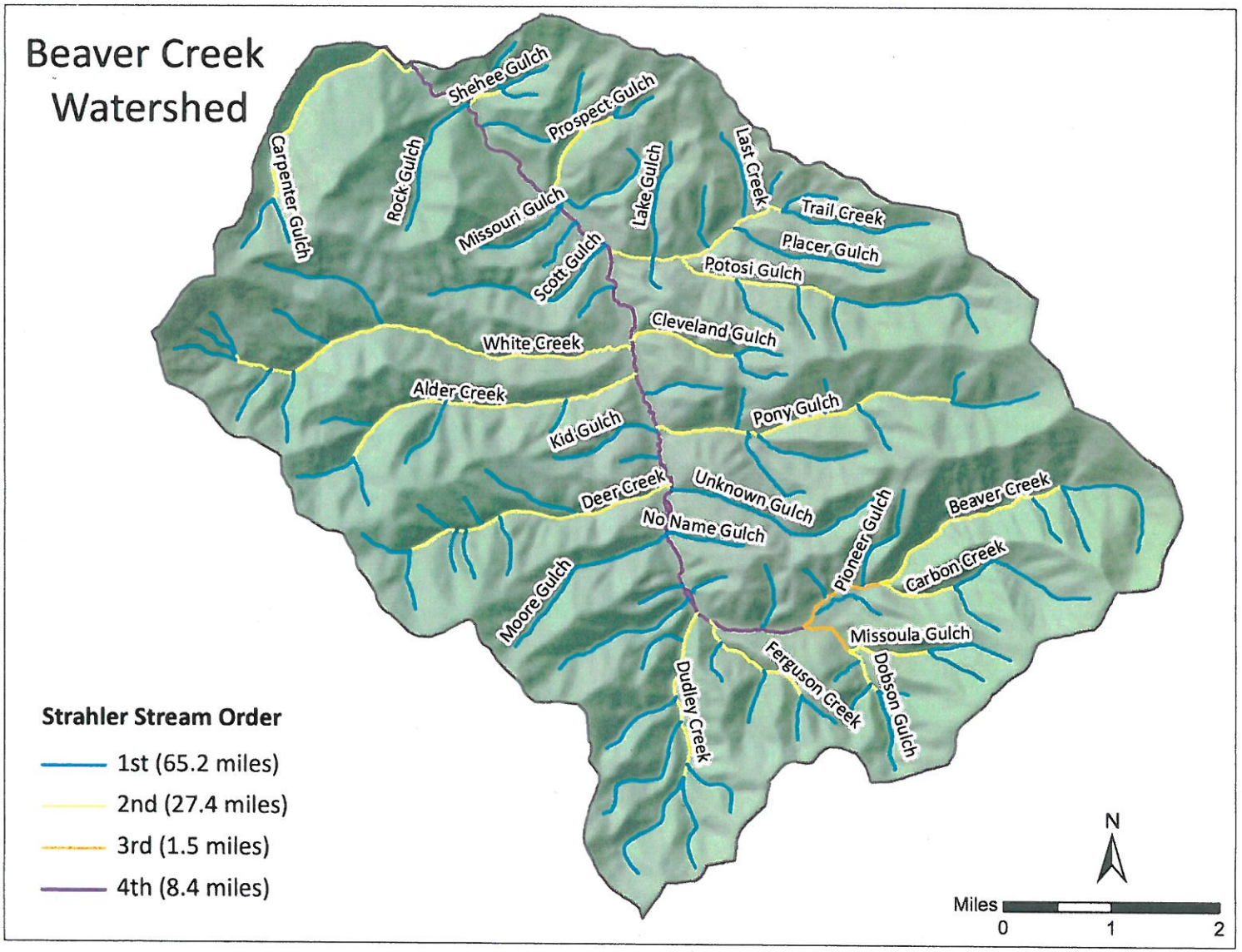

Figure 3. Beaver Creek stream network summarized according to Stream Order (Strahler Method)

Metals Contamination

Historic mining in the Beaver Creek Watershed has also contributed to metals contamination. Streams in the watershed are listed as impaired due to cadmium, copper, lead and zinc in DEQ's 2010 Integrated Report. Investigations have revealed patterns of contamination with concentrations of these pollutants in headwater areas near the large mill sites. Concentrations of metals in stream sediments generally decrease downstream (Figure 16). Mine wastes from the Idora and Ray Carlisle mine and mill sites have been the primary sources of metals contamination in the watershed. Interagency cleanup of the Idora site in 2010-2012 has addressed the major sources of metals contamination from that site. There were 24,793 tons of sediment removed or stabilized from erosion, 341 tons of lead removed to repository, and 131 tons zinc removed to repository. The Ray Carlisle site is the last remaining major source of metals contamination in the Beaver Creek Watershed.

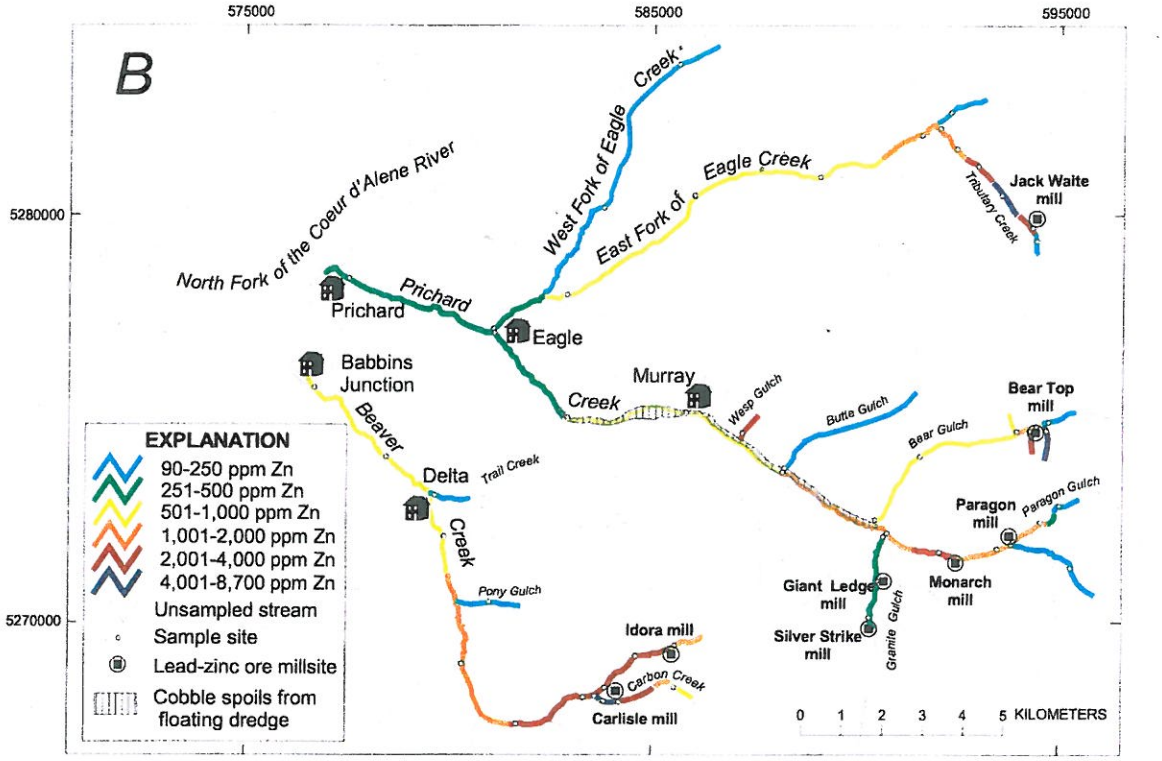

Figure 16. U.S. Geological Survey investigations of metals concentrations in stream sediment found patterns of concentration near mill sites (Box et al 2004)

Railroad

In the early 1900s, the Idaho Northern Railroad constructed a railway that reached Murray in 1907 (Carl Ritchie, former USFS archeologist, personal communication). Construction of a branch line up Beaver Creek began in 1916, largely for the transportation of ore and metals concentrates from the Ray Jefferson/Carlisle Mine (Wood 1983, IGS 1998). The branch opened in 1917, but its use was short-lived due to lack of production at the mines. The railway was eventually abandoned after flooding in 1933. Portions of the railroad grade still exist, but much has been washed away and transported by the shifting stream channel. The old railroad grade has had significant impacts on Beaver Creek and its

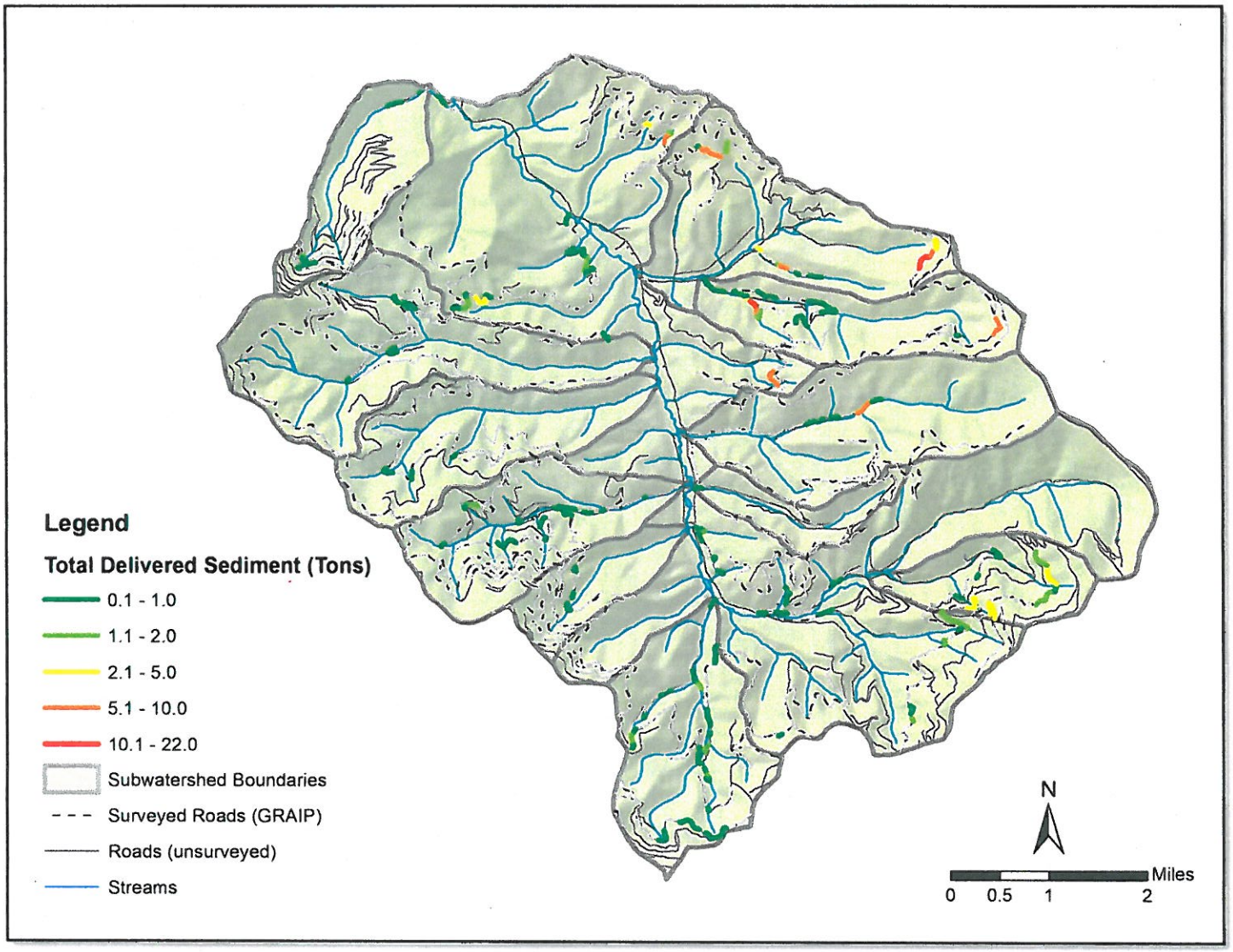

Figure 36. Surveyed road segments responsible for delivering 100% of the sediment from roads to the Beaver Creek stream network, and the relative amount delivered

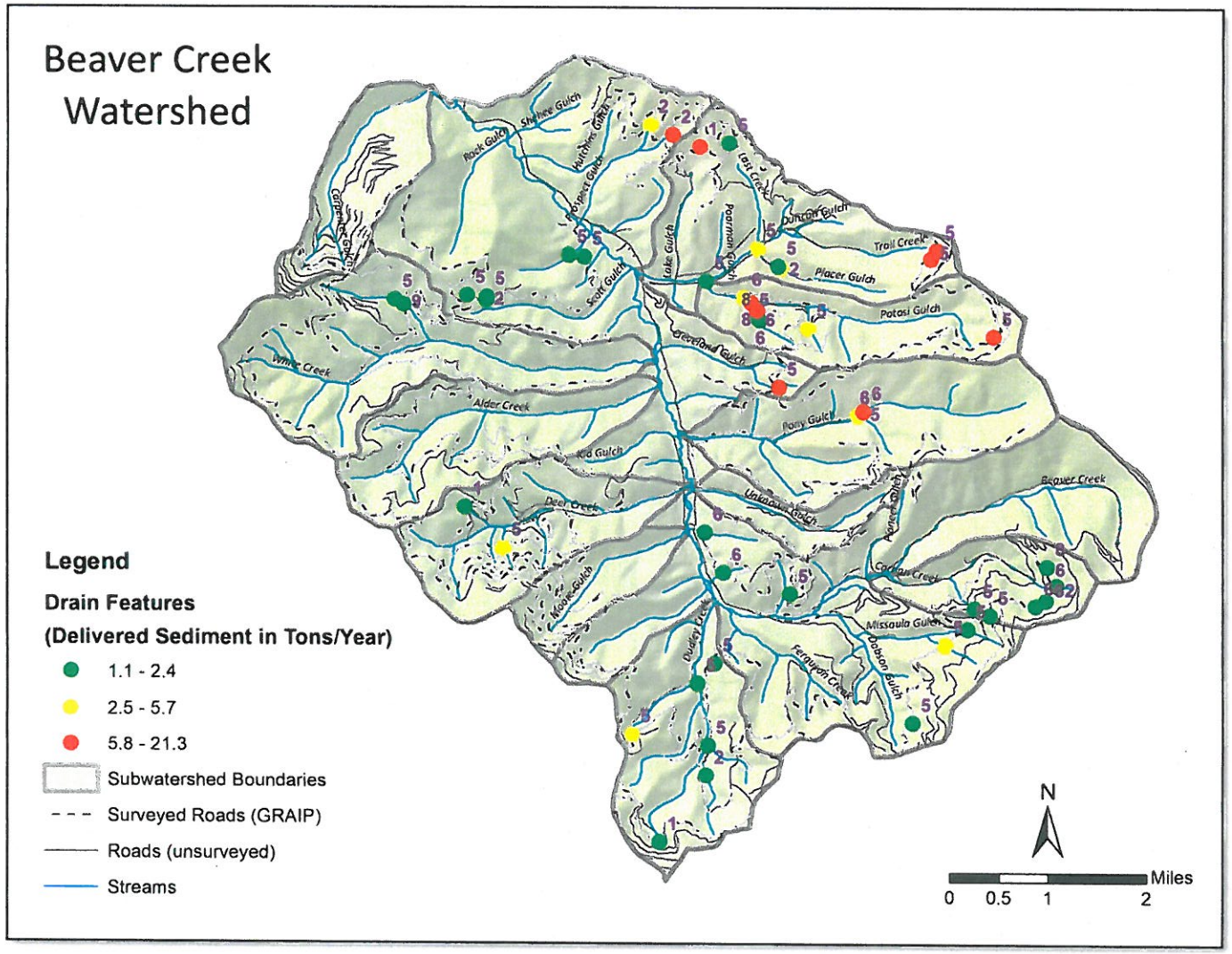

Figure 38. The 50 highest surveyed sediment delivering drain features in Beaver Creek and the relative amount of sediment they deliver to streams. Numbers associated with each point represent the type of drain feature. 1=Broad based dip, 2=Diffuse Drain, 3=Ditch relief culvert, 4=Lead off ditch, 5=Non-engineered feature, 6=Stream crossing culvert, 7=Sump, 8=Water bar, 9=Excavated stream crossing

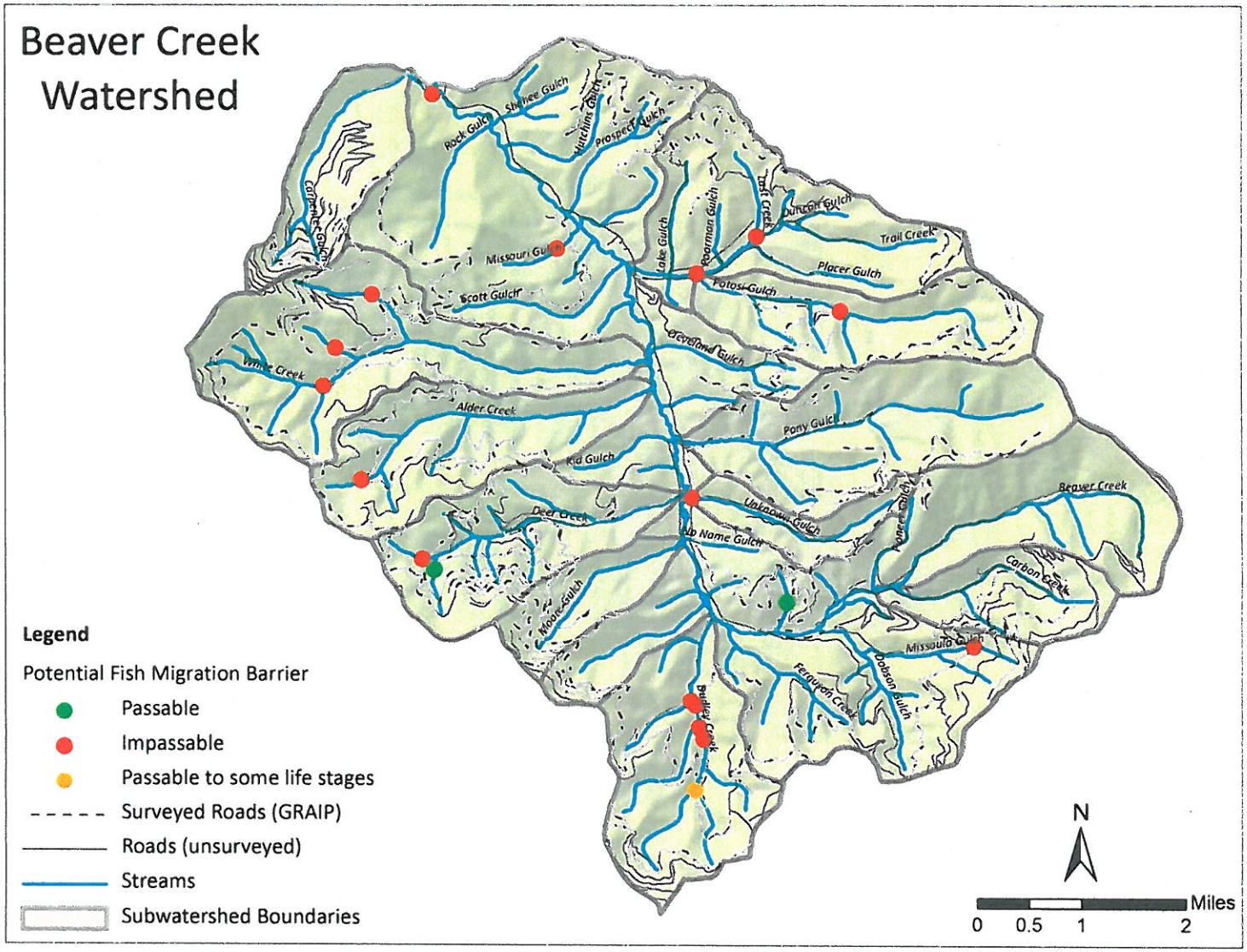

Figure 41. Surveyed culverts that are potential migration barriers to fish in the Beaver Creek Watershed

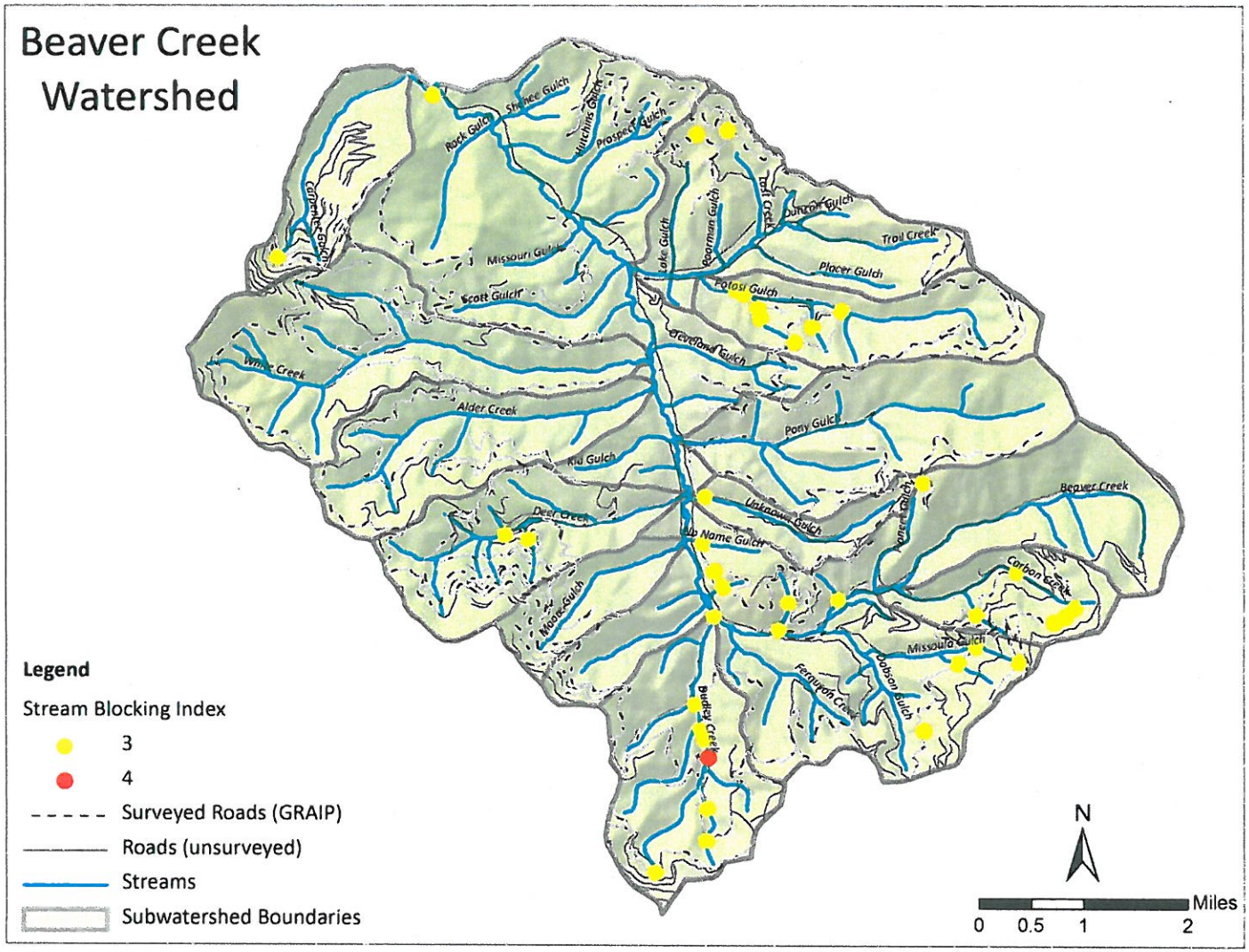

Figure 42. Stream Blocking Index (SBI) scores of 3 (culverts 50% or less as wide as bankfull width) and 4 (undersized culverts plus an angle > 45 degrees) for culverts in the Beaver Creek Watershed

Recommendations

1. **Share the information** - WAG members should learn as much as possible about watershed ecology, BMPs, and restoration techniques and share this information with neighbors, colleagues, and anyone else with an interest.
2. **Work together** - Cooperative and coordinated efforts will be most effective to improve the Beaver Creek Watershed.
3. **Protect special areas** - Protect functional portions of the watershed and unique natural areas.
4. **Don't make things worse** - Avoid activities that would increase sediment, temperature, or metals loads to streams.
5. **Shut off the source** - Implement watershed improvements with a strategic approach as much as possible to reduce pollutant loads in tributaries.
6. **Remove limiting factors** – Removing or replacing features that limit watershed function, such as undersized crossing structures, can be a powerful approach to restoration with high cost-benefit ratios.
7. **Take a top-down watershed approach** - Implement watershed improvements with a strategic approach as much as possible to address watershed conditions from the headwaters downstream to the North Fork Coeur d'Alene River confluence.