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Evaluating the Mineral Potential of the North Cascade Primitive Area - or Mountains I Wished I Could Have Climbed

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The sloping ledge is covered with loose gravel. It is easy climb-ing but the poor footing and steep drop to the ice-filled couloir below are disconcerting. Across the couloir rotten pinnacles and gullies rise up to the western summit of Mount Fury. I finish chipping samples from the brown altered area along the ledge, note the location on my map, and carefully climb out of the couloir, back to the less precipitous snow banks on the south side of the ridge. As I round the corner of a spur and strike out across the snow for the main ridge crest, my assistant and the helicopter pilot wave impatiently from the machine; its tail projects pre-cariously out over the snow cornice and the awful abyss above Luna Creek. We climb in and the pilot starts the motor. Soon we are off for a hot shower and supper at base camp on Diablo Lake. Scenes such as this have been enacted over and over again in the North Cascades since the passage of the Wilderness Act in 1964. The act requires that the U. S. Geological Survey in association with the Bureau of Mines make an evaluation of the mineral resources of each potential wilderness area and report to Congress before the area can be considered for inclusion in the National Wilderness Preservation System.

Some of the areas suitable for wilderness preservation are well known geologically and they have been thoroughly prospected. A short review of the published information and a short field check will suffice. In others, because of their inaccessibility, geologic information is unavailable or unknown, and the Geological Survey must send teams of geologists and geochemists into these areas at a fairly rapid pace in order to finish the job in the seven years required by the Act. The North Cascades primitive area of about 1,300 square miles is one of the largest and most rugged areas so far tackled (fig. 1). The Survey team of four geologists, four field assistants and two geochemists are to complete the job in three years. This would be an impossible task without fairly extensive (and expensive) helicopter support. Because the survey must be rapid as well as thorough, the usual ban on motorized travel in the primitive area has been lifted for the team.

SOPHISTICATED SOURDOUGHS

Daily or for two to four days at a time two-man teams of a geologist and an assistant traverse the river valleys and the ridge tops. Along the ridges we note the different rock types and their relationships to each other. These data are compiled as a geologic map which will show where different types of rocks are found, and roughly spell out the geologic history of the area. Because certain ore minerals are associated with certain rocks and structures, and may have been emplaced in certain periods of geologic history, the map will be an important aid in the mineral evaluation. In addition, we sample altered areas or veins likely to bear ore minerals. Of course, old mines and prospects are examined and the veins assayed.

¹¹Publication authorized by Director, U. S. Geological Survey.

From the stream bottoms we collect stream sediment samples for geochemical analysis. The geochemical prospecting aims at finding specific outcrops of ore minerals. The gold prospector, who at one time traversed the Cascade valleys, searched for the lode by panning, that is, washing the lighter minerals and rock fragments away from the heavy gold in a shallow pan. He began panning on the main river and traced the gold back upstream until he found the exact gully that was shedding the gold. We do the same thing, but we also look for the minerals of copper, lead, zinc, and molybdenum, to mention a few.

Most metals rarely occur in the pure state in nature; their ore minerals are not resistant to chemical breakdown as is gold, and the metals are in part dissolved by ground water. They must be traced by more sophisticated means. We collect samples of mud and silt from all the side tributaries to the major rivers and creeks. Metallic ions in the water tend to become attached to the clay minerals in these sediments. An abnormally high concentration of, say, copper in the water produces an abnormally high concentration in the sediment. All the sediment samples are analyzed by the geochemists for the various metals mentioned and

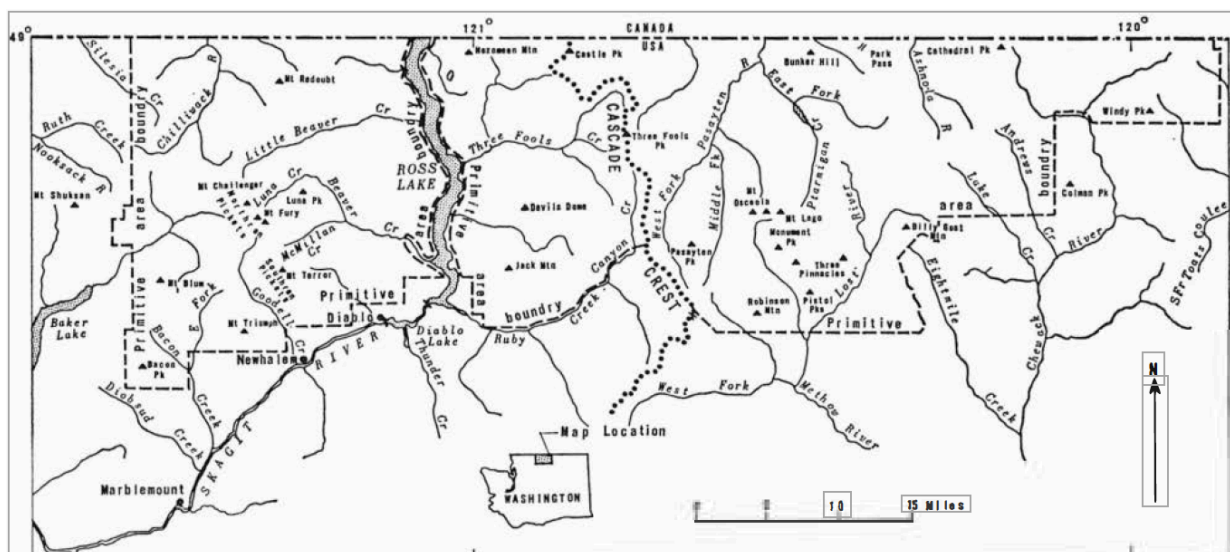


Figure 1. Sketch Map showing location of the North Cascade Primitive Area (Location of boundary from U. S. Forest Service planimetric maps 1961)

² The geologists are permanent Survey employees: Jacques Robertson; Mortimer Staatz, project chief; Rowland Tabor; and Paul Weis. The assistants are predominantly college students hired each summer. Geochemists so far associated with the project have been Bill Lehmbeck, Ed Post, Nick Raymond, and Charles Whittington

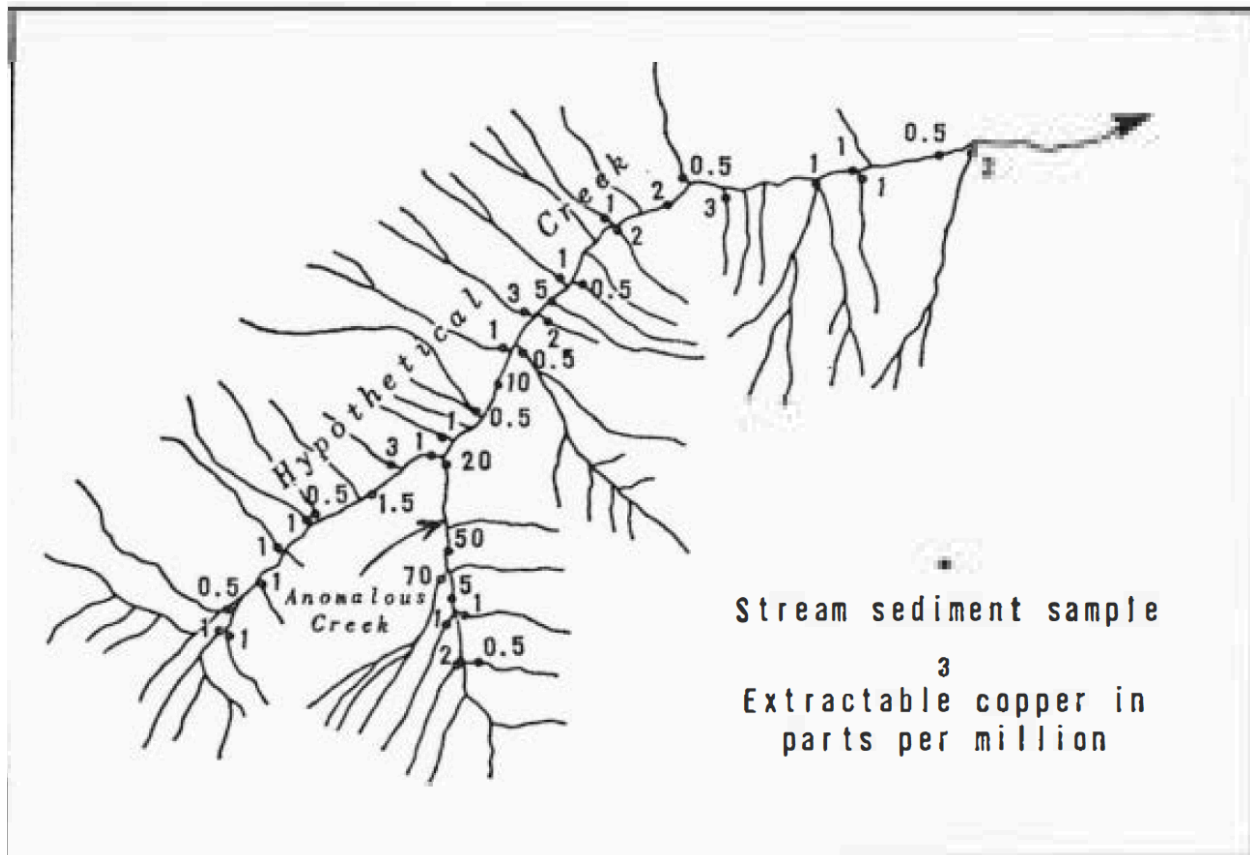


Figure 2. Geochemical Anomaly Map for Extractable Copper

the results are plotted on a map (fig. 2). Streams with anomalously high concentrations are investigated further. Usually the geochemist and geologist take a field test kit to the anomalous stream and begin testing the sediment as they go up the stream. Eventually they may find a vein bearing minerals of the metal they are chasing. The method is also especially effective in finding old mines hidden in the brush or old tin can dumps left by litter bugs.

DAILY LIFE

Accommodations for field surveys are usually fairly civilized when helicopters are involved because the helicopter must be based within reach of gas, oil, and mechanics. Most of the Primitive Area is within 40 minutes flying time from the peripheral roads. Thus, we have had base camps near Twisp on the Methow River, on Diablo Lake, and will have one on the Nooksack River. Our main camp usually is established in June and soon swells to four trailers, five or more tents, and a mobile chemistry laboratory. Wives, children, friends, dogs, hamsters, and visiting dignitaries come and go, but the daily scramble for packs, ice axes, and sample sacks continues through July, August, and early September.

An average day from the Diablo Lake Camp might progress in the following way. Party A is off the ground by 8:30 a.m., bound for a high ridge of Jack Mountain. The geologist and pilot will locate a probable pickup spot just above the tree line, but the pilot puts the party down several miles up the ridge. The helicopter used in this kind of work is small and maneuverable. There is

room for only 2 and 1/2 people in the bubble; it is tight. Party B is going out for a two-day trip. They leave with tent and groceries on the side rack of the helicopter, and within 40 minutes are unloading gear in the shadow of Three Fools Peak, east of the Cascade Crest. Party C is set out on the south side of the southern Picket Range for an open-end traverse. The pilot knows the route they will follow, but no pickup spot is established. They must find a proper spot when the time comes. Party D is slated to use the helicopter all day for stream sediment sampling in McMillan Creek. The geologist selects the streams to be sampled and the first stop is on a steep alluvial fan covered with avalanche snow. The pilot flies straight into the snow and in a full power hover rests one skid of the machine on the snow. The assistant geologist jumps out and dashes for the stream while the helicopter buzzes off to the next tributary. Here one large boulder serves to steady the hover while the geologist jumps out; the rotor blade is almost grazing the uphill slope. Back goes the ship for the assistant who has meanwhile collected the sample. Each stop may last only 2 or 3 minutes. The leapfrog game is kept up until the flustered party must put down on a gravel bar, collect wits, take notes and plan a new attack. This method of sampling can cover ground in an hour which might take two days on foot with backpacks. And in such places as McMillan Creek or Bacon Creek there are always those brush patches that may drive the geologist into another profession altogether. About 3:30 or 4 p.m. the helicopter starts picking up the traverse parties. If all goes well, each party will be in a suitable pickup spot wearing bright parkas or waving a piece of fluorescent cloth when the helicopter arrives. After supper in camp, maps are inked, notes compared, and the logistics of the coming day are laid out.

REFLECTIONS ON A RAINY DAY

Flitting about the mountains in a helicopter may not appear to qualify as a wilderness experience, but in many ways it does, albeit different from the usual North Cascade excursion. The fantastic contrasts, familiar to all who have undergone the hardships or discomforts of rough mountain travel or living, are emphasized ten times by the helicopter's speed. It may be but a few minutes from a hot breakfast in a warm cabin or trailer to a chilly early morning zephyr on a 6500-foot snowfield, or, in reverse, from a steep brush gully (maybe the brush is wet as well) to a hot shower and snack before supper. These rapid contrasts can be even better appreciated if you have experienced the usual slow miles of transition by foot and by car from outside to inside the wilderness Cascades. Also, there is that peculiar feeling of a closing door or snapping rope when you have just stepped out of the helicopter and it disappears over the ridge. One minute you are surrounded by the noisy technology of civilization, the next minute it is all gone; you are alone in the quiet wilderness.

What serious mountaineer would not envy the helicopter-borne geologist his opportunity to reconnoiter the route from a few hundred feet away? With our airy chariot we found and accomplished a relatively easy traverse across the north face of Luna Peak, and a route across the Barrier of the Southern Pickets.

But helicopter traveling has its unexpected hazards and heart breaks too. Many a geologist has acquiesced to the pilot's preference of a landing spot—a seemingly short distance from the desired spot at 80 mph only to find a good hour's rugged going in order to reach the place of geologic interest. Not only the geology must sometimes give in to the demands of the machine. When you must cover a certain amount of ground—at times almost at a dead run—before a scheduled pickup, tempting summits, only a few hundred feet above, must be bypassed. Or imagine the

frustration of rushing through the trees and brush to a pickup spot, only to see the ship sail off to look for you elsewhere. You cannot help but shout and wave knowing fully how ridiculous it is to do so. And then there are those times when the helicopter does not come at all! If the fog is swirling about, you can guess well enough why you must walk home or bivouac or both. But if the sky is clear and the minutes tick by, you know not what to do. He may just be late, but then . . . ?

VARIETIES OF WILDERNESS IN THE NORTH CASCADES

Perhaps wilderness could be defined on the basis of what one must do when the helicopter does not come. In the eastern part of the North Cascade primitive area there are few places where an hour or two of cross-country walking will not bring a stranded geologist to a trail and, generally, a well maintained one at that. An exception to this is stretches of the Lost River, where the hiker is walled in by 3000-foot sheer cliffs which, although mostly flanked by navigable talus along the river, occasionally come right down to deep rushing water. The Lost River flows around the south side of a high and rugged area. Monument Peak (8000+ ft.), one of the highest summits of this massif, may never have been climbed (it is not mentioned in the AAC Climber's Guide). Other handsome peaks of this group include Mounts Osceola, Carru, and Lago, the latter bearing Washington's easternmost (?) glacier, as well as Three Pinnacle Peak, Lake Mountain (with a challenging unclimbed[?] granite gendarme) and Pistol Peaks.

The high and rugged Monument Peak massif consists of hard granitic and metamorphic rocks. It is encircled by meadowed and tree-covered rolling ridges underlain by softer sandstone and shales. To the east metamorphic and igneous rocks predominate again, but most of the relief is found in deep forested canyons cut into timbered and meadowed uplands. There is little rugged terrain except in the granite and gneiss of the Cathedral Peak area. But the region is wild and forest travel off the trail can be gruesome because of fallen trees. Some trails in the Pasayten River drainage are literally sawn through continuous logs piled up to shoulder height. Needless to say, a helicopter is nigh unto useless in such areas and we spent many days with our camp on our backs.

Westward the ridges become more meadowed and rugged as the Cascade Crest is approached. Between the Cascade Crest and Ross Lake is a sort of no man's land characterized by meadowed ridges, occasionally fairly rocky, where there are thick beds of sandstone and conglomerate or small granitic bodies such as Castle Peak. But the deep valleys of this area are real terrors. Most are V-shaped gorges, becoming more so as they approach Ross Lake. The area is so prone to lightning fires that second growth timber is the rule on northern and eastern slopes. Woe to the geologist who is forsaken by his helicopter in the upper tributaries of Three Fools Creek. He will spend the night and be fighting brush for most of the next day to reach a trail. As many a northwest mountaineer knows, the Picket Range is the wildest of the wilderness. The geologist who has lost his helicopter in the Pickets will spend a full day reaching a trail, and in some places, such as the northern Picket Range, will still have 20 miles to go. On a few ridges and saddles where he might be abandoned, he cannot get down at all without technical work or some fairly advanced high-angle brush climbing. Above the brushy U-shaped main valley floors the valley walls are commonly close to vertical. The famous North Cascade zone of meadow and delight hardly exists in much of this range, for although the angle of the slope diminishes a little between 4,500 and 5,500 feet, the walls soar up once more to the 7,000- to 8,000-foot summits.

A geological traverse of these ridge summits is preposterous, so we have to content ourselves with the steep shelf, heathery on the south side, and of hanging glacier and polished rock on the north.

The high peaks of the Pickets are well known and have long been favorites of climbers, but few alpinists have ventured on extended high country trips. A wealth of untried ridge traverses remain to be explored.



When the Survey's prospecting job is finished, and the mineral potential of the North Cascades is wrapped up neatly by the Government Printing Office, I will think back to the places and peaks we did not quite reach even by helicopter, I, for one, will be going back (the hard way).

Southern Pickets from Luna Peak
(left to right) McMillan Spires,
Inspiration Peak, The Pyramid,
Mount Degenhardt, Mount
Terror, Twin Needles and
Crescent Creek Spires

Photo by R. W. Tabor



Photo by R. W. Tabor

Making a geochemical test in Luna Creek, Cirque. West Peak of Mount 'Fury behind.