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**Mining information office.*

## Uses of geologic maps explained

By Wyatt G. Gilbert,
Deputy State Geologist

The Alaska Division of Geological and Geophysical Surveys is charged by state law (A.S. 41) "...to conduct geological and geophysical surveys to determine the potential of Alaska lands for production of metals, minerals and fuel; the location and supplies of ground waters and construction materials; the potential geologic hazards to buildings, road, bridges, and other installations and structures." To fulfill this important service to the public and other state agencies, the making of geologic maps is essential.

### What is a geologic map?

The geologic map shows the distribution of different rocks and surface materials, together with any geologic features that are present---such as folds and faults---within the earth. The geologic map does not portray the form of the land's surface, showing the peaks and valleys of the earth's surface as does a topographic map, nor does it locate manmade features such as highways, roads, and buildings. Rather, the geologic map displays the extent, shape, and position of rock bodies and geologic materials that lie on and beneath the earth's surface.

Although the surface area of Alaska is large (about 375 million acres---roughly as large as France, Spain, Germany, and the United Kingdom combined), its 'volume' is much, much greater. Geologic maps enable us to see Alaska in its third dimension.

Geologic maps are produced at many different scales, but can be grouped into two main types: regional geologic maps (where 1 inch on the map covers more than 1 mile) and detailed geologic maps (where 1 inch on the map equals 1 mile or less). The latter maps provide the most accurate information and are generally the most useful for planning specific land uses, whereas regional geologic maps present general geologic information over a large area and are a preliminary step towards making detailed geologic maps.

**What are geologic maps used for?**

Once geologic information has been mapped---that is, compiled, analysed, and transferred to an image representing a particular part of the world---it is disseminated to a wide variety of users. This information may be used for land planning and for resource evaluation and prediction. Geologic maps allow geologists and others to determine the potential for energy, metals, and construction materials and the geologic conditions that affect construction of roads, dams, cities, ports, and pipelines. For their land-disposal and selection programs and other management decisions, both public and private landowners and managers require information from geologic maps about geologic hazards, mineral deposits, available water supplies, and construction materials.

A few geologic maps are produced by large petroleum and mining companies in areas where they have financial interests; but most companies and individuals, including the prospector, builder, home buyer, engineer, well driller, and ecologist, rely on geologic maps made by government agencies as a guide to the geologic conditions of an area.

**How are geologic maps made?**

To construct an accurate geologic map, rocks and geologic structures are observed in the field and plotted on a topographic map base. Rock samples are also taken; these are later analyzed to confirm the field observations.

In Alaska, regional geologic mapping is generally carried out with extensive helicopter support. Detailed geologic maps can be made by foot traverses from base camps, but some helicopter assistance is usually required in the 49th State. DGGS also uses truck, canoe, fixed-wing aircraft, and even pack horses (p. 9) on occasion.

Remote-sensing techniques such as aerial photography, satellite imagery, and airborne magnetic measurements are also employed, but these methods require confirmation by means of ground checks.

Many types of field observations may be made, such as bedrock type, surface deposits, mineral deposits, and faults, depending on the type of map to be published. During DGGS mapping programs, geologists collect many different kinds of information so that the resulting geologic maps will be as informative and complete as possible. Most geologic maps require several years to complete because it takes time to make careful field observations and to check these observations with analyses of samples in the laboratory. Laboratory analyses often point out new interpretations requiring further field work or new mapping approaches. Careful planning and a long-term commitment are required for the production of a useful geologic map.

The last step in the process is that of cartography, or mapmaking. Here, a cartographer sets up a color scheme, and with painstaking attention to exactitude and registration, creates a graphic reproduction of the area covered by the geological field party.

**What is the current status of geologic mapping in Alaska?**

Alaska lags far behind the other 49 states in the knowledge of its physical resources. About 45 percent of Alaska is now covered by up-to-date regional geologic maps. Most of these maps have been produced by the DGGS and federal agencies at a scale of 1 inch equals 4 miles (1:250,000).

Adequate detailed geologic maps, the most useful maps for public and private resource studies and for answering the needs of other state agencies, cover less than 10 percent of Alaska.

**How do DGGS geologic mapping programs differ from those of other government agencies?**

Almost all published geologic maps on Alaska are produced either by DGGS or the U.S. Geological Survey (USGS). The aims of these two agencies, however, commonly differ. Geologic mapping programs of the USGS are largely designed to satisfy national goals and objectives. Much federal geologic mapping in Alaska is on a regional

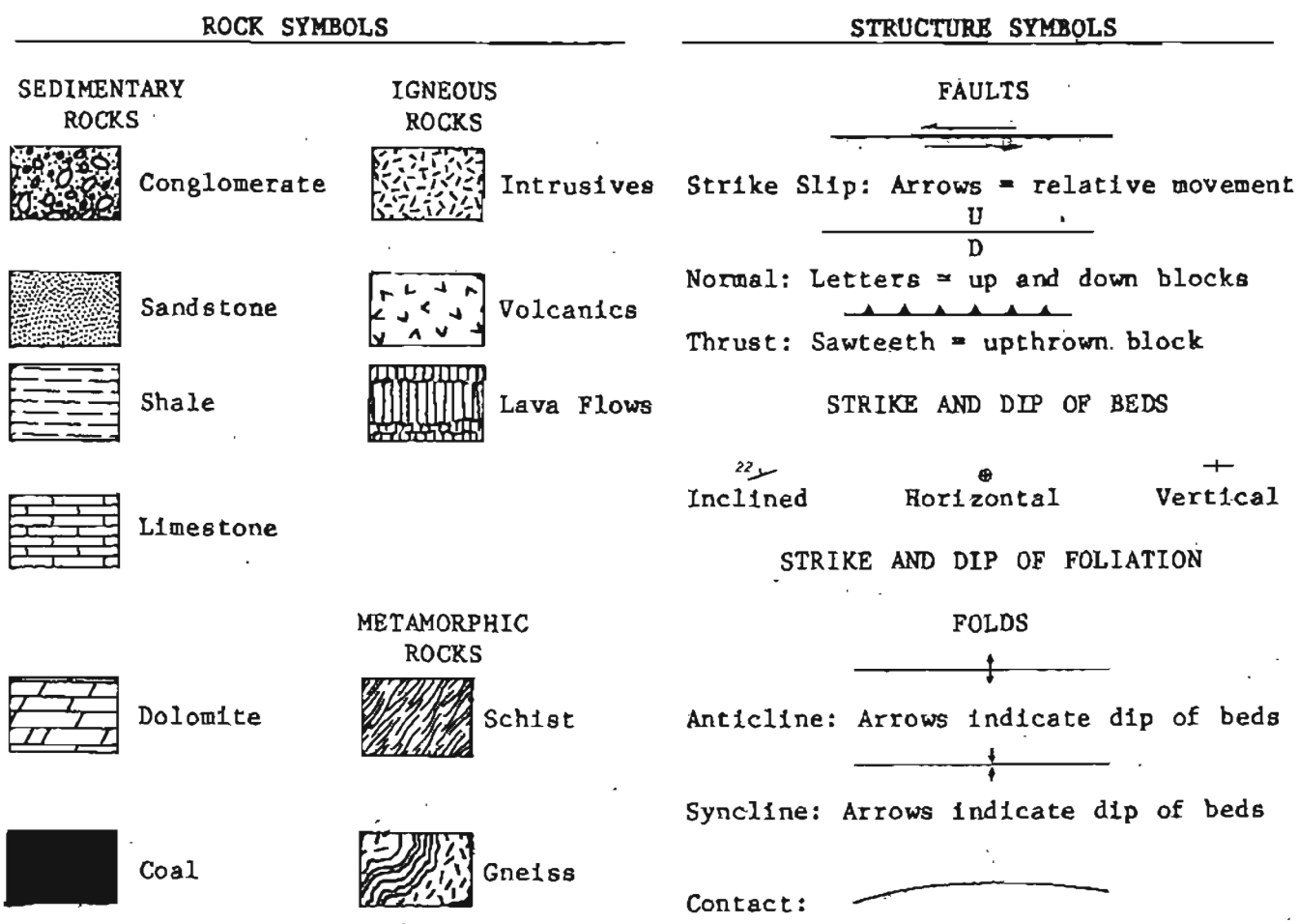
scale, and federal programs are commonly directed at assisting federal land-management plans.

By contrast, the salient purpose of the Alaska Division of Geological and Geophysical Surveys is to produce detailed geologic maps of areas of major interest to the citizens of Alaska. The DGGS formulates its mapping programs after consultation with other state agencies and the public to determine their needs. Only when DGGS has determined that it can provide geologic information useful to Alaskans is the necessary long-term commitment given to a geologic mapping project.

Recent DGGS mapping programs have been directed at the mineral belt in the southern Brooks Range, where significant state land selections were made as a result; at the surficial geology and geologic hazards of the lower Susitna Basin, where large population increases are taking place; at the geology and earthquake hazards of the Cook Inlet (Anchorage) coastal area; and at the mineral and energy potential of the upper Kuskokwim (McGrath) region and the central Chugach Mountains near Anchorage.

**What are some of the more common geologic-map symbols?**

The following figure synopsizes the common work, structure, and age symbols found on geologic maps.




MISCELLANEOUS SYMBOLS

LETTER SYMBOLS AND COLORS COMMONLY USED TO REPRESENT THE AGE OF ROCK UNITS

| Period | Letter | Color | Period | Letter | Color |
|---|---|---|---|---|---|
| Quaternary | Q | Light yellow to tan | Mississippian | M | Blue |
| Tertiary | T | Med. yellow to tan | Devonian | D | Gray-purple |
| Cretaceous | K | Green | Silurian | S | Purple |
| Jurassic | J | Blue-green | Ordovician | O | Red-purple |
| Triassic | Tr | Light blue to blue-gray | Cambrian | Є | Rust-red |
| Permian | P | Blue | Precambrian | pЄ | Brown-gray-brown |
| Pennsylvanian | IP | Blue | | | |

Volcanic rocks, dikes, or veins - Red. Colors used to represent igneous rocks are generally brighter than those used for other rock types.

## Schaff appoints Gilbert Deputy State Geologist

State Geologist Ross G. Schaff recently announced the appointment of Wyatt G. Gilbert to the position of Deputy State Geologist.

Gilbert, 38, was named by Schaff to manage personnel and programs that are located in the DGGS Fairbanks office. Among the duties he will assume are the assignment of personnel to projects, liaison with public and private organizations located in north-central Alaska, coordination and final approval of the Fairbanks office budget, and control of expenditures.

Gilbert, who has a doctorate in geology from Stanford University, is a 10-year resident. He has been a mining geologist with DGGS for 6 years.

Soon after naming Gilbert Deputy State Geologist, Schaff went one step further and named him acting State Geologist. This move was precipitated when DNR Commissioner Bob LeResche named Schaff Acting Director of the Division of Mines and Energy Management, replacing Tom Cook, who resigned May 30. Schaff will remain acting head of DMEM until LeResche finds a permanent replacement for Cook.

In other personnel notes, DGGS geophysicist Steve W. Hackett will resign effective August 1. Hackett, who has been with the Survey nearly 6 years, will devote his immediate future to 'putting a roof over our heads,' he says, referring to the log house he is building near College.

Also retiring was Ona McBride, long-time Anchorage mining-information clerk. Ona, who retired April 30, was replaced at the 941 Dowling Road office by Melvina Tittle. This fall, when the new addition to the main Anchorage office at 3001 Porcupine Drive is completed, the information office may be moved there, depending on the space situation at the time.

In Juneau, Chris C. Landis left his post as mining-information specialist to accept a position as land management officer with the Division of Forest, Land, and Water Management. His replacement was not filled at press time.

In Fairbanks, Maria Polly has been hired as a Laboratory technician I in

the Minerals Lab. She is married and has a son, Zeb.

Lastly, DGGS Coastal Zone Management geologist Gail Davidson transferred from the Anchorage office to Fairbanks. Those wishing to contact her may do so at 479-7062.

## Call for papers issued for Alaskan coal conference

The University of Alaska issued its first announcement and a call for papers for its second Focus on Alaska's Coal conference, to be held in Fairbanks this fall.

The papers will be published in a Proceedings report, probably next year. The sponsors of the program, the UA School of Mineral Industry and the Divisions of Minerals and Energy Management and of Energy and Power Development, will conduct the conference on the UA Fairbanks campus from October 21-23.

According to Dean Earl Beistline of the organizing committee, 'The first conference (in 1975) was well received, and it is felt that it is time to stop, take a look back, and assess the progress that has been made over the past 5 years toward understanding our coal resources. Furthermore,' he added, 'We should examine how we are using our coal to meet Alaska's energy needs, what Alaska can do to meet the energy needs of the lower 48 states, and how we can help reduce our balance-of-payments deficit by exporting to the Pacific Rim nations.'

Co-organizer Dr. Ernest Wolff of the Mineral Industry Research Lab said, 'The conference will benefit anyone interested in understanding Alaska's coal resources: organizations involved in exploration, future users, coal researchers, and investors.'

The 3-day conference will conclude with a panel discussion on the future of coal development in the 49th State. Prominent industry and government coal specialists will be invited to participate.

Those who wish to present papers should submit the title and a brief abstract to Dr. P.D. Rao of the School of Mineral Industry, University of Alaska, Fairbanks, AK 99701, phone (907) 479-7135. For registration information, contact the UAF Dept. of Conferences and Institutes, 117 Eielson Bldg.

## Microfilm files stolen from College office

On Wednesday, May 28, College information specialist Mildred Brown discovered that somebody had stolen the microfilm files of the Circle Quadrangle.

She surmised the thief knew what he was doing, because the files were unnamed---they were tagged by a code number. Moreover, the entire file was in two separate sets---one updated and one to be updated. About 520 microfilm envelopes covering the period 1953-1979 were stolen.

Co-worker Carole Stevenson said, "We're really upset. Everything we have is open to the public. They're not confidential. But they're gone."

Brown estimates it will take about 250 man-hours and $350 in supplies to refilm the approximate 15,000 original claim documents of the Circle area, restuff them into jackets, and make microfiche copies for the other DGGS mining offices.

## Number of new claims takes big jump

The number of new claims filed and the number of visitors seeking mining information are up, says mining-information specialist Mildred Brown, 'Way up.'

This quarter, 5,795 new claims were filed, a threefold increase over the past 3-month period. 'In fact,' says Brown, 'More claims came in during May than we had altogether by this time last year.' A check shows she's right: 3,318 claims were filed during the first half of 1979; more than twice as many---7,628, to be exact---have been filed so far this year, with 3,531 arriving in May (below).

There are many more visitors this year, too---'All related to the higher price of gold,' says Brown. In her

office in College, 1,682 people have sought mining and claim information during the first 5 months of this year. Last year there were 606 visitors during the same period.

Mining-claim totals for the quarter are shown below.

| Recorder | March | April | May |
|---|---|---|---|
| Fairbanks | 165 | 293 | 600 |
| Barrow | 0 | 0 | 362 |
| Manley Hot Springs | 0 | 0 | 7 |
| Nulato | 2 | 0 | 452 |
| Mt. McKinley | 28 | 128 | 110 |
| Nenana | 15 | 17 | 4 |
| Rampart | 12 | 0 | 0 |
| Talkeetna | 122 | 58 | 227 |
| Palmer | 93 | 98 | 108 |
| Nome | 0 | 137 | 1,281 |
| Seward | 0 | 12 | 0 |
| Juneau | 102 | 105 | 206 |
| Haines | 0 | 3 | 4 |
| Petersburg | 335 | 0 | 0 |
| Anchorage | 46 | 98 | 0 |
| Aleutian Islands | 0 | 12 | 0 |
| Cordova | 1 | 12 | 0 |
| Chitina | 104 | 32 | 164 |
| Valdez | 0 | 0 | 4 |
| Kuskokwim | 162 | 45 | 2 |
| Kodiak | 0 | 27 | 0 |
| | 1,187 | 1,077 | 3,531 |

There are four DGGS mining-information offices (p. 1). Three are fairly easy to find---the two in Southeastern are in State Office Buildings and the one in Anchorage is at 941 Dowling Road (take the Dowling cutoff on the Old Seward Highway).

The office in College is not that easy to get to, however. (It used to be, but the main access road to it was closed off a few years back.) Access may be made either by foot from the corner of University Avenue and College Road---wear your hiking boats to cross the berm---or by vehicle in a more circuituous manner.

If you imagine the capital-letter 'B' lying down, with University Avenue as its base, the DGGS mining office would be at the juncture of the two loops. Then, take either Geist Road at the top of the B or Taku Drive at the bottom of the B, and keep turning 'inward.' You'll dead-end in the DGGS parking lot.

"Finding gold may be simpler," says Brown.

## Open-file report, four ICs highlight DGGS printing effort

One new open-file report and four information circulars were printed during the quarter. (Actually, the open-file report will not be out until July 15th, but the author wanted the public to be apprised of its availability). The report is:

. AOF-134, 'Preliminary geology of the McGrath - upper Innoko River area,

**You know it's going to be a bad day when....**

. You wake up face down on the pavement.
. You put your bra on backwards and it fits better.
. You call Suicide Prevention and they put you on hold.
. You see a '60 Minutes' newsteam waiting in your office.
. Your birthday cake collapses from the weight of the candles.
. Your son tells you he wished Anita Bryant would mind her own business.
. You want to put on the clothes you wore home from the party and there aren't any.
. You turn on the news and they're showing emergency routes out of the city.
. Your twin sister forgets your birthday.
. You wake up to discover your water bed broke only to realize you don't have one.
. Your horn goes off accidently and remains stuck as you follow a group of Hells Angels on the freeway.
. Your wife wakes up feeling amorous and you have a headache.
. You mailed all your bills only to realize that payday is next Friday.

---from Alaska Airlines Commercial Newsletter, May 5, 1980

western interior Alaska,' by T.K. Bundtzen. The report has three plates (scale 1:63,360) and a short text with geochemical data and potassium-argon age dates. It sells for $ 5.

Four information circulars were printed during the quarter---one new one and three revised ones.

One new one appears especially timely. Entitled 'Investigate that claim before buying,' IC-26 is a 6-page booklet listing some of the do's and don't's involved in buying a mining claim. As with all ICs, it is free.

Two older---but very popular---IC's have been updated. No. 3, 'Hand-placer mining methods,' and No. 18, 'Amateur gold prospecting,' have been revised and are now in the handy booklet size. Both promise to be 'best sellers' during the coming season.

IC-11, the largest information circular, is exactly as its title states. The new 47-page booklet, 'List of DGGS Publications,' describes every document that the Survey and its predecessor organizations have ever produced, including the open-file-report category. The availability and price of each document is also included.

## State resources being mapped by high-flying 'spy' planes

The bane of President Eisenhower, the U-2 spy plane, is still flying missions.

This time, however, the sleek, high-flying birds are pursuing the cause of science, not the Cold War, and are reconnoitering over America, gathering information about Alaska's storehouse of resources for both federal and state agencies. For the first time, the entire 49th State is being recorded by uniform, high-altitude photography.

James R. Anderson, a former Land Use Planning Commission staffer and now a physical planner for DGGS, is the data-systems coordinator for the project. "It is turning out to be a great success," he said.

### Planning Challenge

With continued implementation of the claims-settlement act and recent legislation requiring resource inventories and land-use planning in Alaska, both the state and the federal government face a great planning challenge in the next 15 years or so.

Until now, state and federal agencies have lacked the tools to do an adequate job of obtaining data about Alaska's resources. State land managers are faced with massive and immediate requirements, ranging from land conveyances to Alaskans to regulatory duties.

### Planes, crews hired

Ten federal agencies and the State of Alaska have joined together to fund and operate a joint high-altitude photography program in Alaska. Participating on the federal side of the ledger are the U.S. Bureau of Land Management, the Forest Service, the National Park Service, the Soil Conservation Service, the Fish and Wildlife Service, the Geological Survey, the Army Corps of Engineers, the Department of Energy (Alaska Power Administration), the Bureau of Mines, and the Bureau of Indian Affairs. They will cooperate with two Alaska state departments, Natural Resources, and Transportation and Public Facilities.

The agencies are pooling their money to hire the high-flying planes and crews of the National Aeronautics and Space Administration. NASA then flies the assigned sectors and sends the bill to the Soil Conservation Service, the administrative contractor for the program.

Both the U-2 and the WB57-F, a remote-sensing twin jet, are in the summer skies of Alaska. The U-2s fly out of Eielson AFB near Fairbanks, and the WB57-Fs have Elmendorf AFB near Anchorage as their summer home. The planes are normally based at the NASA Ames Research Center in California and the Lyndon B. Johnson Space Center in Texas, respectively.

The planes are used, Anderson said, because Alaska has a limited

highway system, which presents problems in obtaining resource information not encountered in other states. "We have to rely on flying up here and organizing high-efficiency programs at the lowest possible cost," he explained.

**$25 per mile**

The costs to date are impressive. For the 1978 and 1979 fiscal years, the agencies made $800,000 available for aerial photography. A modest amount, considering the scope of the job, Anderson said, "for Alaska covers 586,400 square miles, you know."

During the past two summers, the NASA planes photographed 33,000 data line miles of Alaska, or about 61 percent of the photography needed to fill in the blanks.

This is being added to the 10 percent of the uniform and usable photography that already existed. "So now we have better than 70 percent coverage of Alaska," Anderson reported.

The cost per year figures out to be less than $25 a data mile.

**'Loaded' planes satisfy stringent photographing requirements**

It is a short season to meet the agencies photo requirements. Other than high, barren mountains, the countryside must be free of snow. Vegetation must be, in the language of the scientists, 'fully flushed.' Cloud cover must be less than 10 percent. A minimum sun angle of 30° is needed.

Even when all these conditions are met, the program can be hampered by smoke from forest fires, always a problem during Alaskan summers.

The cameras, scalpel-sharp, photograph more than 250 square miles at a time. The planes carry cameras with a 6-inch focal length for black and white film and with a 12-inch focal length loaded with color infrared film; both 'shoot' simultaneously. At an altitude of 60,000 to 65,000 feet, the color infrared cameras photograph a swath about 8 miles wide while the black-and-white cameras are filming terrain 16 miles wide.

On-board computers tape record the flight line, time, altitude, and center of photograph in latitude and longitude so that the subsequent photo mosaics will be exact.

The aircraft also have inertial navigation systems. All the pilots have to do is get on a specific flight line and turn on the cameras.

During the past summers, both types of planes were in Alaska from mid-June to the end of August. There is no need for guesswork about flying conditions, for the Air Force can provide a satellite picture of the entire state every few hours. Thus, the crews can avoid the cloudy or smoky areas.

**Many uses for resource maps**

The high-altitude photographs are used by mapmakers, biologists, land planners, hydrologists, and others to map and analyze land and water resources. The films provide information about river courses, vegetation, landform, soils, and demographic characteristics such as road developments and housing patterns.

"Most areas of Alaska remain unstudied," Anderson said. "Resource maps either are unavailable or of limited usefulness" because of the generalized categories of the data and information presented on the maps.

"Whether Alaska's resources are to be developed or held in abeyance," he continued, "the need for up-to-date information on the physical and natural qualities of Alaska remains paramount."

All the information will be available to the public through duplicate sets of the aerial film at the Bureau of Land Management office in Anchorage, the UA Geophysical Institute in Fairbanks, and the Agricultural Stabilization Conservation Service in Salt Lake City, UT.

Thus, says Anderson, any person, whether he represents industry or environmental protection, can request information on a specific area of Alaska. A computer will produce the

information and even plot a map overlay of the photography that is available. "It's as simple as that," he concluded.

## DGGS use of pack-horse field parties proves successful

In 1977, DGGS sent a pack-horse-supported field party to map the Lignite Creek area of the Healy Quadrangle. The party not only survived but managed to map 85 sq km (34 sq mi) of terrain at a scale of 1:24,000 in 24 days.

Flushed with success, DGGS sent out another group the next year to map the Hatcher Pass area of the Talkeetna Mountains. Here, despite poor weather, the party still managed to map 140 sq km (56 sq mi). UA geographer (and former-Army horse Cavalry officer) Edwin M. 'Rocky' Rhoads acted as field assistant and wrangler on both trips. DGGS mining engineer Cleland Conwell was party chief on the 1977 trek, with UA geology professor Don Triplehorn assisting. DGGS's Jeff Kline was principal investigator on the 1978 trip, and was accompanied by Rhoads and a student.

Conwell and Kline both agree that their treks into the wilderness without the accompaniment of chattering helicopters was refreshing, economical, and efficient. An interview with the saddle-sore earth scientists follows.

**Cleland, you were not the first to do this in Alaska.**

Definitely not. Pack horses were used in support of topographic and geological expeditions in 1898 with the Copper River explorations under Army Captains Edwin F. Glenn and William R. Abercrombie. Pack trains were employed frequently thereafter by U.S. Geological Survey field parties in roadless areas of Alaska up to 1943. In 1975 and 1976 Resource Associates of Alaska used horses in the Bonnifield district and on the Seward Peninsula. The latter project involved flying in nine horses by Lockheed Hercules aircraft and conducting a reconnaissance of an area more than 2,000 sq km in 3-1/2 months. In 1977 the U.S. Bureau of Land Management used horses on a survey of Dall sheep habitat in the Brooks Range.

**Jeff, what prompted you to go the pack-train route? Surely you didn't mind another summer of being ferried around on the padded seat of a helicopter?**

Another summer of trying to yell instructions to helicopter pilots above the continual din certainly held no appeal. A surficial geologist doing moderately detailed mapping on horseback can spend most of his or her time observing landforms and processes. As Cle will tell you, once familiarity with the horse is established, it is not difficult to annotate maps or photos, take pictures, or make notes while moving along on horseback---feats that are usually difficult and impractical on foot, what with all the time you normally have to spend in watching your footing, looking for bears, and just plain huffing and puffing.

Horse travel offers lots of advantages over air transportation--- for starters, you reduce the possibility of overlooking significant microrelief, subtle changes in lithology, or inconspicuous contacts.

For some areas, the horse can double the mobility of the geologist, who can observe and record on the move and can stop for close examination and sampling. Best of all, the horse carries the geologist's rock samples. I always have felt sort of, well, foolish, lugging around backbreaking loads of rocks and dirt anyway.

Incidentally, during the trip I figured that 70 to 80 percent of the days were unsuitable or marginal at best for flying helicopters because of the low ceilings and reduced visibility in rain and fog. But our horses operated in the weather fairly well. Thus, we probably saved a lot of money just by eliminating all of the standby time we would have ended up paying for a helicopter to sit in camp.

Last, horses don't make you airsick. And, they will generally let you know well in advance if a bear is nearby.

**You'll get no arguments here. Any other advantages over helicopters?**

Well, in rugged terrain such as the Talkeetna Mountains, mobility is generally restricted to the valley areas, but the daily area one can cover is still considerably greater than if one is dropped off by helicopter in the morning and retrieved at night. Personally, I think working on a horse is pleasant. Horses provide a degree of autonomy and the absence of a rigid daily schedule, too---you don't often find those freedoms in helicopter-supported operations.

**I'm almost sorry I asked. Any other comments, Cle?**

Not really. Except that you have to remember that Rocky and I both predate the common use of helicopters. He fought the Burma campaign in World War II from the back of a mule, and I spent several years in South America and Wyoming with pack trains.

The worse scare I had with a pack train was when the horses carrying our blasting caps and dynamite bolted and started bucking. Luckily, the cargoes fell harmlessly to the ground.

Today the helicopter has replaced the horse, but if horses are available, and if the mapping project is to be in detail, say 1 inch to the mile or less, using horses can be an advantage and can be cheaper than using the helicopter in remote areas.

**Rocky, as an old Army Cavalry hand, you know your horses. Are they difficult to work with?**

As Jeff says, horses are great in the field ---if you are a 'horse person,' that is. Horses have a highly developed nervous system, a rudimentary intelligence, and a surprising degree of individuality. They can sense a person's fear, doubt, or confidence, and often react accordingly. Horses with any degree of spirit will frequently attempt to evade or get the better of his handler. You have to like them and yet have patience, for they can be tricky devils. After a few days on the trail, with a little supervision, the novice can pick up the fundamentals of horsemanship, and become quite fond of his equine transportation. Horses can pack fairly heavy loads (175-200 lb) over difficult terrain, and keep it up for 8 hours daily with reasonable care.

**Q: Cleland, tell me about the operation itself---where you went, who was in the party, how many horses did you have, and so forth.**

In our party in '77, we had Rocky, Triplehorn, myself, a geological assistant, and a wrangler provided by the horse renter. Plus five horses, of course. We started out July 1 and returned the 24th. We found that, to make the maximum use of the horses, a minimum amount of gear is necessary. Long items such as soil augers and tent poles were awkward to pack. In addition to the usual field gear, we found we had to pack grooming, reshoeing, and first-aid gear for them.

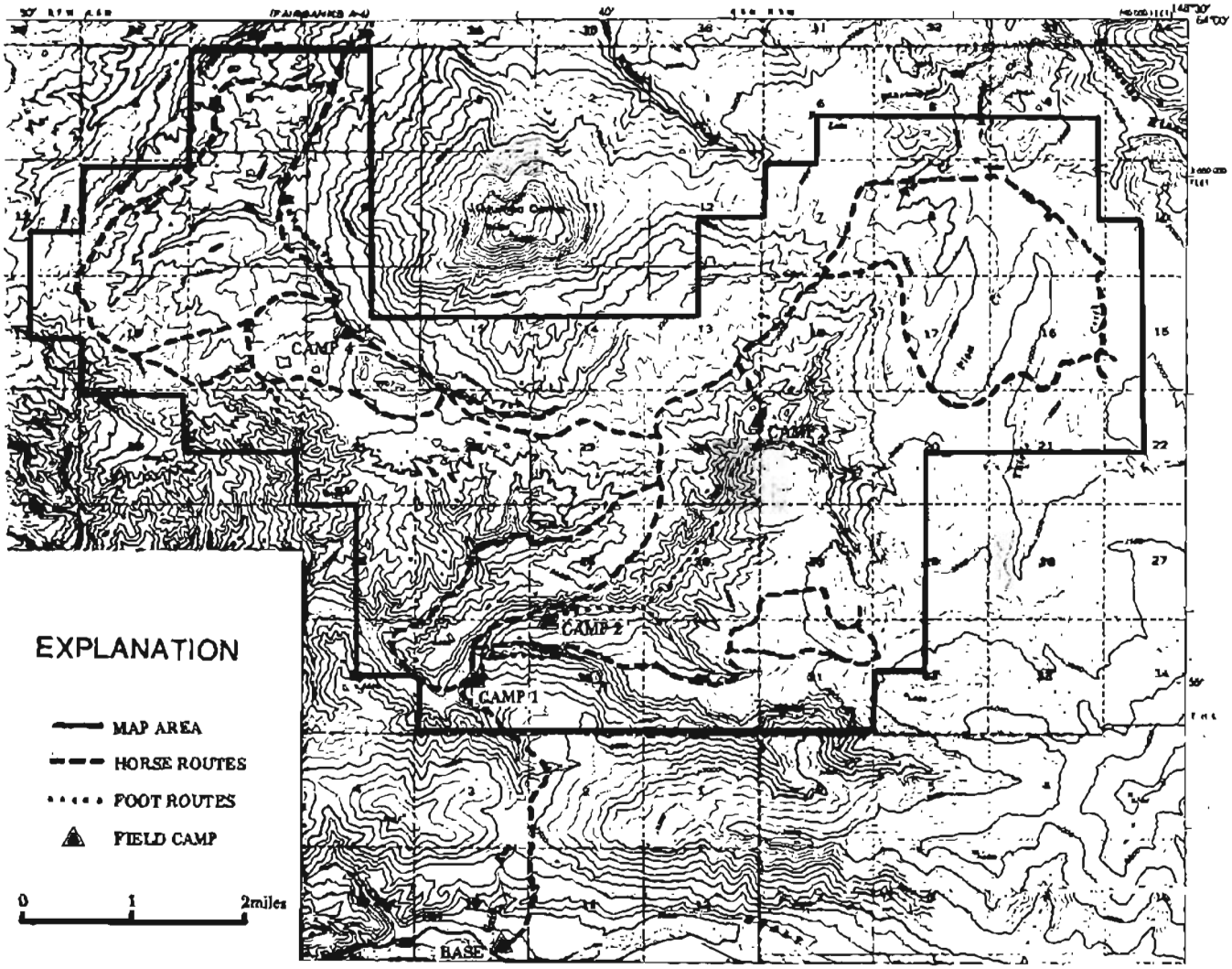
On a pack-horse party, one should definitely limit personal gear and foodstuffs to the essentials. Flour, dry beans, and dehydrated fruits and vegetables are a must. They are great weight and space savers. And spices are a necessity, too. Even Rocky, who thinks a day without beans is like a day without sunshine, had to agree to a judicious supply of spices.

**What do you think you accomplished, if anything, that a helicopter-supported party couldn't have?**

Nothing, really. Except that we did it cheaper---and with fewer frayed nerves. A similar venture would result in ever more of a savings today, what with fuel costs being what they are. (A breakdown of the horse-vs-helicopter expenses is presented at the end of the article.---Ed. note.)

**Jeff, any elaboration on this?**

Undoubtedly, both projects could have been done faster in helicopters. But the fossil-fuel costs would have been greater. Geologic mapping of areas from 100 to 250 sq km at a scale of 1:24,000 on horseback is practical throughout much of 'mainland' Alaska, where the horses can be delivered to you by road, by water, or by cargo air-




Route, 1977 Lignite Creek field party.

craft. Larger areas can be mapped by increasing the size of the party to permit two simultaneous traverses. The logistics involved are a little more complex, but nothing that cannot be overcome. After all, you have to ferry in fuel caches and supplies for helicopters, too.

**Speaking of which, Rocky, was it much of a problem moving sites or supplying feed?**

Not particularly. You do have to do some heavy planning, though. The concept of operations was designed to achieve a maximum of mobility and logistical support with the minimum number of horses. At Healy, four riding saddles (later reduced to three) and two pack saddles were used. An equipment cache and support vehicle were parked at a base immediately south of the field area, giving us a convenient resupply and emergency transport facility.

The area was covered from a series of tent camps. The relatively short distances involved (see figures) in moving camps and resupply enabled the party to operate with a small number of pack animals by making additional round trips. Using the same animals for riding while doing the geological field work resulted in a minimum of idle horses in camp. With the reduced field party, the riding was rotated among the horses.

**What about the feed?**

The feed situation in both camps was made easier by good grazing areas.

During the entire 1977 field period, a night's grazing provided enough daily sustenance for the animals, and all but one of the horses were turned out hobbled in the evening. One was kept in camp to facilitate the morning roundup. Thus, only one horse needed prepared feed each day, and we used only 220 lb for the entire period.

The 1978 field party was a different story, though. Because of the uncertainty of finding natural forage, we decided to provide prepared feed for all animals for the entire period---about a half ton of the stuff. There was pretty good grass for forage, there, too, but its density varied. Our horses occasionally had to compete with a few hundred head of cattle for grazing. Locals from Palmer use the upper Little Su basin as rangeland.

**Jeff, what was the logistical picture in your 7-week field party in 1978?**

Well, our party was a small one---just Rocky, a student, and myself, plus our horses, Lady, Jackson, and Spirit, if you really want detail. We set out June 24 from the Little Susitna Roadhouse in the southwest Talkeetnas and returned August 7, a full 3 years later---or so it seemed.

The field work consisted of mapping the surficial geology and geologic hazards of the upper Little Susitna River and its tributary drainage basins---at a scale of 1:24,000---essentially the Willow Creek mining district east of Hatcher Pass. The topography is extremely rugged---the sharp aretes, steep gradients on upper slopes, and hanging valleys all preclude horse travel on ridges and highlands. Additional obstacles were talus, coarse rock rubble, thick vegetation at the lower altitudes, and boulder-choked rivers and streams. It turned out that lateral moraines and terraces provided us with the most suitable horse routes in much of the area.

The area has three major drainages---Fishhook Creek, Archangel Creek, and the headwaters of the Little Susitna River. The distances to these areas were short enough to permit shuttling of camp equipment and supplies from our main cache, at the Little Su Roadhouse. We took three dual-purpose horses with three riding saddles and a pack saddle with an extra set of panniers. Potential campsites and possible routes to each area were selected from maps and airphotos.

**I'm interested in all the feed Rocky mentioned. How did you get it all in?**

Well, to tell the truth, we sort of 'cheated.' On June 23, we borrowed a helicopter from a nearby DGGS field party and used it to cache ours and the horses' food. We used galvanized garbage cans with the lids secured by sheet-metal screws. The cans weren't impregnable by any means, but an edge is an edge. Cle found that out the hard way in 1971, when he found that the gunny sacks of seed he had flown in for a mine-reclamation project turned out to be a tasty luncheon for some Beluga-area bears.

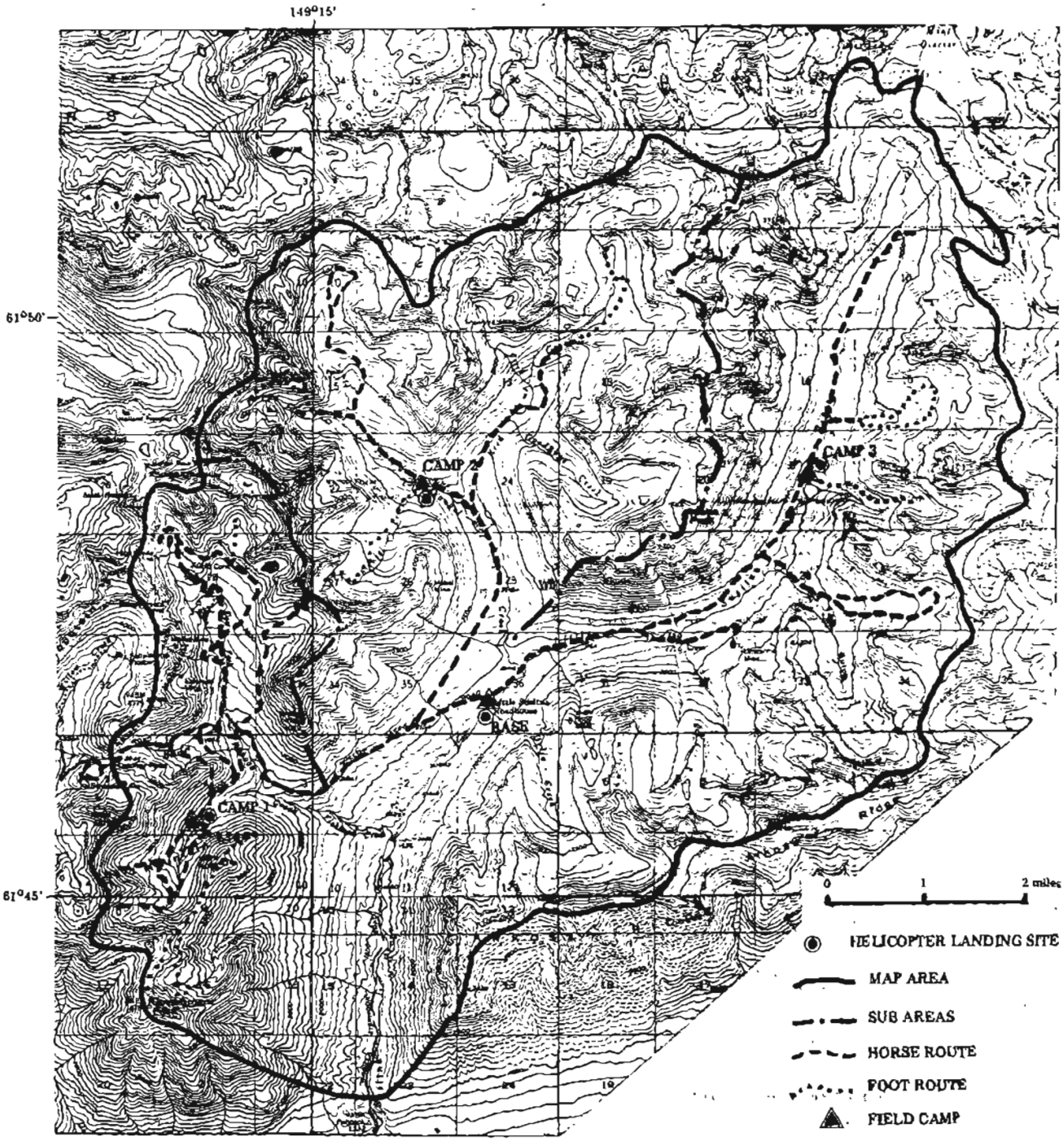
Then, toward the end of the field trip we took the 'luxury' of chartering a helicopter for a day to retrieve the cans, an extra tent, our samples, and so forth. We could have carried them out, mind you, but we were mentally and physically spent.

**Why? Were you more pooped than if you had been riding in 'luxury,' so to speak?**

Hey, man. We were out there for forty-odd days, and by my count it rained on 36 of them. I don't think I ever did dry out. I elected to 'cheat' a bit on the tail end of the field party and charter a helicopter for a couple of reasons---to get to a couple of places the horses couldn't take us and to avoid packing out all those clanging garbage cans. We'd have looked like the Lost Gypsies of Transylvania. Also, I wanted to dry out before my toes started to web.

**Aside from that, Jeff, do you have any fond memories? Did any humorous events happen with the horses, for instance?**

It was fun. I would do it again tomorrow. After all, you can't really do much about the weather. It's just one of those things.




Route, 1978 Little Susitna (Hatcher Pass) field party.

There were a couple of instances when the horses were rather a bummer, though. Once, Dick Reger (DGGS geologist) had come up for a visit from a nearby field party. I gave him Jackson and we went for a short tour of the area. Later, Dick stopped for some reason or other---possibly to examine an umbric podzolic regolithic alfasol, I don't know. Whatever the reason, when he dismounted, he must have thought he was Duke Wayne or somebody, because he didn't tie up his horse. Well, to make a long story short, Jackson ambled off---not too far, but enough to keep Dick optomistic, thinking he could catch him---which he subsequently did, but much, much later in the day. Jackson was still fresh, Dick was pooped and, well, for lack of a more acceptable term, chagrined.

Another time, I was standing alongside Spirit while he drank from a stream. He then decided he wanted to do a little reconnaissance on his own,

I guess. But I wouldn't give him the reins, fearing I might lose him. He walked faster. I jogged along, still holding the reins. He cantered. I ran. Before long, he was Man-o-War and I was Jesse Owens. There we were, right in the middle of nowhere, running the @*!%+ Belmont Stakes. Then I fell. Ol' Spirit, though, kept going. He dragged me for about 100 yards through the brush before he got tired of it his new game. By the time he stopped, I looked like the dummy in a first-aid drill.

**And you, Cle. Are you ready to do it again?**

Sure.


—By Mike Peters for The Dayton Daily News, reprinted in Hazard Monthly, v. 1, no. 1.

**Economic analyses, horse vs helicopter.**

Lignite Creek, 1977 (85 sq km)

a. Horse- - - - - - - - - 24 days, 5 horses

| | |
|---|---|
| Horse rental @ $25/day/horse - - - - - - - - - - - - - - - - | $ 2,700 |
| Salary and per diem, 3 geol - total 31 days @ $124/day - | 3,844 |
| Salary and per diem, fld asst-total 31 days @ $ 84/day - | 2,504 |
| Total | $ 8,048 |

b. Helicopter - - - - - - 11 days

| | |
|---|---|
| Helicopter charter @ $1,000/day- - - - - - - - - - - - - - | $ 11,000 |
| Per diem, pilot and mechanic - $80/day - - - - - - - - - | 880 |
| Salary and per diem, 3 geol. @ $124/day- - - - - - - - - | 1,364 |
| Salary and per diem, fld asst @ $84/day- - - - - - - - - | 924 |
| Total | $ 14,168 |

Little Susitna River (Hatcher Pass), 1978 (140 sq km)

a. Horse- - - - - 47 days, 2 horses

| | |
|---|---|
| Horse rental @ $39.50/day for 45 days- - - - - - - - - - | $ 5,333 |
| Salary and per diem, geol. @ $84/day - - - - - - - - - - | 3,948 |
| Salary and per diem, fld asst @ $79/day- - - - - - - - - | 3,713 |
| Helicopter - - 2 days @ $1,000/day - - - - - - - - - - - | 2,000 |
| Total | $ 14,994 |

b. Helicopter- - - - - 14 days

| | |
|---|---|
| Helicopter charter @ $1,000/day- - - - - - - - - - - - - | $ 14,000 |
| Per diem, pilot - - @ $40/day- - - - - - - - - - - - - - | 560 |
| Salary and per diem, geol. @ $84/day - - - - - - - - - - | 1,176 |
| Salary and per diem, fld asst @ $79/day- - - - - - - - - | 1,105 |
| Total | $ 16,842 |

c. Horse-helicopter opn - - 30 days

| | |
|---|---|
| Horse rental - - 28 days @ $39.50- - - - - - - - - - - - | $ 3,318 |
| Salary and per diem, geol. @ $84/day - - - - - - - - - - | 2,520 |
| Salary and per diem, fld asst @ $79/day- - - - - - - - - | 2,320 |
| Helicopter - - 2 days @ $1,000 - - - - - - - - - - - - - | 2,000 |
| Total | $ 10,208 |

## The Susitna River basin studied

**By James R. Anderson, DGGS physical planner**

The Susitna River Basin Study is a cooperative effort carried out under the authority of Section 6, Public Law 83-566, which authorizes the Secretary of Agriculture to cooperate with other federal, state and local agencies in making surveys and investigations of the watersheds as a basis for development of coordinated programs. The USDA has the authority to collect new data on soils, vegetation, flood plains, water quantity and quality, and other related resources and to evaluate this information for use by planning agencies in their water- and land management programs.

Specific problems identified for study in the Susitna River basin are:

1. Loss of potential agriculture land to other uses unless they are identified and preserved solely for agriculture.
2. Flooding danger to development in flood-plain areas, which will occur with increased urbanization and a corresponding potential loss of life and property damage.
3. Reduction of fish and wildlife resources due to growth and development.
4. Soil erosion, which could increase and impair water quality.

5. Effect of irrigation.

6. Lack of comprehensive data on the land and water resources, which are required for proper planning and development.

The Susitna River basin is located in south-central Alaska. It is bounded by the Copper River and Matanuska River basins on the east, the Tanana basin on the north, the Kuskokwim basin on the west, and Cook Inlet on the south. The topography ranges from sea level at Cook Inlet to over 20,000 feet at Mt. McKinley. The study crosses three climatic zones---Continental, Transitional, and Maritime---and precipitation ranges from 15 to 80 inches of rain and from 70 to 400 inches of snow. The area has been divided into four units for study:

| | | |
|---|---|---|
| .Willow | - | 1.1 million acres |
| .Talkeetna | - | 4.9 million acres |
| .Beluga | - | 3.9 million acres |
| .Upper Susitna | - | 3.1 million acres |

**Analysis and Interpretations**

The basic data collected are being digitized and entered into a geographic-information computer system that allows rapid retrieval and graphic display at any scale in polygon or grid-cell format. The maps displayed maybe electrostatic gray tone plats, color maps, or pen plots of the original data format.

The system allows the user to superimpose a particular data plane over one or more other data planes, each of which may have many interpretive attributes. Thus, criteria models may be developed for answering land-use planning questions. For example, we may ask, "Where are all the state-owned lands within the study area that lie within 2 miles of a road and are suitable to build a dwelling on?" To answer this question we first do a search for all the land within 2 miles of the road; second, we call up the soils data to determine if the land is suitable for housing. Finally, we combine these two data planes with a state-owned lands plane. The result is a map of prime state building land.

The system will also aid in the selection of utility or transportation corridors. Criteria models can be developed to analyze slopes, wetlands, lakes, soils, vegetation, and wildlife habitat so that optimal routes can be selected for economic or environmental purposes or a combination thereof.

The study will attempt to identify land capable and suitable for agriculture, timber management, five urban classes, wildlife habitat (eight species), and recreation. Hazardous areas and areas otherwise unsuitable for development will also be identified.

## Book by Fortune editor warns about land withdrawal danger in Alaska

*(from Alaska Industry, June 1980)*

Herbert E. Meyer, an associate editor of Fortune magazine, has written a book called "The War Against Progress," which uses Alaska as a prime example of a campaign to undermine the American economy by environmentalists and other "anti-growth" advocates. The Alaska reservation land legislation "will go a long way towards crippling the U.S. economy," Meyer is quoted as saying. The book is published by Storm King Publishers, P.O. Box 252, Middleton, N.Y.

## USBM summarizes Alaska's mineral industry for 1979

*(from Mineral Industry Surveys, Feb. 29, 1980)*

Nonfuel mineral production in Alaska in 1979 was valued at about $168 million, an increase of about 2 percent over 1978, according to the U.S. Bureau of Mines. The total quantity of sand and gravel produced during 1979 was slightly less than the total quantity produced during 1978, but an increase in unit value accounted for a total value increase of about $4.7 million. Both total value and quantity produced of crushed stone increased slightly during 1979.

According to preliminary estimates, gold production in the state decreased during 1979. This reduction resulted mainly from the decrease in production by the state's major gold

producer, Alaska Gold Company. Reduced production resulted from activation of only one of the company's two bucket-line dredges located in Nome. Dredge 6 operated on Submarine Beach. During 1979, Alaska again resumed hard-rock gold mining operation with the reactivation of the Mikado Mine, though no significant production resulted from the mine this year. Placer operations located throughout the state accounted for the majority of gold produced in 1979.

Noranda Exploration, Inc. completed a 4,200-ft exploration adit at its Greens Creek deposit on Admiralty Island. Underground fanlike core drilling continued throughout the year to further delineate the high-grade lead-zinc and precious-metal massive-sulfide deposit.

U.S. Borax completed drilling 37,000 feet of core samples during 1979 at its Quartz Hill molybdenum deposit near Ketchikan. This brings the total drill footage to approximately 100,000 feet. Exploration expenditures to date are estimated to be $10.5 million.

Exploration activity continued throughout the state, but at a reduced level to 1978. No new major mineral discoveries were announced in 1979. Major mining and exploration companies reported crews throughout the state with continued emphasis on anomalies in the Brooks Range, De Long Mountains, Seward Peninsula, Tanana Uplands, the Alaska Range, and Southeastern.

## Statewide photography information system computerized

By James R. Anderson,
DGGS physical planner

In response to the need for quick availability of aerial photography in Alaska, the Bureau of Land Management (BLM) has generated a computerized index system of both high- and low-altitude photography. Future expansion of this system could include all photography available on the state of Alaska.

The digitized photography has been entered into a Burroughs B-4800 computer, where it can be retrieved in the form of a computerized plot, a cathode-ray-tube (CRT) screen image, or a paper listing. Anyone with on-line capabilities to the Alaska Federal Processing Center system can retrieve the aerial photography information on file.

To retrieve the computer data only a few factors must be known: 1) the altitude of photograph, whether high altitude (NASA) or low altitude (BLM) and 2) the area and scale desired, either 1:250,000 or 1:63,360. If you wish, all information can be extracted by township and range. Then, it is only a matter of entering a few program access codes into the terminal to determine if the data exist.

Most of the information will be displayed by a CRT screen, which will generally display the following for both the high- and low-altitude photography:

- Roll number, scale, data flown, and latitude and longitude on the center of the photograph displayed.
- Browse number (for high altitude) that corresponds to a duplicate made of the film or microfilm.

The film data may be examined at the Branch of Photogrammetry, Division of Technical Services, BLM Alaska State Office in Anchorage. The low-altitude photography can be viewed as contact prints or directly from the roll film. The high-altitude (NASA) coverage can also be viewed on a CRT screen at the UA Geophysical Insitute in Fairbanks.

For further information contact the author at 703 W. Northern Lights Blvd, Anchorage 99503, or any of the following:

- Alaska DNR
  Bill Latocha (907) 279-5577
  323 E. Fourth Avenue
  Anchorage, AK 99501
- U.S. Geological Survey
  EROS Data Center
  Sioux Falls, SD 57198
  (605) 594-6511
- Precision Photo Laboratories
  Warren Penny (907) 274-3596
  4241 'B' Street
  Anchorage, AK 99503

## DGGS Budget Released

A host of diverse programs were funded in the fiscal-year 1981 DGGS budget. Among the items funded were geothermal and coal investigations, geologic-hazards evaluations, geologic mapping in the southwestern and southeastern parts of the state, and oil and gas lease-tract evaluations.

About $300,000, including $50,000 in federal funds, was allocated to the DGGS geothermal investigations section. Roman J. Motyka says the project will conduct investigations on the Alaska Peninsula and the Aleutian Islands, with site-specific work to be done on Unalaska Island.

DGGS was also budgeted $126,000 to complete the 3-year investigation of the south-central part of the Brooks Range. Principal investigator John T. Dillon said that maps and reports on the area will be published this year.

Water resources section chief William E. Long says that his budget includes $101,000 for ground-water data collection and $159,000 for surface-water studies. Areas to be examined include Willow, Deception, and Capps Creeks in the south-central part of the state and Indian River in Sitka.

Chief mining geologist Gilbert R. Eakins will head up a new $120,000 coal-investigation project. The Capps-Beluga area in the lower Susitna River basin will be the focus of the first year's effort.

About $95,000 was funded to investigate the McGrath-Lime Hills area in the southwestern part of the state--a large area of state-selected land that is essentially unmapped, said Tom K. Bundtzen. Small-scale placers have been mined there for many years.

In the geologic-hazards category, $64,000 was allotted to study earthquake hazards of the south-central part of the state, particularly the upper Cook Inlet and lower Susitna Valley region.

At least 180 avalanche paths cross Alaska highways, says Richard D. Reger, chief of the DGGS geologic hazards section. DGGS received $68,000 to support the Alaska Avalanche Warning System, to determine the avalanche hazards on the Seward and Sterling Highways, and to make the results available to other agencies participating in the AAWS program.

DGGS was appropriated $232,000 in support of a general geologic hazards project. This composite program includes preparation of a statewide natural hazards map; an information circular on geologic hazards, recommendations for hazards legislation, and reports on geologic hazards of the Haines-Skagway and Fairbanks areas.

Also funded in the DGGS budget were oil and gas lease-tract evaluations. Preliminary work will be started on many of the sales listed in the state's projected 5-year lease program, including those in the Cook Inlet area. The geologic evaluations will include subsurface correlations of well data, the acquisition and interpretation of seismic data, and field investigations.

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## Is Alaska the answer to U.S. energy crisis?

*(from Alaska Construction and Oil, Feb. 1980)*

Alaska's oil reserves are so vast they may surpass those of Saudi Arabia, according to a report by Commonwealth North, a team of prominent Alaskans including geologists, engineers and individuals in both the private and public sectors. The group is co-chaired by former governors William A. Egan and Walter J. Hickel.

The report offers Alaska's immense oil and gas reserves and other potential energy resources as the answer to the national energy crisis. It estimates potential recoverable oil in Alaska to be between 22 and 138 billion barrels, compared to Saudia Arabia's 110.4 billion barrels. And although the state currently produces 1.6 million barrels of oil per day (18 percent of all U.S. domestic production) it could conceivably produce 4.5 to 5 million bpd--enough to reduce the flow of U.S. currency overseas by nearly one half.

Commonwealth North cites the Arctic National Wildlife Range as

having the greatest oil and gas potential of any area in North America. Reports, downplayed by government, say it could contain enough oil to supplant all foreign imports for up to 10 years.

The report emphasizes that exploration in the Arctic Range and other areas does not mean callous disregard for other values. "Only one half of one percent of the Arctic Range would be needed for exploration and production of oil and gas. No scientific evidence exists showing that such activity would threaten the wildlife with extinction or even population reduction."

The study was commissioned to discover why Alaska is not part of President Carter's energy program, nor even mentioned in many media discussions of national solutions.

"The main deterrent is the federal government," the report says. "Less than one-third of one percent of Alaska is privately owned, and no federal lease sale on onshore oil potential land has taken place in Alaska since 1966."

The study claims the Carter administration has "architected a deliberate policy aimed at stopping exploration and production of Alaska's vast energy resources." And this policy contributes to America's ever-increasing dependence on foreign oil. Commonwealth North also accuses the government and the national media of ignoring Alaska's energy potential, perpetrating a virtual "blackout" of information about the state's enormous reserves of oil, natural gas, coal, hydro and alternate energy resources.

The White House and many congressional leaders are pushing for a d-2 bill which would place 123 million acres of Alaska in permanent exclusive land classifications. "And yet the exploration of the resource base in these areas is in its infancy," notes Commonwealth North.

The vast majority of the onshore potential oil and gas areas in Alaska are unexplored. The majority of this acreage will be off limits to exploration if the Alaska lands legislation passes.

And yet, according to the Louis Harris Perspective #56 (1979), 87 percent of the American people believe that those Alaska lands which are rich in energy and mineral resources should not be placed in restrictive wilderness categories by the federal government.

The report noted that in addition to oil and gas, Alaska has a great potential in other energy resources. There are somewhere between 1.8 and 6 trillion tons of coal reserves in Alaska, the energy equivalent of 73 Prudhoe Bays. And the hydropower potential in Alaska amounts to 25 to 35 percent of the total U.S. undeveloped potential.

In answer to the question "Why isn't the energy industry more bullish on Alaska?" the report cited the state's taxation policy, high capital investment, red tape, climatic challenges, lack of a transportaiton infrastructure and bureaucratic delays. It noted that an exploratory well costs between $10 million and $20 million in Alaska compared to a U.S. average of from $250,000 to $2 million.

The report made several recommendations for action: 1) Congress must resist the pressure from the national preservationist lobby, and reserve final judgement until there have been thorough and credible inventories of the state's resources; 2) the federal government should expedite the leasing of onshore and offshore federal lands with high oil and gas potential; 3) the American people should demand that the federal government back off and let the private sector produce the energy the nation needs; 4) the energy industry, faced with a deep credibility gap with the American people, must begin to put the health and economic life of the nation first; 5) the state of Alaska must take a more aggressive posture toward the federal government, the establishment of a fair taxation policy and the creation of a transportation infrastructure that would make Interior resources competitive with world prices; and 6) the national media must objectively investigate the Alaska situation.

## Our Gangue.....

By Frank Larson, DGGS editor

Is a spade still a spade? Alas, I fear not...I recently read---with dismay---that another American institution is in its death throes. The local paper said that the 'Sanitary Landfill and Baler Facility' would be closed for Memorial Day. Oh, 'tis a noble thing to pay homage to America's fallen---we owe them everything we are. But to whimsically rename The Dump, one of our most beloved and venerable institutions? Why, old Tom Paine must be a-spinnin' in his grave at this seditious act (or at least revolving slowly)...The name-change authors---doubtlessly bureaucrats---should be pilloried, dunked, and then buried to the neck at the local Sanitary Landfill and Baler Facility. If technocratic buzz words were edible, they should be forced to eat them....The Dump has always been as American as apple pie, baseball, Mark Twain, and pizza. But now, so many people---especially those in the government sector---are climbing on the Obfuscation Bandwagon. Why? To drape otherwise meanlingless jobs in a cloak of murky jargon? To impress their neighbors? 'My husband? Oh, Herb's the superintendent of the Sanitary Landfill and Baler Facility.' (Actually, Herb works as a traffic cop at the dump, waving at pickup trucks full of trash, telling them where to unload.)....Since when has it been wrong to, ala Cosell, call it like it is? Dumps are a historic part of Americana. Immortalized in literature (take, for instance, Faulkner's 'Intruder in the Dump,' or Cooper's 'Dumps along the Mohawk'), song ('There is Nothing like a Dump'), musicals ('Dump Yankees'), and movies ('The Dump Hunter'), the good old reliable dump has even proved popular as burial grounds for a number of prominent East Coast olive-oil importers and labor-union officials...The dump is an integral part of your life. Where did your mother meet your father? Why, at the dump. And where did they go on dates? To the dump, of course. (You have to remember, they courted during the Depression, when the only entertainment available was watching the bears feed.) And several years later, where did you learn to shoot your .22? Why, at the good old dump, plinking cans, telephone-pole insulators (now collectors' items), and an occasional unlucky rat....But alas, all that is gone. Now we are saddled with the cumbersome, sterile---and less descriptive---term of the Technologic Age. Somehow, when you say, 'Sanitary Landfill and Baler Facility,' all the romance of the dump wanes. The only ones who will profit from this so-called streamlining of the American language will be the sign painters, who sell by the yard, and the social scientists, who are into meaningless tautological verbiage anyway. 'Marge, dear. I'm off to the Sanitary Landfill and Baler Facility with a copious quantity of interpersonal human-refuse units. Be back in a fortnight.'.....In a word, Rubbish....Little Squaw will reportedly work both its placer and lode properties in the Chandalar district this year....Houston Oil and Minerals will reportedly do extensive work on its uranium claims in the Circle Hot Springs area of the interior this summer. The claims, acquired from Resource Associates of Fairbanks, are located east of another uranium prospect near Mt. Prindle, held by Mapco... The U.S. Forest Service (USFS) has given U.S. Borax environmental clearance to do another 4 yr of predevelopment work on its Quartz Hill molybdenum property near Ketchikan---but all transport will be by helicopter, drilling sites will be cleared by hand, and drilling water will have to go through settling containers. Borax, which will block out reserves this summer, says passage of a lands act taking the property out of a planned national-monument reserve is critical to development of the lode. The gross value of the deposit is estimated at more than $20 billion at today's moly prices.... Finally, the Mining and Regulation Council says that 'overkill' by the Dept. Interior's Office of Surface Mining (OSM) has caused one-fifth of the nation's surface coal mines to go belly-up in 1979. It estimates that the overly stringent air-pollution regulations now in effect will cause another 15 percent to fail this year, 'during one of the most critical energy shortages in our history,' says Ben E. Lusk, chairman of the council....Ahhhh. It makes you wonder: Are our 'alphabet soup' agencies on an endangered-species list? Will they end up going the way of the condor, the dodo, and the dump? Let's put it this way: Does a bear use Certs?.....Cheers.

| | May 16, 1980 | 3 Months Ago (3/7/80) | 1 Year Ago (5/25/79) |
|---|---|---|---|
| Antimony metal per lb, NY dealer | $ 1.58 | $ 1.52 | $ 1.53 |
| Barite (drilling-mud grade per ton) | $ 70-90 | $ 24-47 | $ 24-47 |
| Beryllium ore, stu | $ 75-85 | $ 75-85 | $ 50-55 |
| Chrome ore per long ton (Transvaal) | $ 54.00 | $110.00 | $ 54.00 |
| Copper per lb. (MW-prod.) | $ 0.916 | $ 1.19 | $ 0.90 |
| Gold per oz. | $516.50 | $628.70 | $270.90 |
| Lead per lb. | $ 0.36 | $ 0.50 | $ 0.51 |
| Mercury per 76-lb flask | $390.00 | $390.00 | $325.00 |
| Molybdenum conc. per lb. (Climax) | $ 10.31 | $ 10.31 | $ 6.84 |
| Nickel per lb. (cathode) | $ 3.50 | $ 3.10 | $ 2.85 |
| Platinum per oz. | $566.40 | $985.00 | $449.00 |
| Silver, New York, per oz. | $ 12.45 | $ 34.71 | $ 8.77 |
| Tin per lb., NW composite | $ 8.58 | $ 8.75 | $ 7.38 |
| Titanium ore per ton (ilmenite) | $ 55.00 | $ 55.00 | $ 50.00 |
| Tungsten per unit (GSA domestic) | $129.00 | $129.49 | $125.00 |
| Uranium per lb., MW US spot oxide | Not quoted | Not quoted | $ 43.25 |
| Zinc per lb. (MW-US PW) | $ 0.375 | $ 0.378 | $ 0.39 |

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