

B REMOTE SENSING IN ALASKA - OPPORTUNITIES & POLICY IMPLICATIONS

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Since this is a conference on remote sensing, I would like to draw a rough sketch of Alaska, as the context for my further remarks. Alaska's size, in square miles (586,000), doesn't mean much to outsiders, so we often lay a map of the state over one of the US at the same scale. Excluding the Aleutian Chain and Southeast, Alaska would stretch from Duluth to Dallas and from Chicago to Denver. Because of its size, rugged terrain, inaccessibility, and sparse population, many events in Alaska are only assumed, never witnessed. It's a place where it's possible for isolated forests to burn and remote rivers to flood unrecorded. Earthquakes, volcanic eruptions, tsunami, and avalanches may register as mere curiosities.

Alaska's lands support wildlife that has virtually disappeared from the Lower 48: caribou, moose, brown bear, mountain sheep, goats, wolves, wolverines and bison. In Alaska are the wetland nesting grounds for migratory geese, swans, ducks, herons and terns. Alaska supports a thriving raptor population. The Chilkat River near Haines is the gathering spot for over 3,000 bald eagles each autumn. Alaska's 6600 miles of coastline is greater than that of the rest of the United States, in total. Its rivers and coastal waters are the rich spawning and feeding habitat for five different salmon species, char, trout, and bottom fish, like halibut; humpback, bowhead, beluga and killer whales; seals, sea lions, walrus and an increasing number of sea otter.

For thousands of years, Native peoples hunted and fished this stock of protein in a subsistence pattern - cultures in balance with carrying capacity. Human populations were never large because the food producing ecosystems, where the growing season is so short, are spread extraordinarily thin - life support zones are broad and fragile. Species need space to find precisely the right conditions for nourishment and growth. Alaska's critters are noted for movement and adaptation. This is also how Native populations survived: moving with the food stock and adapting their cultures to changing conditions.

Western man first came to Alaska to harvest the furbearing animals, so well husbanded for centuries. The next wave brought gold mining, only the first in a continuing series of extractive industries that have had no dependent relationship with the ecosystems of Alaska. The economic history of Alaska, since the Russians depleted the sea otter, has been one of the ups and downs, a roller coaster of boom and bust, riding high

and then bottoming out, most often bouncing along in a depression dependent upon world prices. The one major stabilizing factor has been the federal presence. Especially important to the economy has been the Bureau of Indian Affairs, the Federal Aviation Administration and the military. At the start of World War II, Alaska had only 75,000 people, one third of which lived in the Southeast Panhandle. By 1960, that population had tripled and Southeast had only 16% of the total. The Interior had developed a strategic importance requiring the installation of radar and communications equipment, construction of air bases, roads, the railroad and all the services that go with new settlement.

With statehood in 1959, the state began to select its entitlement of 104 million acres, a process to be completed by 1984. Lands valuable for non-renewable and renewable resources were selected, as were lands critical for wildlife habitat. A major issue for the first state constitutional convention was federal mismanagement of salmon stocks. A great segment of the population - native and white - was made up of subsistence users, and the state wanted to control wildlife on a sustaining basis.

Discovery of oil at Prudhoe Bay reinvigorated interest in Alaska's resources. Energy shortages in the 1970's made Alaska all the more crucial as a source of supply for the country. New construction, project management, an expanding revenue base, and consequent growth of the public sector induced a migration to Alaska that has extensively altered its patterns of land use.

State population grew from 300 to 400 thousand in the 1970's. Anchorage tripled its population. The Kenai Peninsula is now described by some as a "recreational has-been". A pipeline bisects the state as does the road that follows it. Tens of thousands of acres of forest are being cleared for agricultural production. Coal development is on the horizon. New fisheries are being opened and the state is pouring hundreds of millions of dollars into capital projects all over Alaska.

In the meantime, Alaska's Natives, who had never fought a war with the US or signed a treaty, laid claim to valuable lands that were being selected by the state. This put the brake on state selection of entitlement lands until Congress passed the Alaska Native Claims Settlement Act (ANCSA) in 1971. This Act established 12 regional Native corporations and some 200 village corporations which were entitled to a combined 44 million acres, to be chosen before the state's selection could continue.

Among other things ANCSA did was to provide for the designation by Congress of national interest lands - national parks, monuments, wildlife

refuges and ranges - that would be held by the federal government. These lands were finally set aside this year when President Carter signed the Alaska Lands Bill, doubling with the stroke of his pen, the size of America's national park system. When all conveyances are complete, the federal government will control 59% of Alaska's lands. The state will control 29% and 12% will be privately owned.

In the meantime, sides are being taken, lines drawn and conflicts maturing. Alaska, the storehouse of America's resources. Alaska, the developable is up against Alaska the conservable, the last extensive wilderness in the US. Clearly, a balance among the competitive uses must be struck, where the major land managers - federal and state agencies, Native corporations and municipalities will have to become objective referees as well as active proponents for differing points of view. Playing well, these multiple roles in a political context demands objective evaluation capabilities that have been, until now, poorly developed. Fundamental to these capabilities is data and information and, because of the enormous amounts of time and expense needed for its acquisition, a cooperative willingness to share what data and information is available.

In 1972, acts of Congress and the Alaska state legislature established the Joint Federal-State Land Use Planning Commission (FSLUPC), giving it a 7 year life and charging it with the task of inventorying and planning for Alaska's public lands. A pattern of cooperation had been established with this commission. By the mid 1970's, FSLUPC, with the Governor's Division of Policy Development & Planning, the Arctic Environmental Information & Data Center, had produced, among a number of other studies, a set of large-format, regional atlases covering all of Alaska. In 1978, during its final year of existence, FSLUPC put together a remote sensing task force that included federal, state, university, local and Native representation. At the same time, FSLUPC drew up a funding agreement between several agencies and NASA for the acquisition of high altitude black/white and color IR photography covering the whole state. To date, 54,000 data miles have been flown while 22,000 miles remain. The imagery is excellent and should - I stress, should become a valuable resource management tool for all agencies working in Alaska.

Two and a half years ago, the Division of Policy Development & Planning, surveyed all state agencies to determine the existing levels of awareness and use made of remote sensing. Of 112 potential applications identified, black/white or color photography (not color IR) had actually been used in some way in only 43. Color IR had been of value to 10 of the functions. Thermal IR to two and Landsat had been applied to only one function. The use of radar was nonexistent. Since then, over a dozen people from three state agencies have participated in demonstrations of Landsat technology, increasing their skills in using advanced

techniques for vegetation classification, wetlands identification and other basic resource management tasks. The state will soon be acquiring synthetic aperture radar imagery. Nonetheless, the general level of remote sensing expertise among agencies remains quite low. The reasons for this are elementary, having to do with awareness, technical skill, utility and budgets.

Lack of awareness is a major obstacle to the application of innovative technology. Among program managers and executive directors, remote sensing is someone else's jargon. They have little time for it, even though the benefits may be obvious to their own technicians.

As Alaska develops its capabilities for the management of millions of acres of land, these acres must be inventoried and classified. The state must distribute at least 100,000 acres of previously unsurveyed lands to Alaskans every year. We are selecting thousands of acres of potential farming lands for development. We must plan and build dams, roads, bridges, housing and protect against the environmental degradation that can come from each of these activities. All of these tasks could benefit from some aspect of remote sensing, including the use of satellite imagery. Yet, the paradox is that these activities occupy so much time and consume so much energy that few managers can take advantage of opportunities to learn what they need to know to do their jobs well.

Last year, by way of example, BLM put on a half-day seminar for managers on the cost effectiveness of remote sensing. All state resource agencies were contacted twice before the meeting. Not one person from the state attended. And, these are the people that must be made aware of remote sensing's capabilities before technology transfer can succeed. These are the people that develop budgets.

An important point, briefly noted, is that technologies are constantly changing, and potential users must be made aware of advances that can come from outside demonstrations, new technology and experimentation. We still talk to agency people who refer to Landsat as ERTS and wonder what earthly good such small scale pictures can be.

Awareness and skill are inseparable where technology is being developed and applied. Executive managers in Alaska must somehow break through the barrier of not having time to learn what they need to know to manage effectively. Effective management then must incorporate the notion that development of remote sensing skills is a good investment. This can only be done through increasing the upper level awareness of remote sensing utility.

In the case of satellite-derived information, demonstrations of specific applications are absolutely necessary in the transfer process, and continuing education is also critical - keeping abreast of new methods and innovation in technology. Landsat data has a metallurgical quality to it. Through sophisticated technique it can be refined and blended with other data to produce an alloy of exceptional quality. But, each application requires the blending of more-or-less unique data resources, representing a unique location - not yet a standardized procedure and certainly not a standardized product. This is analagous to having each state and local area develop and maintain the skills and equipment needed to produce a high quality steel of unique formula, for local application only. For states and local governments to proceed with confidence under such conditions requires continuous assistance in the form of expertise, training, processing, demonstrations and education in the fundamentals of the technology with which they are working. We cannot be expected to apply complex technologies simply by coattailing one someone else's epiphany.

To make matters more difficult, Alaska has a constantly deteriorating store of human capital. We are at the end of an informative chain. We still hear echoes over phone lines; electrical networks may go dead for hours and days. Mail is slow and library resources are less than comprehensive. The professional in Alaska is recycled from agency to agency. An in-state hire preference insures this.

One way for the state to acquire a greater degree of skill among its technicians has been to pirate federal expertise. Federal agencies have a much broader pool of talent from which to draw and have had the most advanced remote sensing programs, historically. As state agencies look for aqualified people, federal agencies are seen as a natural resource. This of course, depreciates the federal programs and suggests another reason for cooperation in resource management.

In spite of the politically inspired vocal belligerence, there is a good recent history of cooperation between federal and state land managers - at least in the area of data and information management. Cooperation has been established through ANCSA and FSPLUC. The Alaska Lands Bill of 1980 provides for a follow-on Land Use Planning Council having broad federal and state participation. A 1978 interim agreement, signed by the Secretaries of Agricultural, Interior, the Governor of Alaska and the Chairman of the Alaska Federation of Natives, set up the Land Managers' Cooperative Task Force which voluntarily brought together policymakers and technicians from the major land managing agencies in Alaska. Subcommittees were established to address such common problems as flood plain management, Bristol Bay fisheries, reindeer herding, vegetation classification and information management. This last subcommittee has become a forum for the discussion of information systems development and has subsumed the previously independent remote sensing task force. The new Land Use Council may or may not

take over the functions of the various subcommittees. If it does, it will become an important policymaking body. A forum for coordinated budgeting between governmental levels.

At this point, I would encourage all agencies managing resources in Alaska to use such forums as the Land Managers' Cooperative Task Force or the new Land Use Council to develop a coordinated program aimed at improving all resource management capabilities. New information and data sources will be a key, for which such a program must provide continuing education, training, demonstrations and evaluations if Alaskan's are to enhance their resource management abilities.