Water Pollution in Alaska: Present and Future

In developing Alaska, an ecosystem approach to water pollution control will prevent mistakes.

Frederick B. Lotspeich

Many people think vaguely of Alaska as a vast wasteland, dominated by ice and snow. They visualize its resources as unspoiled, believing that the state's sparse population and the relatively low stage of technical development have insignificant impact on the land. This is true to some extent, though an accurate evaluation requires some qualifying.

Alaska is largely an unspoiled wilderness; evidence of man's polluting influence on this northern environment is minimal. Winters are long, cold, and dark; the summers, however, are warm, with long hours of sunlight each day, permitting rapid growth of vegetation.

Alaska's waters, although largely unpolluted at present, are locally polluted in several areas by pulp mills, fish packing, and municipalities. This pollution is serious and will intensify before abatement measures are put into effect. Economic activity is increasing, especially in oil production and lumbering, which will generate wastes that must be controlled, despite industry's insistence that pollution is a necessary consequence of industrial development. Water pollution prevention must be emphasized as Alaska enters a new chapter in its history.

Any program for water pollution control in Alaska must consider the natural environment and the possible effects of man's social institutions on this environment, particularly the effects from wastes generated by advancing technology. Because of its location and the relative lack of contamination in its waters, Alaska offers a unique opportunity to establish a program of pollution control based on the ecosystem approach. The cold environment poses unique problems that cannot be solved with existing knowledge. Several features of Alaskan natural and social environments are discussed in the following pages as a starting point to this state's program for pollution control.

In his introduction to the Department of the Interior's Conservation Yearbook, *The Third Wave* (*1*), Laurance Rockefeller refers to the ecosystem approach as the modern method of conservation. This approach stresses an understanding of ecology, with all its ramifications, as necessary to knowledgeable conservation of the resources which man depends upon for survival. Much needs to be learned about this ecological approach. Without an understanding of man's role in ecosystem dynamics, conservation measures, however well intended, frequently fail because of unforeseen effects. Water pollution is an example of degraded environment caused by man's dumping of his wastes into marine and fresh waters and debasing these ecosystems in varying degrees.

In its report to the Federal Council for Science and Technology, describing the results of its study of waste management and control (*2*), the Committee on Pollution recommends an ecological approach to pollution control. This report emphasizes the need to attain, through research, a better understanding of ecosystem dynamics as a basis for predicting how a given waste will affect the receiving waters. Irreparable damage can be prevented by applying the knowledge thus gained. Research should be programed to anticipate, investigate, and prevent the problems before they are upon us. Alaska must stress such programing because pollution prevention costs less than abatement after the waters are degraded.

Alaska is inviting industry that demands certain raw materials. Economic expansion here depends on attracting industry, but expansion portends polluted waters unless early action is taken to prevent water quality degradation. The enlightened approach—and many top-level industrial managers are coming to accept this view—holds that control of its wastes is industry's responsibility and a normal cost of production. Such attitudes need fostering: pollution control benefits the entire society because industrial profits accrue when industry, municipalities, conservationists, and pollution control agencies work harmoniously in the public interest.

With these thoughts before us, let us turn to Alaska's water pollution problems, scrutinize the unique features of Alaskan ecosystems, and compare this with the other 49 states. There is much to be learned about Alaska's ecosystems if we are to prevent widespread devastation. The tundra and taiga are examples of large areas that may be threatened by man's unenlightened quest for new materials to feed his technology. Pruitt (*3*) describes how the taiga responds to man's activities and points out that the delicate balance of these northern ecosystems is easily upset by man-made interference. The search for, and development of, resources in these environments can easily lead to their destruction unless we have the foresight and knowledge to prevent it. Let us now look at Alaska as it is today and how it is developing.

Physical Environment

To gain some idea of the scope of its management problems, consider that Alaska is the farthest north of the 50 states; most of it lies between 60° and 70°N. Anchorage, the largest city, is about 61°N and is 1300 miles (2100 kilometers) west and 900 miles north of Seattle. Fairbanks, the principal city on the central plateau, lies almost due north of Anchorage and is only 2.5° south of the Arctic Circle.

Figure 1 superimposes a map of Alaska over the continental United States. The main land mass of Alaska, comprising 586,300 square miles, covers the major parts of seven north-central states and is about one-fifth the area of continental United States.

The author is research environmental scientist at the Alaska Water Laboratory, Federal Water Pollution Control Administration, College, Alaska.

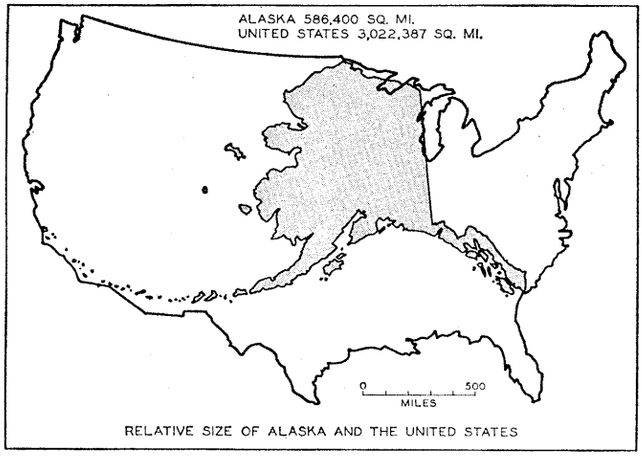
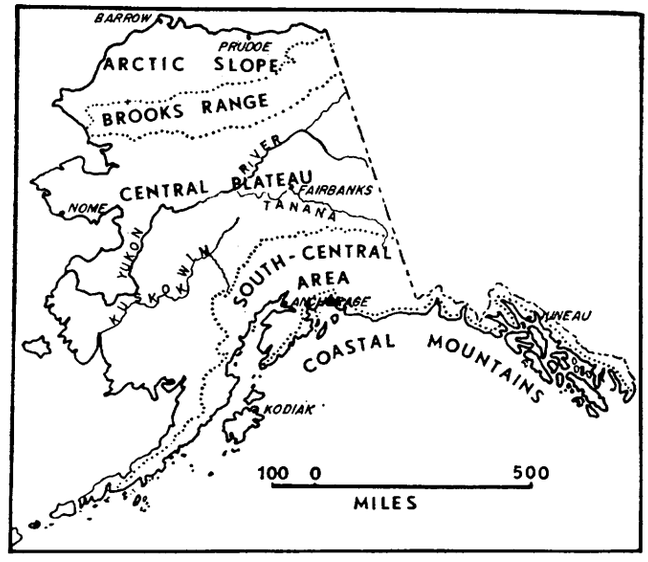


Fig. 1 (above). Map of Alaska superimposed over that of continental United States. Fig. 2 (right). Major environmental zones of Alaska.



The southermost islands of southeast Alaska are on the coast of Georgia and South Carolina, with the Aleutian Islands chain extending all the way to Los Angeles, a distance of about 2500 miles. Because it is essentially a very large peninsula with outlying islands, Alaska's total tidal coastline measures about 47,300 miles (*4*).

The peninsular characteristics provide some moderation of weather by large water masses, but the northern latitude overrides these effects, causing colder climates than those of the other northwest states. Alaska's size and mountain ranges cause severe winter temperatures in the central plateau, commonly dropping to −50°C. Southeast Alaska, lying between 55° and 59°N, has a milder climate because of the maritime influence. The Aleutian Peninsula and Islands are about the same latitude as southeast Alaska, with a cool, damp, windy climate.

High latitude has two important effects on climate—day length and sun angle. Fairbanks, at 65°N, enjoys 24 hours of daylight at the summer solstice although the sun is below the horizon for about 4 hours. At the winter solstice, Fairbanks has a 3.75-hour sun day (a sun day is the length of time the sun is visible); however, because of long twilights and dawns, daylight is about 5 hours. At the Arctic Circle, 175 miles north of the city, the sun neither rises at the winter solstice nor sets at the summer solstice. At Barrow, about 450 miles north of Fairbanks, the sun sets on 29 November, and does not rise until 24 January, a period of 56 days. Anchorage, about 300 miles south of Fairbanks, enjoys a sun day of about 5.5 hours at the winter solstice. Portland has a day length of 8.5 hours at the winter solstice. Sun angle (the angle between the sun and the horizon) at Fairbanks never exceeds 47.5°, so that even with long summer days, the rays strike obliquely. In winter, sun angle is only 2.5° at Fairbanks, and warming is correspondingly less. By comparison, the sun angle at Portland is 66.5° at the summer solstice and 22° at the winter solstice.

Fig. 3. Coniferous forests of south and southeastern Alaska. Trees grow to high-tide level; note the stream delta, treeless regions at higher altitudes (tree line is about 2000 feet), closed canopy, and steep valley wall. [U.S. Forest Service photo]

Alaska is the only state with permafrost, a permanently frozen surface layer of earth. It is directly related to past and present climate and causes aggravating problems of pollution, water supply, and construction. Distribution of permafrost is included in the discussion on Alaska's ecological division.

In Fig. 2, Alaska is divided into five principal physiographic zones: the north slope, Brooks Range, central plateau, south-central area, and the coastal mountains. These divisions are also logical ecological zones because climate and resulting vegetation are strongly influenced by the mountain ranges separating the lowlands. Be-

cause most of the precipitation comes from the south, the Alaska Range, forming the southern boundary of the central plateau, removes most of the moisture as air masses move northward, causing a semiarid climate in regions north of the range. The far north is similarly affected by the Brooks Range; Barrow is arid and has an average precipitation of about 5 inches (13 centimeters) annually. A fifth narrow zone along the coast, south and west of the central mountains, needs delineating because its climate and vegetation differ from that inland from the mountains.

This coastal zone extends in a broad arc from southeastern Alaska across the Gulf of Alaska to Kodiak Island and has a high to moderate rainfall, well distributed throughout the year, with relatively mild temperatures for this latitude. Annual rainfall ranges from about 150 inches at Ketchikan to about 26 inches at Skagway on the upper end of Lynn Canal. Vegetation in this zone is primarily coniferous forest (Fig. 3), a continuation of the coastal forests of Washington and British Columbia. Sitka spruce is important in all the zone with western hemlock an important species as far west as Kenai and western red cedar as far north as Petersburg. These forests contain the bulk of the timber resource of Alaska. No permafrost occurs in this zone; however, it contains many glaciers because of heavy precipitation and low temperatures above altitudes of 3000 to 4000 feet (*5*).

Inland from this coastal zone, rainfall decreases rapidly, with Anchorage receiving about 15 inches a year. Temperatures are colder and the vegetation changes from predominantly conifers to birch, aspen, cottonwood, and white spruce. Figure 4 shows a scene representative of this zone. The Matanuska and Susitna valleys are in this zone and offer potential agricultural lands because of milder average temperature and longer growing season. However, by comparison with other states, this climate is rigorous. Both intermittent and sporadic permafrost is present in this zone, forming a mosaic of frozen and unfrozen areas (*6*).

The central plateau occupies that area of the interior between Alaska Range on the south to Brooks Range on the north. This is the zone of intense winter cold and summer warmth, and is the extension of the taiga forests of northern Canada. Precipitation is low for reasons given earlier; Fairbanks

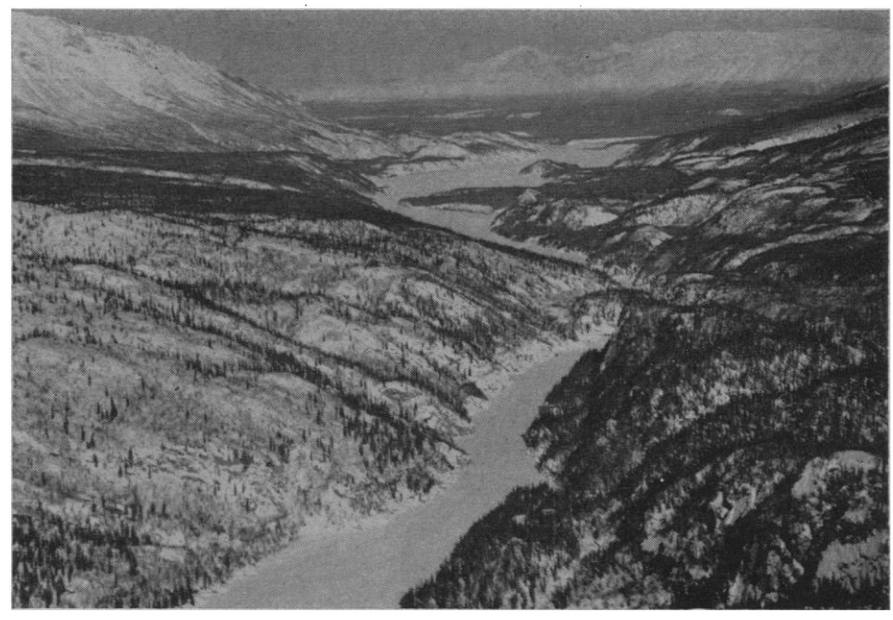


Fig. 4. Mountains and valleys of south-central Alaska. This is the zone of spectacular scenery; glaciers are numerous; Wrangell Mountains in background. [U.S. Fish and Wildlife Service photo]

receives about 12 inches and Fort Yukon about 7 inches annually. The zone is drained by the Yukon and Kuskokwim rivers with wide expanses of marshy land near the mouths of these streams. Forests dominate this zone, except for a broad strip along the coast, and consist of white spruce along streams and favorable hill sites, intermingled with birch, aspen, and willow. Much of the lowlands are marshy during the summer and support black spruce and, on better-drained sites, birch and aspen. Figure 5 presents a typical scene showing some uplands in this zone. Permafrost is dominant but

Fig. 5. Scene from the central plateau in east-central Alaska. The tall trees are white spruce growing on unfrozen substrate; the white areas are birch and aspen with yellow leaves in fall. Note the rounded hills and ox-bow lakes; West Fork River in foreground, Dennison River in upper part; elevation of ridge on skyline is about 4000 feet. [Bureau of Land Management photo]

intermittent in this zone and is an important ecological factor that distinguishes this zone from anything similar in other states. There is some potential for agriculture in the Tanana Valley in this zone but short, dry growing seasons limit the kinds of crops that could be grown.

Brooks Range is the extension of the Rocky Mountain system that bends westward in Yukon Territory, to form a barrier between the interior lowlands and the Arctic slope (*6*). This rugged range is treeless except for stunted willow and birch on the southern flanks. The Arctic slope is the true tundra which slopes from Brooks Range to the Arctic Ocean. Figure 6 shows the flat, patterned ground typical of the tundra. Permafrost is continuous and deep. Climate is severe, although winter temperatures are not as low as in the interior plateau. Summers are cooler, giving a lower annual mean. Barrow has a summer mean temperature of about 4° to 5°C. Precipitation is about 5 inches a year, but because of the short summer and frozen subsoil, the entire region is a morass from June through August when the surface soil thaws and creates a shallow, perched water table. Vegetation consists primarily of prostrate willow, shrubs, and forbs; no upright trees grow in this zone.

Fig. 6. True tundra north of Brooks Range. Note the patterned ground, barren appearance, flatness, and extensive surface water between polygons; tracks are caused by tracked vehicles in winter and will remain for many years. [Federal Water Pollution Control Administration photo]

Socioeconomic Environment

Since people and their activities are chiefly responsible for polluting natural environments, let us look at Alaska and speculate on future problems of water pollution control. Alaska's population of 1 July 1967 was estimated at 270,000, an increase of 25,000 over 1966. Traditionally, Alaska's population has been highly transient because its industrial and economic activity has been seasonal; however, this transiency is steadily declining as new industry develops in the state and improved construction methods are used. Alaska can conceivably support a much larger population; for example, Scandinavia supports a population of 15 million on less area at latitudes similar to Alaska's, although its climate more closely approximates that of coastal Alaska with less rain. As economic activity increases, population will increase, and a population of 400,000 to 900,000 by the year 2000 is forecast (*7*).

Economically, Alaska has served as a source of raw materials which are removed and processed elsewhere. This condition will continue to some extent because of the high price of local processing; however, as the economy stabilizes, costs should come down, partly as the result of the recent introduction of efficient freight-handling techniques, such as containerization and hydrotrain. Competition will also influence the price structure as larger enterprises move to Alaska. Some economists feel that the state is near the economic "take-off" stage where industrial expansion generates its own prosperity.

Some industries associated with Alaska—such as gold mining and fur trapping—which were once important, are now minor. Others, like fishing, are still important; some, like oil, are completely new to Alaska, and may prove to be all-important future industries. Tourism, although not new to Alaska, is expected to become one of the most important industries in the state. Oil production is the immediate stimulus to prosperity in Alaska which now ranks ninth in production, and predictions are for the state to climb to the nation's fourth largest oil producer in a few years (*8*). Costs of exploration, production, and transportation are high; however, even in the face of these costs, the future for oil in Alaska is optimistic.

Lumbering should prove to be a stabilizing industry along the coastal forests, with 5.7 million acres of commercial timber (*9*), now that a third pulp mill is scheduled to be built. Nearly all the national forest commercial timber is now scheduled for cutting under a sustained yield plan. Interior forest resources, although never inventoried in detail, are estimated at 39 million acres of commercial timber and, once markets develop, will add to the total resource activity. Furs, once important, are no longer in demand as in the past; hence, this industry continues to be minor, although it is capable of large expansion if demands for furs increase (*10*). Agriculture is unlikely ever to become important because of unfavorable climates and of Alaska's inability to compete with other areas of agricultural production. Gold mining flourished in recent years, but the cost-price structure has caused this industry to wither (*11*). Mining for other metals is almost certain to increase in future years because deposits of many minerals are known and the geology is similar to that of adjacent Canada, where mining is a thriving industry.

Tourism and transportation are related, and both continue to expand with expansion of the road network to all major communities. Tourism is projected to increase and become an even more important industry because of the

state's many scenic attractions. Freight costs compare favorably with those in other states, now that efficient handling methods, mentioned earlier, are in effect. The state ferry system has stimulated surface travel to Alaska and bids to compete with the Alaska Highway as a means of entry from Canada. The jet age has arrived in Alaska with regular air routes to Japan, Europe (over the pole), and Seattle; Alaska is strategically located for world air travel. The new superjets are optimistically predicted to transport a significant percentage of Alaskan freight now moving on the surface.

Traditionally, Alaska's salmon fishery was its foremost industry. Although this industry reached its peak several years ago, fishing will continue as an important industry in the state. Recent new conservation and fishery techniques, diversification of the industry to king crab, shrimp, and other shellfish, and modern processing methods will stimulate fishing as an industry (*12*).

Alaska's water resources, like her petroleum reserves, are tremendous. A recent inventory of U.S. water resources (*13*) disclosed that runoff from Alaskan streams is about 650 million acre-feet (1 acre-foot is about 1235 cubic meters), approximately one-third that of the entire United States. If runoff from Canada into the Yukon River is included, the figure rises to about 800 million acre-feet. Alaskan marine waters are an additional resource because of the long tidal coastline and the vast continental shelf totaling 830,000 square miles.

Because Alaskan waters, fresh and marine, are pristine except for a limited number of local areas, and because water quality is increasingly recognized as one possible limiting factor to continued prosperity, serious thought is being given to preventing pollution in these waters. How to use the surplus freshwater resources of Alaska is a question often asked. Thirsty states of the "Lower 48" propose huge programs to import water from the north, but those who now control surplus water (*14*) oppose this. An alternative proposal is to develop water-using industries in Alaska adjacent to the water resource. Such action could use the water and at the same time disperse plant and prosperity by providing jobs and capital in areas where natural resources need developing. Regardless of the direction Alaska water resources use takes, the quality of this water must be such that it is usable without costly pretreatment.

Summarizing this discussion on the total environment brings out two principal points. Alaska's natural environment is harsh, with many serious problems to be overcome in the state's orderly development of resources and economic expansion; development and expansion are inevitable because Alaska has many natural resources in quantity that are or will be needed by our growing technological society. Although capable of supporting many more people as resources are developed, Alaska's rigorous natural environment will strongly influence population density and economic expansion.

Loci of Pollution Today

Although its waters are now dominantly pure, Alaska has several local pollution problems. By today's standards, no city in the state has an adequate municipal waste disposal system, and only a few have treatment of any kind. None of the major military bases has adequate treatment facilities. Dumping of raw wastes into the nearest water body is the rule; this results in some serious local pollution. Fairbanks runs the effluent from its primary treatment plant directly into the Chena River, and Fort Wainwright, immediately upstream does also. Pollution in this stream is evidenced by bacterial counts below Fairbanks that are 300,000 to 500,000 times those in the river above all sources of man's wastes.

Cook Inlet receives raw sewage from Anchorage and the Elemendorf Air Force Base. Fort Richardson's untreated wastes also end up in Cook Inlet by way of the Eagle River. All these wastes are to be treated by a treatment plant by 1972. The plan calls for primary treatment of wastes initially, with secondary treatment added at a later date as population increases. Raw sewage from Juneau is discharged directly into Gastineau Channel, a poorly circulating inlet. To date no health problem has developed, probably because the population is small. The discharge of raw sewage into any available water is common practice in coastal communities.

Kodiak Harbor has become so polluted from seafood cannery wastes that harbor waters can no longer be used in the live holding tanks. Water quality is so poor that crabs so held die and are wasted. This condition has developed to an acute state in the 10 to 12 years that the king crab industry has been in Kodiak.

Few of the many small military installations, Bureau of Indian Affairs schools, or other state or federal agency properties provide adequate waste treatment by today's standards. When small military installations were built throughout Alaska after World War II, waste disposal was a salient point in the overall plan. The tragic aspect of these plans was their complete reliance on criteria from temperate zones, with insufficient data and with little understanding of the environment in which they were to be applied. This lack of suitable design criteria for northern waste disposal has resulted in a large percentage of failure of waste disposal systems at many locations. Contributing to the failures were the lack of trained treatment plant operators and generally poor management and maintenance of installed systems.

Only the sparse population and the relatively low quantities of these raw wastes have kept the pollution problems from becoming acute and thus highly publicized. This is an example where knowledge is insufficient to deal with a problem that may well become paramount as Alaska develops and population pressures on the environment increase. Design criteria are simply not available—and this includes Scandinavia and Soviet Russia as well as Alaska—to build disposal systems that will function with assurance under the severe climatic conditions of northern latitudes. Only by research, to explore new methods of waste treatment and to improve or modify conventional systems, can satisfactory disposal systems be developed.

Industrial wastes are being recognized as potential pollution agents in Alaska. Two pulp mills now discharge their wastes into estuaries that were pristine 10 to 20 years ago. Recent surveys indicate that pollution products are accumulating: the diminished size and number of shellfish in the intertidal zones of these estuaries are attributed to the polluting agent and the lack of sufficient circulation in these marine water bodies. With a third pulp mill to be built somewhere in southeastern Alaska, it is possible that another estuary will suffer a similar fate.

Oil spills on the waters of Cook Inlet are common, as the petroleum industry enters the production stage. This

estuary has some unique physical characteristics making it totally unlike any other water body in the United States. The tides in Cook Inlet are second in magnitude only to those in the Bay of Fundy. Currents during a tidal cycle commonly reach velocities of 8 knots; the upper end of the inlet carries a high silt load derived from glacial streams; in winter the ice becomes several feet thick. How Cook Inlet will react to extensive oil pollution is unknown because our documented knowledge is inadequate to predict the behavior of a cold-water, silt-laden estuary.

Future Pollution Problems

If Alaska prospers as its people hope it will, its cities will assuredly grow, magnifying the volume of municipal wastes. This is being recognized by local governments which are planning disposal systems. Present plans call for all Alaska municipalities to have adequate sewage and waste treatment facilities in place by 1972. A recent inventory to establish the costs of pollution control in Alaska sets forth an estimate of $82 million just for the immediate needs with no reference to future projects.

In the past, great reliance was placed on dilution when raw sewage or the effluents from treatment plants were discharged to a stream. An unknown factor in such reliance is the uncertainty of the efficacy of planned conventional treatment systems in an arctic or subarctic environment. This rigorous environment imposes restrictions on conventional systems that can be overcome only with costly modification of the local environment under which the equipment must function. Moreover, water now unused and considered surplus may have an alternative important future use that is totally unpredictable under prevailing economics today. Another unknown associated with northern climates is the capacity of these cold waters to assimilate wastes. Continued reliance on dilution can result in dramatic failures because the accumulated effects are insidious; they build up with time and are triggered when a critical level is reached. Frequently, these failures are irreversible under the imposed conditions.

Industrial wastes are bound to increase with economic expansion. Ultimately effects of pulp mills on estuarine ecosystems are not known. In these waters in Alaska, temperatures seldom rise above 10° to 20°C, which retards biological and chemical reactions compared to the normal rate for warmer waters. Kodiak Harbor is an example of accelerated pollution because of thoughtlessness. Petroleum wastes will cause problems either because of accidents or irresponsible operations. Methods for the disposal of these wastes warrant intensive research to eliminate the problem before it grows bigger. Certain wastes, now exempt under Alaskan law, will surely assume increased importance, once industry expands as it is almost certain to do. How silt affects stream ecology, except in a general way, is also a subject that has hardly been studied. Dissolved oxygen in arctic streams is low because of ice cover during the winter months (*15*); the addition of oxygen-demanding wastes may trigger irreversible reactions in the ecosystem which could interrupt the food chain and cause serious damage to desirable species of flora and fauna.

Timber harvesting is ancillary to pulp mills to supply the wood from which to make pulp. This industry frequently comes in for severe criticism from the fishery biologists because of opposing viewpoints on how logging affects the streams of a watershed. Stripping climatic forest from a watershed is indeed traumatic, but is it as disastrous to aquatic life as some biologists infer, if properly done? There must be a compromise position that will satisfy both interests if responsible parties will agree to look at the problem objectively and accept the facts from unbiased research. Much research needs to be done in this area, but enough information is at hand to justify certain controls that prevent stream degradation. The principal obstacle is unwillingness on the part of loggers to accept the premise that it is possible and desirable to log without ruining the watershed (*16*).

Future Courses of Action

Two courses of action must be implemented immediately. First, present knowledge must be used to treat and manage waste to prevent damage to the environment; and, second, necessary research must be instituted to acquire an understanding of ecosystem dynamics in the northland. Such an approach was supported in a colloquium at Washington, D.C., where a "National Policy for the Environment" was discussed (*17*). Treating municipal wastes and using only approved logging practices are examples of the first action where much benefit will accrue. However, ultimate solutions must await research or engineering innovations for some problem areas. For example, in the Point Barrow area, the Navy and various other groups under contract for oil exploration have accumulated an estimated one-quarter of a million drums of human wastes because no feasible disposal method is available (*18*). What is going to happen as oil development expands with its attendant problems in the tundra ecosystem? How to provide ground transportation in the tundra without destroying these tundra ecosystems, how to dispose of human and petroleum wastes in this environment, and how to prevent polluting the arctic waters when water is everywhere in summer—these are some of the problems that must receive attention if damage is to be avoided.

Research to gain additional knowledge of Alaskan waters off the continental shelf needs to be given momentum. Alaska's continental shelf area is estimated at 830,000 square miles and constitutes 74 percent of the total U.S. shelf (*19*). The fisheries over the Alaskan continental shelves are incompletely understood. However, the consensus is that these fisheries have a tremendous potential for supplying seafood to a growing population. Mining the continental shelf for desirable metals will probably become important as research develops information to extract these metals from shelf areas. For these industries to develop without damaging the marine ecosystems, marine scientists must have research completed which will furnish guidelines to orderly development of these resources.

Total solution of these and other pollution problems is not at hand today, but the Washington, D.C., colloquium concurred on one need—to continue educating all persons involved to accept responsibility for preventing pollution and to develop incentives to make this desirable. When it can be shown that, in the long run, degradation of the environment costs more than preventive measures, potential polluters will more readily accept and initiate control measures. Regulations and water quality standards in themselves are insufficient to provide long-range results; there must be an honest desire on the part of the general population

to prevent deterioration of man's environment. Once this is accomplished, policing becomes an insignificant facet of pollution control.

Summary

Evidence indicates that Alaska is on the threshold of economic expansion. The magnitude of the expansion is unknown, but any expansion is certain to increase pollution pressures. Because Alaskan waters are, for the most part, still clean, a unique opportunity exists to apply a preventive program based on ecosystem dynamics, instead of the classical practice of cleanup after deterioration has set in. Research on the tundra and taiga ecosystems must be initiated to learn the dynamics of ecological response to man's quest for new resource development. Imaginative engineering innovations must be applied toward solving the immediate problems while awaiting research findings that accrue slowly over time. An accelerated, continuing education of industry and all others who are potential polluters must be initiated. All the research, engineering, standards, and regulations in the world will not prevent the ultimate destruction of our environment unless we all accept our responsibility to prevent this destruction. Pollution prevention will make great strides when we devise means, through economic analysis, to show that esthetics and society's acceptance of the costs of pollution control are imperative to man's survival, health, and happiness. Then we will no longer think in terms of how heavily we can load a stream with wastes, but how clean we can get it and how we can maintain it in this enhanced condition.

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NEWS AND COMMENT

Foundations and the Tax Bill: Threat to the Private Sector?

About a year ago, Alan Pifer, president of the Carnegie Corporation, offered a prophetic warning for the philanthropic foundations, which even then stood closer to the brink than Pifer realized. "The danger which foundations have faced in recent years, and perhaps never more so than today," he wrote, in Carnegie's annual report, "is that public loss of confidence in them, occasioned by limited, but continuing and well-publicized disclosure of abuses, will become great enough to precipitate Congress into a hasty and clumsy piece of legislation." Pifer, who was and is chairman of the Foundation Center (a foundation service and information organization), was appealing to the foundation world to put its house in order through self-regulation, but, even had this been promptly accomplished, the hour already was late.

If the present session of Congress ends without the foundations' suffering heavy penalties, Pifer and other leaders in the field, such as McGeorge Bundy of the Ford Foundation, will be shown to have a better line of credit with Providence than they are now generally thought to possess. The tax reform bill passed by the House (*Science*, 15 August) is in some respects for the good of the foundations but, generally, it deals them a heavy blow.

The bill is a stupefying document, so complex that nobody seems really to understand it, and it affects foundations in many different ways, only a few of which can be gone into here. It would, among other things, impose a 7½ percent tax on foundation income (hence reducing funds for beneficiaries) and forbid not only foundation lobbying but also prohibit, in language which many consider dangerously ambiguous, activities "affect[ing] the opinion of the general public" on legislation.

The House bill has been rewritten by the Senate Finance Committee and is now being considered by the Senate as a whole. From the foundations' standpoint the Finance Committee has improved the bill in most particulars, yet from this committee comes the unkindest cut of all—a proposal for a "40-year death sentence." The tax-exempt status of new foundations would be limited to a 40-year life; existing foundations would keep their tax-exempt status for no longer than 40 years.

These misfortunes suffered by the foundations were brought on by an unusual combination of circumstances. First, there was the much discussed "taxpayer's revolt," coupled with reports of tax dodging by foundation donors and of "self-dealing" by some of the smaller or lesser known foundations (as, for example, when someone who has established a foundation makes