Strip mining: Impact on forests and wildlife

Surface mining of coal and precious minerals is dramatically increasing in the United States. Since 1965, strip mining has doubled in some areas of Kentucky and West Virginia. It has increased 30 percent in the West during the past seven years. The U.S. Forest Service is besieged with thousands of applications to strip-mine national forests.

This upsurge in strip mining has stimulated biologists to intensify studies of the impact of surface mining on forests and wildlife. Findings were reported at the annual meeting of the American Institute of Biological Sciences in Amherst, Mass.

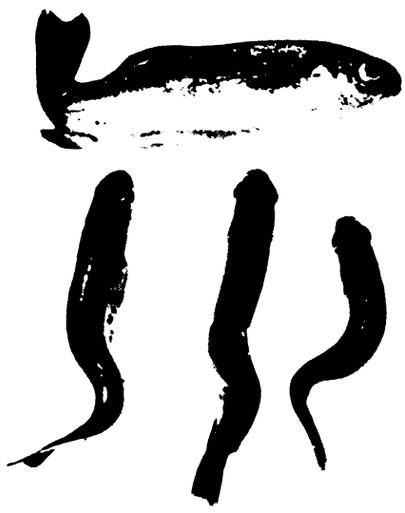
"One of the most serious results of surfaced mining is degradation with bulldozers," reports Paul Packer of the Forest Service in Logan, Utah. If trees are not razed they are left to stand as pathetic islands of greenery. Isolated trees not only lose their beauty, they are no longer capable of providing delicately balanced ecosystems for wildlife. The effects of surface-mining bulldozing can be seen on Bear Tooth Plateau north of Yellowstone National Park. The plateau is the nation's largest alpine tundra. Regrowth of natural vegetation is extremely slow.

Pollutants from surface mining can also harm or kill fish. John Goettl, a biologist with Colorado's Game, Fish and Parks Division, found that if zinc effluents don't kill trout first, the tails of the trout will turn black or their spines will become curved by lead effluents, or their offspring will be killed by silver effluents. Surface mining, for oil shale for example, releases sediment into streams that can prevent fish from mating and laying eggs, Packer and Donald L. Batch of Eastern Kentucky University report.

Surface mining can also make water so acid certain aquatic species increase while others decrease. If water is extremely acidic (a pH of 3.5), only bloodworms survive. If it is somewhat less acidic (pH 3.5 to 4.5), dragonflies may also make it. If it is only mildly acidic (pH 4.5 or more), fish may also survive. Streams in eastern Kentucky contain so much acid they are a sickening orange, red or yellow. The Ohio River is so swollen with acids from surface mining that it is largely unsuitable for aquatic life.

Surface mining also destroys feeding areas for big game and birds of prey, R. L. Hodder of Montana State University points out. Animals are then forced into adjacent areas that may already be fully populated. Birds of prey are also endangered by fish and insects whose systems are full of lead, silver or other heavy metals that come from surface mining. Says Goettl, "Insects' ability to accumulate lead is fantastic."

So far, no one has done much to keep surface mining from hurting forests and wildlife. But industry is making efforts to reclaim lands after they have been mined (SN: 7/7/73, p. 11). Whether reclaimed lands will integrate themselves back into the original ecosystems, only time will tell. On one grassland Hodder helped reclaim, only five of the original sixty plant species returned. Apparently the reclaimed soil was too alkaline. □



Goettl

Lead effluents from surface mining cause spinal curvature in the trout.

Packer

Bulldozer disrupts delicate evergreen ecosystem on the Bear Tooth Plateau.

Wild rice—a new boost to Minnesota

Northern Minnesota is an economically depressed region. Its once-flourishing dairy industry has declined; mining and forestry are no longer as important as they once were. But in recent years farmers, scientists and industrialists have been working on a new crop that might give a boost to the area's economy—wild rice.

Wild rice is not actually a rice but an aquatic grass that grows in southern Canada, northern Minnesota and Wisconsin. Sixty percent of the world's wild rice crop is produced in Minnesota. Traditionally, the "rice" is harvested by canoe. Minnesotans buy a harvester's license, similar to a hunting license, and harvest during a yearly open season regulated by law.

Attempts to domesticate the grain have met many obstacles. Where to grow the "rice" was the first concern. Artificial lakes were first suggested; now paddies are used. Second, the grain

USDA

John Bedish, a Soil Conservation Service state biologist, holds wild rice grain grown in paddy in Minnesota.

Weather modification: Uncertainty, hope and three proposed goals

One matter always strikingly evident in discussions of weather modification is the contrast between the ingrained caution of atmospheric scientists and the enthusiastic convictions of commercial cloud seeders. In the early 1950's possibly as much as 10 percent of the land area of the United States was under commercial seeding operations. The annual cost was several million dollars. Most scientists at the time considered these programs premature and probably ineffective.

Today, two decades later, the central conclusion of a new report of the National Academy of Sciences entitled "Weather & Climate Modification" emphasizes that despite many advances, the subject is still fraught with uncertainties: "The panel now concludes on the basis of statistical analysis of well-designed field experiments that ice-nuclei seeding can sometimes lead to more precipitation, can sometimes lead to less precipitation, and at other times the nuclei have no effect, depending on the meteorological conditions."

This conclusion seems to portray accurately the awareness of scientists that the results of field experiments in weather modification have been mixed. Some experiments, like those carried out in recent years in Florida, have shown encouragingly positive results; others, like the still-debated Project Whitetop in the 1960's, produced less rain, not more.

Still, says panel chairman Thomas F. Malone of the University of Connecticut, "progress has been made during the past few years," although much slower progress than had been hoped for. The new report, issued this week, updates a 1966 NAS report on the same subject.

The most successful major weather-modification research efforts have been those seeding winter clouds over mountains to stimulate greater snowfall. This technique has "demonstrated that precipitation can be increased by substantial amounts."

The mixed results of projects to stimulate more rainfall emphasize "the complexity of the processes involved," says the report, and point to the need for "a more careful search" to learn exactly when to seed what clouds.

As for hail reduction, the panel finds "there is now more optimism than there was seven years ago." It points to Project Stormfury's meager but encouraging data that hurricane winds might be reducible and also calls for a "vigorous program of tornado research" to help mitigate the destruction of these severe storms.

Longtime followers of weather-modification research efforts will find little new information in the report but will profit from its long-view perspective on a subject that has produced its share of controversy and debate.

The report takes full cognizance of the immense public-policy issues inherent in weather modification. Increasingly, it notes, the crucial question in the future will be: "What weather-modification activities are in the public interest?"

The report notes disapprovingly evidence that the United States carried out weather-modification activities in Southeast Asia in support of military operations during the late 1960's. Malone says the record of the Senate hearings a year ago on these activities "must rank among the more astounding testimony ever presented before the Congress." The panel proposes a United Nations resolution dedicating all weather-modification efforts to peaceful purposes.

All in all, the panel found the field of weather modification ready for the identification of major goals as part of a national strategy. It proposes three goals: place precipitation modification on a firm basis by 1980, develop the means in the next decade to mitigate severe storms and weather hazards and determine by 1980 the extent to which man is inadvertently modifying weather and climate.

To achieve these goals, the panel calls for a level of funding that would approximately double the extent of current research efforts. The request seems to have little likelihood of being met. As the panel itself notes, weather modification is not yet being funded at the $30-million level recommended by the panel's earlier report in 1966.

ripens unevenly. It separates on the head and falls into the water a few grains at a time. A commercial non-shattering strain was developed in 1965 by the Manomin Development Co. at Deer River, Minn. Further research is needed in the area of plant diseases and parasites.

Yet, by 1972, 20,000 acres of wild rice paddies had been built in Minnesota. According to a report in the Department of Agriculture publication SOIL CONSERVATION, approximately 1,000 new acres of wild rice is expected to be added each year.

Those most affected will be the 3,000 Chippewa Indians living on the Red Lake Reservation. They own more than 40,000 acres of land suitable for growing wild rice. Yet, they face considerable obstacles cultivating it. Lack of money is the main one. Because wild rice is a new crop, specialized machinery is expensive, and for certain operations, the right machinery has not been developed. Loans and crop insurance are difficult to get. But if the wild rice industry develops, the benefits for the reservation and surrounding areas are numerous.

The paddies could prevent flooding along the Red River of the North by serving as temporary water reservoirs for spring runoff.

They would provide nesting grounds for waterfowl and spawning grounds for the northern pike. Thus, the reservation could further increase its income by selling special hunting permits for migratory waterfowl.

Increased paddy acreage will increase labor demand. Eventually, a processing plant will be needed in the area.

"Paddy rice really helped the economy here," says Beltrami County Commissioner Carl Falk. "Before this started, you never saw any big tractors here, because no one could afford them. We were really in bad shape. There was nothing here—but now, look around town. And it's going to get bigger. I think water will finally be our controlling factor. Nothing else in the world is going to stop this." □

Weather satellite fails to orbit

The latest in a series of advanced weather satellites failed to achieve orbit this week and presumably fell into the Pacific Ocean.

The Improved TIROS Operational Satellite (ITOS-E) was launched by NASA for the National Oceanic and Atmospheric Administration (NOAA) from the Western Test Range in California. According to preliminary analysis, the second stage of the Delta rocket shut off 50 seconds early, thus failing to boost the satellite into orbit.

ITOS-E would have joined NOAA 2 (SN: 6/9/73, p. 374), a twin spacecraft which was to serve as a backup. The failed satellite would have beamed global measurements of atmospheric temperatures directly to nations around the world. Its data would have provided a vertical temperature profile of the atmosphere from sea level to 20 miles above the earth. □