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BIOLOGICAL IMPACT OF THE PROPOSED HUOT DAM AND RESERVOIR ON THE RED LAKE RIVER, MINNESOTA

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BIOLOGICAL IMPACT OF THE PROPOSED HUOT DAM AND RESERVOIR ON THE RED LAKE RIVER, MINNESOTA

By
Oliver M. Jarvenpa
and
Earl H. Huber

ABSTRACT

The proposed Huot dam and reservoir would destroy 16 miles and adversely affect an additional 19 miles of unique, irreplaceable, free-flowing fishing, and canoeing river by permanent and periodic inundation. In addition, adverse effects in the form of sedimentation would take place upstream far beyond the project area itself, as a result of the 40 foot rise in the base level of the stream.

The project would destroy 2,000 acres and adversely affect another 5,400 acres of diverse wooded wildlife habitat. The periodic inundation of flood pool land would prevent establishment and maintenance of a stable habitat and reduce productivity over an acreage much larger than would be lost directly to the conservation pool itself.

Recreation benefits in the form of a temporary lake type fishery, camping, picnicking, boating, swimming, and water skiing would not replace, compensate for,nor to any great extent mitigate the resources lost.

Alternative flood control measures, other than reservoirs, should be fully explored--measures that would be environmentally and ecologically less destructive.

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INTRODUCTION

The purpose of this report is to provide data needed in evaluating the probable effects of the proposed U. S. Army Corps of Engineers flood control project on the Red Lake River near Huot on fish and wildlife resources. The data is required both for administrative decision-making and for project planning, should the project be implemented.

The report is based largely on information collected on several field surveys conducted by the Division of Fish and Wildlife over a period of several years, the U. S. Fish and Wildlife Service, and the Bemidji State College Center for Environmental Studies.

PROJECT PROPOSAL

The primary purpose of the proposed Huot dam and reservoir is to provide flood protection for Crookston, Grand Forks and East Grand Forks, and agricultural lands along the Red Lake River between Huot and Crookston. The project would also to a degree reduce flows into the Red River of the North during critical flood periods and provide recreational opportunities in the area.

Project plans call for a large multiple-purpose dam on the Red Lake River about 3.5 miles below Huot. The structure would be a rolled earth-fill enbankment 10.4 miles long (including tie back dikes) with a maximum height of 100 feet. The reservoir would be about 2,000 acres at conservation pool

(elev. 910 MSL), 7,400 acres at full flood pool (elev. 960 MSL),and 1,600 acres at winter pool (elev. 904 MSL).

About 1,000 acres of forested wildlife habitat would have to be cleared from within the conservation pool area. Sixteen miles of free-flowing stream (Red Lake River - 13 miles, Black River - 3 miles) would be inundated by the conservation pool. An additional 2,200 acres of woodland and 19 miles of free-flowing stream (Red Lake River - 11 miles, Black River - 6 miles, Clearwater River - 2 miles) would be affected by the flood pool.

Recreational facilities for boating, camping, picnicking, swimming, and fishing would be provided in five areas around the reservoir (one below the dam).

THE SETTING

The Red Lake River originates at the outlet dam of Lower Red Lake. The river valley forms a 196 mile biological corridor, which extends a narrow band of lake-forestland community of north-central Minnesota deep into the flat agricultural valley of the Red River of the North. This unique corridor provides for the merging of plants and animals typical of coniferous forest and tall grass prairie habitats.

All of the river valley and most of the watershed was once covered by Glacial Lake Agassiz. The location of the proposed dam represents the transition zone between lake-washed till plain and lake plain. The upper portions of the watershed are covered by extensive bogs and glacial moraines.

The area has a typical mid-continent climate, characterized by relatively cold winters and warm summers. Extreme temperatures range from 100°F to -50°F. The average frost free growing period in the Huot area is

113 days. Average annual precipitation in the area is 21 inches, 16 inches of which occurs as rainfall.

The project area is a deeply-entrenched wooded valley bordered by relatively flat farm lands. Between St. Hilaire and Huot, the river intersects and for varying distances courses adjacent to several pronounced Glacial Lake Agassiz beach ridges. This gives the river in this reach a special character, predominated by rapids, short pools, and scattered large boulders.

AQUATIC RESOURCES

The 45 mile reach from Thief River Falls to the Huot area is the most scenic, has the greatest fall, and has almost all of the rapids on the entire Red Lake River. From Thief River Falls to Red Lake Falls, the river falls 140 feet in 2 miles. This fast water stretch provides anglers and canoeists opportunities for recreation in surroundings unique in northwestern Minnesota. The Red Lake River has been designated a canoeing and boating river by the Legislature (1965, 1967) and has been proposed for inclusion in the state's wild, scenic, and recreation river system (1973).

An electrofishing survey of the Red Lake River from St. Hilaire to the Huot area was conducted by the Environment Section, July 13-15, 1971. The Bemidji State College Center for Environmental Studies carried out spot seining for smaller fishes in the area on August 25, September 5, 6, 11, and 12, 1972. The data collected shows that this reach supports walleye, perch, channel catfish, rock bass, sheepshead, burbot, and forage fishes typical of larger rivers, such as suckers, redhorse, quilback, shiners, darters, and dace. Although no northern pike were collected in these surveys, they

are known to be present in the river and are frequently taken by local anglers.

Collections by the Bemidji group indicates a diversity of aquatic invertebrates, indicative of a healthy stable environment. Work by Cvancara (1970), as reported by Elwell et al (1973), showed that there are more species of unionid mussels in the Red Lake River between Red Lake Falls and Crookston than any in other portion of the Red River basin in Minnesota in North Dakota.

AQUATIC RESOURCES WITH THE DAM

The dam would permanently convert 16 miles of free-flowing river into a 2,000 acre impoundment ("conservation" pool), 5 miles long, about a mile wide (at its widest point), having a maximum depth of 40 feet. Another 19 miles of river would be adversely affected by the flood pool.

Actually, the Huot dam would result in changes in the Red Lake River and Clearwater River much further upstream than would be indicated by the conservation pool elevation. The dam would raise the effective base level of the stream bed 40 feet, resulting in a much flatter gradient and reduce stream velocity where it enters the impoundment. Deposition of sediments at the point where the stream enters the impoundment would begin as soon as the dam became operative and would gradually work its way upstream. With the passage of time, the stream channel upstream from the impoundment would build up until it had about the same slope as the original channel but at higher level. The sedimentation and build-up of the stream channel above the impoundment would have adverse effects on both bottom fauna production and spawning and hatching success of desirable sport fishes. A high quality

river fishery would be replaced with a reservoir fishery that would begin to decline in value after about the fourth year of impoundment.

Predictions or estimates of fish standing crop, sport fish harvest, and angler use in the proposed Huot reservoir have been made, based on correlations and analyses of data on existing reservoirs throughout the United States, (Peterson 1973, Jenkins 1973) adjusted to Minnesota conditions. These data indicate that in the early years (first eight years) of impoundment good fishing could be expected, especially for northern pike and walleye. The sport fish harvest would very likely fluctuate from year to year but would average about seven pounds per acre. This is based on a predicted standing fish crop of 185 pounds per acre of which 137 pounds per acre would be rough fish. As the reservoir aged, sport fish harvests would decline to about 2 to 3 pounds per acre as a result of increased siltation, reduced water clarity, decreased dissolved oxygen in deeper waters, and a proportionately higher rough fish population.

Angler use would follow a similar pattern. It could be expected to reach a mean of seven man trips per acre in the first eight years of impoundment and decline thereafter.

These predictions are based on the expectation that intensive fish management practices would be a part of overall reservoir operations. This would require a total or near-total drawndown feature to permit chemical control of rough fish populations, sport fish stocking as needed, and water level management to enhance spawning success and food production for both sport and forage fishes.

For maintaining a good sport fishery, especially for walleye and northern pike, reservoir water level fluctuations would have to be manipulated during

early spring to ensure maximum spawning and hatching success. It appears doubtful if this can be accomplished with the Huot dam, since it is designed primarily for flood control.

Turbidity, wind, and the presence of finely textured soils in a drainage basin are the principal factors limiting fish production in reservoirs (Benson 1968). These interrelated factors are all present in the Red Lake River basin and would have adverse effects on the growth of aquatic plants, fish spawning and feeding activities, and on egg survival.

The project would likely provide benefits in the form of a tailwater fishery, the magnitude and quality of which cannot be predicted. This fishery would result primarily from the obstruction to the upstream movement of fish, thereby bringing the anglers and fish together in a restricted area.

An abundance and variety of good fishing lakes are located within a short drive of the project area. The high quality lake regions of Detroit Lakes, Park Rapids, Bemidji, and Walker are within a 100-mile radius of the project area, as are Upper Red Lake and Lake of the Woods. Providing additional lake fishing opportunities in this area cannot be justified, especially when they come at the expense of an existing high quality stream fishery that is unique in this part of the state.

TERRESTRIAL RESOURCES

The Red Lake River in the project area is part of a much longer biological corridor, which brings into close proximity and association plants and animals representative of coniferous forest, deciduous forest, and tall grass prairie biotic communities.

The merging of these biotic communities in the project area results in a greater diversity of terrestrial plants and animals than would be commonly found in the surrounding valley.

Observations and samplings along transect lines by the Bemidji State College Center for Environmental Studies point up this biological diversity.

Eleven species of trees, 24 species of shrubs, and 141 species of herbaceous plants were recorded as being present in the project area. The most common trees in the area are American elm, quaking aspen, bur oak, basswood, box elder, green ash, and cottonwood. Common shrubs in the area are chokecherry, hazel-nut, prickly ash, Virginia creeper, gooseberry, Canada moonseed, grape, red osier dogwood, wolfberry, and high bush cranberry.

The Bemidji State College group recorded (observed the animals or their sign, trapped, or had reported by residents) 20 species of mammals in the project area. Included were deer, moose, raccoon, red fox, badger, beaver, mink, muskrat, gray squirrel, red squirrel, jackrabbit, and striped skunk. The remainder include mostly smaller mammals, such as mice, shrews, moles, and chipmunks. Another 16 mammals are likely to be present and an additional 19 species possibly present, according to Professor E. B. Hazard.

A total of 71 bird species were recorded or identified in the project area. Included were Canada goose, mallard, wood duck, pie-billed grebe, great blue heron, ruffed grouse, mourning dove, osprey, goshawk, red-tailed hawk, rough-legged hawk, and marsh hawk. The project area serves as a stopover point for migrating shore birds, warblers, and other small birds.

TERRESTRIAL RESOURCES WITH THE DAM

Construction of the Huot dam would result in the permanent loss of 2,000 acres of diversified wildlife habitat. The interspersion of woodland, prairie, and cultivated fields along the river in the project area results in numerous ecotones or "edges." Both the number of species and population denisty are often greater in these edge areas than in the adjoining more homogeneous communities.

The dam and reservoir would interfere with the normal movement of animals along the river and result in reduced populations between Red Lake Falls and Crookston. The river valley downstream from the dam very likely would be cleared and converted to more intensive agricultural use, resulting in further loss of wildlife habitat.

In addition to the direct habitat losses noted above, there would be wildlife losses resulting from the water level manipulations that would be required for flood control. Substantial water level fluctuation in the spring would reduce nesting success of ducks and other birds nesting near the waters' edge and prevent the establishment of emergent aquatic vegetation, needed for wildlife food and cover.

Experiences on other reservoirs have shown that periodic inundation of flood pool land prevents the establishment and maintenance of a stable habitat and reduces productivity over an acreage much greater than that lost by the conservation pool itself.

CONCLUSIONS

Analysis of the available biological data for the Red Lake River in the

Huot area indicates that the proposed dam and reservoir would:

1) Destroy 16 miles and adversely affect an additional 19 miles of high value, free-flowing, fishing and canoeing river, unique in northwestern Minnesota. This stretch of river is irreplaceable.

2) Degrade the Red Lake and Clearwater Rivers much further upstream than the upper limits of the conservation pool due to raising the effective base level of these streams by 40 feet.

3) Destroy 2,000 acres and adversely affect another 5,400 acres of diverse wildlife habitat, for which replacement in kind or mitigation in the project area is infeasible.

4) Permanently interrupt a unique biological corridor and river ecosystem.

5) Convert 16 miles of free-flowing river into a 2,000 acre lake that would provide fair to good fishing for a few years after the dam is completed. The sport fishery would decline in value as the reservoir aged and rough fish populations became predominant.

6) Provide tailwater fishing opportunities below the dam.

7) Provide a resting area of limited value for migratory waterfowl.

8) Provide outdoor recreational opportunities (boating, camping, picnicking, swimming, and water skiing) largely at the expense of similar existing opportunities in and adjacent to the river.

9) Provide flood control and outdoor recreational benefits at prohibitive environmental costs (to date, the actual benefits and costs have not been evaluated in a system of accounts, as is required by the new federal "Principles and Standards for Planning Water and Related Land Resources," which became effective October 25, 1973.

10) Provide for lake-based recreational opportunities that cannot be justified in the area, since there are literally thousands of natural lakes within a 100-mile radius of the project area.

11) Destroy by inundation cultural features, including the Old Crossing Treaty State Wayside Park, a historical monument and a cemetery, as well as 17 farmsteads.

RECOMMENDATIONS

Because of the severe adverse biological impact of the proposed Huot dam and the difficulty, if not impossibility, of providing compensation, replacement, or adequate mitigation for habitat losses in the project area, it is recommended that flood control alternatives other than reservoirs continue to be explored--alternatives that would be environmentally and ecologically less destructive. Alternatives or cobminations of alternatives that deserve serious consideration and further study, especially in light of the new federal requirements in the "Principles and Standards," include: flood plain regulation, flood plain evacuation, levees, floodwalls, flood diversion channels, channel improvement, and flood insurance.

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