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A Study of the Dickey-Lincoln Hydroelectric Project and its Impact on the Resources of the Upper Saint John River Valley

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New England Chapter

A STUDY OF THE DICKEY-LINCOLN HYDROELECTRIC PROJECT AND ITS IMPACT ON THE RESOURCES OF THE UPPER SAINT JOHN RIVER VALLEY

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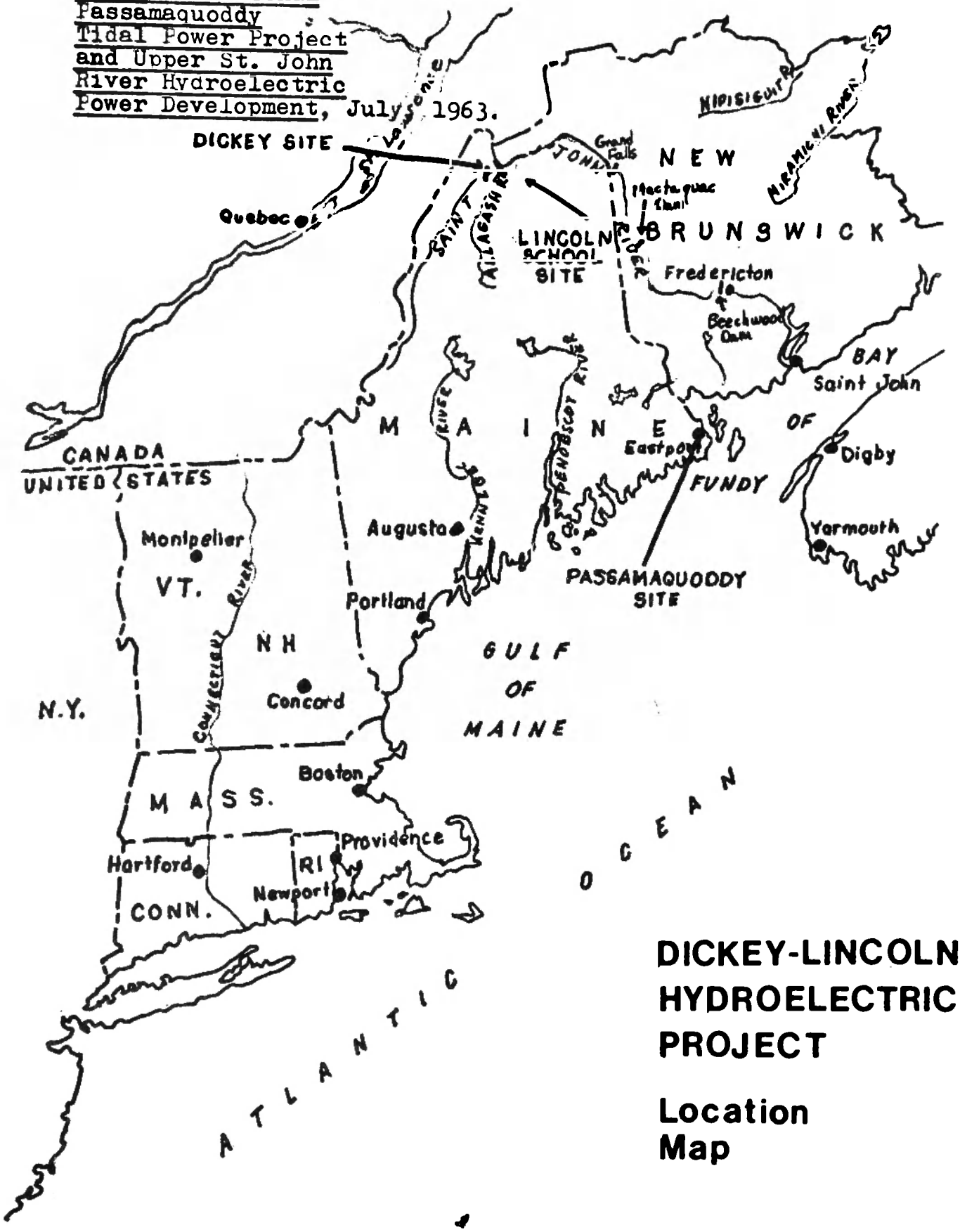
UPPER SAINT JOHN RIVER VALLEY

Prepared for the SIERRA CLUB, NEW ENGLAND CHAPTER.

CONTENTS

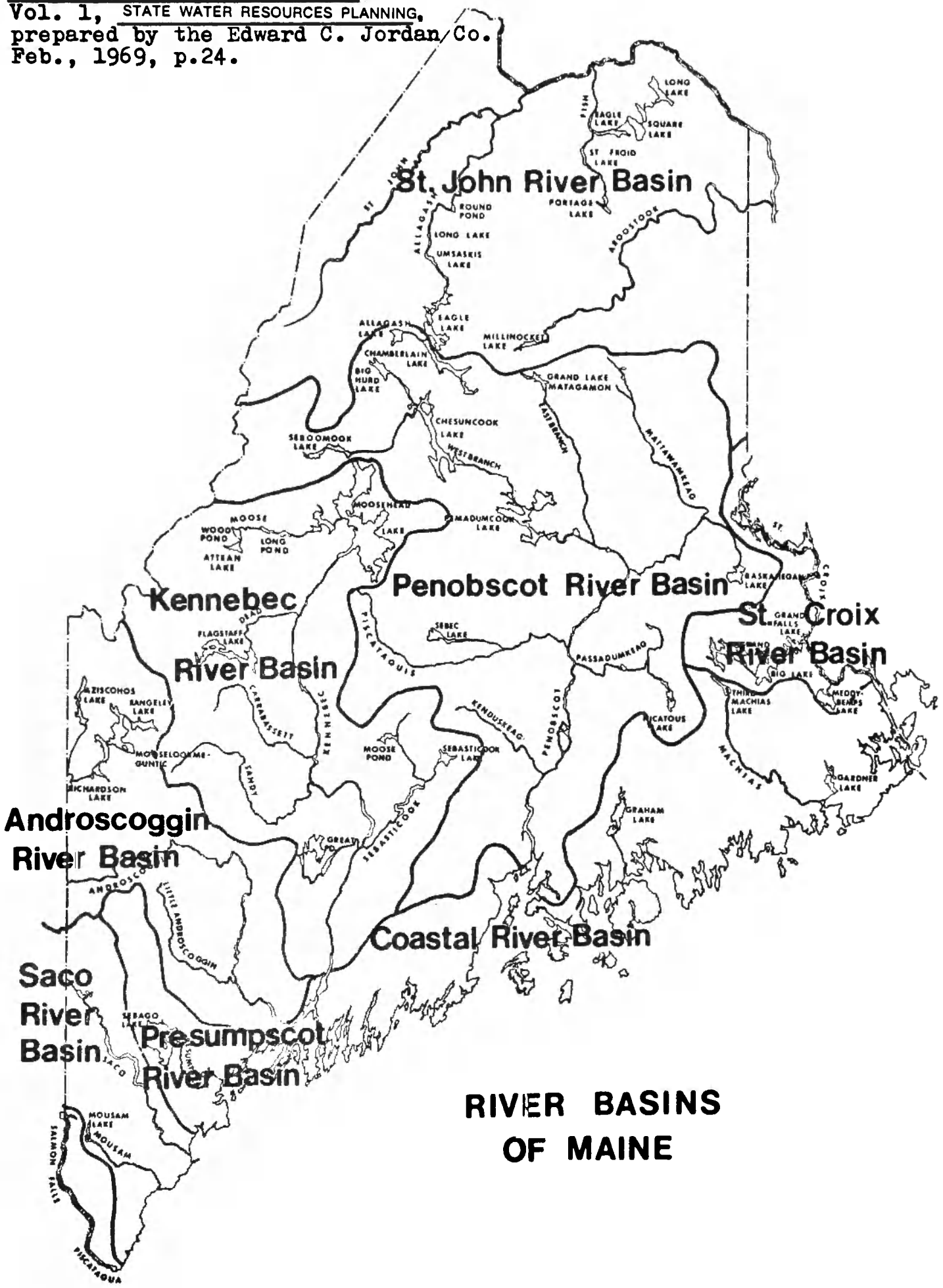
Source: Department of the Interior, Report to President John F. Kennedy: The International Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Power Development, July 1963.



DICKEY-LINCOLN HYDROELECTRIC PROJECT

Location Map

Maine Water Resources Plan,
Vol. 1, STATE WATER RESOURCES PLANNING,
prepared by the Edward C. Jordan Co.
Feb., 1969, p.24.



Introduction to the River and the Controversy

From its headwaters in the mountains of western Maine, the St. John River flows for 400 miles across northern Maine and into Canada where it flows to the sea at St. John, New Brunswick. The upper 130 miles of the St. John River flow through the remotest section of Maine's forest wilderness. Most of the 2,725 square miles drained by this upper river, in Maine and Canada, are heavily forested and owned exclusively by the forest products industry. Land ownership in the Upper St. John River basin follows the characteristic pattern prevailing throughout the Maine woodlands, with vast tracts of forest acreage, owned by a few major corporations, interspersed with the comparatively minor holdings of many smaller companies. Four paper companies dominate the Upper St. John River basin: Great Northern Paper Company and International Paper Company own large blocks of territory in the headwaters area, with scattered holdings downstream, while to the north Irving Pulp and Paper Limited and the Pingree Heirs are the major land owners. Settlement has never occurred in the unorganized townships of this section of Maine so the population is sparse and no permanent communities exist. No public roads penetrate the interior forest area. Automobile access is seasonal and restricted to a network of private gravel roads maintained and controlled by the paper companies. A large part of this wilderness can be reached only by canoe, airplane or on foot.

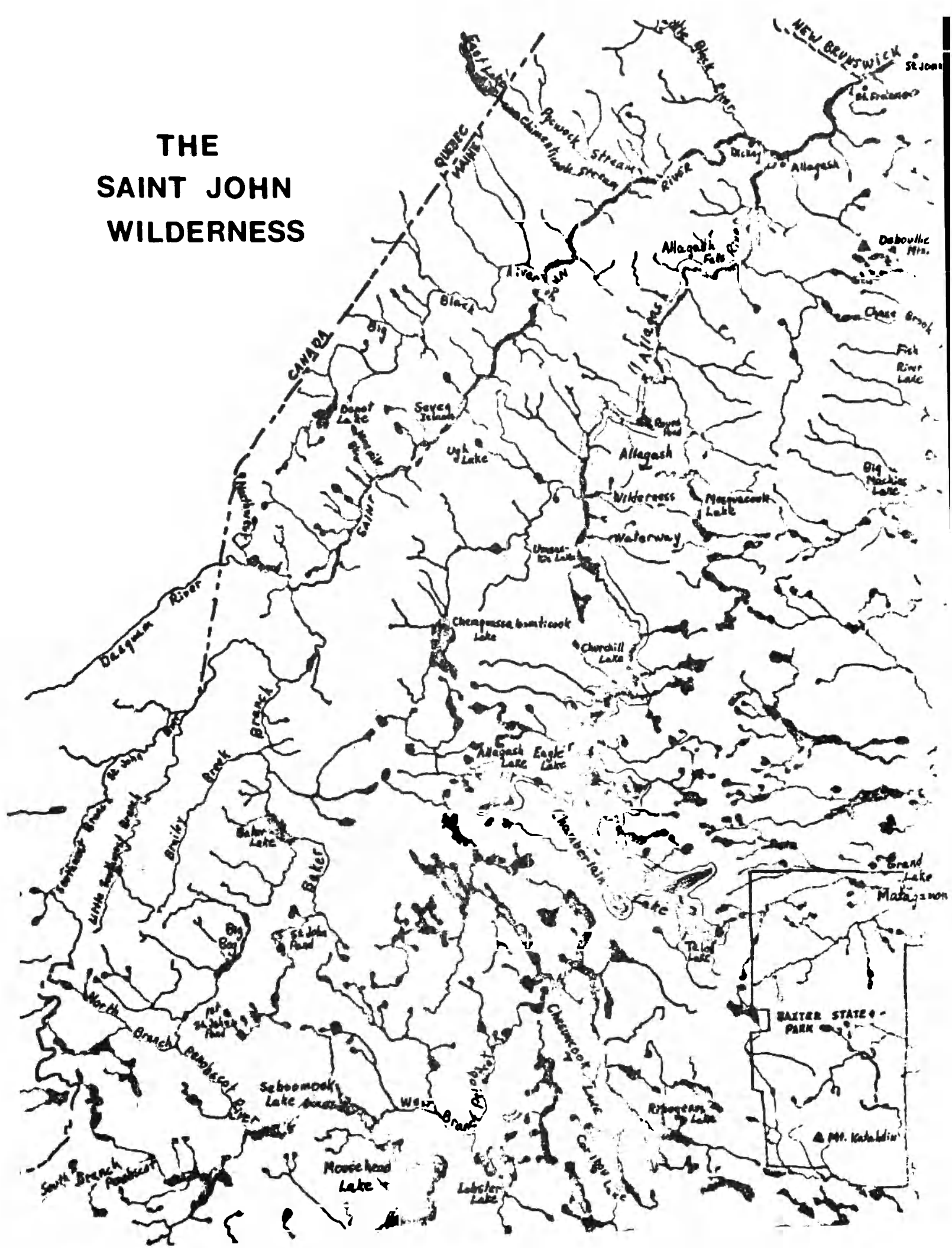
Below its confluence with the Allagash, the wilderness nature of the Upper St. John Valley undergoes a transition as the river emerges from the uninhabited woodlands. From St. Francis, Maine, to Grand Falls, New Brunswick, a distance of over 80 miles, the St. John defines the international boundary, flowing through a series of border towns and rich agricultural country. At Hamlin, Maine, the river spills over Grand Falls and begins its 200-mile passage to its outlet in the Bay of Fundy.

There are two St. John Rivers: the Upper river 130 miles long from its headwaters to the village of Dickey in the Allagash plantation, and the "Lower" St. John, beginning where the river emerges from the wilderness and ending at its outlet to the sea.

The Upper St. John is a wild river, free from pollution or obstruction, its waters and valley rich in fish and wildlife. Yet the Upper St. John is no pristine wilderness. Supporting a variety of wilderness associated activities, the river has a renowned native trout fishery, supplies critical wintering habitat for Maine's most popular game animal, the white-tail deer, is a hunting and trapping ground, a challenging and popular canoeing stream, and, as a thriving timber plantation, is a source of raw materials for the forest products industry which is Maine's largest single employer.

The Lower St. John, on the other hand, is characterized by human settlement and activity. From Ft. Kent to the sea,

THE SAINT JOHN WILDERNESS



towns are spaced along the banks of the St. John River, end the intervals between the towns are spanned by roads that steadfastly parallel the river's banks. Most of the towns and industries dump their wastes into the river, and certain stretches are severely polluted. The Maine Department of Environmental Protection, in March, 1973, announced that it considers the Lower St. John River, in certain parts, to be "water quality limited", a term used to describe water so polluted that it cannot be improved to meet standards of acceptability by the best available means of waste treatment. In New Brunswick, at Fredericton and Hartland, two hydroelectric dams have converted the river into long narrow lakes. Fully two thirds of the length of the St. John River has been "civilized" in this fashion. Only one third of the river remains wild and intact.

But the Upper part of the St. John River has been threatened in the last two decades by the forces of growth and expansion which require the consumption of the remaining "underutilized" wilderness resources at an accelerating pace. This remote forest area of northern Maine has been caught up in the intensifying competition between demands to preserve wild areas, and demands to tap the energy resources that these areas harbor. Over the past fifteen years the construction of a Federally-financed hydroelectric project on the Upper St. John River has been planned, debated, approved, revised, defeated, and revived. Just as the original Federal proposal for a dam that would have flooded the Allagash as well as the St. John provoked

protest and spurred measures to protect the wilderness qualities of the Allagash, so the plan for flooding the Upper St. John has provoked increasing controversy over what constitutes the best use of that area. For, although the St. John drains the heart of the privately-owned paper company domain, the river itself belongs to the state of Maine, and should, therefore, be used in a manner that promotes the welfare of Maine people.

At this time, the Dickey-Lincoln issue is just one of several unresolved issues which have direct bearing on the future of the Upper St. John River. The controversy surrounding the Federal development of the upper St. John River for hydroelectric power production is clouded by a number of overlapping issues, each one posing a complex problem in itself. The Dickey-Lincoln question has become entangled with the "energy crisis", the merits of public versus private utility operation, and the question of who will determine the future land-use of Maine's ten million acres of unorganized territory. Dickey-Lincoln is just one among many possible ways of developing the Upper St. John River. The question of whether the Dickey-Lincoln project should or should not be constructed is really part of a larger question: what use of the Upper St. John River would best promote the economic, environmental, and social well-being of the people of Maine?

With this question as a guide, this report was undertaken primarily to evaluate the impact that the construction

of the Dickey-Lincoln project would have upon the resources of the Upper St. John River, and to examine the assertion that the Dickey-Lincoln project constitutes a wise use of the public's environmental and economic resources. Since the case that has been made for the construction of the Dickey-Lincoln project rest primarily on the justification of the project in economic terms, this aspect of the project proposal will be intensively explored.

PART I-Description of the Dickey-Lincoln Project

The concept of a Federal hydroelectric project on the Upper St. John River grew out of the need for auxiliary power to supplement the proposed Passamaquoddy Tidal Power Project. First outlined in the 1920's by an American engineer, Dexter Cooper, the Quoddy tidal power project was revived in the late 1950's by the Department of the Interior. Extensive engineering and economic studies proved the tidal project to be feasible from an engineering standpoint, but not on economic grounds. The Upper St. John River hydroelectric proposal, however, was found to be economically sound if developed as a separate project. Of the several Upper St. John River sites studied, the one having the greatest hydro potential was found to be Rankin Rapids, located downstream from the Allagash and St. John River confluence. That site was later rejected, in response to pressure against flooding the Allagash. The Dickey site, located on the St. John, just upstream from the Allagash-St. John junction, was selected as the best alternate.

According to the Department of the Interior Army Corps of Engineers' plan, formulated in the early 1960's and authorized by Congress in 1965, the Dickey-Lincoln project would create impoundments behind two dams: the main Dickey dam, and a smaller re-regulating dam 11 miles downstream at Lincoln School. [1] The Dickey dam would be

[1] U.S. Department of the Interior, Report to President John F. Kennedy. The Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Development. July, 1963, p.70.

9,260 ft. long, rising 340 ft. above the river bed. The Lincoln School Dam would measure 1,290 ft. long, and 87 ft. high. [2]

Army Corps of Engineers' plans call for both dams to be of the earthfill type, the main dam requiring 65 million cubic yards of fill and the Lincoln School dam requiring 2.2 million cubic yards of fill. [3] Five dikes necessary to prevent spillover from the main reservoir into the adjacent river basins, would require an additional 10 million cubic yards of fill. [4] It has been said that if built, the Dickey-Lincoln complex would be the eleventh largest dam in the world, the sixth largest in the United States, and in total volume of structure, larger than the Aswan Dam. [5]

Preliminary surveys made by the Corps of Engineers indicate that the immense quantity of fill necessary can be obtained locally at all sites. [6] The extensive glacial deposits that cover the valley would be the source of permeable and impermeable fill, while the slaty shale bedrock of the region would provide most of the rock required for rockfills and slope protection. Where the rock slope on the face of the dam would be exposed to fluctuating water levels and freezing and thawing, a rock more resistant than shale to weathering would be required. High quality, durable

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[2]U.S.Army Engineer Division, New England Corps of Engineers, Supplement to July 1963 Report: The International Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Power Development, Engineering Report, April 1, 1964, p.3.

[3]Ibid., p.3. [4]Ibid., p.29.

[5]Sleeper, Arthur, Portland Press Herald, July 18, 1965.

[6]U.S.Army Engineer Division, Supplement to July, 1963 Report, op. cit., p.30.

granitic rock, suitable for slope facing and for the production of concrete aggregate would be quarried at Deboullie Mountain, an 18-mile haul from the Dickey dam site.[7] The Deboullie granite is the only major occurrence of resistant igneous rock in the region.[8]

Hydrologic studies of the St. John River were undertaken by the Corps of Engineers to determine the potential regulated flow available at the Dickey site. Records of the volume of streamflow in the Upper St. John River have been kept since 1946, at a gauging station two miles upstream from the Dickey dam site. The average annual streamflow, which corresponds to the potential regulated flow, at that point is 4,600 cubic feet per second (c.f.s.).[9] Although the streamflow in the Upper St. John follows a normal seasonal pattern, the heavy snowfall of northern Maine, plus the lack of extensive natural storage in the St. John headwaters, combine to produce torrentially high flows in the spring (as high as 70,000 c.f.s.) and drastically low flows during July, August and September (record low of 129 c.f.s.).

The function of the reservoir would be to even out seasonally irregular streamflow, impounding the flows in excess of the annual average, 4,600 c.f.s., to be released during periods of lower than average streamflow. The

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[7] U.S.Army Engineers Division, Supplement to July 1963, Report, op. cit., p.33.

[8] Ibid., p.17.

[9] U.S.Department of the Interior, Geological Survey-Water Resources Division, Water Resources Data for Maine, 1966, Part I: Surface Water Records, 1967, p.11.

maximum reservoir drawdown (the maximum distance that the water in the reservoir can be lowered when water is withdrawn for power generation) planned is 40 ft., which provides 2.9 million acre-feet of active storage capacity. This active storage capacity corresponds to a regulated flow of 4,370 c.f.s. [11] Since the flow of the St. John at the dam site averages 4,600 c.f.s., it appears that the Dickey dam is planned for near maximum size to control 95% of that flow.

There ie only a limited quantity of potential energy in a river at any one site, depending upon the volume of streamflow. A hydroelectric dam stores the potential energy of river flows and converts it into electrical energy. Kilowatts of electricity are a produot of the amount of flow times the head (or drop). With an average head of 290 ft. and the rather low average flow of 4,600 c.f.s., there is only enough potential energy in the St. John River at the Diokey site to run a generating unit of 95,000 kilowatts. This is the "prime power" in the St. John River at that point. Operating continuously, an installation of that size could produce about 830 million kilowatt-hours (KWH) per year of baseload power. [12]

But if, instead of continuous operation, the potential energy stored behind the Dickey dam were released in larger

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[11] U.S. Army Engineers Division, Supplement to July 1963 Report, op. cit., p.58.

[12] John M. Wilkinson, "New England's Power Developments: Part II . . . Public Power Proposals", New England Business Review, Federal Reserve Bank of Boston Research Department, April, 1966, p.9.

quantities for shorter time intervals, peaking power could be produced instead of baseload power. This is the operating procedure planned for the Dickey dam, which would have an installed generating capacity of 760,000 kilowatts. The Dickey dam and power house is sized for operating periods of 3½ hours each day, equivalent to a plant factor of 11%. Approximately the same number of kilowatt-hours per year of energy (830 million KWH) would be produced under either operating procedure, however, because the total output is governed directly by the flow in the river.

Cast in this light, the true value of the St. John as a hydroelectric resource appears to be less mammoth than when generating capacity figures alone are cited. If operated at 50% plant factor, for the production of baseload power, a generating capacity of 190,000 kilowatts would provide adequate conversion ability.

During peaking power operation of the Dickey dam, large surges of water would be released downstream. The function of the re-regulating dam at Lincoln School is to re-impound and release these surges evenly. 34,000 kilowatts of generating capacity would be installed at Lincoln School to be operated for the production of baseload power at a high (87%) plant factor.[13] The production of baseload power at Dickey-Lincoln appears to be coincidental to the need for re-regulation of peaking releases and maintenance of minimum stream flows.

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[13] U.S.Army Engineer Division, Supplement to July 1963 Report, op. cit., p.81.

The reservoir capacity of the Lincoln School dam must be sufficient for the re-regulation of the flows from the Dickey dam, but the size of the reservoir, and, hence, the generating capacity of the Lincoln School power plant, is restricted by two factors: the re-regulating reservoir cannot encroach upon the Dickey spillway discharge channel, and it cannot encroach upon Allagash Falls, a natural barrier protecting the Allagash River. These limitations on the eize of the Lincoln School reservoir mean that the flows from the Dickey dam and from the "uncontrolled drainage area of 1,300 miles" of the Allagash River basin, cannot be fully utilized for the production of electric power.[14]

At full pool (910 ft. above mean sea level) m.s.l. the Dickey reservoir would extend 57 miles up the St. John River to the area known as Seven Islands. The backwater would reach 25 miles up the Little Black River, and 23 milee up the Shields Branch of the Big Black River.[15]

A total of 110,000 acres would be used for the project. The Dickey reservoir itself, at full pool, would occupy 88,600 acres. At minimum pool, the reservoir would occupy 58,000 acres. Daily fluctuations in the reservoir pool level would occur in response to the peaking power operation. Approximately 2,000 acres would be required for work areas at the dam and saddle dikes, including access routes and borrow areas. A 300-foot wide buffer zone and access strip

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[14]U.S.Army Engineer Division, Supplement to July 1963 Report, op. cit., p.76.

[15]Ibid., p.67.

would be acquired around the perimeter of the reservoir. A borrow area of 20 acres at Deboullie Mountain for granite quarrying is also projected. [16]

The coordinated operation of the two dams would require excavating a new channel for the lower end of the Allagaeh River. The deep curve in the Allagash channel, just before it enters the St. John, would be straightened to accommodate the tailrace from the Dickey power house. One mile up the straightened channel, the Dickey spillway discharge channel, which handles reservoir overflows, would empty into the Allagash.

Almost all of the land that would be inundated by the formation of the reservoir pool is held in large tracts for pulpwood cutting. Ninety-nine per cent of the population in the project area is concentrated in Diokey, a hamlet of about 700 people, therefore, relocations will not be extensive.

Negotiations with the Canadian government would be necessary before construction of the Dickey-Lincoln project since two arms of the Diokey reservoir encroach upon Canadian territory. Moreover, the seasonal pattern of flow in the Lower St. John would be altered by the regulation of the upper portion of the watershed by the Dickey dam. Although no power dams exist on the Lower St. John within Maine, three power installations at Grand Falls, Mactaquac and Beechwood have been built on the St. John

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[16] U.S.Army Engineer Division, Supplement to July 1963 Report, op. cit., p. 67-68.

in Canada. Dickey-Lincoln would act as controlled storage for these plants, and by smoothing out the naturally erratic flows from the Upper river, would enhance downstream production at New Brunswick hydroelectric power plants by about 350 million KWH per year. [17]

A modification of the Dickey-Lincoln project has been proposed, and $50,000 appropriated to study that proposal as of August, 1973. The modified project would produce power primarily for a Maine market, its generating capacity to be sized for the production of baseload power at roughly 100,000 kilowatts. The economic and engineering facts of the smaller project can only be estimated by interpolating from the full-scale Dickey-Lincoln project. The changes in the engineering features such as the size of the reservoir, the reduction in the size of the dam, the necessity of a re-regulating dam have not been analyzed, and, therefore, the economic feasibility of the smaller project plan is also unknown.

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[17] U.S. Department of the Interior, Report to President John F. Kennedy. July, 1963, op. cit., p.73.

PART II-The Resources of the Dickey-Lincoln Project Area

Evaluations of the Dickey-Lincoln project have been largely confined to examining the economic and engineering feasibility of the project, while glossing over the environmental aspects. The procedure for determination of the soundness of a Federal water resource project is prescribed by Senate Document #97, which essentially requires a comparison in dollar terms of the costs and benefits of a project. [1] This approach to the evaluation of the merit of water resource developments does not lend itself to consideration of the social costs or the environmental consequences of the project, but is strictly geared to consideration of the direct dollar costs of planning, construction, and operation of the power plant and transmission facilities. Nowhere in the highly favorable benefit-cost analysis for Dickey-Lincoln, prepared by the Department of the Interior and Army Corps of Engineers, is even qualitative consideration given to the environmental costs inherent in any hydroelectric power development.

Two studies deal with the effects of the Rankin Rapids hydroelectric project on the fish and wildlife of the Allagash and Upper St. John Rivers. Both reports were made before the dam site was changed to Dickey-Lincoln. The first, a "Preliminary Report on the Effects of the Proposed Rankin Rapids Dam on the Fisheries of the Upper

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[1] U.S.Congress, House, Committee on Appropriations, Subcommittee on Public Works, Public Work Appropriation for 1968, Hearings, 90th Congress, 1st Session, March 13, 1967, p. 393.

St. John River Basin" was prepared by the Maine Department of Inland Fisheries and Game in 1957, and revised in 1960. This report was based on a preliminary investigation undertaken to collect data on existing aquatic habitat conditions to assess the status of the trout populations, and from this information to make preliminary evaluations of the effects of the proposed Rankin Rapids project on the fishery resources of the Upper St. John River. [2]

A second report was prepared in 1959 by the Fish and Wildlife Service, U.S.Department of the Interior, "Substantiating Data for a Report on Fish and Wildlife Resources in Relation to the Rankin Rapids Dam and Reservoir." This is essentially an expanded version of the Maine agency's "Preliminary Report", broadened in scope to provide information on wildlife habitat and populations as well as on the fisheries of the Upper St. John-Allagash basins.

A dam built at the Rankin Rapids site, located below the confluence of the Allagash and St. John, would have caused the inundation of both rivers. The 1959 Federal report appears to have been designed mainly to justify the relocation of the dam site from Rankin Rapids to a site on the St. John above the mouth of the Allagash, in response to strong public reaction against flooding the Allagash. As a consequence, the later report is biased, since it heavily emphasizes the fish and wildlife and recreation

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[2]Kendall Warner, Maine Department of Inland Fisheries and Game, Preliminary Report on the Effects of the Proposed Rankin Rapids Dam on the Fisheries of the Upper St. John River Basin. 1957 (Revised, 1960), p.2.

losses that would be incurred by flooding the Allagash, while minimizing the same type of losses that would be caused by flooding the Upper St. John. The dam site was changed to a point upstream from the Allagash, as advocated in this report, the Big Rapids site. Later, the Dickey site was substituted because of greater site potential for power generation.

Both reports are of a preliminary nature, although the Fish and Wildlife Services report is subtitled "A Detailed Report on Fish and Wildlife Resources". Both call for future detailed field investigation of the Upper St. John fishery and wildlife resources. Acoording to Mr. Lyndon Bond, Head of the Fisheries Division of the Maine Department of Inland Fisheries and Game, no field work on the Upper St. John has been done since 1960 and none is planned in connection with the Dickey-Lincoln project. [3]

In conjunction with the publication of the North Atlantic Regional Water Resources Study (coordinated by the Army Corps of Engineers), in 1972, a Draft Environmental Impact Statement was issued to analyze the impact of the water resource development projects which, according to the economic and population projections used in the Study, will be needed in the St. John River Basin by the year 2,000 in order to meet the development objectives set forth for this region. The key proposal, fulfilling several of the

[3]Statement by Lyndon Bond, Maine Department of Inland Fisheries and Game, Fisheries Division, personal interview, January 30, 1973.

projected water resource needs, is the development of a huge multi-purpose reservoir on the Upper St. John which is easily recognizable as the Dickey-Lincoln project. The Draft Environmental Impact Statement and the North Atlantic Regional Water Resources Study, while providing a revealing insight into the current Corps of Engineers' attitudes toward the Dickey-Lincoln project, derives its information about the environmental resources of the Upper St. John from previous studies, probably the two mentioned above, and contributes no new factual information about the effect of Dickey-Lincoln on those resources.

The Fishery of the Upper St. John River

The Upper St. John River and its tributaries comprise a vast system of streams offering ". . . an almost unlimited amount of superior seasonal stream habitat for brook trout." [4] Compared with the extensive system of lakes of the Allagash, pond habitat in the Upper St. John River basin is very limited, consisting of a few small headwater ponds. Thus, the existing fishery is almost exclusively for brook trout. [5]

Fishing pressure on the Upper St. John results principally from accessibility. Roads built in connection with logging activities have directly opened up much of the basin to fishing and canoeing. Stretches on the main river and tributaries which are not easily reached from the logging roads are accessible by canoe only during high water. The "Preliminary Report" describes the use of the St. John for fishing generally as "moderate" during spring and early summer in terms of a wilderness type of fishing, with parts of the river and tributaries near access points receiving more intensive utilization. [6]

Brook Trout Habitat

Brook trout habitat on the Upper St. John and its tributaries approaches ideal conditions for the species.

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[4] Kendall Warner, Maine Department of Inland Fisheries and Game, Preliminary Report on the Effects of the Proposed Rankin Rapids Dam on the Fisheries of the Upper St. John River Basin, 1957 (Revised 1960), p.4.

[5] Ibid. [6] Ibid.

Water quality is generally exoellent, free from human or industrial pollution. The brook trout fishery coexists successfully with timber harvesting, the predominant land use in the Basin. Siltation problems have occurred in the past due mainly to dredging of headwater streams in Canada.[7] Logging practices are responsible for some damage to the fishery habitat by causing erosion and removal of protective shade along stream banks, and by the change in run-off patterns created by the deforestation of portions of the Basin.

Both the Allagash and the St. John rivers are considered to be among the top trout streams in the country. Limitations on brook trout habitat in the Upper St. John are caused by two conditions: the extreme seasonal fluctuations of water levels in the river, and the obetacles to migration at the mouths of many tributary streams.

Water levele are critical for the quality of fish habitat because water temperatures increase rapidly ae flowe diminish. Brook trout cannot tolerate temperatures over 70°F without deleterioue metabolic changes. As water levele recede, and the water temperature reachee a critical point, the trout seek areas of coldwater influence to carry them over the hot summer period. The trout congregate in well-ehaded tributaries, in spring holes, and pools at the

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[7] Kendall Warner, Maine Department of Inland Fisheries a and Game, Preliminary Report, op.cit., p.5.

mouths of the tributaries during warm periods.[8] Due to the concentration of the fish during low flows, the fishing is said to be liveliest during these periods, but access to fishing grounds by water routes is severely curtailed.

July, August and September are the critical months for brook trout in the Upper St. John River. From a peak in April and May, averaging between 12,000 and 14,000 c.f.s., river flows drop to about 3,000 c.f.s. in late May, and this fairly high level is usually maintained through mid-June. During the next three months, however, water levels are often too low for canoeing, and river flows may diminish to a mere trickle. On the other hand, during seasons of abundant rainfall, or periods of storms, the river level remains quite high.

The extreme seasonal fluctuations of water levels in the Upper St. John, and the abrupt rise and fall of river levels in response to rainfall result from a combination of circumstances. In contrast to the Allagash, which is continuously fed even throughout the critical summer months by a system of large and small lakes, the Upper St. John has inadequate natural storage capacity to maintain high water levels. Much of the Upper St. John drainage is flat swampland and high water tables, which is conducive to

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[8]U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data for a Report on Fish and Wildlife Resources in Relation to the Rankin Rapids Dam and Reservoir. September, 1959, p.12.

rapid run-off and heating. [9] It is alleged that deforestation has further affected the run-off characteristics of the drainage by reducing the water retention and delayed run-off capacities of the soil.

The other limitation on trout habitat suitability in the St. John is the scarcity of spawning and nursery areas above the Nine-Mile Bridge section, due to obstructions to fish migration which block many of the tributaries above this point. The Maine Department of Fish and Game has checked tributaries from the headwaters of the St. John downstream to St. Francis for obstructions to migration and extent of good trout spawning and nursery habitat. They found that, of nine tributaries checked between the Northwest Branch and the Nine-Mile Bridge, only two were then pass ble. Five were blocked by beaver dams, and boulder cascades made two others difficult to ascend at low water levels. Gravel "fane" formed at the mouth of the tributaries were another frequently encountered barrier. From Nine-Mile down to the St. Francis River, forty tributaries were checked, and twenty-five were found to be passable to brook trout at low water. [10]

Despite these limitations, the Upper St. John provides seasonal brook habitat of sufficient quality to be considered one of the outstanding stream fisheries for brook trout in America. Even more renowned for brook trout fishing

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[9] Kendall Warner, Maine Department of Inland Fisheries and Game, Preliminary Report, op. cit., p.6.

[10] Ibid., p.7.

than the mainstream are two of its tributaries, the Big Black River and the Little Black Rivor. The Big Black with wide, shallow bouldor riffles where trout feed, has excellent seasonal trout habitat, although water levels beoome very low in July and August. The Little Black reputedly has even better trout fishing, despite severe damage inflicted on the trout habitat by log drives in the 1950's. Pockwock and Chimenticook Streams also both provide exceptional seasonal habitat for trout. [11]

The reservoir that would be created by the construction of the Dickey-Lincoln dam would extend about fifty-seven miles upstream from the dam site on the main stem of the St. John to Seven Islands. The portion of the St. John River remaining in the wild state would be reduced by half. Twenty-five miles of the Little Black River would be inundated and twenty-three miles of the Big Black. The Big Blaok and Little Black rivers would be flooded back into Canada, resulting in obliteration of these two superb trout fisheries in the United States. Also, several miles of Chimentioook and Pockwock Streams would be flooded.

The planned inundation would oause complete destruction of the existing river habitat for brook trout on the main etem of the Upper St. John for 57 miles, the Little Black River, and most of the Big Blaok River. Brook trout

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[11] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p. 15.

are not well adapted to the lake environment such as exists in a reservoir pool. Thousands of acres of vast warm shallows would exist within the reservoir where competitive species better adapted to tho lake environment, such as yellow perch, already present in the St. John, would gain a foothold and proliferate.[12] In the deeper water typical lake species such as lake trout, whitofish and smelt might become dominant. Not only would the brook trout fishery in the project area be destroyed, but the trout fishery upstream from the reservoir would deteriorate as a result of the proliferation of yellow perch, a direct competitor with trout. The best spawning and nursery grounds for brook trout in the entire Upper St. John River are located within the project area, and would be engulfed and destroyed by the reservoir, further damaging the trout fishery upstream of the reservoir.

Some compensation for the damage would be provided by the lake-type fishery of the reservoir pool, since species of fish adapted to a lake environment are not now significant in the Upper St. John basin. The adjacent Allagash watershed, however, contains numerous lakes and ponds. The reservoir fishery could consist of a high-demand sport species such as lake trout,[13] but this cannot be predicted with certainty. The Fish and Wildlife Service report

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[12] U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p.21.

[13] Ibid., p.25.

states: ". . . it is anticipated that the reservoir pool will provide fishery values which will only partially compensate losses." [14] In any case, construction of Dickey-Lincoln would result in a complete change from the present excellent natural river fishery for brook trout to a lake fishery of unpredictable, but certainly lower quality.

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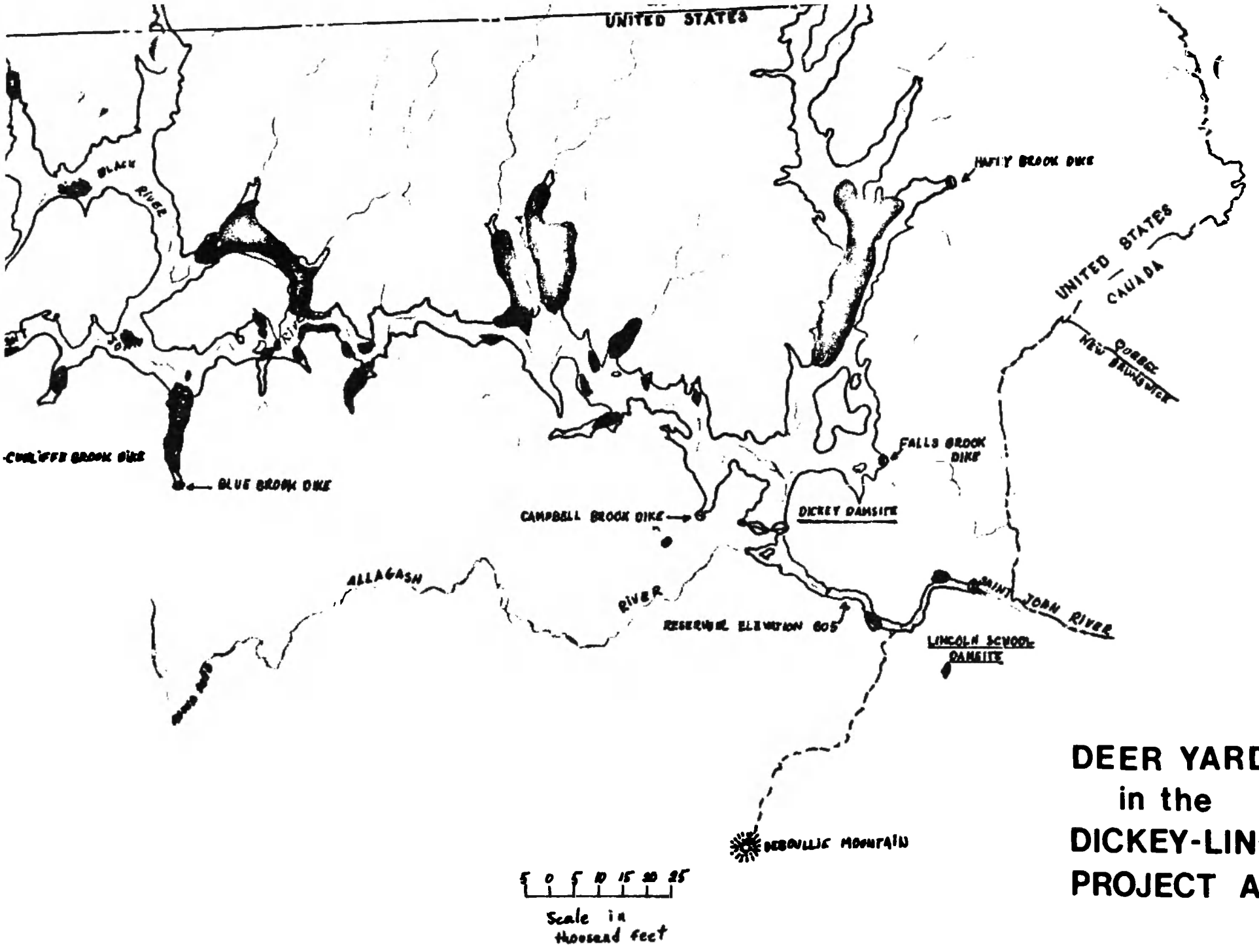
[14] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p. 24.



DEER YARDS in the DICKEY-LINCOLN PROJECT AREA

Wildlife Resource

The Upper St. John River basin is covered by coniferous forests, but 100 years of logging activity has left virtually no virgin timber. The forest type that now predominates is the northern spruce-fir forest. Growth is characteristically thick, producing a dense canopy that admits little light to the forest floor. What open land does exist, consists of abandoned farms, cleared long ago to produce supplies for logging crews, and areas recently cut-over by logging operations.

The white-tail deer is the most important game species in the Upper St. John watershed, as in the rest of Maine. In general, however, the harsh climate of northern Maine and the heavily forested nature of the area, provide an environment far from ideal for the deer population. Good browse and cover are scarce in the interior forest, even during the milder seasons. The best deer habitat in this wilderness forest area is offered by the transitional vegetation, the young, brushy growth bordering open lands and the fringes of water courses. Small, well-managed timber outs provide good deer habitat, but large clear-cut areas, covered with deep slash, are of less value for deer.

The olimate of northern Maine is characterized by long winters with snow cover lasting from October through April. This is the critical season for the deer populations of northern Maine. During the deep snow period, the deer gather in areas that provide both cover and ample food

supply, known as deer yards. Almost all of the deer yards in the Upper St. John basin are located along watercourses. Thirty-four yarding areas have been identified within the area that would be covered by the Dickey-Lincoln reservoir.[15] The largest deer wintering areas were found to be in a ten-mile stretch along the Little Black River, large areas on Chimenticook and Pockwock Brooks, and the lower ten-mile section of the Big Black River. Numerous smaller areas are located along the main stem of the St. John and on the minor tributaries.[16] The Fish and Wildlife Service reported in 1959 that, "The deer yards located within the project area are of vital importance in maintaining populations and attract deer from outside the project boundaries.[17]

Thirteen thousand acres of deer yards would be obliterated if the project were built.[18] The deer population in the northern Maine forest is particularly vulnerable to destruction of its winter range. The Department of Inland Fisheries and Game, having extensively surveyed deer yards throughout the state, estimate that 38%, or one in three, of the deer yards in the interior forest have deer in excess of carrying capacity. In the sections of the state where

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[15]U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data-Rankin Rapids. letter of transmittal, p.2.

[16]Ibid., Figure 3, "Location and Extent of Existing Deer Wintering Areas".

[17]Ibid., p. 27. [18]Ibid., letter of transmittal, p.9.

the farm-woodland habitat is more predominant only one in ten deer yards was found to be over-browsed.[19]

Since the yards in the project area constitute the major deer wintering areas in the Valley, many deer from outside the project area proper are attracted to them. These deer would be forced to seek wintering areas outside the project area in yards which are already overcrowded, thus creating a secondary impact on the deer population wintering in yards outside the project area. Therefore, the Fish and Wildlife Services conclude, ". . . It is certain that a dramatic reduction in deer population will take place within the area affected by the project." [20]

Moose are reported to be common in parts of the Upper St. John region, particularly in the project area. In the past, moose, once common throughout the Northeast, were found only in the northern Maine counties. That area served to replenish the moose herd throughout Maine, and it is now said that the state's moose herd ". . . is the last sizable remnant of the species in the eastern United States." [21] The moose remains a protected species in Maine. Black bear are also abundant here and are subject to hunting usually for their trophy value.

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[19]State of Maine, Department of Inland Fisheries and Game, Deer in Maine. January 1961 (Revised 1964), p.82.

[20]U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data-Rankin Rapids. op.cit., p.31.

[21]Ibid., p.27.

Fur-bearing animals are abundant in the Upper St. John Valley, although fur-trapping activity in the region ie much reduced from its past importance. Beaver ie the most abundant fur-bearing species and their dams are common on the tributaries in the project area. Flowages created by theee dams are generally of benefit to other species, although not always to the brook trout. Mink, otter, and muskrat are also taken by trappers, and weasel, skunk, raccoon, rabbits, fisher, marten, and fox also inhabit the Upper St. John Area. [22]

Waterfowl breeding habitat in the projeot area has been created largely by beaver flowages. The Little Black River is particularly noted for providing good waterfowl habitat. Black duck, blue-winged teal, wood duck, and ring-necked duok are the varieties most common to the project area. [23] An informal waterfowl survey made in July 1972 by a party canoeing the river, reported sightings of ninety ducks of undetermined species over a period of seven days between Red Pine Grove ten miles upstream from Nine-Mile, and Ouellete Brook, along a fifty mile stretch of the Upper St. John. [24]

Bald eagles have been sighted in the Upper St. John area, but the Audubon society was unable to locate a nest

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[22]U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids. op. oit., pp. 28-29.

[23]Ibid., p.29.

[24]John Libby, July 18, 1972.

in the area during their recently completed census of eagles in Maine. Ugh Lake, located in the vicinity of Seven Islands, however, was found to offer good eagle nesting habitat.[25]

Hunting pressure in the Upper St. John Valley, like fishing pressure, is dependent upon access, and the increase in hunting in recent years is largely attributable to the expanded network of logging roads within the wildlands. Weather conditions do limit access to a greater extent in the northern section of Maine than elsewhere in the state, and an early heavy snowfall can result in a sharp decline in the area deer kill. The white-tail deer is the most sought after game animal in the Upper St. John area, although black bear trophy hunting attracts many sportsmen to the area. The deer harvest in the region is low in comparison with the rest of the state, a result of the relatively light hunting pressure and the scarcity of ideal deer habitat.[26] A sharp upward trend in the deer kill in the Dickey-Lincoln project area during the 1950's became stabilized in the 1960's.[27] As hunting pressure continues to increase in southern Maine, however, the Upper St. John can be expected to receive a share of the spillover, particularly as access roads are improved.

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[25]Statement by Richard Anderson, Executive Director, Maine Audubon Society, personal interview, Jan. 31, 1973.

[26]U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data-Rankin Rapids, op.cit., p.25.

[27]Fred Bilbert, Maine Department of Inland Fisheries and Game, Deer Season 1970. September 1971; Deer Season 1971. July, 1972.

All wildlife inhabiting the project area would be displaced and lose 90,000 acres of habitat if the Dickey-Lincoln project is built. The Fish and Wildlife Service Study concluded that, "The displaced wildlife population will be lost, since wildlife habitat in surrounding areas is being utilized to its maximum capacity.[28]

At the maximum pool elevation planned by the Corps of Engineers, 88,600 acres would be flooded. At the proposed minimum pool elevation, 58,000 acres would be flooded. Development of edge-type habitat, beneficial to most species of wildlife, would normally result from the growth of brushy cover along the cleared shoreline. The fluctuation of the water level in the reservoir, in response to the daily peaking operation of the Dickey dam, however, would greatly reduce the benefits by inhibiting the type of vegetation which would provide food and cover for wildlife. Approximately 1,000 acres would be flooded or uncovered for each one-foot change in the water levels of the pool, with the result that 30,600 acres could be alternately exposed or inundated during the normal operation of the project. Although this area would not be removed completely as wildlife habitat, it would have minimal value as wildlife habitat, and no value as deer wintering habitat.

Waterfowl breeding habitat in the project area would be completely lost. Some marshy areas would develop on

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[28] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data-Rankin Rapids, op.cit., p.31.

the fringes of the reservoir, but due to the fluctuations in the pool level that will occur, they would be completely unsuitable for nesting use. Additional resting area for waterfowl would be provided by the reservoir, but this type of habitat is already so abundant that any waterfowl benefits from the pool will only be competing with the lakes and ponds of northern Maine whioh are more than adequate to meet the need. [29]

The Fish and Wildlife Service found in 1959 that "The wildlife species found within and adjacent to the projeot area are of considerable value even though not heavily utilized at the present time. Heretofore, this wilderness area acted as a reserve of wildlife which would be expected to take up increasing hunting pressures as more accessible areas beccme heavily hunted. The recent increase in deer hunting indicates that tapping of this reserve has begun.[30] The importance of this area for maintaining deer populations by supplying critical deer wintering habitat for the entire region has been pointed out already. It is particularly significant, according to this study, that this wilderness area has functioned as a regenerative area for once-rare species such as the moose, the marten, and the fisher, when their populations became drastically reduced

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[29]U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op.cit., p.31.

[30]Ibid., p. 29.

throughout the state, due to the advance of civilization or heavy hunting or trapping pressures. At one time the marten could be found in Maine only in the Upper St. John-lower Allagash valleys. [31]

The stated purpose of the 1959 report, "Substantiating Data for a Report on Fish and Wildlife Resources in Relation to the Rankin Rapids Dam and Reservoir", was to evaluate the fish and wildlife resources of the lower Allagash River Basin and the Upper St. John River Basin, and to estimate the effect of the proposed Rankin Rapids project on those resources. The conclusions and policy recommendations of the Fish and Wildlife Service are contained in a separate part of the report in the accompanying letter of transmittal. The results of the investigation, as interpreted by the Fish and Wildlife Service, showed that: "1) the proposed project would cause major losses to fish and wildlife resources, 2) that the effects of the project on fish and wildlife resources would extend far beyond the limits of the projeot area . . " and "3) that the proposed project would destroy existing and potential values of the Allagash River which cannot be replaced by any other site in the eastern United States." [32] The central reoommendation of the report is that ". . . maximum overall benefits, including those based upon fish

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[31] U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids. op.cit., pp. 28, 29 and 30.

[32] Ibid., letter of transmittal, p. 1.

and wildlife resources, be realized by utilizing the Big Rapids and Lincoln School dam sites." [33] Later investigation of the sites on the St. John located above the confluence with the Allagash proved the Dickey-Lincoln site to be more satisfactory than the Big Rapids site.

In essence, the Fish and Wildlife Service Study concludes that the Allagash River is an irreplaceable natural resource, and that the Upper St. John River is expendable. The evidence supplied in the two reports, however, does not justify this distinction between the value of the Allagash and the value of the St. John. Only the brook trout fishery of the Allagash is said to be "of better quality and quantity" than that of the St. John, and even so, it is a fine distinction between which of the two "superior" trout streams is more so. The fact that the St. John offers more abundant deer wintering habitat than does the Allagash is not pointed out. Nearly every statement extolling the irreplaceable values of the region applies equally well to the St. John as to the better known Allagash.

The recommendation that the Upper St. John should be flooded "to maximize overall benefits" has no basis in the evidence presented in the "Substantiating Data" report. Indeed, the tone of the letter of transmittal conveys the impression that the conclusions and recommendations were made independently of the factual information on fish and

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[33] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, letter of transmittal, p.2.

wildlife resources presented in the report. This report represents an attempt to declare arbitrarily that the environmental damage inflicted on the Upper St. John by a hydroelectric project would not be serious enough to reject such a project. Yet, in 1959, no comprehensive evaluation of the Dickey-Lincoln project had been made, the final dam site had not been chosen, and thus, very little was known about the economic value of the project. It is clear that the 1959 report was used to justify and advocate the trade-off that was being made, the St. John for the Allagash, by the Department of the Interior through its subagency the Fish and Wildlife Service. The construction of the hydroeledtric dam on the St. John is depicted as crucial for the protection of the Allagash: "The proposed plan to use a dam eite above the Allagash, i.e., Big Rapids or Dickey would also forever protect the recreational value of the Allagash River." This weak attempt to justify the project by equating its construction with the preservation of the Allagash, in spite of the overwhelming evidence of the project's adverse environmental impact on the St. John, is a far-fetched and insidious rationalization, at best.

The attempt, in the 1959 report, to identify the Dickey-Lincoln project with the preservation of the Allagash, plus the pre-determined character of the conclusions to the report, prompts speculation concerning the true motivation of the Department of the Interior in advocating the change of the dam site from Rankin Rapids to

a site upstream on the St. John. It is not unlikely that Interior anticipated strong opposition to a hydroelectric project involving the Allagash, and actually never expected to succeed in "selling" the Rankin Rapids project. But, by starting out asking for a lot, an Allagash-St. John project, the planners succeeded in getting, not just a little, but the St. John River project. Such a strategy allowed a grand gesture of concession to be made to environmental interests, at the same time allowing opposition to the project to run its course. This apparent concession undoubtedly did de-fuse much of the opposition to the project, opposition that might have focused on preserving the St. John had not the Allagash also been threatened.

These suspicions are further substantiated by the lack of consideration given environmental impact in reports made on the Dickey-Lincoln project in the 1960's. These reports totally ignored the information presented in both the 1957 Fish and Game report and the 1959 report by the Federal Fish and Wildlife Service. The report of a two-year review of the Passamaquoddy-Upper St. John joint project issued by the Department of the Interior in 1963, [34] and a supplement to this comprehensive report by the Department of the Interior and the Army Corps of Engineers including an in-depth study of all aspects of the Dickey-Lincoln proposal,[35]

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[34] U.S. Department of the Interior, Report to President John F. Kennedy, The Passamaquoddy Tidal Power Project. July 1963, op. cit., p.

[35] U.S. Army Engineer Division, New England Corps of Engineers, Supplement to July 1963 Report: The International Passamaquoddy Tidal Power Project April 1, 1964, op.cit.

make absolutely no mention of fish and wildlife losses which would result from the construction of the Dickey-Lincoln project. A section entitled "Fish and Wildlife" is included in the comprehensive Interior Corps of Engineers report, but the environmental impact of the Dickey-Lincoln project is not discussed at all. Instead, this section, consisting of two paragraphs, goes to absurd lengths to stress the environmental benefits of the Passamaquoddy project, dismissing completely the possibility of any adverse environmental effects from the tidal project. It is significant that the well-documented adverse environmental effects of the Dickey-Lincoln project were not mentioned, nor was it even indicated that any studies of the subject had ever been made.

Wilderness Camping and Canoeing

The primary attraction of the Upper St. John-Allagash region is the opportunity for long, unbroken canoe trips, enhanced by excellent brook trout fishing, entirely in a wilderness setting. It is possible to canoe for 130 miles on the Upper St. John, from the headwaters in the remotest part of the north woods at Fifth St. John Pond, through the heart of the interior forest of Maine, before striking any settled areas.

The traditional approach to the headwatere involves a long and arduous upstream trip from Moosehead Lake to the Weet Branch of the Penobscot River, from the West Branch to the North Branoh Penobscot and Bog Pond, where a canal leade to Fifth St. John Pond. Beaver dams and uncontrolled growth now impede the canal, but there is no automobile accees. A small stream runs from Fifth St. John Pond to Baker Lake, where a private International Paper Company road crosses the stream. This ie the highest point in the headwaters that may be reached by automobile.

Probably the access route to the Upper St. John used most commonly by canoeists is the private road of the International Paper Company known as the Realty Road. Since the Realty Road comes in from Daaquam, following the Daaquam River and the Northwest Branch St. John, it affords easy access to those wishing to begin their trip in this section of the headwaters. The Realty Road orosses the St. John just below the confluence of the Baker Branch with

the Northwest Branch, a good starting point for the run down the main stem of the St. John. It is about eighty miles from the Realty Road Bridge to the settlement at Allagash by river, and the canoeist is warned that, after putting in there is ". . . no way to return to civilization except to go downstream, and there are heavy rapids before reaching the Allagash." [36]

The run from Daaquam to Allagash is no longer the dire test of survival that this statement implies. An exteneive network of private paper company roads has been developed on the west side of the river from the Nine-Mile Bridge area downstream. Today there remains only one good sized stretch on the main stem of the St. John River whioh is truly inaccessible by road. All the land in the Upper St. John Valley is owned by the forest products industry, however, and all roads are privately constructed, maintained, and controlled by the landowners. Permission is required for their use by the public.

The two drawbacks to canoeing the St. John River, namely indefinite water levels and voracious insects, make it ideal to run the river early in the season. In middle to late May high water is guaranteed but the flood stage has passed and the black fly hatch has not yet begun. Within the 2,725 sq. miles of the Upper St. John basin, only a few lakes or ponds of any else exist, thus, natural

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[36] Appalachian Mountain Club, The A.M.C. New England Canoeing Guide. Boston: The Appalachian Mountain Club.

storage is insufficient to maintain the river at high levels during the summer. During June, water levels in the river decline until, by the beginning of July, little more than a trickle may remain. High water levels occur periodically throughout the summer, however, depending on the amount of rainfall in the basin.

In July, 1972, I spent ten days on a canoe-fishing trip on the Upper St. John with Sherwood and Lorraine Libby and their family. The water level was consistently high during our trip and we found the canoeing to be delightful. The canoe run consists of a swift current, smooth for the most part, but never tedious due to the frequently encountered sets of rocky rips. The stream bed gradient is gentle, falling at the rate of six feet per mile with only two really fast drops. Two sets of difficult rapids must be negotiated before reaching settled communities. The Big Black Rapids, just above the mouth of the Big Black River are rated Class III [37] and, because heavy growth along the shore prohibits carrying these rapids, they must be either lined or run. Big Rapids is a more difficult, notably treacherous drop, two miles in length, but it can be carried via the logging road which parallels the river in the lower section.

The major canoeing challenge of the trip was the negotiation of the Big Black Rapids, because these cannot be

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[37] Appalachian Mountain Club, Canoeing Guide. op. cit., p.389.

easily carried. Lining these rapids is probably as dangerous as running them, since the river banks consist of vertically folded peaks of bedrock and narrow ledges running out into the channel. The approach to the rapids is marked by the steady dropping of the river bed into a gorge, affording some of the best scenery on the mainstem run.

We found that, while one is aware of being remote from organized towns and within paper company domain on the Upper Saint John, there are some unpleasant reminders of "civilisation". Our introduction to the river oame at Red Pine Grove campsite, slightly north of the Realty Road Crossing. This campsite is marred by its location beside a gravel pit and an airstrip, and is apparently used by the Forestry Service as a trash dumping area. Other campsites farther downetream, particularly those distant from road access, were overburdened with camper's debris.

Logging activity is another intrusion into the scenic beauty of the river, and the wilderness quality of the canoe ing experience. From the Big Black River, where, in 1972, the camper wae awakened by the grinding of chain eaws and the crashing of trees, down to Chimenticook Stream, cutting operations are very muoh in evidence. On the north bank some recently cleared areas extend down to the river'e edge.

Although solitude is an essential ingredient in the experience of wilderness camping, the Libby party discovered that it is hard to find even in the "remote

interior forest". No formal oensus of the canoeing pressure on the St. John has been taken, but our experience is probably indicative of the popularity of the Upper St. John for canoeing and fishing. Our first campsite, Red Pine Grove, was shared with a group of Massachusetts sportsmen who were well satisfied with their trout catch. At Nine-Mile Bridge, where the campsite is on the lawn of the Forestry Service Camp, we shared the campsite with a group of about thirty boys. Their leader, Gardiner DeFoe, takes several groupe of young people with no previous canoeing experience down the St. John each summer, including an all-girl group, teaching them everything from how to hold a paddle to the use of the setting pole. Another small party also arrived at Nine-Mile, having come in from Allagash. The next two stops were shared with Gardiner DeFoe et al at Seven Islands and Simmons Farm, although the open nature of the terrain allowed relative isolation. We encountered occasional parties of fishermen along stretches of the river olose to access roads.

Neither the visual pollution nor the lack of privacy, however, could detraot from the impressiveness of the St. John or from the delightful oanoeing. Towering spruce orowd down to the edge of the river bank, scarred and hewn as it is by the annual ice jams. The river itself is very broad, dark, and forbidding, an aspect that is in part created by the ooloration of the water. Although the water remains clear and unaffected in taete, it ie a dark

brown color that is attributed to tannic acid originating in the swampy headwater areas.

Often heard descriptions of the "cathedral-like splendor" of the Maine woods can be best understood by canoeing a river such as the St. John. Dense walls of spruce and fir rise on either side of the river, making the canoeist very much aware of his insignificance in this vastness of trees. The forbidding aspect of the forest gives the traveller renewed appreciation of the gentle, pastoral serenity of the open areas, such as Seven Islands. The scenery is rarely dramatic except in the Big Black Rapids, but it is consistently majestic and is enlivened by the frequent sighting of wildlife--deer, moose, ducks, and even bald eagles, and the startling displays of wildflowers in the clearings.

It is possible to canoe all the way to Grand Falls, Canada before taking out of the St. John, but it is recommended that the canoeist end the trip in the vicinity of Ft. Kent. Below Ft. Kent, the St. John runs through a series of Maine border towns which introduce not only visual pollution but serious sewage pollution and industrial wastes from potato processing plants and pulp mills. The Canadian St. John can be canoed, but it has two hydroelectric projects located on it with substantial water impoundments at Mactaquac and Beechwood, so that the free-running nature of the river has been lost.

The Upper St. John would be flooded out as far as the

upper end of the Seven Islands area by the construction of the Dickey-Lincoln dam. The project area encompasses the best canoeing, the best spawning areas for brook trout, and the major part of the only remaining unpolluted, free-running, wilderness section of this 423-mile river.

Flooding the Upper St. John, as proposed, would replace the current high value wilderness canoeing and fishing experience with a very large lake environment. The recreational opportunities offered by the reservoir pool would not begin to compensate for the loss of the wild river canoeing experience. The Dickey-Lincoln reservoir would be used primarily by boating enthusiasts or by those seeking access to hunting areas. The "Rankin Rapids Substantiating Data" report points out another factor that could have significant impact: "Construction of the reservoir would also afford easy access by boat to thousands of acres of previously almost inaccessible wilderness." [38]

Proponents of the project have argued that the Dickey-Lincoln lake would provide a more popular recreational facility, one which could absorb greater use pressure than the more fragile wilderness environment. The same features which would be offered by the reservoir pool, however, are already provided in abundance by natural lakes and ponds in Maine, many in wilderness settings. Opportunities for

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[38] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p.32.

long wilderness canoe trips on rivers are, however, in far ehorter supply. [39]

Certainly the scenic value of the Dickey-Lincoln lake would not compare with the river which it would replace. The debris generated by the 50,000 acres of timber that would be drowned by the reservoir would not enhance its eoenic quality. Mudflats would surround the reservoir except when at full pool. When the reservoir was lowered the full 40 ft. allowable, the recreationists seeking access to the lake might walk across half a mile of these badlands to reach the water.

The recreational hunting potential of the area surrounding the reservoir would also be damaged by the elimination of waterfowl habitat, the destruction of vital deer yarding areas, and, in general, by removing over 90,000 acres of wildlife living space. At the same time that wildlife habitat was being reduced, access to the area would be improved, and hunting pressure would increase accordingly.

Several problems have been mentioned which detract from the quality of the Upper St. John for wilderness recreation. The riverside logging activity, the crowded campsites, and the overflowing trash barrels, however, can all be corrected. Additional oampsites for instance, would permit the degree of isolation the wilderness camper seeks. Restrictions on cutting close to the river would alleviate

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[39] U.S. Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p. 34.

another source of blight. In other words, these conditions are symptoms, not of over-utilization, but of under-management for the level of use the river now receives. The transmission facilities necessary to connect the powerhouse to load centers in Maine and Boston, a total distance of 400 miles, would be a major source of scenic blight. It is estimated that the right-of-way slashes in which transmission lines and towers are located require over 100 acres per mile.[40] Routing of transmission lines from the Dickey-Lincoln site has not been finalized, but the lines and slashes would inevitably extend the visual and environmental impact of the project far beyond the dam site.

The quarrying of 70 million cubic yards of earth and rock required for the dams and dikes in the vicinity of the project, as proposed by the Corps of Engineers, also holds tremendous potential for environmental and scenic degradation. The main dam at Dickey alone would require 56 million cubic yards of fill.[41] The Corps of Engineers' plans call for the quarrying of select granitic rock at Deboullie Mountain, 18 miles from the Dickey site. The Deboullie Mountain area system of lakes has been identified as one of four lake areas in Aroostook County with outstanding potential for recreational development, in an inventory made of

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[40]Dean E. Abrahamson, "Environmental Cost of Electric Power", A Scientists' Institute for Public Information Workbook. 1970, p. 11.

[41]U.S.Army Engineer Division, New England Corps of Engineers, Supplement to July 1963 Report, op. cit., p.29.

the lakes in Northern Maine in 1969. The Lakes Study reports that "few Maine areas can match the scenic qualities of this location." [42] Twenty acres of Deboullio Mountain are slated for quarry areas for the Dickey-Lincoln project.

As access to northern Maine and the interior forest improve, utilization of the area for all types of wilderness-related recreation will increase. The Upper St. John is already absorbing the overflow of recreationists from the Allagash wilderness Waterway. The Upper St. John has particular appeal for those seeking a less popular, relatively undiscovered river trip. As the Allagash becomes more and more heavily utilized, it can be expected that use of the St. John, as the only comparable alternative, will continue to intensify. Conversely, if the St. John were flooded as proposed, one of the consequences would be increased utilization of the already crowded Allagash Waterway.

The Massachusetts and National Audubon Society have gone on record in opposition to the construction of Dickey-Lincoln, contending that the present demand for wilderness-type recreation will be slight compared to the demand in the near future. They have urged that the Upper St. John be declared a national wilderness waterway, since the construction of the Dickey-Lincoln project would ". . .

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[42] Edward C. Jordan Co., Inc., Northern Maine Regional Planning Commission: Lakes Study, Phase I Report. April, 1969, p.18.

destroy 90,000 acres of the most usable wilderness remaining in the Northeast." [43]

The Fish and Wildlife Service declared in 1959, referring to the expanding demand for wilderness canoeing, hunting, and fishing, that "In the eastern United States, this northwestern section of Maine is the only remaining wilderness of its type, by present day concepts, which can supply this demand." [44]

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[43] Statement for the National Audubon Society and Massachusetts Audubon Society, loc. cit.

[44] U.S.Department of the Interior, Fish and Wildlife Service, Substantiating Data - Rankin Rapids, op. cit., p.34.

Part III - Planning Studies of the Dickey-Lincoln Project

1959-1965

In 1956, the International Joint Commission (IJC) [1] was requested by the United States and Canadian governments to study the feasibility of constructing a tidal power project at Passamaquoddy Bay. The IJC subsequently appointed a study committee which, in 1959, made its report based on extensive study that took over three years and cost approximately $3 million. [2] It was determined that an auxiliary source of power would be necessary to "firm" the output of the Passamaquoddy project which would vary with the tidal cycle. The IJC considered several different auxiliary power sources, and selected a hydroelectric dam on the Upper St. John at Rankin Rapids as the most favorable combination with Passamaquoddy. [3]

According to the plan proposed in the IJC report, the combined output of the two projects would produce continuous baseload power for a Maine and New Brunswick market, with installed capacities of 300 megawatts at Passamaquoddy and 400 megawatts at Rankin Rapids. The cost of the project was estimated to be $687.7 million (interest @ 2 7/8%); the tidal project accounted for $532 million of the total

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[1] The IJC was established in 1909, in accordance with the Boundary Waters Treaty of 1909, to settle questions involving the use of the waters of the St. John River basin.

[2] U.S. Congress, House, Committee on Appropriations, Subcommittee on Public Works, Public Works Appropriations for 1968, Hearings, 90th Congress, 1st. Session, March 13, 1967, p. 353.

[3] U.S. Department of the Interior, Report to President John F. Kennedy. July, 1963, op. cit., p. 16.

cost. [4] In 1961 the IJC evaluated the 1959 report and determined that while the Passamaquoddy-Rankin Rapids Project would be possible from an engineering standpoint, it would not be economically feasible at that time. [5]

In May 1961, President Kennedy asked the Secretary of the Interior, Stewart Udall, to review the IJC Report to see what changes in fuel, engineering, and financial costs might make the joint project economically feasible. [6] A Passamaquoddy-St. John River Study Committee was appointed and it reported in 1963 that the joint Passamaquoddy-Tidal-Upper St. John River hydroelectric project was feasible from both an engineering and an economic standpoint, if a number of basic changes were made in the IJC plans. [7]

The most significant change recommended was the development of different marketing assumptions, based on a Preliminary Load and Resources Study in the New Brunswick-New England areas, made in 1961 for the Study Committee. The Interior Plan proposed that the combined project produce primarily peaking power instead of baseload power, and serve an expanded market area necessary to utilize the peaking power potential from the project. The Interior Plan visualized that the potential peaking power capacity of the two sites would be adequate to supply most of the growth in

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[4] U.S.Congress, House, Public Works Appropriations for 1968, op. cit., p. 383.

[5] U.S.Department of the Interior, Report to President John F. Kennedy, July, 1963, op. cit., p. 1.

[6] Ibid., p. 2. [7] Ibid., p.8.

peaking requirements for years ahead in New England and New Brunswick. [8]

In accordance with the changed marketing plans, the proposed installed capacity at Passamaquoddy was increased to 1,000 megawatts and the proposed Dickey-Lincoln capacity was increased to 750 megawatts (one megawatt equals 1,000 kilowatts). [9] Another source of project revenues was introduced in the form of payment to the United States government for so-called downstream power benefits to Canadian plants on the lower St. John, that would accrue from increased electrical production made possible by an increase in river storage on the Upper St. John. [10] The site of the Upper St. John hydroelectric project was changed from Rankin Rapids to Dickey-Lincoln School "in order to protect the Allagash".

The "Benefit to Cost Ratio" for the joint project was calculated to be 1.27 based on benefits from power, recreation and area redevelopment. [11]

No separate economic analysis was presented for the Dickey-Lincoln project, but this statement paved the way for the independent Dickey-Lincoln project: Although we propose that the Tidal Power Plant and the Upper St. John River Development be fully integrated, our economic analysis clearly indicates that either project is

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[8] U.S. Department of the Interior, Report to President John F. Kennedy, July, 1963, op. cit., p. 75.

[9] Ibid., p. 6. [10] Ibid., p. 6. [11] Ibid., p. 41.

financially feasible and could stand on its own feet as a separate project." [12]

Immediately following the publication of the July 1963 report and recommendations, an "Army-Interior Advisory Board on the Passamaquoddy-Upper St. John River Project" was created to oversee the additional work needed to supplement the July 1963 report. The supplement [13] contained two separate reports: an economic analysis of the joint project by the Department of the Interior, and a Corps of Engineers report on geologic site investigations on the hydrologic conditions on the Upper St. John, and preliminary engineering layouts of the dams and generating facilities for the Dickey-Lincoln project. For the first time, the Dickey-Lincoln project was presented and analyzed as a separate facility capable of independent operation.

The 1964 supplement determined the benefit-cost ratio[14] for the combined project to be 1.47, [15] but the benefit-cost ratio for Dickey-Lincoln alone was much more favorable, 2.25, while the Quoddy benefit-cost ratio was marginal at 1.04. The average annual cost of equivalent amounts of

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[12] U.S. Department of the Interior, Report to President John F. Kennedy, July, 1963, op. cit., p. 52.

[13] Passamaquoddy-St. John River Study Committee, for the U.S. Department of the Interior, Supplement to July 1963 Report: The International Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Power Development, August, 1964,

[14] Ratio of annual project benefits to annual costs, the basic tool used in the evaluation of the economic feasibility of Federal water resources projects.

[15] Passamaquoddy-St. John River Study Committee, Supplement, 1964, op. cit., p. 47.

electricity was found to be lower if supplied by the proposed Quoddy-Dickey-Lincoln[16] source than by privately-owned power sources,[17] and even lower if supplied by an independent Dickey-Lincoln project.

The 1964 Supplement also showed that the Federal government could produce equivalent electrical power at less cost than the cost of power from Quoddy-Dickey-Lincoln, by building federally-financed steam plants, nuclear plants, or pumped storage. Those alternatives were rejected, however, as being ". . . incompatible with the fundamental purposes of this report.",[18] because they would not provide the non-power benefits of recreation and area redevelopment that would be provided by the Quoddy-Dickey-Lincoln proposal. Furthermore, alternate sources would ". . . fail to utilize a significant undepletable resource and source of energy which is constantly being wasted . . . in the flows of the Upper St. John River on its course to the sea." [19]

The 1964 Supplement was circulated to Federal agencies and the New England governors for their review and comment. The interest rate for the Federal Treasury was increased to 3 1/4% in 1965. [20] Also, the cost of

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[16] $19.75 per kilowatt per year plus 3 mills per KWH

[17] $27.50 per kilowatt per year plus 3 mills per KWH. Composite figure provided by the Federal Power Commission (FPC)

[18] Passamaquoddy-St. John River Study Committee, Supplement to July 1963 Report: August 1964, op.cit.,p.7.

[19] Ibid., p.8.

[20] U.S.Department of the Interior, Report to President Lyndon B. Johnson. July, 1965, op. cit., p.4.

electric power from alternative private sources had dropped substantially. [21] These changes caused the benefit-cost ratio for the Quoddy-Dickey-Lincoln project to decline to 1.19. [22] The benefit-cost ratio for Dickey-Lincoln declined as well, but remained very favorable, at 1.81.[23] The separate Quoddy project's benefit-cost ratio declined, however, below unity, to 0.86.[24] In terms of at-market electricity for 1965, it was estimated that power from an independent Dickey-Lincoln project would cost $15.50 per kilowatt-year and 3 mills per KWH (kilowatt-hour); [25] equivalent power from a private utility, serving the same market, cost $23.50 per kilowatt-year plus 2.6 mills per KWH; [26] while power from the joint Quoddy-Dickey-Lincoln project would cost $36.72 per Kilowatt-year and 3 mills per KWH. [27]

In their reviews, the Department of Commerce, the Federal Power Commission, and the Treasury Department pointed out that the Quoddy tidal project was clearly uneconomical, but recognized the economic feasibility of the Dickey-Lincoln project. On the basis of the approval and concurrence of the agencies reviewing the Supplement in 1965, the Department of the Interior made five recommendations:

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[21] U.S. Department of the Interior, Report to President Lyndon B. Johnson, The Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Development. July, 1965, p.5.

[22] Ibid., Federal Power Commission review, p.6.

[23] Ibid., p.6. [24] Ibid., p.5. [25] Ibid., p.6

[26] Ibid., p.5. [27] Ibid., p.6.

1) Immediate authorization, funding and construction of Dickey-Lincoln and early completion of necessary arrangements with the Canadian government.

2) Authorization of continued study, re-examination and possible redesign of the Passamaquoddy project.

3) Preservation of the Allagash River.

4) Improvements to Roosevelt International Park on Campobello Island.

5) Continuation and intensification of a comprehensive program for the multiple-use of the area's natural resources.

The Dickey-Lincoln proposal was the only recommendation that had any substance. The others were padding designed to bolster the importance of the Dickey-Lincoln project as the 'key' to a regional resource development program. The Dickey-Lincoln proposal recommended for authorization was the 1964 Corps of Engineers' plan: at the Dickey dam, a generating capacity of 760 megawatts, operating for brief periods each day would generate 750 million KWH of peaking power annually. At the Lincoln School dam an installed capacity of 34 megawatts would be operated to produce 260 million KWH annually of baseload energy. [29]

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[28] U.S. Department of the Interior, Report to President Lyndon B. Johnson, July, 1965, op. cit., pp. 4-5.

[29] Passamaquoddy-St. John River Study Committee, Supplement to July 1963 Report, August, 1964, op. cit., pp. 23-24.

PART IV - Congressional Action on Dickey-Lincoln 1965-1972

Acting on the recommendation of the Department of the Interior, President Johnson, on July 11, 1965, asked Congress for the immediate authorization of the Dickey-Lincoln Project at a cost of $227 million. On the motion of Senator Muskie, a member of the Senate Appropriations Committee, a provision authorizing the Dickey-Lincoln project was included in the omnibus Public Works Bill. Unlike other projects in the $1.9 billion bill, the Dickey-Lincoln provision was included without hearings. [1]

On July 27, the omnibus Public Works Bill passed the Senate, including the Dickey-Lincoln measure. [2] Reportedly, no reference was made to the Maine Project in the Senate debate on the Public Works Bill, and the Maine senators did not participate in the floor deliberations. [3]

The House of Representatives did, however, assign its Public Works Subcommittee to review the Senate measure and hear testimony. Arguments in favor of Dickey-Lincoln were heard from the Governors of Maine, New Hampshire and Vermont, Maine Congressmen Hathaway and Tupper, Interior Secretary Udall, and spokesmen for the Maine and National Rural Electric Associations. Supporters of the project testified that the Dickey-Lincoln project would provide a source of inexpensive electric power for Maine and New England and bring

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[1] U.S.Congress, Public Works Appropriations for 1968, op. cit., p.355.

[2] Ibid.

[3] Bangor Daily News, July 28, 1965.

economic benefits to a depressed area as well. [4]

Opposition to the authorization of the project in the Subcommittee hearings came from two sources: the New England private electric utilities, and the supporters of the proposed Maine Power Authority. No testimony opposing the project on environmental grounds was given in 1965.

The chairman of the Electric Coordinating Council of New England (ECC), Albert Cree, spoke for the nineteen major electric utilities, all private, of New England. Mr. Cree claimed that electric power equivalent to the amount produced by Dickey-Lincoln could be produced by a combination nuclear-pumped storage plant for 71 million dollars, capital cost, based on the costs of the two power plants then under construction in southern New England. [5] The president of Central Maine Power, William Dunham, represented the seven major Maine private electric utilities. Mr. Dunham stated the inveetor-owned utilities would meet the needs of the state for baseload and peaking power, and do it at lower cost than Dickey-Lincoln, including taxee, from which Federal projects are exempt. He predicted that, between 1965 and 1980, barring further inflation, private utilities would decrease Maine electric rates by 30%. This would be accomplished by the economies of scale that would be

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[4] Portland Press Herald, August 10, 1965.

[5] Ibid.

realized by expansion of the transmission grid, the strengthening of the Maine systems interconnection with the New England energy pool, and the construction of an atomic plant in Maine in the 1970's.[6]

To reinforce their claims, CMP announced a rate cut for domestic consumers, the second in two years, shortly before the final vote on the 1965 Public Works Bill.

The Citizens Committee for a Maine Power Authority also appeared in opposition to Dickey-Lincoln. They contended that their proposal to create a state power authority to finance the construction of a hydroelectric project at Big Rapids on the Upper St. John River, could produce and deliver power at lower costs than either the Federal proposal or a private utility alternative.[7]

The majority of the House Public Works Committee recommended the authorization of Dickey-Lincoln. A motion to strike the project from the omnibus bill was rejected by a tie vote in the House. In October the House passed the Senate version of the 1965 Public Works Bill as recommended by a House-Senate Conference committee, by a vote of 207-185. Twenty out of twenty-five New England Congressmen voted against the omnibus Bill, primarily because of their opposition to the Dickey-Lincoln authorization measure.[8]

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[6]Bangor Daily News, August 17, 1965.

[7]Portland Press Herald, August 11, 1965.

[8]Bangor Daily News, August 17, 1965.

To fund pre-construction planning of the Dickey-Lincoln project, $724,000 was appropriated for 1966, and $1,100,000 for 1967. [9] A special study by the staff of the House Public Works Subcommittee was ordered in September, 1966 to ". . . determine the economic feasibility and soundness of the proposed Federal investment of $218,700,000." [10] in the Dickey-Lincoln project. The Staff Report as entered into the record of the March 1967 Subcommittee hearings on the Public Works appropriations for 1968.

Congress subsequently denied the appropriation of $1,676,000 to complete preconstruction planning, and has refused every year since 1967 to grant more funds for the Dickey-Lincoln Project, although well over $2 million had been spent in actual planning when funds were cut off.

In order to circumvent the persistent opposition of the private utilities to the Dickey-Lincoln project, in 1971, Representative William Hathaway proposed a compromise plan. According to the Hathaway Plan, the generating capacity at the dams would be reduced to 100 megawatts, and would produce baseload power for a Maine market. The transmission of peaking power to southern New England would be dropped, and the project purposes would be extended to include irrigation for Arroostook County potato farms.

In 1971, Congress authorized a study of the Hathaway

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[9] Bangor Daily News, August 17, 1965.

[10] U.S.Congress, Public Works Appropriations for 1968 op. cit., p. 382.

Plan, but failed to appropriate the $100,000 requested to finance a feasibility study. Soon after, the Senate approved $800,000 for the original project, but later gave in to House pressures and completely dropped the Dickey-Lincoln Project from the 1972 Public Works. [11] The following year, basically the same pattern was repeated.

In 1973, the House approved $50,000 to fund a study of the compromise Hathaway Plan for Dickey-Lincoln. After considering an $800,000 appropriation to revive the full-scale project, the Senate concurred with the House action.

If the results of a study, by the Army Corps of Engineers, of the economic, engineering and environmental feasibility of the compromise Dickey-Lincoln project are favorable, the compromise project stands a better chance of receiving funding than does the full-scale project. Support for the full-scale project has waned within the Maine congressional delegation. Senators Hathaway and Muskie remain committed to the original Dickey-Lincoln plan, but prospects for funding are very dim, given the persistent and powerful opposition of the private electric utilities of New England. Since opposition by the private electric industry has been the major obstacle for Dickey-Lincoln, the revised marketing plan of the compromise Dickey-Lincoln should quell resistance from that quarter. Presumably only Maine's electric industry will continue to oppose the smaller project.

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[11] *Maine Times*, September 24, 1971.

PART V - Examination of the Economic Justification Put Forth for Dickey-Lincoln

In the years immediately following the authorization of Dickey-Lincoln by Congress in 1965, two significant studies were made of the economic aspects of the project: one by the Research Division of the Federal Reserve Bank of Boston, and one by the staff of the Subcommittee on Public Works, House of Representatives.

Subcommittee on Public Works Staff Study

In September, 1966, the House Committee on Appropriations asked that a special Staff study be made of the economic feasibility and soundness of the proposed Federal investment of $218,700,000 in the Dickey-Lincoln project. [1]

The Public Works Subcommittee Staff was asked to include the following in their research:

1) a review and appraisal of the completeness and adequacy of the study conducted by the Corps of Engineers and the Department of the Interior on which the report was based recommending the project for authorization.

2) An analysis of the soundness of the estimated allocation of the annual project benefits to power, flood control, and area redevelopment.

3) An analysis of the soundness of the cost estimate of $218,700,000.

4) An appraisal of the plans for the marketing of power, including the proposed power rates to be charged and the payout schedule.

5) A comparison of the estimated cost of power production under the project with costs under alternative means, including steam plants, nuclear

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[1] U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 382.

5)(continued)
plants, and pumped storage and nuclear combinations.

6) An overall appraisal of the need and significance of the project in meeting power requirements in the light of the expansion program planned by the New England utilities." [2]

In the course of its investigations, the Subcommittee Staff consulted a variety of informed sources and sought to obtain the views of those opposed to the project, as well as those who had planned and promoted it. Members of the Staff discussed the project with officials of the Federal Power Commission, the Department of the Interior, and the Army Corps of Engineers. The Departments of Commerce, Treasury, and the Bureau of the Budget were also consulted on their views. Meetings were held with officials of New England's private electric industry and with municipal electric utilities and rural electric cooperatives. The opinions of the Federal Reserve Bank of Boston, Maine state officials, and engineering and constructions firms were also solicited. [3]

The Staff report on Dickey-Lincoln was entered in the record of the Subcommittee hearings on the Public Works Appropriations for 1968.

The Federal Reserve Bank of Boston Study

In 1966, the "New England Business Review", a publication of the Federal Reserve Bank of Boston, produced a study of "the quest for low-cost electricity" in New

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[2] U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 382.

[3] Ibid.

England. [4] One issue examined the past, current, and prospective developments within the private utility industry of New England; the next examined four public power developments, including Dickey-Lincoln, then being proposed for New England.

The principal finding concerning the private utilities was that rapid technological advances in electrical production and operational coordination would substantially reduce power costs by 1972 "barring further inflation".[5] The "Business Review" predicted that through the efficiency of an interconnecting extra-high-voltage transmission network, combining production from all major New England generating sources on a one-system basis, the cost of electricity to consumers should decline by as much as 25% from 1966 price levels. [6]

In judging the merit of a public power proposal, the "Business Review" suggested the following factors should be given consideration, in addition to the dollar costs:

> "Would the proposals foster worthwhile intersystem coordination and assure high standards of service?
>
> Would they fill a distinct need in some parts of the market?
>
> What are the ultimate effects on taxpayers?

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[4] John M. Wilkinson, "New England's Power Developments: Part II . . .Public Power Proposals", New England Business Review, Federal Reserve Bank of Boston Research Department, April, 1966, p.2.

[5] Ibid.

[6] John M. Wilkinson, "New England Power Developments: Part I . . .The private Utility Industry", New England Business Review, Federal Reserve Bank of Boston Research Department, February, 1966, p.17.

> Is economic efficiency the sole criterion in judging a development, or are there over-riding social purposes of greater weight?
>
> Will utility commission regulation of a natural monopoly assure the lowest possible power rates, or is regulation by competition also necessary?" 7

Within this framework, four public power proposals were considered: the Dickey-Lincoln Federal hydroelectric project, Canadian hydroelectric import through Vermont, mine-mouth thermal power from Appalachia, and a nuclear power plant in Maine built by a State Power Authority. While less concerned with the validity of the economic analysis of Dickey-Lincoln than the Staff report, the "Business Review" set forth a number of factors important for evaluating the contribution of these proposed public power developments to the problem of reducing power rates in New England.

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[7]John M. Wilkinson, "New England's Power Developments: Part II . . .Public Power Proposals", New England Business Review, op. cit., p.2.

Federal Evaluation Standards

Federally-financed water resources projects are evaluated according to a set of standards embodied in Senate Document #97. In the procedures outlined in S.D. #97, it is required that three tests be applied before Federal investment in a project can be considered a worthwhile allocation of public funds. First, the "comparability test" requires that the project be the least costly means of providing power, the cost of equivalent power produced by alternative means being compared on the same terms, that is, at the same interest rate and with the same tax exemptions. Second, the "benefit-cost" test asks if the benefits from the project exceed its costs. For this purpose, benefits are defined as the prices consumers would pay for equivalent services if the project were not built, and costs as the investment required to construct, operate and maintain the project. Third, although the project may not pass the first two tests, fulfillment of important socio-economic objectives, such as regional growth and relief of unemployment and poverty, may justify a project not justifiable on purely economic grounds. [8]

The comparability test essentially compares the cost of a public project with the cost of private alternatives in terms of goods and services, assuming the same type of financing for each. If the alternatives prove less costly by this test, theoretically our "national resources

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[8] Wilkinson, "New England's Power Developments: Part II . . .Public Power Proposals", op. cit., p.11.

stock" would be more efficiently used by providing the service by the alternate means. The benefit-cost test is a comparison of the cost of the project services when provided by the project and by alternatives with all the market place money costs figured in. Thus, the higher interest rates and taxes paid on privately-financed projects are claimed as project benefits, since the consumer would have to pay these costs to obtain the equivalent service by alternative means. If more than a single service is provided by the project, such as flood control provided by a hydroelectric dam, the alternative costs of providing that service, by building a flood control structure, are also claimed as project benefits. [9]

The benefit-cost measure is by far the most important and widely used tool for water resource project evaluation. The comparability ratio is rarely even calculated. If a project passes the comparability test, it automatically passes the benefit-cost test as well. The benefit-cost ratio may be favorable, however, even though the comparability test is not. That is, a private alternative which costs less than the public project when both are assumed to be tax exempt and financed at the same interest rate, may cost more than the public project when taxes and the higher interest rate which private utilities must pay are taken into account. By strict definition, such a project is <u>not</u> economically feasible. Even if a project does not meet the above criteria, it nevertheless may be justifiable

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[9] Wilkinson, "New England's power Developments: Part II . . .Public Power Proposals", op. cit., p.11.

on the grounds that it is the most efficient means of stimulating the economy of an area, or of alleviating poverty and unemployment.

Project Cost Analysis

In order to comply with the House Public Works Subcommittee Staff's request for an up-to-date benefit-cost ratio, in October 1966, the Army Corps of Engineers prepared a new project cost analysis for Dickey-Lincoln. When the Staff study was conducted, and the 1966 cost estimates were current, the New England Division of the Corps had begun the preliminary stages of advanced engineering and design for Dickey-Lincoln. Approximately two more years of advanced planning would be required as part of a total of four years of preconstruction planning. The cost of Dickey-Lincoln increased only $2 million between 1964 and 1966, but certain unit costs changed substantially. Although estimates for construction costs might be expected to fluctuate less widely as the more detailed phases of planning proceeded, the Staff study added a cautionary note: "Although the Corps cost estimate of $229,300,000 to construct the Dickey-Lincoln project is the best available at this preliminary stage of engineering and design, the final configuration of this project has not been determined and future engineering and design refinements will have an effect on costs until the stage of final contract letting." [10]

In order to carry out the requested evaluation of the reasonableness of the Corps construction cost estimates, the Staff consulted a variety of sources: the Tennessee

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[10] U.S. Congress, Public Works Appropriations for 1968, op. cit., p. 388.

Valley Authority, a private engineering firm, and the New England Electric Coordinating Council (ECC). These consultations confirmed the fact that final costs can only be ascertained when detailed plans are available. A large number of variables are involved in estimating construction costs, such as climatic conditions, the length of the work year, the type of equipment used, the efficiency of the contractor, the availability of good fill materials, the amount, type, and cost of labor, the cost of construction materials, and the unpredictable escalation of costs. Different cost estimates were arrived at by different estimators because of the difficulty of precisely determining the effects on costs of these factors. The Staff recognized that basically the cost estimates depend on the assumptions made by the estimators, and that judgment factors are influential since the estimation of costs is imprecise. [11]

On the basis of a so-called "limited review" of the Corps construction cost estimates for Dickey-Lincoln, the Tennessee Valley Authority (TVA) agreed the major items of cost were accounted for in the Corps calculations, and that the construction cost estimates seemed reasonable for 1966. [12]

A firm of consulting engineers, the Charles T. Main Co., of Boston, retained by the ECC to review the Corps construction cost estimates of August 1964, claimed that

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[11] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 390.

[12] Ibid, p. 390.

Diokey-Linooln Project: Estimate of Costs

as of October, 1966

(In thousands of dollars)

	Dickey Project	Lincoln School Project	Total
Lands and Damages	5,214	400	5,614
Relocations	1.738	1,238	2,976
Reservoir clearing	11,050	150	11,200
Dams	67,114	6,490	73,604
Penstocks	11,414	-	11,414
Powerplant	52,385	5,307	57,692
Switchyard	19,470	476	19,846
Access roads	560	50	610
Buildings, grounds, and facilities	728	208	936
Subtotal	153,673	14,319	167,992
Contingencies	21,361	1,961	22,322
Engineering, design, supervision, administration	19,079	1,720	20,799
Subtotal	194,113	18,000	212,113
Interest during construction	16,100	1,100	17,200
TOTAL	210,231	19,100	229,313

TOTAL DICKEY-LINCOLN COST* = $229,313,000

* Not including transmission costs.

Source: U.S. Congress, House Committee on Appropriations, Subcommittee on Public Works, Public Works Appropriations for 1968, Hearings, 90th Congress, 1st Session, March, 1967, p. 387.

Benefits and Costs of Dickey-Lincoln Compared

Source: U. S. Congress, House, Committee on Appropriations, Subcommittee on Public Works, Public Works Appropriations for 1968, Hearings, 90th Congress, 1st. Session, March 13, 1967, p. 383.

Project Costs

Dickey-Lincoln construction cost (including interest at 3 1/8% during construction)	$229,313,000
Transmission system cost (including interest at 3 1/8% during construction)	82.515.000
Total construction cost	$311.828.000

Total at-market annual project cost using 100-year period of analysis and 3 1/8% interest rate:

Annual interest and amortization cost $311,828,000 x 0.3276 (3 1/8% for 100 years)	$10,215,000
Annual operation and maintenance costs:	
Dickey-Lincoln	1,095,200
Transmission system	862.000
Total annual at-market project cost	$12,172,400

Project Benefits

Annual flood control benefit	$40,000
Annual area redevelopment benefit	467,000
Annual power benefit, including downstream energy benefit	18.798.000
Total annual project benefits	$19.305.000

Ratio of annual project benefits to annual project costs:

$$\frac{\$19,305,000}{\$12,172,000} = 1.59$$

the Corps had underestimated the cost of the Dickey dam alone by $70 million. Main alleged that the cost of fill was understated by $34 million, and that the climatic conditions of Northern Maine would shorten the working season to 4 1/2 months, substantially increasing construction costs. The Corps demonstrated, however, to the apparent satisfaction of the Subcommittee, that their fill prices were realistic, although conservative, and that climatic conditions had been taken into account. [13]

The Corps 1966 cost estimate of $229,300,000 for Dickey-Lincoln is based on construction costs for that year, in compliance with S.D. #97, not on projected costs for the initial year of construction. The TVA advised that the total Corps cost estimate, minus the interest, should be escalated at about 4% per year, with the likelihood of higher rates of escalation after 1966. The 4% per year figure was an average of the rates at which the costs of land, labor, construction equipment, and installed equipment were increasing. Since about six and one half years would be required for the construction of the Dickey-Lincoln project, according to the Corps, 4% cost increases each year would amount to about $55 million, or a final project construction cost of $267 million, without interest. Assuming escalation at 5%, the final cost would be $280 million without interest. [14]

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[13] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 397.

[14] Ibid., p. 394.

An increase in the Federal interest rate would cause a corresponding increase in the final project costs. That rate is estimated annually, by a formula set up by Congress for multi-use water resources projects, related to the return on U. S. Treasury Bonds with terms to maturity of fifteen years or longer. The Corps calculation of interest during construction of Dickey-Lincoln used the 1966 rate of 3 1/8% per year, or $17,200,000 for the entire project. The Staff noted that an increase in the interest rate to 4 5/8% would result in a total interest for the project of $25,400,000 and an interest rate of 5 1/2% (the Treasury estimate of the true cost of borrowing money in December 1966) would produce a total interest cost of $30,270,000. [15]

Federally-financed water resource projects are exempt from local, state and Federal taxes, so increasing levels of taxation would affect the Dickey-Lincoln project costs only insofar as they contribute to increasing the costs of land, labor, and equipment. It might be said that this is the only factor that can be counted on to remain stable when making estimates of future project costs.

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[15] U.S.Congress, Public Works Appropriations for 1968, op. cit., p.394.

Analysis of Project Benefits

In the economic analysis of the Dickey-Lincoln project upon which Congressional authorization was based, benefits attributed to Dickey-Lincoln were derived from three sources: flood control, area redevelopment, and power. The so-called "non-power" benefits assigned to the project are minor, $510,000, compared to benefits from power of $18,800,000 annually.[16] At various times since the project was authorized, other non-power benefits have been added from recreation, and it has been proposed that irrigation benefits also be added.

Non-power Benefits

The annual flood control benefit to be derived from Dickey-Lincoln, $40,000, is a measure of the cost of two flood control dikes, averaged over 100 years. At 1963 prices, the two dikes that would be required were estimated to cost approximately $1,060,000. Between 1933 and 1963 Fort Kent has suffered seven "consequential" floods, with damages averaging $47,800 per year.[17] In May 1973, floods on the St. John River caused damages estimated at $2,500,000 in Fort Kent alone.[18]

Annual area redevelopment benefits of $467,000 credited to Dickey-Lincoln represent the "wages paid during construction to pereons employed from the pool of unemployed

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[16] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 409.

[17] Ibid., p. 406.

[18] Portland Press Herald. May 4, 1973.

and underemployed workers residing within a reasonable distance of the project.", [19] and wages paid to operation and maintenance personnel for 15 years after the project begins operation, averaged over a 100-year period.

A total of 11,200 man-yeare of labor would be required to build the Dickey-Lincoln project, according to the Corps of Engineers. The Corps determined that a maximum of 550 unemployed and underemployed workers could be obtained from the Fort Kent area. The local labor pool would supply 840 man-years of semiskilled and 3,110 man-years of common labor, and 35 from the local labor pool would be employed in operation and maintenance jobs. [20]

All of the 2,700 man-years of skilled labor required for the construction of Dickey-Lincoln would have to be imported. Over the nine yeare required to construct the project, the Fort Kent area would supply the total requirement for semi-skilled and common labor for the first three years and the last year. For the four middle years, a large part of the semiskilled and oommon labor force would also have to be imported. Imported labor, in all categories of skill, would be required to perform 1,100 man-years the fourth year of construction, 1300 the fifth, 1800 the sixth and seventh, 900 the eighth, and none during the last year. Presumably, some portion of this labor would be imported from Canada. [21]

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[19] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 407.

[20] Ibid., p. 407

[21] Ibid.

The long-term area redevelopment benefits from employment on the dam construction are debatable, since having a large temporary labor force in the area, for a few years, with many left unemployed in the wake of construction, could have an adverse effect on the local economy. A "peak" in the number employed would be reached in the eighth year of construction, according to the Corps plan, followed by a sharp decline. The Department of Commerce, in its comments on the August 1964 Corps and Interior report, advised some gradual phasing out of construction in order to achieve the projected area redevelopment benefits. [22] It has been predicted that the project would have only a temporary positive impact on the area's economy, producing a "boom" as services and trades are overextended to satisfy the demands of the influx of temporary labor, and a "bust" when construction was completed. [23]

A study of the social and economic consequences of the Dickey-Lincoln Project was made for the Department of Agricultural and Resource Economics, Maine Agricultural Experiment Station in 1966. The purpose of the study was "to present a still picture of the selected areas as of the summer of 1966," [24] and to collect data which would provide a base for subsequent analysis. The focus of this

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[22] U.S. Department of the Interior, Report to President Lyndon B. Johnson. July, 1965, op. cit., U.S. Department of Commerce Review, op. cit., p. 7.

[23] U.S. Congress, Public Works Appropriations for 1968, op. cit., p. 408.

[24] Louis A. Ploch and Nelson L. LeRay, Social and Economic Consequences of the Dickey-Lincoln School Hydroelectric Power Development on the Upper St. John Valley Maine—Phase I, Preconstruction, March, 1968, Preface.

preliminary phase of the research program was defined: "What happens to a relatively culturally and physically isolated rural, resource-oriented area, and to its people, when it becomes the site of a publicly financed project which temporarily increases the population by many hundreds of persons?" [25] Of the five towns surveyed, 43% of the households had incomes under $3,000 a year. The survey found that, except for the people of Allagash, where most of the population would have to be relocated, the residents of the Upper St. John Valley were generally looking forward to the construction of Dickey-Lincoln as a means of reversing the trends of poverty, unemployment and outmigration. [26]

There is certainly no doubt that flood control benefits would accrue from the construction of a dam above Ft. Kent. No claim is made that area redevelopment benefits would result from the attraction of industry to the area or from increased tourism if Dickey-Lincoln were built. The alleged area redevelopment benefits may or may not be valid, but consideration of non-power benefits serves two purposes: one, to pad the benefit side of the benefit-cost ratio, thus offsetting costs; and two, to designate a portion of the project costs as nonreimbursable in the project repayment analysis, thereby lowering the rates that must be charged for electricity to repay the

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[25] Louis A. Plooh and Nelson L. LeRay, Social and Economic Consequences.--Phase I. Preconstruction. March, 1968, op. cit., p. 1.

[26] Ibid., p. 38.

the investment cost of the project. In general, non-power benefits serve to enhance the project's apparent value, without adding anything to the cost of the project.

Power Benefits

The $18,798,000 in annual power benefits from Dickey-Lincoln constitutes 96% of the total benefits. Dickey-Lincoln power benefits were calculated in accordance with S.D. #97, which states in part: "The value of power to the users is measured by the amount that they should be willing to pay for such power. The usual practice is to measure the benefit in terms of the cost of achieving the same result by the most likely alternative means that would exist in the absence of the project." [27] The Federal Power Commission interprets "the most likely alternative means" as the least costly alternative. S.D. #97 also specifies that when computing costs of alternative sources of power to be constructed with private financing, which alternatives to Dickey-Lincoln would be, the costs must include the interest, taxes, insurance and other cost elements actually incurred by such privately-owned projects. [28]

The Subcommittee Staff asked the Federal Power Commission to study the estimated cost of power from alternative sources (so-called "power values") as compared with the cost of power that would be produced by Dickey-Lincoln.

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[27] U.S.Congress, Public Works Appropriations for 1968, op. cit., p.409, citing Senate Document 97, Section V-E-5.

[28] U.S.Congress, Public Works Appropriations for 1968, op. cit., p.398.

The Department of the Interior's proposed plan for marketing Dickey-Lincoln power was considered in making this comparison, since marketing assumptions about the future type (peak or baseload), quantity and location of demand affect the cost of producing and transmitting power.[29] Therefore, a valid alternative must meet the needs of the same type of market. The Department of the Interior, which would market Dickey-Lincoln power, proposed to sell 100 megawatts of baseload power at 50% system load factor in Maine, and the remaining 600 megawatts of power in the Boston area as peaking power, at 10% load factor.[30]

Unit costs for the two types of power were derived and converted to at-market cost of power delivered to Bangor, Portland and Boston, using both privately and Federally financed sources of power. The at-market charges for Dickey-Lincoln power were computed to be $15. per kilowatt per year for capacity plus 3.0 mills per KWH (kilowatt-hour), equivalent to a total cost, with the above marketing plans, of 6.4 mills per KWH for 50% load factor power delivered to load centers in Maine, and 20.1 mills per KWH for 10% load factor power delivered to Boston. The computation of these power rates is explained in the "Project Payout Schedule" section.

The Federal Power Commission determined after examination of power costs from several types of alternatives, that a combination of a private conventional steam plant in

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[29] U.S. Congress, Public Works Appropriations for 1968, op. cit., p. 398.

[30] Ibid., p. 399.

Maine and a private pumped storage development in the Boston area would provide the lowest cost private alternative to the power that would be produced by the Dickey-Lincoln project. [31] No publicly financed alternatives were considered, since no public power facilities exist in New England, and hypothetical sources are not considered valid alternatives. Fixed charges for the private alternatives included interest at 7%, insurance, federal, state, and local taxes. 50% load factor power from the alternative private Maine baseload plant required rates of $23.50 per kilowatt per year for capacity plus 3.1 mills per KWH. The cost of power produced by the alternative private peaking power facilities in the Boston area, operating at 10% load factor, was estimated to be $19.50 per kilowatt per year plus 4.5 mills per KWH. [32]

It is evident from the comparisons made by the Staff that ". . . the privately financed alternates cannot compete eostwise with the Federal government in providing identical facilities for power supply whether it be conventional steam, nuclear steam, or a pumped storage hydro development." [33]

In 1966, the ECC also prepared estimated costs of power from private source alternatives. The ECC calculation of the lowest priced alternative for 50% load factor power delivered in Maine was based on the 600 megawatt Millstone Point nuclear plant in Connecticut, with at-market

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[31] U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 401.

[32] Ibid., p. 404

[33] Ibid., p. 402.

cost of $19.14 per kilowatt per year plus 1.9 mills per KWH. When the ECC's estimate was adjusted by the Staff to include realistic transmission costs and losses to Maine, however, it was increased to $25.14 per kilowatt per year plus 1.91 mills per KWH, which would require at-market rates of 7.7 mills per KWH for baseload power in Maine. [34]

The ECC cost estimates of alternative power costs of peaking power for the Boston area, based on the Northfield Mountain pumped-storage project in western Massachusetts, was $10.91 per kilowatt per year plus 2.99 mills per KWH. The ECC estimate, however, included no allowance for the cost of the backbone transmission system needed to transmit power from the alternative peaking power plant. Therefore, the Federal Power Commission adjusted the ECC pumped storage estimate to $16.82 per kilowatt per year plus 2.99 mills per KWH, equivalent to a rate of 22.2 mills per KWH.[35]

Using the Federal Power Commission's figures for the cost of power from the most economical alternatives, the total annual power benefit was calculated for the Staff report as follows:

Maine load factor power

Capacity:	100,000 kilowatts at $23.50 per kilowatt per year	$2,350,000
Energy:	351.6 gigawatt-hours[36] at 3.1 mills per KWH	1,090,000
Total Maine load factor power benefit		$3,440,000

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[34] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 403.

[35] Ibid., p. 404.

[36] One gigawatt-hour = 1,000,000 kilowatt-hours.

Boston peaking power

Capacity:	623,500 kilowatts at $19.50 per kilowatt per year	$12,158,000
Energy:	594.5 gigawatt-hours at 4.5 mills per KWH	2,675,000
Total Boston peaking power benefits		$14,833,000

Downstream energy benefits

Energy:	175 gigawatt-hours at 3.0 mills per KWH	525,000
Total Power Benefits		$18,798,000 [37]

The "downstream" energy benefits would derive from the 350 gigawatt-hours per year of additional energy produced by the hydroelectric plants located on the St. John River in Canada, as a result of the increased natural storage on the Upper St. John River provided by Dickey-Lincoln. In accordance with the draft treaty with Canada of May 1966, the United States is entitled to one half the downstream benefits, or 175 gigawatt-hours per year, valued at 3.0 mills per kilowatt-hour at that time. [38]

Project Payout Schedule

In order to compute the rates to be charged for power from Dickey-Linooln, the amount of the total project cost allocated to power must first be determined. The rates charged must be suffioient to pay back the Treasury an annual amount for fifty years to compensate the government for its power investment. The oosts allocated to flood oontrol and area redevelopment are non-reimbursable, that is, power rates are not required to reoover the government

[37] U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 408.

[38] Ibid., p. 409.

investment in the non-power aspects of the project. In 1966, using the latest cost estimates for Dickey-Lincoln, the Department of the Interior calculated that 96.2% of the total project costs should be allocated to power. The annual project costs for power based on a 50-year period of analysis, at 3 1/8% interest, including transmission, operation and maintenance costs, was determined by the Department of the Interior to be $13,821,400. [39]

Proposed at-market payout schedule

Annual capacity:	Maine - 100,000 kilowatts at $15 per kilowatt per year	$1,500,000
	Boston - 623,500 kilowatts at $15 per kilowatt per year	9,352,000
Annual energy:	Maine - 438 gigawatt hours at 3.0 mills per KWH	1,314,000
	Boston - 672.5 gigawatt hours at 3.0 mills per KWH	2,017.500
	Subtotal	$14,184,000
Less:	Interior administrative and marketing costs of $0.50 per kilowatt per year	361.750
Annual project cost allocated to power		$13,822,250 [40]

Department of the Interior Proposed Marketing Plan

Electric power generated by Dickey-Lincoln would be marketed by the Department of the Interior, its authority as marketing agent based upon the Flood Control Act of 1944. The rates charged for power must be the lowest possible that are adequate to recover the costs of producing and transmitting the power, including the amortization of the capital

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[39] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 414.

[40] Ibid., p. 415.

investment allocated to power. The 1944 law also states that preference in the sale of such power shall be given to public bodies and cooperatives. [41]

Plans to market Dickey-Lincoln power are based on the projected needs of New England at the time the project would become operational. At the time of the Staff report, Interior had not officially discussed marketing plans with either preference customers in Maine or with private utilities in Massachusetts. [42]

Of the Dickey-Lincoln project's total capacity of 794 megawatts, Interior planned to sell 100 megawatts of 50% load factor power (100 megawatts of capacity generating energy for 12 hours each day) to preference customers in Maine. In 1965, there were two rural electric cooperatives and six municipal systems in Maine, with a peak demand of 21,695 kilowatts. [43] It was projected that by 1975 the Maine preference customers demand would double, to 44,000 kilowatts. The remaining 50% load factor power would be offered to Maine private utilities on a withdrawable basis until 1985 when, Interior predicted, Maine preference customers would be able to use the total 100 megawatts allotted to them. [44]

The major part of Dickey-Lincoln's capacity, 625 megawatts, would be sold as peaking power at 10% load factor (625 megawatts of capacity generating energy for approximately two and one half hours each day) to private utility

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[41] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 420.

[42] Ibid. [43] Ibid., p. 416. [44] Ibid., p. 420.

companies in the Boston area.[45] The Federal Power Commission, in 1965, predicted that this peaking power capacity would be needed in New England by 1975, over and above the new capacity planned by the private utilities in 1965.

Under the Interior marketing plan, the lowest rates at which Dickey-Lincoln power could be sold would be, (at 1965 prices), $15 per kilowatt per year for capacity plus 3.0 mills per KWH for energy. This cost is equivalent to a "total cost" of 6.4 mills per KWH for 50% load factor power, delivered to load centers in Bangor and Portland by 345-kilovolt transmission lines.[46] The lowest total charge to Maine preference customers for Dickey-Lincoln power would be approximately 8.0 mills per KWH, after adding 1.5 mills per KWH for "wheeling" charges. In 1966, it was reported that Maine Rural Electric Associations and municipal systems paid from 11.0 mills per KWH to 19.0 mills per KWH, buying most of their energy from the private utilities.[47]

The lowest total cost for Dickey-Lincoln peaking power, (at 10% load factor), sold in the Boston area, was estimated in 1966 to be 20.1 mills per KWH, not including wheeling charges.[48] The Federal Power Commission, in 1966, estimated that the lowest cost pumped-storage alternative could produce 10% load factor power in the Boston area for 26.8 mills per KWH, based on charges of $19.50 per kilowatt per year for capacity plus 4.5 mills per KWH for energy.[49]

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[45] U.S. Congress, Public Works Appropriations for 1968.
[46] Ibid., p. 421.
[47] Ibid., p. 407.
[48] Ibid., p. 421.
[49] Ibid., p. 404.

Although the majority of private utilities in the Boston area told the Staff that they were not interested in Dickey-Lincoln peaking power at the forecasted rates, the Department of the Interior found that the proposed selling prices for Dickey-Lincoln peaking and baseload power were lower than the alternative power values supplied by the Federal Power Commission, and lower than the prices then paid by Maine preference customers. [50] Therefore, Interior concluded that power from Dickey-Lincoln would be marketable since private utility companies are required to buy power from the least expensive source available.

The Staff report indicated that an alternative market for Dickey-Lincoln peaking power would exist. Municipal electric systems in Massachusetts, New Hampshire, and Vermont stated their willingness to buy, by 1975, over 600 megawatts of peaking power from Dickey-Lincoln. [51] The Municipal Electric Association of Massachusetts, representing 39 of the 40 Massachusetts municipal systems, told the Staff that in 1965 their systems had a combined peak of 500 megawatts, and that they had purchased 1,900 gigawatt-hours of energy. In 1965, the peak projected for these Massachusetts systems by 1975 was 1,100 megawatts. [52] According to the Municipal Electric Association, in 1966 thsir systems paid an average of 12.0 mills per KWH, while the average national wholesale rates were 4.9 mills per KWH for power sold to municipals.[53]

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[50] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 421.

[51] Ibid., p. 422. [52] Ibid., p. 418. [53] Ibid., p.422.

Significance of Dickey-Lincoln in Reducing Power Rates

Dickey-Lincoln's effectiveness in reducing the cost of electricity to Maine and New England ratepayers lies at the core of the continuing controversy over the project. Rates paid by all classes of electric consumers in New England are among the highest in the country, according to the Federal Power Commission, and at present 98% of the power sold in New England is produced by private utility companies. New England's investor-owned utilities contend that the problem of high power rates would not be solved by public power projects, but by improving the efficiency of power generation by constructing an integrated system of modern power plants interconnected with extra-high-voltage transmission lines. In 1966, the ECC told the Subcommittee Staff that with this type of planning they would produce power at less cost than Dickey-Lincoln could, and sell it at rates 40% lower than the rates predicted for Dickey-Lincoln power by 1980.[54] The Federal Power Commission, in its 1964 National Power Survey, also forecasted a reduction in New England power rates in the 1970's of 30%, resulting largely from increased consumption of electricity. But, the ECC admits it is almost impossible to predict future retail electricity prices, because ". . . even though the costs of power generation may be lowered, and the costs of power to the consumer reduced with greater consumption of power, these advantages may be offset by the demand

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[54]U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 423.

for underground transmission facilities and other unpredictable and costly conditions of power service." [55]

In 1966, the Department of the Interior was confident that the Federal project could produce power at less cost than comparable private projects then being constructed or planned for New England. The preference customers of Maine would benefit most directly and substantially if that proved to be true, since the 100 megawatts of baseload power generated by Dickey-Lincoln would fulfill an increasingly greater proportion of the needs of the preference systems. The 1965 Maine preference customers peak demand of 21,695 kilowatts [56] was, however, only a small fraction of the 604,599 kilowatt peak experienced in 1963 by the three major private utilities of Maine. [57] Therefore, the projected low rates for Dickey-Lincoln power would directly affect the rates of a relatively small number of Maine electric consumers. According to the Subcommittee Staff, the Department of the Interior conceded that the availability of low-cost power from Dickey-Lincoln would have ". . . only a nominal, if any, effect on the power rates of consumers in the Boston area if Dickey-Lincoln project peaking power is sold to the private utilities." [58] The reason for this is simple: private utilities would mix ". . . the relatively small amount of Dickey-Lincoln purchased power with a very large amount of power from other sources and sell the power to a large number of customers. The economy

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[55] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 425.

[56] Ibid., p. 416 [57] Ibid., p. 419 [58] Ibid., p. 426.

of price realized in the purchase of Dickey-Lincoln peaking power is, therefore, widely dispersed and will have little effect on the individual consumers." [59]

The "New England Business Review" reached a similar conclusion: ". . .the impact of new power--whether public or private--on electric bills of ultimate ratepayers will be significant, but . . . the difference in impact of public power proposals compared with industry plans will not be significant for the region as a whole." [60] The fact that the rates charged for electricity by the Maine and New England private utilities have not decreased as was predicted in the 1960's, but have instead dramatically increased in the 1970's, does not nullify these conclusions since increasing rates of inflation have escalated costs for the Dickey-Lincoln project. Therefore, the rates charged for Dickey-Lincoln power would be increased to reflect increasing costs in any future project payout analysis.

If the Department of the Interior were able to work out plans for the sale of Dickey-Lincoln peaking power to Massachusetts preference customers, the rate reducing effect of Dickey-Lincoln power might be more marked. This change in the marketing plan would not produce reductions, however, for the average Maine ratepayer. The "New England Business Review" suggested a redesign of the proposed project to better serve the needs of the inland power

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[59] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 426.

[60] Wilkinson, "New England's Power Developments: Part II, op. cit., p. 16.

market of northern New England, to maximize the rate-reducing effects and minimize the dilution effects by concentrating the Dickey-Lincoln power market. In place of the plan to size the installed capacity of Dickey-Lincoln for the production of peaking power at close to 800 megawatts, the "Business Review" study recommended the installation of capacity adequate for the generation of baseload power primarily.[61]

The installed capacity of Dickey-Lincoln for peaking power would be comparable to the size of most of the units now being installed in New England. If planned for baseload power production, the Dickey-Lincoln installation would be considerably smaller, probably closer to 200 megawatts, its size limited by the relatively low flows of the St. John River. Acceptance of the Northfield Mountain project as a valid alternative to Dickey-Lincoln led the "Business Review" to conclude, "It seems unlikely . . .that a market now exists in southern New England for the 700,000 kilowatts of peaking power in the present Dickey-Lincoln plan, unless rates are set below a level to recover costs."

The Staff report states (and the 1964 Department of the Interior report also recognized this fact) that, although Dickey-Lincoln could be built for less than any privately-financed alternatives, the Federal government could generate power at less cost than Dickey-Lincoln by other means with Federal financing.[62] Nuclear steam, conventional steam, or

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[61] Wilkinson, "New England's Power Developments: Part II, op. cit., p.15.

[62] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 427.

pumped storage hydro plants could all be constructed at less cost and produce power that could be marketed at lower rates than Dickey-Lincoln, according to the 1966 analysis.[63] The Department of the Interior, however, has argued that Dickey-Linooln should be considered a multi-resource development, as well as an electric generating project, and that none of the alternates, Federally or privately financed, could provide the non-power benefits offered by the Dickey-Lincoln project.[64] There is no indication that the efficiency of alternative means of providing area redevelopment objectives, with Federal assistance, has been explored.

Pumped storage was ruled out by the Corps of Engineers as an acceptable alternative to Dickey-Linooln peaking power. According to the Federal Power Commission, while Dickey-Lincoln and pumped storage are equivalent in many ways, conventional hydroelectric projects such as Dickey-Lincoln have certain advantages over pumped storage. For reliability of service, it is important that some part of the generating capacity of any system be able to assume additional loads quickly. Hydroelectric power is best suited to providing rapid peaking capacity and almost instantaneous reserve for load protection 24 hours a day, while steam plants are only useful for baseload operation because they load slowly. Dickey-Lincoln's large volume of usable power storage allows for flexibility of operation for baseload reserve production as well. Pumped storage plants, on the other hand, require 3 KWH of pumping energy to produce 2 KWH

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[63] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 399.

[64] Ibid., p. 437.

of peaking energy and are unavailable for reserve capacity during the pumping phase. [65] Conventional hydroelectric plants are also subject to fewer interruptions for repairs and maintenance, as compared with other types of generating units, because of the use of rugged machinery operating at low speeds and temperatures. [66]

The Federal government could produce energy for about one half the cost, in every instance (steam, nuclear, pumped-storage), of power produced by private companies. [67] The Department of Commerce, in its 1965 review of the Dickey-Lincoln project, compared the capital cost of constructing Dickey-Lincoln with the capital costs of other types of plants. The capital cost of Dickey-Lincoln, on a cost per kilowatt of installed capacity basis was $277. per kilowatt; for a steam-electric in Boston, $125. per kilowatt; for steam electric in Maine, $140. per kilowatt; and for nuclear steam, $130. per kilowatt. The lowest capital cost alternative for the production of peaking power was pumped storage at $196. per kilowatt. [68] Operating costs for fuel and maintenance tend to equalize the costs of power produced by these plants with the cost of Dickey-Lincoln power but, if Federally financed, their power would still be less expensive. In 1966, the Federal Power Commission predicted that, in 1975, when Dickey-Lincoln would theoretically be producing power for $15. per

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[65] U.S.Congress, Public Works Appropriations for 1968. op. cit., p. 427.

[66] Ibid. [67] Ibid., p. 399.

[6] U.S.Department of the Interior, Report to President Lyndon B. Johnson. July, 1965, U.S.Department of Commerce Review, p. 4.

kilowatt per year plus 2.4 mills per KWH. With private financing, the same power was predicted to cost $26.50 per kilowatt per year plus 2.4 mills per KWH. Pumped storage, federally financed and in the Boston area, it was predicted, would be marketed for $8.(in 1975) per kilowatt per year, and 4.5 mills per kilowatt-hour, but the same project with private financing would require rates of $19.50 per kilowatt per year plus 4.5 mills per kilowatt-hour. [69]

The gap between the cost of equivalent Federally financed and privately financed electric power is a result of the higher interest rates and Federal, state, and local taxes which private utilities are obliged to pay. The interest rate for Federal water resource projects, in 1966, was 3 1/8% while private utilities were paying interest ratee of 7%. [70] Federal projects are completely tax exempt, but private utilities pay 15% of their gross revenues in Federal income taxes alone, and are subject to state sales taxes and local property taxes on plant and transmission facilities. Private utilities have the additional cost of dividend payment to investors.

While any untaxed, Federally-financed power development can probably lower costs to ratepayers to some degree, or help to stabilize rising electric bills, in choosing a tax-free project in place of a private investment, the taxes are foregone that the private project would have paid. Local and State services, however, must still be supported. Therefore, to the extent that investments by private

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[69] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 399.

[70] Ibid.

utilities are displaced or deferred, the on-going tax burden is shifted to other taxpayers who are also electric ratepayers. [71] The benefit-cost method of determining economic feasibility has no provision for measuring the net benefit or cost resulting from the loss of tax revenue versus the gain to ratepayers from lowered electric bills. A large part of the taxes paid by private utilities go to local communities where the power facilities are located, so that the dollar benefits from taxes paid are not as widespread as would be the dollar benefits of lower cost power from tax-exempt sources. In the case of Dickey-Lincoln, any benefits of lower-cost power would be concentrated in the preference customers market in Maine, and it has not been established that rates would be lowered to the extent that the stimulative effect of low-cost power on the economy would compensate for the tax loss.

A Maine private utility official pointed out, during the 1965 Congressional hearings on Dickey-Lincoln, that the construction of the Federal project would cost approximately $7,650,000 annually in taxes. Based on annual revenue of $15,000,000 for Dickey-Lincoln, its tax-exempt status would cost $2,250,000 per year in Federal taxes and $3,000,000 in State sales taxes. Since investor-owned utilities, in 1965, paid property taxes of $1.80 per kilowatt each year in unorganized townships, the tax on the capacity of 794,000 kilowatts at Dickey-Lincoln would amount

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[71] Wilkinson, "New England's Power Developments: Part II . . .Public Power Proposals", New England Business Review, April, 1966, op. cit., p. 11.

to $1,437,000 per year. The exemption of 300 miles of double circuit transmission lines worth more than $65 million, normally taxed at 1.5%, would cost $954,000 each year in property tax revenues. [72]

Almost no mention of the comparability test of economic feasibility is made in the Staff's report on Dickey-Lincoln. Although, in 1966, the Corps of Engineers assigned Dickey-Lincoln a favorable benefit-cost ratio, 1.91, and an acceptable comparability ratio of 1.12, [73] the adjustments made by the Department of the Interior in project costs subsequently reduced the benefit-cost ratio to 1.59. Adjusting the comparability ratio in the same manner reduces it from $11,605,000 : $10,390,000[74] or 1.12, to about $11,100,000 : $12,172,400, or less than unity. Thus, it would seem that in 1966 all the tests for economic justification were not met by Dickey-Lincoln.

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[72] Bangor Daily News, August 17, 1965.

[73] U.S.Congress, Public Works Appropriations for 1968, op. cit., p. 441.

[74] Ibid.

PART VI Current Planning: North Atlantic Regional Water Resources Study

The North Atlantic Regional Water Resources Coordinating Committee, in May 1972, published a massive report covering the availability of water supplies from Maine to Virginia. Analyses and recommendations for the St. John River Basin are included. In October 1972, a "Draft Environmental Impact Statement" was issued assessing environmental effects of the program proposed for the St. John.

This draft was prepared in response to the National Environmental Policy Act of 1969, which requires an evaluation of potential environmental impacts due to major Federal actions. The implementation of the Dickey-Lincoln project is one of the recommendations made in the Water Resources Study.

The North Atlantic Regional Water Resources Study is part of a program of study of all the major river basins in the United States grouped into twenty regions. This program was established by the Water Resources Council, which was created in 1965, under the Water Resources Planning Act, to coordinate the activities of the Federal, State, and local agencies engaged in planning the use of water resources. [1] The North Atlantic Region (NAR) study was directed by the Army Corps of Engineers, but the final authority in the planning process was the Coordinating

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[1] North Atlantic Regional Water Resources Study Coordinating Committee, North Atlantic Regional Water Resources Study, Appendix A, History of Study, May, 1972, p. A-1.

Committee. The membership of this body included interested Federal agencies, all the States within the NAR, and the existing river basin commissions. [2] The study attempts to project needs and solutions through the year 2020. Three general planning objectives are taken into account:

1) National Efficiency
2) Environmental Quality
3) Regional Development [3]

A "Draft Environmental Impact Statement" (DEIS) was prepared for each of the twenty-one Areas within the NAR, from the St. John River Basin to the James River Basin. Area #1 consists of the 7,360 square miles of the St. John River basin located in Maine.

For this Area, a program emphasizing equally the objectives of Environmental Quality and Regional Development was recommended in order to ". . .protect and in some ways improve this Area's extensive wildlands while helping to stimulate industrial growth." [4] The water resource management program recommended should, therefore, ". . .preserve the Area's extensive scenic and recreational resources, especially in Sub-area 1-a [the western portion of the basin] by limiting their economic development and maintaining their quality." [5] In keeping with the dual objective, however, it is recommended that "This preservation should be done in such a way, however, to allow the increasing needs of industry to be met . . .". [6]

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[2]North Atlantic Regional Water Resources Study Coordinating Committee, Annex to Report. May, 1972, op. cit., p.5.

[3]Ibid., p. 22. [4]Ibid. [5]Ibid. [6]Ibid., p.23.

The needs considered most important for attaining the so-called "mixed" objective are listed as ". . .fish and wildlife, water recreation, recreational boating, publicly supplied water, agricultural irrigation, and industrial self-supplied water," [7] the need for water quality maintenance being considered the key element in all cases. It is further stated that "Preservation and maintenance of unique landscapes will be necessary for meeting the visual and oultural needs. Provisions of such landscapes depends upon the retention and extension of the Area's unique wilderness and wild streams." [8] And on hydroelectric power: "Power plant cooling and hydroelectric generation needs will beoome relatively large during the later years of the planning period due to the growth of the paper industry and to the increase in power exportation from the Area." [9] This last statement is particularly confusing since any increase in power exportation will be due to an increase in generating facilities installed in the Area.

Although hydroelectric "needs" appear to be of low priority, the construction of "Dickey-Lincoln Lake", is persistently advocated in the Water Resources Study. Yet, it is acknowledged in the DEIS that, of all the programs recommended for the St. John River Basin, "The largest and most widespread adverse environmental effeots would result from the construction of Dickey-Lincoln Lake project." [10]

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[7] North Atlantic Regional Water Resources Study Coordinating Committee, Annex to Report, May, 1972, pp.cit., p.22.

[8] Ibid. [9] Ibid., p.23.

[10] North Atlantic Regional Water Resources Study Coordinating Committee, Draft Environmental Impact Statement, "Area 1 - St. John River Basin", October, 1972, p. 8.

The losses of wildlife habitat, cold water fish habitat, the creation of a barrier to wildlife migration routes, and the poor aquatic and terrestrial edge habitat that would be caused by the instability of reservoir water levels are recognized in the DEIS, but without any indication that their significance for the region, as well as for the immediate project area, is appreciated by the project planners.

Some confusion surrounds the effect of the Dickey-Lincoln project on the Allagash.[11] In the DEIS concern is implied about whether the reservoir would be backed up above Allagash Falls (". . .the downstream portion of the Allagash River will be submerged.")[12] The size of Lincoln School Reservoir and, therefore, the generating capacity of the reregulating dam, is severely restricted by the height of these Falls. Any plans to utilize more fully the hydroelectric potential of the Allagash flows would encroach upon the Wilderness Waterway.

The Water Resources Study reflects a new approach to the promotion of Dickey-Lincoln by the Army Corps of Engineers. The hydroelectric project is referred to as being primarily a multiple-purpose storage project which would ". . .directly or indirectly fulfill a broad array of human needs, among which are hydroelectric power, flood control, low flow augmentation for water quality, public and industrial self-supplied water and irrigation."[13] The Dickey-

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[11]Richard Rothe, New England River Basins Commission, "Memorandum: Comments on NAR Draft Environmental Impact Statement". December 8, 1972.

[12]North Atlantic Regional Water Resources Study Coordinating Committee, op. cit., p. 11.

[13]Ibid., p. 8.

Lincoln project, authorized in 1965, was credited with benefits from only two of these sources, hydroelectric power and flood control.

While it is admitted that most of the needs cited above could be met by other water management devices such as small upstream impoundments, it is stated ". . .fulfillment of hydroelectric power generation and water quality maintenance needs all require a mainstream reservoir by the year 2000." [14] In addition, such a reservoir could ". . . reduce the initial capital investment that would be necessary for the individual needs of water quality maintenance, hydroelectric power generation, irrigation water, recreational boating, water recreation . . ." [15] Dickey-Lincoln is depicted as being not only necessary to meet energy needs of the future, but also as having the potential to fulfill, in a single multi-purpose project, many other future water resource needs. In the absence of a large mainstream reservoir to meet the predicted demands, the development of several single-purpose devices might cumulatively cost more than the Dickey-Lincoln project, according to the Water Resources Study. This attempt to broaden the cost basis of Dickey-Lincoln may be valid if the projections of the future water resource needs are sound. However, the need for some of these services, such as extensive agricultural irrigation in northern Maine, is open to debate.

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[14] North Atlantic Regional Water Resources Study Coordinating Committee, Annex 1 to Report, p. 25.

[15] Ibid.

A thread of unresolved conflict between the need for the services of a large multiple purpose reservoir on the Upper St. John and the need to preserve the area for its wilderness values, runs throughout the Water Resources Study and DEIS study of the western portion of the Upper St. John River. According to the DEIS, "Area 1 contains . . .the only remaining large wilderness area in the North Atlantic Region.", [16] The Water Resources Study states that "the mixed objective plan stresses a preservation approach to most of the area, recognizing its unique wilderness value." [17] In the light of these statements, the recommendation for the construction of the Dickey-Lincoln dam, or any other "large mainstream reservoir" which would physically obliterate the core of this wilderness, seems downright contradictory. But, the Water Resources Study also states "This Area has the only reservoir storage site in the North Atlantic Region which combines a large capacity for in-stream power generation with a large amount of permanent storage for other needs." [18] According to the Coordinating Committee, the Upper St. John River is the last reservoir site remaining in the Northeast with large hydro potential. [19]

The negative environmental effects of Dickey-Lincoln cited in the DEIS would seem to far outweigh the benefits, since each of the "needs" which would be met by the power

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[16] North Atlantic Regional Water Resources Study Coordinating Committee, Annex 1 to Report, op. cit., p. 21.

[17] Ibid., Draft Environmental Impact Statement, p.11.

[18] Ibid., Annex 1 to Report, p.23.

[19] Ibid., Appendix F-Power. p. P-57.

dam and reservoir could be fulfilled by other means at other sites, including the generation of electric power. Nevertheless, the fact cannot be ignored that, if each of the "needs" identified for the St. John River Basin in the Water Resources Study is valid and must be met, they will be fulfilled at other sites if the Dickey-Lincoln project is not built, and the alternative devices will also have some effect on the environment, possibly cumulatively more damaging than Dickey-Lincoln. The environmental impact statement is a draft, and is, presumably, subject to change. Re-evaluation of that portion of the DEIS dealing with Dickey-Lincoln has been recommended by the Maine State Planning Office. [20]

Philip M. Savage, Maine State Planning Director, correspondence with Harry E. Schwarz, Executive Secretary North Atlantic Division, Corps of Engineers, December 11, 1972, p. 1.

Conclusion - Dickey-Lincoln in the 1970's and the Prospects for the Upper St. John River

Because Congress has annually refused appropriations since 1967, the Dickey-Lincoln project is generally thought to be a "dead" issuo. The North Atlantic Regional Water Resources Study indicates, on the contrary, that from the current perspective of the Corps of Engineers, Dickey-Lincoln is very much alive as the key feature of a comprehensive water resources development program for the St. John River Basin. Furthermore, the "Hathaway plan", proposing a smaller-scale Federal hydroelectric installation and revised marketing plan with agricultural irrigation included as an additional non-power project benefit, has won over much of the former Congressional opposition to Dickey-Lincoln. Also, proponents of the creation of a Power Authority of Maine have not ruled out a St. John hydroelectric project. Its predecessor, the 1965 proposal for a Maine Power Authority, was based on well-developed plans for a hydroelectric dam on the St. John River at Big Rapids, a few miles above the Dickey site.

Other types of development may pose a future threat to the Upper St. John wilderness as well. Although paper company domination of the watershed has been largely responsible for its present unsettled wilderness state, unsound timber harvesting practices and recreational development of timberland holdings could be as damaging to the wild qualities of the area as a hydroeleotric project.

A combination of circumstances currently prevails

which tends to make Dickey-Lincoln hydroelectric energy more attractive than ever. Despite the achievement of many private utility goals for integrating New England's electric systems, the rate reductions predicted in the mid-1960's for Maine have not materialized. Instead, rate increases of approximately 9% were granted in 1972 by the Maine Public Utilities Commission to the three major private electric utilities serving Maine. Additional substantial increases will probably be requested in 1974. Fuel shortages resulting in rising fuel prices and uneasiness about overdependence on foreign oil supplies may revive interest in the reliable qualities of hydro power. Delays in nuclear plant licensing and increasing difficulty in siting thermal and nuclear power plants tends to increase the appeal of the already-authorized Dickey-Lincoln project to those concerned about the inadequacy of utility company plans for meeting future demands. The natural advantages of the use of a "clean", renewable resource such as hydro power versus methods of power production entailing the consumption of fossil fuels and the attendant pollution problems add further attraction to Dickey-Lincoln. In addition, some environmentalists have advocated the Dickey-Lincoln project on the grounds it would give Maine the electrical self-sufficiency to resist the anticipated wave of construction in Maine of huge generators primarily intended to produce power for export south to the New England Power Pool network. [1]

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[1] Editorial, Maine Times. September 6, 1971.

The original objective of developing the Dickey-Lincoln project was to reduce the exceptionally high New England power rates. Yet it is not clear, on the basis of the economic justification used by the Department of the Interior, and on which Congress authorized the project, that Dickey-Lincoln is the most efficient means of achieving that objective, or that Dickey-Lincoln power would have any impact on the average Maine ratepayer's electric bill, because of the marketing restrictions on Federally developed power. And, if rate reduction is the most important consideration, perhaps a combination of closer Public Utilities Commission regulation of the private electrical industry and an extension of the tax subsidies to private utilities from which public projects automatically benefit would achieve that purpose more quickly. On the other hand rate reductions accomplished by tax subsidy for private or public power developments do not necessarily benefit the ratepayer-tax-payer. A new economic analysis of Dickey-Lincoln, taking these factors into account, cased on current costs and prices, would be required to demonstrate its current economic justification.

The question then arises as to whether Dickey-Lincoln power could be integrated with private industry plans for improving the efficiency of power generation, or if the introduction of competition in a natural monopoly situation may not come at a sacrifice in efficiency. [2]

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[2] Wilkinson, "New England's Power Developments: Part II . . .Public Power Proposals", op. cit., p. 17.

the NEPOOL (New England Power Pool) agreement, awaiting approval by the Federal Power Commission, would bar publicly-financed utilities from using the extra-high-voltage transmission grid developed by New England's private utilities, which is crucial to intersystem electrical coordination. [3]

Dickey-Lincoln was planned and authorized before the days when environmental impact was a major concern. A reappraisal of the entire project should seriously weigh the environmental and social cost of obliterating "the irreplaceable natural resource of the present St. John River watercourse and its adjacent 88,600 acres of streams and timbered beauty", [4] which provide a natural reserve area for Maine wildlife, a valuable timber industry resource, and a high-quality natural recreational area of growing value to the urban Northeast.

But, if the Federal project is not built, the growing power market will demand that the electricity be supplied by other means. Since every means of electrical generation currently in use has inherent environmental costs, to reject Dickey-Lincoln is to shift the environmental losses to other sites, where they will take different forms. With this dilemma in mind, the basic question is whether the Upper St. John is more important for its unique value as an integral component of the last great wilderness of the Northeast, or for its value as the last significant hydroelectric site remaining in the Northeast. This decision

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[3] Sam Barouch, COMBAT, personal interview, February, 1973.

[4] Wilkinson, "New England's Power Developments: Part II . . . Public Power Proposals", op. cit., p. 17.

should be made within the framework of a comprehensive energy policy for the state. If it is not, construction of the Dickey-Lincoln project would just be another random, short-term solution to a predictable, long-term problem.

The North Atlantic Regional Water Resources Study recognized the value of the St. John for both purposes, and recommended development of its hydroelectric potential. That study reveals an attitude of inevitability toward the construction of Dickey-Lincoln on the part of the Corps of Engineers, and a willingness to persevere until funds are appropriated for the completion of planning. Thus, unless those who favor the preservation of the Upper St. John's wilderness values are prepared to fight a perennial battle indefinitely against Dickey-Lincoln, they must develop an equally substantial plan to implement their proposals.

Such a plan, to create a St. John Wilderness Waterway by ingenious resolution of the public lots issue, was proposed by Congressman Peter Kyros in February, 1973. The Upper St. John lies entirely within the unorganized townships, except for the Allagash Plantation. When these townships were laid out an area of land, generally 1,000 acres, was reserved for public ownership, to be used for the support of the ministry and the schools after these townships were settled and had organized local governments. About 1850, timber and grass cutting rights were sold for a nominal sum, to lumber companies on almost all the public lots.

The potential of the 400,000 acres of public reserved lands was brought to the public's attention in 1972, and the State Attorney General's Office performed a study of

the status of the State's ownership rights and ways by which the state could reassert its claims to these lands. A special legislative Public Lands Committee was created in 1973 to hear bills proposing various ways of resolving the public lands controversy and to study ways in which these public lands could be used to the best advantage of Maine people.

Sixteen unorganized townships span the length of the Upper St. John, from Baker Lake to the Allagash Plantation. In all but three of these townships, the public lots are unlocated, that is, they have never been surveyed and laid out on the ground. As envisioned by the Kyros plan, these unlocated lots would be located along the Upper St. John in such a manner that they would form a continuous corridor along either side of the river. In the three townships where the public lots have been located previously, relocation of the lots would be necessary. The width of the strip of public lands would vary from township to township, since a fixed acreage (1,000 acres) would be divided over varying lengths of river footage.[5] The average width of the strip would exceed 500 feet on either side of the river, and would not be less than 358 feet in any township, as calculated in the Kyros plan. Not only would this plan protect the Upper St. John River for the people of Maine, but it would require no expenditure of funds for land acquisition of the approximately 15,690 acres of public lots involved.

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[5] News Release from Congressman Peter Kyros, First District, Maine, Washington Office, Friday, March 23, 1973.

The implementation of the Kyros plan must await the resolution of the entire issue of the ownership and use of the public lots. No matter what the special committee recommends, or what course the legislature takes, the public lote issue will be finally resolved in the courts, which may take years. [6]

The Maine Land Use Regulation Commission's (LURC) authority to zone the 10.5 million acres of wildlands in the unorganized territory has the potential to provide some degree of protection to the Upper St. John. Interim zoning standards are now being formulated to protect the wildlands from further unplanned development, based on three land-use dietriots. In the protection district, special permits are required for cutting and development is strictly controlled. Included in this district would be the lands 250 feet back from "significant" streams. The interim zoning will be followed by permanent zoning after development of a comprehensive plan. LURC zoning would not, however, override a vote of Congress to fund construction of the Dickey-Lincoln Projeot, nor could it insure future public use of the adjacent riverlands. It is apparent that LURC with its current authority, cannot insure the continued availability of this wilderness area for Maine citizens.

Although it will not be possible to implement the Kyros plan immediately, it does fulfill the need for a substantial plan and management proposal for the use of the

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[6] News Release from Cpngressman Peter Kyros, March 23, 1973, op. cit.

Upper St. John that can be held up as a concrete alternative to the Dickey-Lincoln project. Obviously, serious consideration of protective measures for the St. John is certain to spark more vigorous promotion of the project. The full-scale Dickey-Lincoln project clearly could not coexist with a St. John Wilderness Waterway such as Congressman Kyros proposes. Whether or not a conflict exists between the Hathaway plan variation of the Dickey-Lincoln project and the Kyros plan for preserving the St. John will be demonstrated by the feasibility studies now in progress. Until engineering studies do demonstrate the degree of conflict, these two proposals must be weighed as alternative usee of the Upper St. John. Congressman Kyros' creative approach to the preservation of this remarkable Maine river through the use of the public lots deserves the attention end the same consideration that the Dickey-Lincoln project has received. The Dickey-Lincoln project should not be renewed without a thorough reappraisal of its economic benefit for the people of Maine and its environmental and social costs.

The climate of opinion in Maine favors the Dickey-Lincoln project as a means of lowering power rates and stimulating economic growth in the state. These expectations are largely based upon promises made by advocates of the project, that Dickey-Lincoln would assure low-cost power for all the people of Maine. In reality, the vaet majority of Maine people would receive abeolutely no economic benefit from construction of the hydroelectric project. No general reduction in electrical rates would occur

if Diokey-Linooln were built, beoause the relatively emall number of Maine preference customers would be entitled to receive the 100,000 kilowatts of baseload capaoity . Even the southern New England customers buying Diokey-Linooln peaking power through private utility distributors would not find their power rates reduoed since the new power would be mixed with large quantities of power from other sources and the rate-reducing effect diluted substantially. Vast amounts of inexpensive power from Dickey-Lincoln would not be generally available, so the project would not serve to attract industry to Maine. The evidence that the projeot is the best way to revitalize the economy of northern Maine is questionable. Certainly more effioient means of accomplishing this objective could be found than the construction of a $500 million power development. Also, it is unlikely that any rate reduction resulting from the project would be more equitably distributed than the tax increase that would be generated by the project. Only a limited number of Maine people (preference customers) would directly benefit from lower-cost power from Dickey-Linooln, but the tax burden from whioh the Federal projeot would be exempted would be distributed over all classes of taxpayers, who are also ratepayers, but who would not all benefit from rate reductions.

The environmental consequences of the proposed Diokey-Lincoln project would be profound. The Upper St. John River would be devastated. The trout fishery would be destroyed in the project area and damaged upstream. Its value for

wilderness canoe-camping would be nullified. 110,000 acres of wildlife habitat would be obliterated by the reservoir, an area that has been of particular importance as a natural wildlife reserve. The displacement of the wildlife inhabiting the project area is expected to have a significant secondary impact on the populations of animals outside the immediate project area, causing an over-all decline in populations of all species in the Upper St. John region. The most severe blow would be dealt to the deer population, since 13,000 acres of deer yarding areas, which support deer from the entire region, would be inundated. At the same time, the Dickey-Lincoln reservoir facility would open up this section of the wildlands to greater numbers of people, increasing hunting and fishing pressures.

In the absence of any demonstrable economic benefits to Maine people from the construction of the Dickey-Lincoln project, these drastic environmental consequences are unjustifiable. The Federal project would produce less than 2% of New England's total electrical requirements at the present time. It would consume, however, the last wild section of the St. John River, a core area of what has been called the only remaining large wilderness in the Northeast. The construction of the Dickey-Lincoln project on the Upper St. John River would squander a unique wilderness river, of ever-increasing value to the people of the state, the region, and the nation.

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