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Let's Get All the Facts about 'Quoddy'

Maine Development Commission

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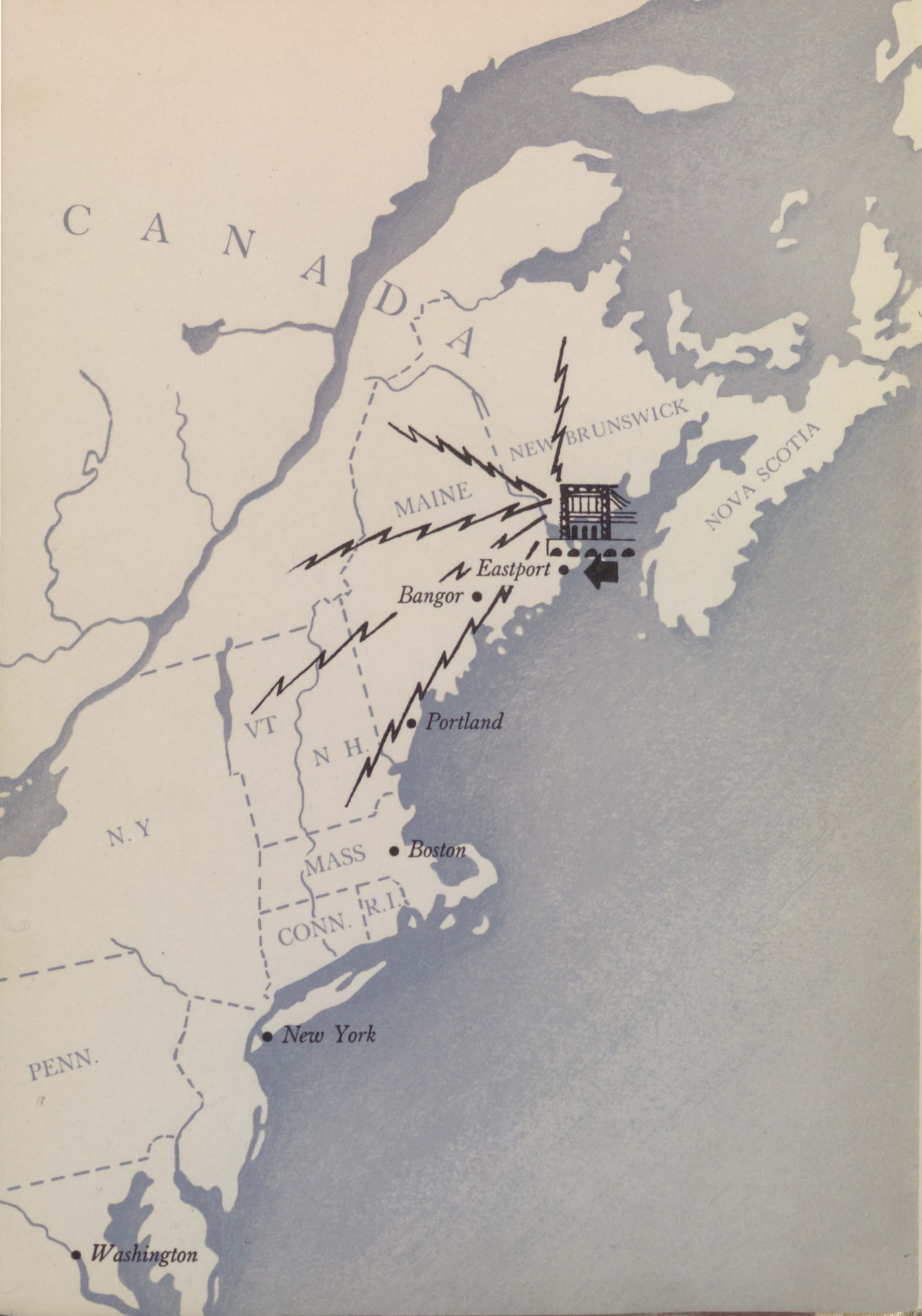
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Let's get **All**

the facts about

'Quoddy

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Introduction

On November 9, 1948, the Governments of the United States and Canada referred to the International Joint Commission of the two countries the responsibility for a preliminary investigation to determine the practicability, desirability and cost of a full-scale survey of various plans for hydro-electric power development in Passamaquoddy Bay.

In April 1949, the Commission appointed two representatives from each country to an International Passamaquoddy Engineering Board to carry out this preliminary investigation.

On March 15, 1950, the Board reported back to the Commission as follows:

- that it was the Board's opinion that an international Passamaquoddy tidal power project could be physically engineered, constructed and operated;
- that determination of its economic feasibility must await a full-scale survey;
- that such a survey would cost an estimated \$3,900,000—the cost to be apportioned equitably between the two countries.

The Purpose of this little booklet - - -

is to give a brief, concise summary of the available facts on the Passamaquoddy Project, in the hope that this will prove of assistance to all those who may be concerned with the vital decision—whether or not the Congress of the United States shall appropriate this country's share of the funds needed to finance this important survey.

What is 'Quoddy ?

'QUODDY is the familiar name now widely used to refer to the International Passamaquoddy Tidal Power Project.

'QUODDY is a farsighted venture in international cooperation between the two great neighbors of the North American continent.

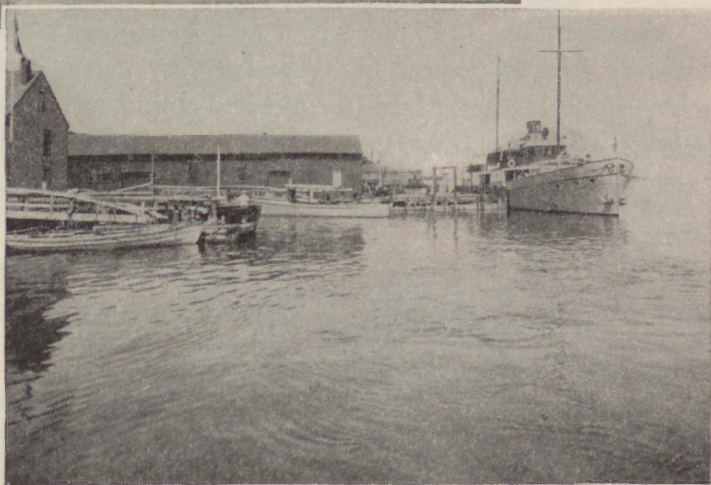
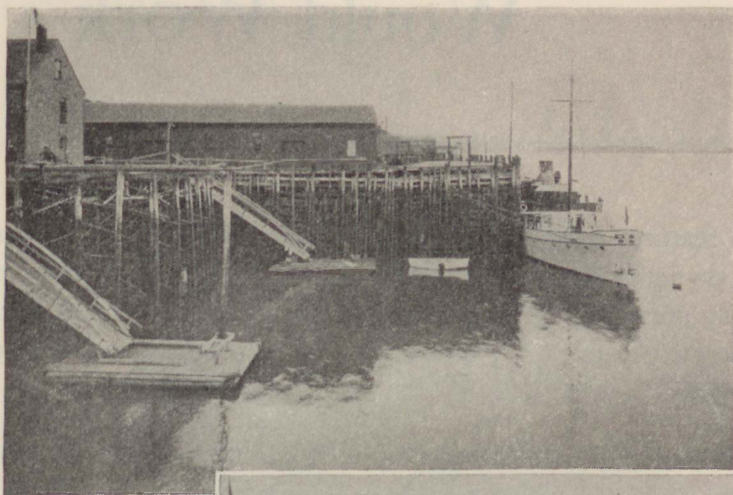
'QUODDY in essence is a plan to harness the tremendous tides of the Passamaquoddy Bay region of New England and the Canadian province of New Brunswick for the production of cheap, ample electric power.

The present International Plan must not be confused with the earlier, "All-American" plan of 1936. Less bold in concept and less acceptable from an engineering standpoint, the All-American plan was frankly undertaken as a compromise. It was largely written off as a work-relief project at a time when the country-wide depression of the 1930's made such projects desirable from a social-welfare point of view.

The new International Plan is free from the defects inherent in the earlier Plan. Hence, it cannot be dismissed as a question that has already

been settled. It deserves to be examined carefully on its own considerable merits.

Tremendous Tides —averaging 19 feet between flood and low water—were the inspiration for 'Quoddy. The two pictures below, taken 6 hours apart in Eastport harbor, illustrate the enormity of this tidal range. No-where else in the world can we find such a huge tidal range combined with the other favorable factors that make 'Quoddy engineeringly possible.



How 'Quoddy Would Work

Two natural features give 'Quoddy its vast potentials for tidal power development that do not exist elsewhere in the world. The range of tides in the Passamaquoddy area is far greater than average—from 13 to 28 feet. And the area boasts two large basins, almost entirely landlocked, and closely adjacent to each other.

The project is basically simple (see simplified chart opposite). It calls for a series of dams and locks which would keep one of these basins, Passamaquoddy Bay, at or near high-tide level by means of sea gates opening inward as the tide neared full height and closing when it started to recede. The other basin, Cobscook Bay, would be kept at or near the low-tide mark by sea gates opening outward on the ebbing tide, and closing as the tide turned.

19-Foot Differential

The difference in water level between the two basins would average 19 feet, and power would be generated by turbines in another dam between these two basins. The enormous flow of water would be constant and un-failing. The controlled operation of the sea gates in the 12-hour tide-cycle would maintain a continuous, though somewhat varying, difference in water

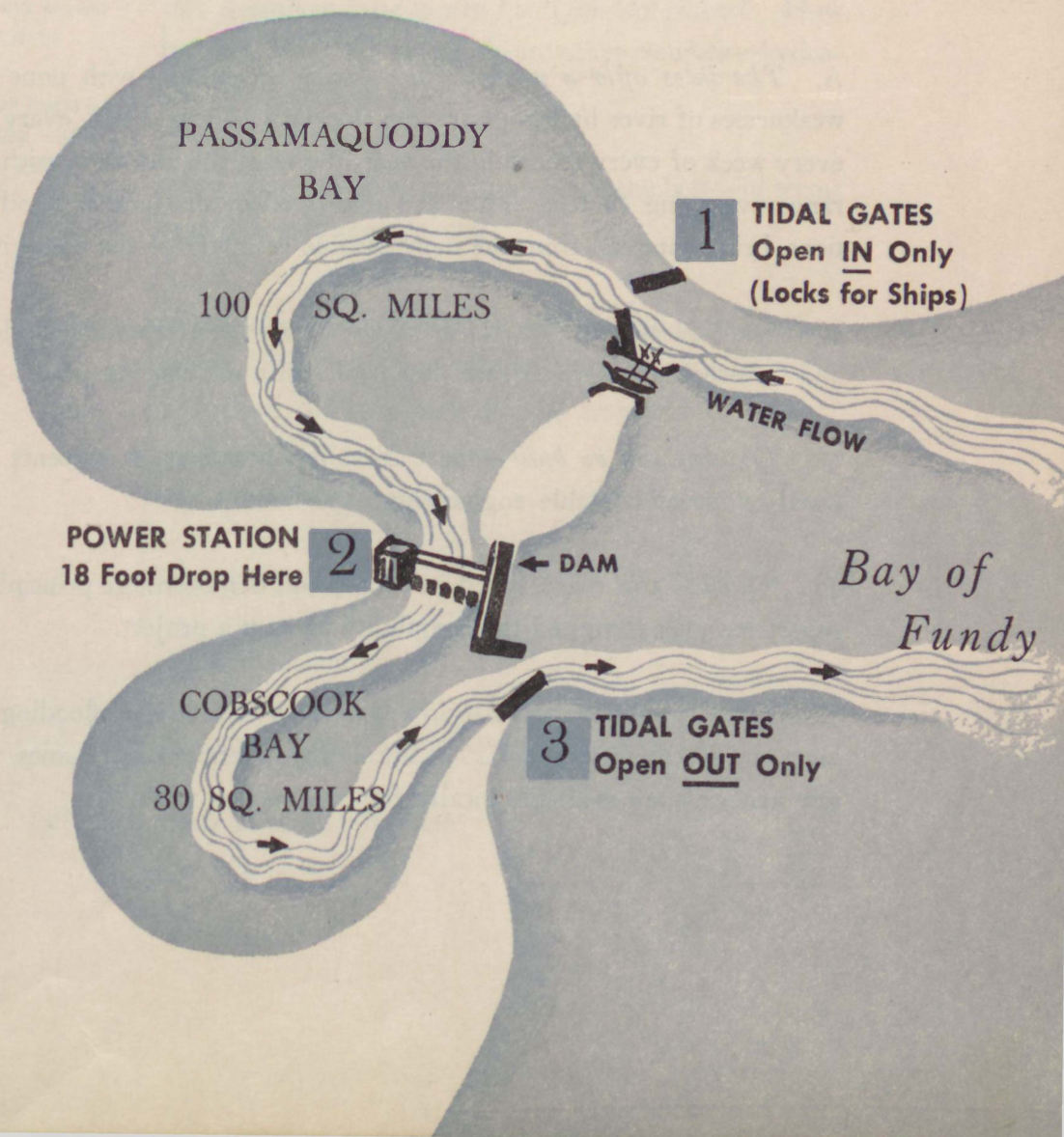
level 24 hours a day. This is made the easier by the fact that the upper basin is roughly three times as large (c. 100 square miles) as the lower basin (c. 30 square miles).

3 Billion Kilowatts

With a theoretical capacity of some twenty billion kilowatt hours of electricity per year, 'Quoddy, according to latest estimates, could yield an actual production of three billion kilowatt hours per year—around 1,000,000 horsepower.

CANADA

MAINE



What We Know About

'Quoddy



A. *The tides offer a never-failing source of power*—with none of the weaknesses of river hydro-electric development. Twice a day, every day of every week of every month in the year, the tides ebb and flow, with a total range averaging 19 feet. They are unaffected by drought or flood conditions, being supplied from the inexhaustible reservoir of the ocean itself.

B. *'Quoddy provides two large natural reservoirs*—Passamaquoddy Bay and Cobscook Bay—for a receiving pool and a discharging pool.

C. *'Quoddy can be built*—apart from its sheer size, it presents no unusual or insurmountable engineering obstacles.

D. *'Quoddy will work*, based on simple and demonstrable principles. No report has ever contested the operability of such a project.

E. *'Quoddy requires no costly condemnation of land*—no flooding of villages and fertile farmlands . . . no uprooting of families and homes. Ample raw materials are available locally for construction work.

What We Want to Find Out

1. *Is 'Quoddy economically feasible?* How much will it cost to build?
... to operate?
2. *How much will the consumer have to pay for 'Quoddy power?* How
will its cost compare with that obtainable from other sources—hydro-
electric river power and fuel-operated power?
3. *Which of the several alternate plans for 'Quoddy is the best—in terms*
of cost, power to be realized, maintenance, etc.
4. *How great a market is there for 'Quoddy power?—existing and poten-*
tial? ... local and export? How can this power be coordinated with power
from other sources? How far can it be economically transmitted?
5. *What would be the effect of 'Quoddy on:*
 - (a) the fishing industry?
 - (b) the regional economy?
 - (c) waterborne, highway and railway transportation?
 - (d) any other affected interests?

Who would benefit from 'Quoddy?

First of all, those areas immediately adjacent to 'Quoddy—the State of Maine and the Province of New Brunswick—would derive direct benefit from the development of the 'Quoddy power project. Abundant power at reasonable prices would attract new basic industries . . . would enable these regions to get in step once more with the orderly industrial development of the rest of their respective countries.

Secondly, New England—historically the “Machine Shop of America”—would benefit from 'Quoddy. Here is concentrated a vast backlog of technical skill and know-how. Here is a trained labor force, skilled in the arts of precision manufacture, unduplicated elsewhere in the land. Here are numerous highly-specialized industries—turning out small but vital components and equipment for the industry of the whole country. Here are the great universities and engineering schools, the technical schools and research laboratories, at work on projects and problems affecting industry in every corner of the land. A dependable new supply of cheap power would assure that New England could maintain and improve its present productive position.

Finally, having the foregoing in mind, it becomes inescapable that 'Quoddy would add to the basic strength and the economic and social well-

being of the United States and Canada—as a military and industrial asset and as a step towards developing vital new metal and mineral resources, valuable in war or peace. To the people of the United States and Canada as a whole, 'Quoddy offers possibilities far beyond that of relocating industries in a new and spacious area through the incentive of cheap power.

Conclusion

The foregoing is the briefest possible statement of the various factors involved in the 'Quoddy project. The second section of this booklet develops this material to a greater degree and is strongly recommended to those who wish fully to understand the need for the 'Quoddy Survey and the benefits that could be derived therefrom.

The International Passamaquoddy Engineering Board has estimated that the complete Survey would cost \$3,900,000. A breakdown of the costs will be found on the last page of this booklet.

It is earnestly hoped that—once the whole story of 'Quoddy is clearly understood—the conclusion will be inescapable that the proposed Survey is not only desirable but urgently needed.

New Brunswick
CANADA

UPPER POOL
100 Sq. Miles

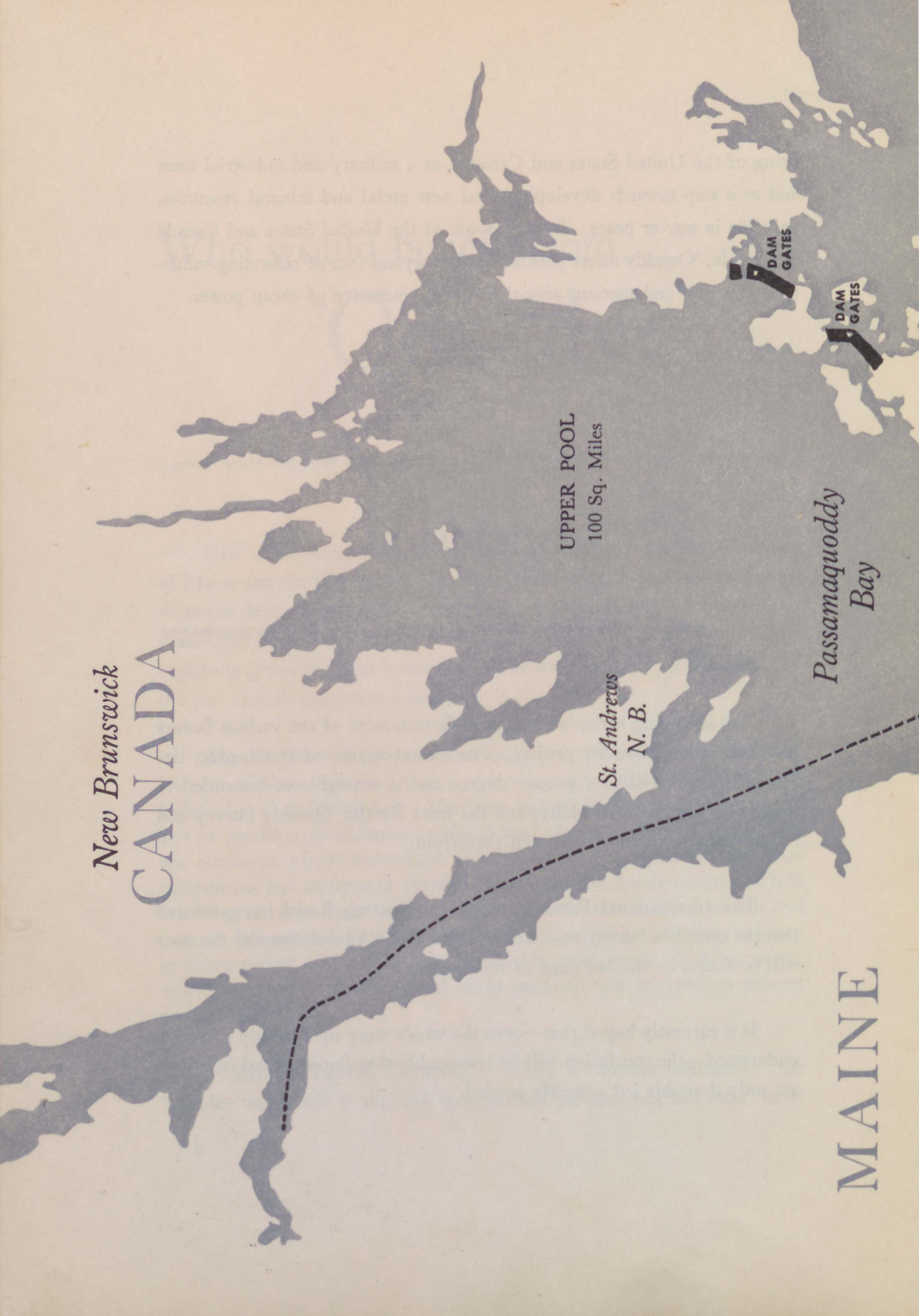
St. Andrews
N. B.

Passamaquoddy
Bay

DAM
GATES

DAM
GATES

MAINE





Bay of Fundy

Campobello Island

CANADA
U.S.

West Quoddy

Lubec

LOCK
GATES

North Lubec

DAM
GATES

Eastport

POWER
HOUSE

BRIDGE

DAM
DAM

Cobscook Bay

LOWER POOL
50 Sq. Miles

Perry

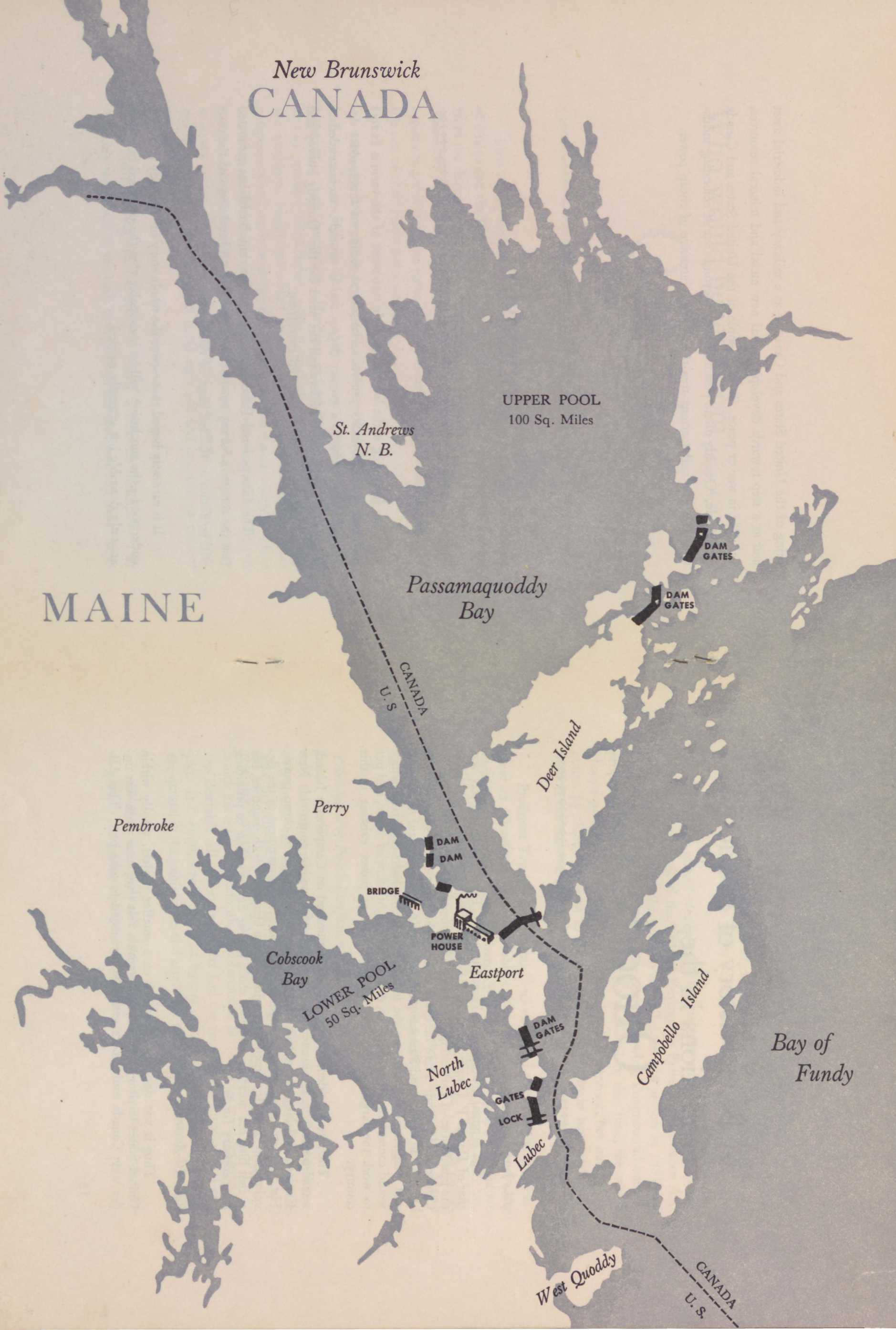
Pembroke

CANADA
U.S.

Deer Island

New Brunswick
CANADA

MAINE



A Brief History of Previous Operations in the 'Quoddy Area

The International Plan

The original concept of a Passamaquoddy Tidal Power Project was that of Dexter P. Cooper, famed hydro-electric engineer, who first studied the possibilities of harnessing the tides of Passamaquoddy from his home on Campobello Island. Here he could observe the great tides, and their ebb and flow in and around Passamaquoddy Bay and Cobscook Bay. With skill and imagination, he drew up the first plans for the locks and dams which would connect the island barriers, control the mighty flow of water, and put to work the largest single undeveloped block of power existing in this country.

The late President Roosevelt, who summered on Campobello Island, was also struck by the immense potentialities of 'Quoddy, to provide New England and New Brunswick with a never-failing source of cheap power. He made strenuous efforts to interest the Canadian government in the development of an International project, to the benefit of both countries, but at that time our northern neighbor could not see her way clear to providing the necessary funds.

The All-American Plan

Thus it was decided to embark on a smaller project, wholly within United States territory. President Roosevelt felt that, once work was under way, Canada could more easily be persuaded to take part. This All-

American project was admittedly less practical from an engineering standpoint, and offered less power potential. Yet it was so laid out that it could be incorporated readily into the larger International project, should Canada subsequently decide to join in the development.

In 1935, a sum of money was made available to the War Department under the provisions of the Federal Emergency Relief Appropriation Act. Army engineers began the work on the All-American project in 1935 and continued through 1936, suspending operations when Congress did not appropriate funds needed to continue the work. Since that time, the whole idea of power development at 'Quoddy has lain dormant, but never forgotten by those who wish to see New England maintain her accustomed place in our national economic structure.

President Truman has several times expressed regret at the abandonment of 'Quoddy. Numerous cabinet officers and other men high in the ranks of government have approved the project. The people of Maine are on record as being strongly in favor of it—through popular elections, the action of their legislature, the expressed approval of every Maine governor since the plan was first presented, and of every member of the Maine delegation in Congress. Other New England states are actively interested and now strongly support the plan.

The Source of Public Confusion

The countrywide depression of the 30's justified in President Roosevelt's mind the spending of money in an admittedly distressed area, and gave the All-American plan the aura of a social-welfare undertaking. It is this aspect which has always obscured the true facts about 'Quoddy . . . which has made it so difficult to differentiate in the public mind between the less desirable All-American project and the far sounder International project. It is emphasized that most figures on cost and power output which are quoted in the public press and elsewhere refer to the All-American plan.

There is no comparable data available for the International project—to get it is the primary purpose of this Survey.

New England Power - -

Present and Future

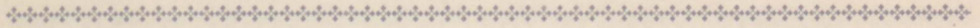
Authorities differ widely in their estimates as to how much new power is needed in New England in the foreseeable future.

New England's present power sources are steam plants, which account for about 75% of the total electric energy produced, and hydro-electric developments. Steam plants are fired by coal or oil, both of which are variable in price, not altogether certain of supply (the coal strike of 1950 is an example), and dependent on costly transportation from mines or wells hundreds or thousands of miles away.

River hydro-electric plants, on the other hand, are undependable at certain seasons, and the exact timing and extent of these seasons are unpredictable from year to year.

It is no exaggeration to say that the development of new power sources is basic to the continued orderly growth of New England's economy. We know already that tidal power is potentially far more dependable than river hydro-electric developments. If the Survey should reveal that tidal energy also could be produced more cheaply from present power sources, the future for New England . . . and for the many industries the country over which depend on the products of New England's mills, factories and machine shops . . . would be bright indeed.

Testimony of Federal Power Commission on International Project



Pertinent excerpts from the Report of the Federal Power Commission to the United States Senate, March, 1941:

"No Bar to Thorough Exploration of the Project"

"The natural and doubtless justifiable presumption that the construction of a large international tidal power project at Passamaquoddy will not be economically feasible or desirable in the near future should be no bar to a thorough exploration of the possibilities of such a project jointly by the Governments of the United States and Canada. It may confidently be assumed that the power potentially available in the Passamaquoddy tides will ultimately be developed. The event seems certain; the only uncertainty is in point of time."

"Most Dependable Source of Power"

"Unaffected by droughts, floods, or ice jams, the tides provide the most dependable and most permanent source of power known to Man. These unique advantages are not to be cast aside lightly."

"Engineering feasibility generally recognized"

"No informed person will say that it is impossible to produce electric power from the tides under the conditions obtaining in and around Passamaquoddy Bay. The engineering feasibility of producing tidal electric power in that locality is generally recognized and accepted. Moreover, from the viewpoint of the construction engineer, it is not believed that there would be any insuperable obstacles to the construction of the two-pool tidal project, wholly within the State of Maine as considered in this report, or of a much larger international tidal power project."

"As fuels become scarcer and dearer"

"The idea of generating electricity from the enormous latent power of the tides along the shores washed by the Bay of Fundy is fascinating, interesting, entrancing—a challenge, as it were, to the imagination and ingenuity of Man. As high-grade fuels become scarcer and dearer concurrently with greatly increased demands for electric power in the northeastern States and in contiguous Canadian territory, attention will surely be directed to the problem of harnessing the tides."

Excerpts from Statements Made Relative to the Power Situation in New England

Report of Federal Power Commission, 1941

“The prevailing high domestic rates and low domestic usages in Maine and other New England States suggests the possibility that greatly increased supplies of electrical energy may be required for this region, if domestic and other consumption levels rise to those already experienced elsewhere in the United States.”

New England Power Conference, Washington, March 31, 1949

... the region has the lowest average use of residential electricity of any in the country. When the question of higher New England rates is brought up, the answer is that New England rates are lower today than in past years. That much is true. But that still does not clear away the fact that in 1932 the average rate per 100 kilowatt hours in New England was 22% higher than the average charged by private companies in the TVA area, while today it is 60% higher. We cannot compare New England today with New England in the past.”

Rep. Chase Goring Woodhouse (Conn.)

“New England’s average per capita use of power for industrial purposes is definitely below the average of the country . . . the New England average per capita use in 1947 for industrial purposes was 1,067 kilowatt hours per year. The U. S. average was 2,000 kilowatt hours per year . . . for 1947 the average rate per kilowatt hour for industrial sales in New England was 15.4 mills . . . compared with the United States average of 9.8 mills. . .”

*Leland Olds, Chairman
Federal Power Commission*

Assistant Secretary of the Interior Davison

“While generation of electricity in the rest of the country jumped 6½% in the first quarter of 1949 compared to the same period in 1948, it decreased 2½% in New England, the only section of the country to show a drop.”

*Speech at Textile Conference
Worcester, May 14, 1949*

Assistant Secretary of Interior Warne

“Using the years from 1929 to 1947 as a yardstick, power generating capacity in the New England States . . . increased 48%. For the country as a whole the increase averaged 77%, for the TVA states 140%, and for the Pacific Northwest 146%. In this same period, total income in New England rose 91%, while the increase for the country as a whole was 129%, for the TVA states 198%, and for the Pacific Northwest 202%.”

*Speech before U. S. Chamber of Commerce
Washington, May 6, 1950*

Possible Outlets for 'Quoddy Power

It is axiomatic that cheap, ample electric power attracts its own market. This has been demonstrated again and again in the industrial development of this country. New industries have flocked to the site and new prosperity, lower rates and increased population have greatly increased domestic usage. Niagara Falls, New York, for instance, was a little tourist town of 6000 inhabitants, before the power of the falls was harnessed. Today it is a thriving industrial community of 92,000 and still growing. More recent examples are to be seen in the industrial development throughout the region served by TVA and in the burgeoning communities of the Pacific Northwest.

One of the major purposes of the Survey is to determine what market exists or can be attracted for the enormous amounts of power potentially available from 'Quoddy. If 'Quoddy proves economically feasible, it will be one of the very few places in North America where large amounts of relatively inexpensive electric power will be available at a point directly accessible to low-cost, ocean-borne transport the year round. Thus it would logically attract a wide variety of heavy industries—operations which require large amounts of raw materials and ship bulky finished products. Some of these might be:

Pulp and Paper

This ever-expanding basic industry would feed on the vast pulpwood reserves of Maine and nearby Canada.

Lacquers and Solvents

Hydrogen, combined with carbon monoxide, permits the manufacture of synthetic wood alcohol—leading to the development of many chemical industries, such as lacquers and solvents.

• *Fertilizers*

With nitrogen from the air and hydrogen obtained by electrolysis, the manufacture of cheap synthetic ammonia is practicable. Combined with water-borne phosphate rock from Florida and sulphur from Louisiana, cheap phosphoric and sulphuric acid could be produced, leading to low-cost ammonium phosphate and ammonium sulphate fertilizers.

Chlorine and Caustic Soda

Salt water is the basic raw material in the electrolytic process for manufacturing caustic soda and chlorine; also for the manufacture of liquid chlorine as a bleaching agent.

Iron and Steel

Ore from the recently uncovered Labrador deposits, plus local limestone in both Maine and New Brunswick, would make 'Quoddy a most logical location for new mills to manufacture steel by the latest electric furnace process. Ample power would be on hand for the production of special steels and alloys.

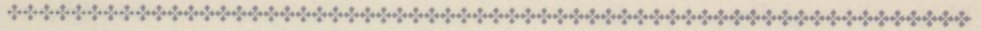
Non-ferrous Metals

Aluminum—The production of aluminum requires large amounts of electricity, combined with cheap transport. 'Quoddy would offer both.

Magnesium—The extraction of magnesium from sea water by electrolysis has long since proved practical. Here again, 'Quoddy's unusual combination of ample power, plus sea water, plus low-cost water transport would make it a natural place to establish a magnesium plant.

Manganese—One of our scarce strategic metals is manganese. Maine has vast deposits of admittedly low-grade ore. Principal sources of high-grade ore—China and Russia—are practically closed to us. Stockpiling has been inadequate and the U. S. Congress is showing deep concern. Imports are being raised from Brazil, Africa and India. In the event of war, such long supply lines will be most vulnerable to enemy submarine activity. Then the development of Maine ores, though uneconomic in peacetime, may become a vital military necessity. 'Quoddy would be ready for the task.

Incidental Benefits to be derived from 'Quoddy



Harbor

The development of 'Quoddy would offer new industries the advantages of a superb deep-water, year-round port at a point well situated in regard to world markets—283 miles nearer Gibraltar than New York, 425 miles nearer Liverpool. Raw materials and heavy cargoes would benefit from cheap water-borne transportation. The region already has rail connections with both American and Canadian lines and ample sites for docking and repair facilities.

Naval Base

When completed, Passamaquoddy Bay itself would be transformed into an immense, land-locked, year-round anchorage—100 square miles in area—with deep and safe approaches and natural terrain features that would lend it admirably to defense against submarine and air-borne attack. All the combatant ships of all the navies in the world could manoeuvre in perfect safety in its broad, protected reaches. It is difficult to envision a more ideal spot on which to base joint U. S.-Canadian sea forces to guard the northeastern approaches to this continent.

ESTIMATED COST OF PROPOSED SURVEY

The following table breaks down the cost of various items in the complete Survey of 'Quoddy, proposed in March 1950, by the International Passamaquoddy Engineering Board.

<i>Item</i>	<i>Estimated Cost</i>
Preliminary Investigations	\$ 45,000
Field Surveys	463,000
Hydrographic Investigations	155,000
Fishery and Miscellaneous Investigations	305,000
Foundation Explorations	1,655,000
Material and Laboratory Investigations	284,000
Hydraulic and Power Studies	140,000
Design of Project Structures	437,000
Construction Plant and Facilities	32,000
Lands, Relocations, Damages	37,000
Power Market for Project Output	47,000
Transmission System to Power Market	19,000
Cost Estimates	68,000
Alternative Sources of Power	62,000
Preparation of Report	86,000
Consulting Service	65,000
	<hr/>
	\$3,900,000

It is earnestly to be desired that the Congress of the United States will vote to appropriate funds to cover this country's share of the cost of this important Survey.

Only if this Survey is carried out can New England and the nation as a whole hope to

Get all the facts about 'Quoddy!

This report prepared by

MAINE DEVELOPMENT COMMISSION

State House, Augusta, June, 1950

