REPORT ON POLLUTION -

NAVIGABLE WATERS OF THE

PENOBSCOT RIVER AND UPPER PENOBSCOT BAY

IN MAINE

(Revised)

Merrimack River Project

Northeast Region

Federal Water Pollution Control Administration

U. S. Department of the Interior

Boston, Massachusetts

February 1967

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SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY AND CONCLUSIONS

l. The Commissioner of Sea and Shore Fisheries for the State of Maine,

Mr. Ronald W. Green, ordered the closing of the remaining shellfish

beds in Searsport and Stockton Springs, Maine, on June 28, 1966,

because of the polluted condition of the water. The Federal Water

Pollution Control Administration, in conjunction with the United

States Public Health Service, conducted an investigation of the

Penobscot River below Bangor, Maine, and the upper Penobscot Bay

area to determine the sources of this pollution, the direction of

travel of this pollution, and the degree of economic injury involved.

2. Discharges from the following communities and industries result in

serious pollution in the Penobscot River and upper Penobscot Bay area:

Bangor

S. A. Maxfield Co., Bangor

Brewer

Standard Packaging Corp., Brewer

Hampden

Winterport

Frankfort

Bucksport

- ]\_ -

St. Regis Paper Co., Bucksport

Maine Blueberry Growers, Penobscot

Castine

Maine Maritime Academy, Castine

Stockton Springs

Searsport

Northern Chemical Industries, Inc., Searsport

Bangor and Arroostook R.R. Co., Searsport

Freighters and tankers serving Shell Oil Co., C. H.

Sprague and Sons, Inc.; Jarka Corporation of New England;

and U. S. Air Force Petrol Depbt, Searsport

Belfast

Belfast Canning C0., Belfast

Maplewood Packing Co., Belfast

Penobscot Poultry Co., Inc., Belfast

Sherman and Company, Belfast

Northport

These·discharges caused the closure of the shellfish beds in North-

port, Belfast, Searsport, Stockton Springs, Penobscot, Castine, and

may cause the closure of some of the beds in Islesboro. There is

presently a harvestable standing crop of 96,600 bushels of soft shell

clams; these are worth from $1,900,000 to $5,200,000. An estimated

harvestable standing crop of M6,200 bushels of clams worth from

$900,000 to $2,500,000 would be available next year.

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3- Bicteria equivalent to those in raw sewage of approximately 70,300

persons are discharged at the present time in the study area. The

communities of Bangor and Brewer contribute 65 per cent of the total,

while the two poultry plants in Belfast discharge ll per cent. The

remaining 2M per cent is contributed by the following sources: S. A.

Maxfield Co., Bangor; Standard Packaging Corp., Brewer; Hampden;

Winterport; Frankfort; Bucksport; St. Regis Paper Co., Bucksport;

Maine Blueberry Growers, Penobscot; Castine; Maine Maritime Academy,

Castine; Stockton Springs; Searsport; Northern Chemical Industries,

Inc., Searsport; Bangor and Arroostook R. R. Co., Searsport; Freight-

ers and tankers serving Shell Oil Co., C. H. Sprague and Sons, Inc.,

Jarka Corporation of New England, and U. S. Air Force Petrol Depot,

Searsport; Belfast; Belfast Canning Co., Belfast; Sherman and Company,

Belfast; Northport. Coliform bacteria exceeded the 70 MPN/lOO ml

maximum value for harvesting shellfish at every sampling location

except two, and coliform bacteria analyses of the clam meat clearly

indicate that the waters were polluted. A median of 70 MTN/100 ml

is used by the State of Maine as the maximum for taking of shellfish.

Disease-causing Salmonella bacteria were identified in the waters

polluted by discharges from both community and industrial plant

sources.

M. Sewage and industrial wastes presently discharged have an estimated

population equivalent of 1,190,000, as measured by biochemical oxygen

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demand, of which the two pulp and paper industries contribute more

than 90 per cent of the total. Data from the State of Maine show

that the dissolved oxygen is reduced by these discharges and is at

times zero. This reduction of dissolved oxygen destroys fish and

fish food organisms and prevents the passage of anadromous fish,

such as salmon. If pollution were reduced, the Penobscot River

could support fish and aquatic life; and with the construction of

fish passageways, the river could also support runs of the anadro-

nous fish.

5. Discharges of suspended solids create a severe water pollution

problem in Belfast Bay, Stockton Harbor and the Penobscot River.

These materials cause sludge deposits which deplete the water's

oxygen supply; produce offensive odors, especially when tidal flats

are exposed; reduce or eliminate aquatic life which serves as food

for fishes; smother shellfish and/or prevent their propagation.

The suspended solids also make these once attractive waters appear

turbid. The amount of suspended solids discharged is equivalent

to the raw sewage of 633,000 persons; of these, about 83 per cent

come from two pulp and paper mills.

6. Discharges of sulfite waste liquor from pulp and paper mills, in

addition to adding suspended solids, organic matter causing bio-

chemical oxygen demand, and materials that discolor the receiving

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stream, do have a toxic effect on aquatic life. Standard Pack-

aging Corporation in Brewer and St. Regis Paper Company in

Bucksport both release wastes of this type.

7. Studies of the water currents, along with bacteriological and sulfite

waste liquor analyses, show that wastes discharged to the Penobscot

River caused pollution of Stockton Harbor, Long Cove, Searsport

Harbor, Belfast Bay, Penobscot Bay, Castine Harbor and the shores

of Islesboro Island. In addition, Belfast wastes pollute Belfast

Bay and, under recurrent tidal and wind conditions, contribute to

the bacterial densities of Searsport Harbor, Long Cove, Stockton

Harbor, Islesboro Island and waters south of Belfast Bay. Wastes

from Searsport are polluting the waters of Searsport Harbor, Long

Cove and Stockton Harbor. Wastes from Stockton Springs increase the

bacterial densities of Stockton Harbor and Fort Point Cove, while

Castine and the Maine Maritime Academy cause pollution of the waters

in Castine.

8. The waters of the study area have been classified by the State of

Maine. Part of Belfast Bay was classified as suitable only for

transportation of sewage and industrial wastes without a public

nuisance. According to the existing State classification, the

taking of shellfish will not be a legitimate water use in the future,

except in a small part of Searsport in Stockton Harbor and on the

western side of Islesboro Island below Marshall Point, since it

will be legal to exceed 70 MPN/100 ml in the waters overlying a

shellfish bed. The Maine water quality standards should be upgraded

to reflect`, more truly, legitimate water uses in the area.

9. Water quality requirements have been developed by the Merrimack

River Project for the pollutional discharges and for various sec-·

tions of the upper Penobscot Bay area. These requirements are con-

tained in the recommendations section. The recommended quality can

be achieved if the sources of pollution listed above provide adequate

treatment. The water quality requirements would allow the waters

in the communities of Northport, Searsport, Stockton Springs,

Penobscot, Castine, Isleaboro, Belfast east of Goose River, and

Belfast south of latitude lU+°2l+'N to be used for:

D Shellfish Production

Lobster Production

Coxmnercial Fishing, including anadromous fish

Aesthetics

Industrial - Processing and Cooling

Recreation - Whole Body Contact

Sport Fishing

Pleasure Boating

Wildlife

Navigation

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The water quality requirements would allow the waters in Belfast

west of Goose River and in Belfast north of latitude M-&°2i+'N to be

used for:

Lobster Production

Comercial Fishing

Aesthetics

Industrial Water - Processing and Cooling

Recreation - Whole Body Contact

Sport Fishing

Pleasure Boating

Wildlife

Navigation

The water quality requirements would allow the waters in the

Penobscot River from the Bangor dam to the southern tip of Verona

Island to be used for:

Comercial Fishing, including anadromous fish

Aesthetics

Industrial Water - Processing and Cooling

Recreation - Limited Body Contact

Sport Fishing

Pleasure Boating

Wildlife

Navigation

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10. Substantial economic injury results from the inability to market

shellfish or shellfish products in interstate commerce because

of pollution caused by sewage and industrial wastes discharged

to the Penobscot River and Upper Penobscot Bay area, and action

of State authorities. Accordingly, the pollution of these

navigable waters is subject to abatement under procedures described

in Section l0 of the Federal Water Pollution Control Act, as

amended.

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RECOMMENDATIONS

Receiving Waters

It is recommended that:

a. The tidal and marine waters in the cormmmities of North-

port, Searsport, Stockton Springs, Penobscot, Castine,

Islesboro, Belfast east of Goose River, and Belfast

south of latitude hh°2h‘N meet Water Quality Require-

ments I shovm in Table l.

b. The tidal and marine waters in Belfast west of Goose

River and in Belfast north of latitude hh°3l;·N meet

Water Quality Requirements II shovm in Table 2.

c. The Penobscot River from the Bangor dam to the southern

tip of Verona Island meet Water Quality Requirements III

shovm in Table 3.

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TABLE 1

WATER QUALITY REQU —I

Total Coliform Bacteria - MPN ger 100 ml

Weekly median not more than 70 and no more than 10 per cent

of the values greater than 230.

Dissolved gggen - Engl

Average over a 2M hour period shall not be less than 6.0.

At no time shall the dissolved oxygen be less than 5.0.

True Color — Units

Not more than 30 at any time.

Turbidity

No turbidity of other than natural origin that will cause

substantial visible contrast with the natural appearance of

the water.

Sulfite Waste Liguor [10Q solids basis} - ppm

Not mczre than 10 at any time.

RH Units

Within range 6.9 - 8.5 at all times.

Odor \_

No obnoxious odors other than those of natural origin.

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TABLE l (Continued)

Temperature -°C

Daily average not more than 20.

At no time shall temperature exceed 25.

Oil or Grease

Substantially free of oil or grease.

Floating Solids and Debris

Substantially free of floating solids and debris from other

than natural sources.

Bottom Deposits

Substantially free of pollutants that will: (l) unduly affect

the composition of the bottom fauna; (2) unduly affect the

physical or chemical nature of the bottom; (3) unduly inter-

fere with the spawning of fish or their eggs.

Substances Potentially Toxic

Hot in toxic concentrations or combinations.

- ll -

TABLE 2

WATER QUALITY REQUIREMENTS-II

Total Coliform Bacteria — MPN per 100 ml

Weekly arithmetic average not more than 1,000.

Dissolved ggen · ggfl

Average over a 2h hour period shall not be less than 6.0.

At no time shall the dissolved ozqrgen be less than 5.0.

True Color - Units

Not more than 30 at any time.

Turbidity

No turbidity of other than natural origin that will cause

substantial visible contrast with the natural appearance of

the water.

Sulfite Waste Liguor §1Q@ solids basis} - ppm

Not more than lO at any time.

EH - Units

Within range 6.9 - 8.5 at all times.

Odor

No obnoxious odors other than those of natural origin.

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TABLE 2 (Continued)

Temperature - OC

Daily average not more than 20.

At no time shall temperature exceed 25.

Oil or Grease

Substantially free of oil or grease.

Floating Solids and Debris

Substantially free of floating solids and debris from other

than natural sources.

Bottom Deposits

Substantially free of pollutants that will: (l) unduly affect

the composition of the bottom fauna; (2) unduly affect the

physical or chemical nature of the bottom; (3) unduly inter-

fere with the spawning of fish or their eggs.

Substances Potentially Toxic

Not in toxic concentrations or combinations.

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