

MAINE STATE LEGISLATURE

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PUBLIC DOCUMENTS

OF THE

STATE OF MAINE

BEING THE

REPORTS

OF THE VARIOUS

PUBLIC OFFICERS
DEPARTMENTS AND
INSTITUTIONS

FOR THE TWO YEARS

JULY 1, 1932--JUNE 30, 1934

EIGHTH BIENNIAL REPORT

OF THE

COMMISSIONER OF

SEA and SHORE FISHERIES

STATE OF MAINE

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STATE OF MAINE

BIENNIAL REPORT
DEPARTMENT OF SEA AND SHORE FISHERIES

Thomaston, Maine

To the Honorable Governor and the Executive Council:

Sirs:

I have the honor to transmit herewith, in compliance with the law, the report of Sea and Shore Fisheries, for the year ending June 30, 1934.

H. D. CRIE,

Commissioner

After a thorough study of the lobster situation on the Maine coast, H. D. Crie, Commissioner of Sea and Shore Fisheries, decided something must be radically wrong or the lobsters would not decrease almost annually. In 1932 he decided to have his men go out with the fishermen and examine the lobsters under normal conditions also to study the gulls and examine their stomachs.

The following tests on the lobsters show conclusively that very few lobsters arrive at the egg bearing stage before they are 12 inches or more in length and that the gulls destroy quantities of lobster fry when they are on or near the surface of the water in the free swimming stage.

LOBSTER INDUSTRY

The year 1926 was the beginning of low prices for lobsters produced in New England and the starting of hard times for the fishermen and then to make a bad condition worse depression in all kinds of business from the Atlantic to the Pacific closed down on this country and the lobster business came in for its share.

During 1926 someone conceived the idea that lobsters could be shipped in refrigerator cars from the North Shore, so-called, in Canada which includes the enormous lobster fishing grounds from Cape Breton Islands to Anticost. The new plan proved to be so profitable and the business grew so rapidly that since the year 1927 the fishermen of the Maine Coast, especially, have not been able to make a decent living from lobster fishing owing to the influx of cheap lobsters from Canada which have controlled the price in this country.

In 1932 Canada shipped to Boston 10,840,000 pounds of lobsters in the shell and when you take into consideration the number of pounds of lobsters shipped to New York and other states and the tons and tons of "picked out" lobster meat that enter our markets you can readily see why the Maine lobster fishermen are not making a living wage.

Until there is some control over the Canadian lobsters entering this country in shipments so great that they glut our markets and have to be sold at almost any price, our Maine fishermen will not be able to earn a living and give their families some of the pleasures of life which they have a right to expect.

The depression is surely bad enough but when a fisherman has to share his market with another country to the extent that he cannot get price enough for his lobsters to hardly get a new dollar for an old one, it surely is an insult to the integrity of our Maine lobster fishermen who are practically all descendants of the old stock that first settled on American soil.

Maine fishermen are not foreign born for they were born in Maine, reared under the ideals of Maine parents, owned their homes and showed thrift until the imports of Canadian lobsters put them on the rocks. I honestly believe that to-day if it were not for the influx of Canadian lobsters in the shell and lobster meat that our fishermen would be weathering the storm of depression with a smile, but as long as Canada is allowed to ship lobster meat in carload lots to New York and quantities to other markets and all the dead and weak lobsters are allowed to be boiled and put on the market in competition with our high grade Maine product, and it is estimated that one-third of

the lobsters are dead and weak when they arrive at their destination, we cannot expect our Maine fishermen to be self supporting under such conditions and such unfair competition.

The only way I can see to remedy existing conditions and the fishermen placed in a position where they can be self supporting by receiving a higher price for their lobsters is through an embargo, a high protective tariff or a gentlemen's agreement with Canada, and every agreement we have had in the past with Canada has always worked a hardship on the Maine fishermen.

The state department in Washington seems to me to hold the key to the whole situation so far as agreements with Canada are concerned, because Canada always takes the matter of agreements up with the state department.

When it comes to fisheries, Canada is a past master in that line simply because the fisheries are the backbone of Canada, while in the United States the fisheries seem to be considered as an "inferior complex," using Mrs. Craig's expression, compared with other industries, when in reality they are next to agriculture in importance because fisheries and agriculture furnish the food on which we live and without which we cannot exist.

If a gentlemen's agreement is undertaken with Canada on the lobster situation we want to be sure that one or more men from Maine who are familiar with the way Canada puts agreements across and understands the lobster fishermen's needs thoroughly, are on the committee to represent the interests of Maine. The reason I am making this statement is because I was once on a committee to discuss fisheries with Canada regarding the Cooper Dam project, and the Canadians surely displayed their keenness when it comes to fisheries.

My advice to you is this, whatever you do on fisheries with Canada be sure and have the right men to represent your interests. Every person who is affiliated with the New Lobster Fishermen's Co-operative should be proud of the men chosen to guide the affairs of the organization and everyone must realize that it is his duty to do all in his power to help the men who have so unselfishly agreed to give their time to make the organization a success.

These men have my sympathy because they have undertaken a real job and whenever I can be of assistance to them I hope that they will feel free to call on me for assistance.

OPERATING EXPENSES OF CATCHING LOBSTERS ALSO NUMBER OF POUNDS OF LOBSTERS CAUGHT AND VALUE OF SAME AS TAKEN FROM LOBSTER FISHERMEN'S APPLICATIONS JULY 1, 1932 TO JULY 1, 1933

County	Lobsters Caught		Gasoline		Bait		Traps		Cars		Boats	
	No. Lbs.	Value	No. Gals.	Value	No. Bu.	Value	No.	Value	No.	Value	No.	Value
Cumberland	628,406	\$119,397.00	77,336	\$13,686.01	25,800	\$10,658.72	24,150	\$47,619.50	175	\$637.50	680	\$92,299.00
Hancock	1,142,242	174,927.98	160,487	31,998.75	46,955	23,605.75	45,473	74,604.20	95	1,752.50	902	169,302.50
Knox	1,122,158	191,311.08	176,181	32,944.80	50,772	22,713.62	51,511	96,724.00	125	837.50	1,024	160,520.50
Lincoln	441,531	83,528.87	53,883	10,719.06	16,005	6,938.18	23,108	42,467.00	205	1,510.50	554	72,074.00
Washington	883,840	133,942.55	114,504	22,875.07	39,385	17,195.10	52,982	71,450.00	65	860.00	892	139,876.50
York	379,854	51,676.77	49,016	7,876.44	13,216	7,295.93	12,456	28,734.25	60	266.25	365	81,063.00
Small Counties	177,702	20,746.75	17,238	3,051.90	5,199	2,035.60	5,231	10,599.00	45	310.00	216	933.00
Totals	4,775,733	\$775,531.00	648,645	\$123,152.03	197,332	\$90,442.90	214,911	\$372,197.95	770	\$6,174.25	4,633	\$716,068.50

OPERATING EXPENSES OF CATCHING LOBSTERS ALSO NUMBER OF POUNDS OF LOBSTERS CAUGHT AND VALUE OF SAME AS TAKEN FROM LOBSTER FISHERMEN'S APPLICATIONS JULY 1, 1931 TO JULY 1, 1932

County	Lobsters Caught		Traps		Boats		Gasoline		Bait	
	No. Lbs.	Value	No.	Value	No.	Value	No. Gals.	Value	No. Bu.	Value
Cumberland	637,782	\$157,249.41	27,302	\$38,395.45	792	\$113,796.00	99,932	\$17,599.70	31,495	\$13,942.76
Hancock	1,131,217	238,275.45	50,731	85,964.25	950	200,590.00	166,846	33,907.83	53,166	27,326.63
Knox	1,286,447	280,886.36	53,118	106,589.10	993	175,902.50	249,813	36,859.40	85,241	30,458.98
Lincoln	485,932	99,113.83	22,831	44,729.94	547	68,650.75	55,664	9,724.22	20,507	9,089.30
Washington	987,711	201,672.53	55,090	74,710.50	979	165,156.25	145,230	30,097.96	49,037	21,164.87
York	328,350	65,670.00	11,689	28,346.50	329	57,471.00	43,583	7,261.63	10,583	6,958.80
Small Counties	146,638	25,436.50	5,234	9,459.75	212	20,394.25	18,024	3,222.23	5,657	2,695.04
Totals	5,004,077	\$1,068,304.08	225,995	\$388,195.49	4802	\$801,960.75	779,092	\$138,672.97	255,686	\$111,636.38

RESULTS OBTAINED FROM GOING WITH THE FISHERMEN WHEN THEY WERE
HAULING THEIR TRAPS—1933

	9"-10¼"		10¼"-11"		11"-12"		12"-13"		13"-14"		14"-15"		15"-16"		16"-17"		Number	
	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	Males	Females
Casco Bay	110	72¼	63	75	69	108½	30	71¾	20	31	1	3¾					131	162
Duck Island	295	218¾	56	78½	71	111¼	36	73½	11	11½	2	6¾	1	3¼			222	250
Portland	176	155	160	267½	105	188¼	29	75¾	9	30¼							239	240
Orr's and Bailey's Islands	91	80¼	33	56½	32	66¾	6	13½	3	38½							62	103
Boothbay Harbor	48	53⅝	16	23¼	14	23½	7	15¼	2	5¾	3	10	1	4½			54	37
Corea	177	144½	108	143	68	119	28	63¾	26	70	13	44½	4	23¼	2	14¼	232	194
Tenant's Harbor	55	55	40	56½	29	44¼	14	28¼	8	22	3	9¾					70	79
Blue Hill Bay	14	17½	7	11½			5	20					1	3¼			13	14
Totals	966	796⅞	483	711¼	388	661½	155	361½	79	209	22	74¾	7	34¼	2	14¼	1023	1079

Grand Total: 2102-2863¾ Lbs.

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
		1	2½	1	3¼	1	3½	1	5			1	6½
		1	2¼	1	3⅛	1	3⅛	1	4½			1	6½
		1	2¼	1	3½	1	4	1	4½				
		1	2½	1	2¾	1	3½	1	5				
		1	2½	1	3	1	3¼	1	4				
		1	2	1	3	1	3¾	1	4½				
		1	2¼	1	3	1	3½	1	4¾ ³ / ₁₆				
		1	2½	1	3¾ ³ / ₁₆	1	4	1	5½				
		1	2⅞	1	3⅞	1	3¾	1	4½				
				1	3	1	3½	1	4¾				
				1	3	1	3½						
				1	2⅞	1	3¾						
				1	2¾	1	3½						
				1	2¾	1	3¾						
				1	2½	1	3½						
				1	2⅞	1	3½						
				1	3	1	3⅞						
				1	3	1	4						
				1	3¼	1	3½						
				1	2¾								
				1	3								
				1	3								
				1	3								
				1	3⅛								
				1	3¼								
				1	3								
				1	3								
				1	3⅛								
				1	3¼								
				1	3								
				1	2⅞								
				1	3	1	3¾						
						1	3¾						
								1	4¾				
		1	3	1	3¼	1	3⅞	1	4½	1	4½	1	7½
		1	2½	1	3	1	3⅛		4½	1	5½	1	6
		1	2¼	1	3¼	1	3½	1	4½				
				1	3¼	1	3¾	1	5				
				1	2⅞	1	3¾			1	5¾ ⁷ / ₁₆		
				1	3¼	1	3½	1	4½	1	4½		
				1	3⅛	1	4⅛	1	4¾ ⁵ / ₁₆				
				1	3⅛			1	4¾ ¹ / ₁₆				
				1	3	1	3½	1	4				
				1	2⅞			1	3¾ ¹³ / ₁₆				
						1	3¾						
								1	4¾				
		1	3	1	3¼	1	3⅞	1	4½	1	6¾ ¹ / ₁₆		
		1	3¾	1	3	1	4	1	5½	1	6¾ ¹ / ₁₆		

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
		1	2 $\frac{7}{8}$	1	3 $\frac{9}{16}$	1	4 $\frac{1}{4}$	1	5				
		1	2 $\frac{3}{4}$	1	3 $\frac{5}{16}$	1	3 $\frac{9}{16}$	1	4 $\frac{3}{4}$				
		1	3	1	3 $\frac{1}{2}$	1	3 $\frac{9}{16}$	1	5				
				1	3	1	3 $\frac{3}{4}$	1	5 $\frac{1}{8}$				
				1	2 $\frac{1}{2}$			1	5				
				1	2 $\frac{7}{8}$			1	4 $\frac{5}{8}$				
				1	3			1	5 $\frac{1}{8}$				
				1	3 $\frac{1}{2}$			1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$								
				1	3 $\frac{1}{4}$								
				1	3 $\frac{1}{2}$								
				1	2 $\frac{3}{4}$								
				1	3 $\frac{1}{2}$								
				1	3 $\frac{1}{8}$								
				1	3								
1	2	1	2 $\frac{7}{8}$	1	3	1	3 $\frac{9}{16}$	1	4 $\frac{9}{16}$	1	5 $\frac{1}{4}$		
		1	2 $\frac{1}{2}$	1	2 $\frac{3}{4}$	1	4	1	3 $\frac{3}{4}$	1	5 $\frac{1}{4}$		
		1	2 $\frac{1}{2}$	1	3	1	3 $\frac{1}{2}$	1	4 $\frac{1}{16}$	1	5 $\frac{1}{2}$		
		1	2 $\frac{5}{16}$	1	3 $\frac{1}{4}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{2}$	1	5		
		1	2 $\frac{1}{2}$	1	3 $\frac{1}{4}$	1	3 $\frac{5}{8}$	1	4 $\frac{1}{8}$	1	5		
		1	2 $\frac{3}{4}$	1	2 $\frac{3}{4}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	1	5		
		1	2 $\frac{1}{2}$	1	3 $\frac{1}{8}$	1	3 $\frac{3}{4}$	1	4	1	5 $\frac{1}{2}$		
		1	2 $\frac{1}{2}$	1	3 $\frac{1}{4}$	1	3 $\frac{7}{8}$	1	4				
		1	2 $\frac{1}{4}$	1	3	1	4	1	4 $\frac{1}{2}$				
		1	2	1	3 $\frac{1}{8}$	1	3 $\frac{5}{8}$	1	4 $\frac{7}{8}$				
		1	2	1	2 $\frac{3}{4}$	1	3 $\frac{3}{4}$	1	4 $\frac{9}{16}$				
		1	2 $\frac{3}{4}$	1	3	1	4	1	4 $\frac{1}{2}$				
		1	2 $\frac{1}{4}$	1	3	1	4 $\frac{1}{8}$	1	4 $\frac{1}{8}$				
		1	2 $\frac{3}{4}$	1	2 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$				
		1	2 $\frac{1}{4}$	1	3	1	3 $\frac{1}{16}$	1	4 $\frac{3}{4}$				
		1	2 $\frac{1}{8}$	1	3 $\frac{1}{8}$	1	3 $\frac{7}{8}$	1	4 $\frac{3}{4}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{2}$				
				1	3 $\frac{3}{4}$	1	4	1	4 $\frac{3}{4}$				
				1	3 $\frac{3}{4}$	1	3 $\frac{1}{4}$	1	4 $\frac{3}{4}$				
				1	3 $\frac{1}{8}$	1	3 $\frac{3}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$	1	4 $\frac{3}{8}$				
				1	2 $\frac{3}{4}$	1	3 $\frac{1}{2}$	1	4 $\frac{3}{8}$				
				1	3	1	4	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{4}$	1	4	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{5}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{7}{8}$	1	4 $\frac{3}{8}$				
				1	3	1	3 $\frac{7}{8}$	1	4 $\frac{3}{8}$				

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
						1	4 $\frac{1}{2}$						
						1	3 $\frac{1}{2}$						
						1	3 $\frac{7}{16}$						
		1	3	1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$				
		1	3 $\frac{1}{4}$	1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{8}$				
		1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{2}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{2}$	1	4						
				1	3 $\frac{1}{2}$	1	3 $\frac{7}{8}$						
				1	3 $\frac{1}{4}$	1	4						
				1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$						
				1	3 $\frac{1}{2}$	1	4						
				1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{3}{8}$	1	4						
				1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$						
				1	3 $\frac{3}{8}$	1	4 $\frac{1}{8}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{7}{8}$						
						1	4						
						1	3 $\frac{1}{8}$						
						1	4						
						1	3 $\frac{1}{2}$						
						1	4						
				1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	1	5	1	6 $\frac{1}{2}$
				1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$	1	4 $\frac{1}{2}$	1	5 $\frac{7}{16}$		
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{3}{8}$	1	3 $\frac{7}{8}$	1	4 $\frac{1}{8}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{9}{16}$	1	4 $\frac{1}{8}$				
				1	3 $\frac{3}{16}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$				
				1	3	1	3 $\frac{1}{2}$	1	4 $\frac{7}{8}$				
				1	4	1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$	1	4 $\frac{1}{2}$				
				1	3	1	3 $\frac{3}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$	1	4	1	4 $\frac{1}{4}$				
				1	3 $\frac{1}{2}$	1	4	1	4 $\frac{1}{2}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$						

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
				1	3½	1	4						
				1	3½	1	4						
				1	3½	1	3½						
				1	3½	1	3½						
				1	3 ³ / ₁₆	1	4						
				1	3 ⁷ / ₁₆	1	3½						
				1	3½	1	3½						
				1	3½	1	4½						
				1	3½	1	4						
				1	3½	1	3½						
						1	3½						
						1	4½						
						1	3½						
						1	4½						
						1	4						
						1	4						
		1	2 ¹ / ₁₆	1	2½	1	4	1	4½	1	5½	1	5½
		1	2½	1	3½	1	3½	1	4½	1	5½	1	6
				1	3	1	3½	1	5½				
				1	3½	1	4½	1	4½				
				1	3½	1	4½	1	4				
				1	3½	1	4	1	5½				
				1	3½	1	3½	1	4½				
				1	3	1	4½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	5½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	4	1	4½				
				1	3	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	3½	1	4½				
				1	3½	1	4	1	4½				

RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY FIRST BEGIN TO PRODUCE

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches					
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.				
1	1 $\frac{1}{8}$	1	2 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	3 $\frac{5}{8}$	1	4 $\frac{1}{2}$	1	4 $\frac{1}{2}$	1	5 $\frac{1}{2}$				
				1	3 $\frac{5}{8}$	1	4										
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$										
				1	3 $\frac{7}{8}$	1	4										
				1	3 $\frac{3}{4}$	1	3 $\frac{3}{4}$							1	4 $\frac{1}{2}$		
				1	3 $\frac{1}{2}$	1	4							1	4 $\frac{1}{4}$		
				1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$							1	4 $\frac{3}{4}$		
				1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$							1	5 $\frac{1}{4}$		
				1	3 $\frac{1}{2}$	1	4 $\frac{3}{8}$							1	4 $\frac{3}{4}$		
				1	3 $\frac{1}{4}$	1	3 $\frac{11}{16}$							1	3 $\frac{11}{16}$		
				1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$							1	4		
				1	3 $\frac{1}{4}$	1	4							1	3 $\frac{7}{8}$		
				1	3	1	3 $\frac{1}{2}$							1	3 $\frac{1}{2}$		
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$							1	4 $\frac{3}{8}$		
				1	3	1	4 $\frac{3}{8}$							1	4 $\frac{1}{16}$		
				1	3 $\frac{1}{2}$	1	4 $\frac{1}{16}$							1	4		
				1	3 $\frac{7}{16}$	1	4 $\frac{1}{8}$							1	3 $\frac{7}{16}$		
				1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$							1	3 $\frac{5}{8}$		
				1	3	1	3 $\frac{5}{8}$							1	3 $\frac{7}{8}$		
				1	3 $\frac{1}{4}$	1	4 $\frac{3}{8}$							1	4		
				1	3 $\frac{1}{4}$	1	3 $\frac{7}{8}$							1	4 $\frac{1}{4}$		
				1	3 $\frac{1}{2}$	1	4							1	3 $\frac{1}{2}$		
				1	2 $\frac{7}{8}$	1	2 $\frac{7}{8}$							1	4	1	4 $\frac{5}{16}$
				1	2 $\frac{1}{2}$	1	2 $\frac{1}{2}$							1	4	1	4 $\frac{1}{2}$
				1	3	1	3							1	3 $\frac{5}{8}$	1	4
				1	3 $\frac{1}{8}$	1	3 $\frac{3}{4}$							1	3 $\frac{3}{4}$	1	5
				1	2 $\frac{5}{8}$	1	2 $\frac{5}{8}$							1	3 $\frac{5}{8}$	1	4 $\frac{3}{4}$
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{4}$							1	3 $\frac{5}{8}$	1	5 $\frac{1}{4}$
				1	3	1	3							1	4 $\frac{1}{4}$	1	4 $\frac{1}{2}$
				1	3 $\frac{1}{4}$	1	3 $\frac{1}{4}$							1	4	1	5
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$							1	4		
				1	2 $\frac{3}{4}$	1	2 $\frac{3}{4}$							1	3 $\frac{5}{8}$		

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
				1	3 $\frac{5}{8}$	1	4						
				1	3 $\frac{1}{4}$	1	4						
				1	3	1	4 $\frac{1}{4}$						
				1	3 $\frac{1}{4}$	1	3 $\frac{3}{4}$						
				1	3	1	3 $\frac{1}{2}$						
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{4}$						
				1	2 $\frac{7}{8}$	1	3 $\frac{3}{4}$						
				1	3 $\frac{1}{4}$	1	4 $\frac{1}{2}$						
				1	2 $\frac{7}{8}$								
				1	2 $\frac{3}{4}$								
				1	3 $\frac{3}{8}$								
				1	3 $\frac{3}{4}$								
				1	3 $\frac{1}{8}$								
				1	3 $\frac{1}{8}$								
				1	2 $\frac{5}{8}$								
				1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$	1	4 $\frac{5}{8}$	1	4 $\frac{3}{4}$		
				1	3 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	1	5 $\frac{1}{4}$		
				1	3 $\frac{3}{8}$	1	4	1	4 $\frac{7}{8}$	1	4 $\frac{3}{4}$		
				1	3 $\frac{3}{8}$	1	4	1	4 $\frac{1}{2}$				
				1	3 $\frac{1}{8}$	1	3 $\frac{3}{8}$	1	5 $\frac{1}{4}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{4}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	1	4 $\frac{1}{2}$				
				1	3	1	3 $\frac{3}{4}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{5}{8}$	1	3 $\frac{5}{8}$	1	4 $\frac{3}{4}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{5}{8}$	1	4 $\frac{1}{2}$				
				1	3	1	4	1	5				
				1	3 $\frac{1}{2}$	1	3 $\frac{3}{4}$	1	4 $\frac{1}{8}$				
				1	3 $\frac{1}{8}$	1	4 $\frac{1}{8}$	1	4 $\frac{1}{4}$				
				1	2 $\frac{3}{4}$	1	3 $\frac{5}{8}$	1	4 $\frac{3}{4}$				
				1	3 $\frac{3}{8}$	1	3 $\frac{5}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{5}{8}$						
				1	3 $\frac{3}{8}$	1	3 $\frac{5}{8}$						
				1	3 $\frac{5}{8}$	1	3 $\frac{3}{4}$						
				1	3 $\frac{1}{2}$	1	4						
				1	3 $\frac{1}{4}$	1	4						
				1	3 $\frac{1}{8}$	1	4						
				1	3 $\frac{5}{8}$	1	3 $\frac{3}{4}$						
				1	3 $\frac{1}{4}$	1	3 $\frac{5}{8}$						
				1	3 $\frac{3}{8}$	1	3 $\frac{5}{8}$						
						1	3 $\frac{1}{2}$						
		1	2 $\frac{1}{2}$	1	3 $\frac{1}{2}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{4}$	1	5		
				1	3 $\frac{1}{4}$	1	3 $\frac{5}{8}$	1	4 $\frac{1}{4}$	1	5 $\frac{1}{4}$		

RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
						1	3 $\frac{1}{2}$						
						1	3 $\frac{3}{4}$						
						1	3 $\frac{5}{8}$						
						1	4						
						1	4						
						1	3 $\frac{3}{4}$						
						1	3 $\frac{3}{8}$						
						1	3 $\frac{3}{8}$						
						1	3 $\frac{7}{16}$						
						1	4						
						1	3 $\frac{1}{2}$						
						1	3 $\frac{3}{4}$						
						1	3 $\frac{3}{8}$						
						1	3 $\frac{1}{2}$						
						1	3 $\frac{3}{8}$						
						1	4						
						1	3 $\frac{5}{8}$						
						1	4						
						1	3 $\frac{1}{8}$						
		1	3	1	3	1	4 $\frac{1}{4}$	1	4 $\frac{1}{2}$	1	4 $\frac{3}{4}$	1	7 $\frac{1}{2}$
		1	3	1	3	1	4	1	4 $\frac{1}{8}$	1	5 $\frac{1}{4}$		
		1	2 $\frac{3}{8}$	1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{8}$	1	5 $\frac{1}{4}$		
		1	2	1	2 $\frac{3}{4}$	1	4	1	4 $\frac{1}{2}$	1	6 $\frac{1}{2}$		
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$	1	4 $\frac{3}{8}$	1	5 $\frac{1}{4}$		
				1	3 $\frac{1}{8}$	1	3 $\frac{7}{16}$	1	4 $\frac{1}{2}$	1	5		
				1	3 $\frac{7}{16}$	1	3 $\frac{7}{16}$	3	4 $\frac{1}{8}$	1	5 $\frac{1}{2}$		
				1	3 $\frac{3}{8}$	1	3 $\frac{1}{2}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{7}{16}$	1	4 $\frac{1}{4}$	1	4				
				1	3 $\frac{1}{4}$	1	3 $\frac{3}{4}$	1	4				
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{8}$	1	4 $\frac{1}{2}$				
				1	3 $\frac{7}{16}$	1	4 $\frac{1}{2}$	1	4 $\frac{1}{8}$				
				1	2 $\frac{3}{8}$	1	4 $\frac{1}{4}$	1	4 $\frac{3}{4}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{3}{4}$	1	4				
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{4}$	1	4 $\frac{1}{4}$				
				1	3 $\frac{1}{2}$	1	3 $\frac{7}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{4}$	1	3 $\frac{7}{8}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{1}{8}$	1	3 $\frac{1}{2}$	1	4 $\frac{3}{8}$				
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{4}$	1	4 $\frac{1}{2}$				
				1	3 $\frac{1}{2}$	1	4	1	4 $\frac{1}{2}$				
				1	3	1	3 $\frac{3}{4}$						
				1	3 $\frac{3}{8}$	1	3 $\frac{3}{4}$						
				1	3	1	3 $\frac{3}{8}$						

RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY FIRST BEGIN TO PRODUCE

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
				1	$3\frac{3}{8}$	1	$3\frac{7}{8}$						
				1	$3\frac{1}{2}$	1	$3\frac{3}{4}$						
				1	$3\frac{1}{4}$	1	4						
				1	$3\frac{5}{8}$	1	$3\frac{5}{8}$						
		1	$2\frac{5}{8}$	1	3	1	$4\frac{3}{4}$	1	$4\frac{1}{4}$	1	$5\frac{1}{2}$	1	$6\frac{1}{2}$
		1	$2\frac{1}{2}$	1	$3\frac{1}{4}$	1	$4\frac{1}{4}$	1	$4\frac{1}{4}$	1	$5\frac{3}{4}$		
		1	$2\frac{3}{4}$	1	$3\frac{1}{8}$	1	4	1	4				
		1	$2\frac{5}{8}$	1	$3\frac{5}{16}$	1	4	1	$4\frac{5}{8}$				
		1	$2\frac{3}{4}$	1	$2\frac{1}{2}$	1	$4\frac{1}{8}$	1	$4\frac{5}{16}$				
		1	$2\frac{5}{8}$	1	$3\frac{1}{8}$	1	$4\frac{1}{8}$	1	$4\frac{1}{8}$				
				1	$3\frac{3}{8}$	1	4	1	4				
				1	$2\frac{3}{4}$	1	$3\frac{5}{8}$	1	4				
				1	3	1	$3\frac{5}{8}$						
				1	3	1	$3\frac{1}{2}$						
				1	3	1	$3\frac{11}{16}$						
				1	$2\frac{3}{4}$	1	4						
				1	$3\frac{1}{4}$	1	4						
				1	3	1	$3\frac{3}{8}$						
				1	3	1	$3\frac{5}{8}$						
				1	$3\frac{1}{8}$	1	$3\frac{3}{4}$						
				1	$2\frac{3}{8}$	1	$3\frac{1}{4}$						
				1	$2\frac{7}{8}$	1	$2\frac{7}{8}$						
				1	$2\frac{1}{4}$	1	$3\frac{1}{2}$						
				1	3	1	4						
				1	$3\frac{1}{8}$	1	4						
				1	3	1	$3\frac{1}{2}$						
				1	3	1	4						
				1	3	1	$3\frac{1}{2}$						
				1	$2\frac{3}{4}$	1	$3\frac{1}{4}$						
				1	$2\frac{1}{4}$	1	4						
				1	1	1	$3\frac{3}{4}$	1	4				
		1	$1\frac{13}{16}$	1	$2\frac{3}{4}$	1	$3\frac{5}{16}$	1	4				
		1	$1\frac{3}{4}$	1	3	1	$3\frac{1}{16}$	1	$3\frac{13}{16}$				
		1	$1\frac{15}{16}$	1	$3\frac{1}{8}$	1	$3\frac{1}{2}$	1	$3\frac{15}{16}$				
		1	$1\frac{1}{2}$	1	$2\frac{1}{2}$	1	$2\frac{7}{8}$	1	$4\frac{1}{16}$				
		1	$1\frac{5}{8}$	1	$2\frac{1}{2}$	1	$3\frac{1}{16}$	1	$4\frac{1}{8}$				
		1	$1\frac{3}{8}$	1	$2\frac{1}{2}$	1	$3\frac{1}{4}$	1	4				
		1	$1\frac{1}{4}$	1	3	1	$3\frac{1}{4}$	1	$4\frac{1}{8}$				
				1	$2\frac{15}{16}$	1	$3\frac{1}{8}$						
				1	$2\frac{13}{16}$	1	$3\frac{1}{2}$						
				1	$3\frac{1}{16}$	1	$3\frac{7}{16}$						
				1	$2\frac{3}{4}$	1	$3\frac{1}{8}$						
				1	$2\frac{9}{16}$	1	$3\frac{1}{4}$						

**RESULTS OBTAINED FROM TESTS MADE ON SEED LOBSTERS
TO ASCERTAIN WEIGHTS AND SIZES WHEN THEY
FIRST BEGIN TO PRODUCE**

11 In.		12 Inches		13 Inches		14 Inches		15 Inches		16 Inches		17 Inches	
No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
				1	3	1	$3\frac{3}{16}$						
				1	$2\frac{1}{2}$	1	$3\frac{7}{16}$						
				1	$2\frac{1}{2}$	1	3						
				1	$2\frac{1}{4}$	1	$3\frac{1}{16}$						
				1	$2\frac{1}{4}$	1	$3\frac{3}{16}$						
				1	3	1	$2\frac{7}{8}$						
				1	$2\frac{1}{16}$	1	$3\frac{7}{16}$						
				1	$2\frac{1}{2}$	1	$3\frac{1}{2}$						
				1	$3\frac{1}{8}$	1	$3\frac{1}{4}$						
						1	$3\frac{1}{8}$						
						1	$3\frac{5}{16}$						
						1	$3\frac{1}{8}$						
2	$3\frac{1}{2}$	65	$162\frac{1}{4}$	327	$1045\frac{15}{16}$	362	$1354\frac{11}{16}$	166	$738\frac{1}{2}$	32	$168\frac{1}{2}$	10	$63\frac{1}{2}$

THE CLAM LAW

When the clam law was amended two years ago the Legislators thought that they had made ample provision for the men who support their families by digging clams but we find now that it is necessary for the diggers to be licensed because New York and Massachusetts dealers and consumers are getting more strict about clams being dug on clam areas free from contamination and in order to preserve the sale of the Maine clams we must be able to prove beyond a doubt that the clams shipped to other states are a clean, wholesome food product.

It is also necessary to know the quantity of clams dug annually in the different counties because the Department of Sea and Shore Fisheries is often asked by dealers and canners who contemplate locating in Maine, for definite information about the clam industry, therefore it is for the benefit of the diggers themselves as well as the state at large for the department to furnish such information because business men now days do not care for estimated amounts but must have actual facts so it is necessary to license all clam diggers, but I believe that the license should be free to all who dig clams. When they apply for their renewal licenses they should be required to state as near as possible the amount of clams dug the previous year, on their renewal applications. It is also necessary to license the diggers in order to keep a few of the diggers who persist in digging on polluted areas from doing so because if we cannot show that our clams are free from contamination the sale for Maine clams will be lost.

I realize that most everyone is dissatisfied and some are disgusted with the present clam law but it is not an unusual thing for the Legislature to make a mistake, but I have found that at the next session they are always ready and willing to rectify such mistakes and I have confidence that the coming Legislature will make the necessary changes in the clam law so that it will not work a hardship on anyone but will be a benefit to all clam diggers in the future.

After working two years under the present law which does not require clam diggers to be licensed we find that it is almost impossible to stop a man from digging on polluted areas. If it was possible to suspend his license and put him out of business for a few months the diggers would then abide by the laws of the state and would then protect their business for the clams shipped to other states would be free from pollution and fit for food.

Unless the diggers are all licensed there is a question of how long Maine will be able to ship clams to other states.

PENOBSCOT RIVER SALMON

Conditions on the Penobscot River seem to indicate quite clearly that the salmon are decreasing in numbers and I feel that every possible remedy at our command should be used in order to increase the Penobscot River salmon.

Adequate fishways should be constructed or the fishways now in use should be remodelled in such ways as to allow the salmon to enter and proceed through them. After this is done the fishways should be kept clear of refuse at all times so that the fish can have a clear and unobstructed passage.

I also believe that a sufficient amount of money should be appropriated to purchase all the live fish taken in the weirs and the spawn and milt taken from them when ripe. When the eggs hatch the small fish should be liberated only after they are capable of taking care of themselves and not liberated in a haphazard way without any regard for their future. Tests should be made to determine whether or not the water contains pollution sufficient to retard the growth or perhaps kill the fish. Pickerel are very destructive and eels are a menace. I believe that the gulls, loons and sheldrakes take these small fish in great numbers especially if the small fish are obstructed in any way in their passage to the ocean.

Oftentimes young fish are unable to return to the sea because flushboards are placed on the top of the dams when they are returning to the ocean and if the water is low in the rivers the small fish come down against the dams and are unable to get any farther until the fall rains raise the water in the rivers. During the time that they are above the dams waiting for the water to rise eels and other fish prey on them and while the small salmon are in the rivers and ponds the gulls, sheldrakes and loons work havoc with them.

Why should we hesitate to give the Penobscot salmon protection when years ago hundreds of men earned almost their entire livings by salmon fishing. If the sportsman could be assured of landing one fish each when they came to the salmon pool at Bangor hundreds of anglers would fish the pool annually and that would mean thousands of dollars to the State of Maine. What are we doing to save the salmon from extinction except trying to enforce the laws? There are no adequate fishways and the ones we have are plugged almost continually with refuse. No small fish are being hatched from native Penobscot River salmon and practically all the salmon that get above the dam at Bangor go over the dam at extreme high tides. Such conditions are deplorable and must be remedied if we do not want the salmon to follow the sturgeon and shad which was once a valuable commercial branch of the fisheries.

A LIBERAL APPROPRIATION IS NECESSARY FOR THE DEPARTMENT OF SEA AND SHORE FISHERIES

The Sea and Shore Fisheries of the State of Maine represents millions of dollars. This valuable resource makes possible the livelihood of approximately sixty thousand people and assists greatly in furnishing food for the whole world because large quantities of Maine cured salt fish and sardines are shipped annually to foreign countries besides a goodly supply to the people of nearly every state in the Union. These fisheries also provide an abundant supply of the most wholesome and choicest food to the inhabitants of our own state. The fishing industry is one of the most valuable industries in the state. The only other industry of equal importance is that of agriculture. These two industries provide by far the greater amount of food on which we live and consequently should be protected and developed to their greatest extent.

There are approximately twelve thousand fishermen on the coast who brave the storms of winter and suffer untold hardships to provide a livelihood for their families. These fishermen should have every encouragement possible, their rights should be protected by the strict enforcement of just laws. A sufficient number of wardens should be employed to patrol the waters of the state and apprehend the violators. If this is not done and there is not an adequate force to put the rogue out of business, he will catch and sell the illegal lobsters which the honest fisherman throws back into the ocean, the only interest on his investment he has to look forward to, and in this way deprive the honest man's family of the comforts of life that they have a right to expect in a state like Maine. The honest, law-abiding fisherman is the one who should be protected.

With the small appropriations this department has had since 1922 it has been impossible to do the work that actually must be done if any degree of efficiency is to be acquired. A limited warden force and a limited number of boats to patrol the coast properly has been a great stumbling block to this department.

A majority of the fishermen to-day are honest citizens but the traffic in short lobsters has had a very marked degrading influence on the fishing communities along the coast. I am asking for a sufficient appropriation to put on a warden force that can take care of the persistent violators so the honest fisherman can be protected, earn a sufficient amount to furnish his family with some of the comforts of life and still have enough to educate his children. The future of the state depends entirely on the children and if they live and acquire their education among God fearing, law-abiding citizens there can be no question about the future prosperity of our state.

The Commissioner has had seventeen years experience in the Department of Sea and Shore Fisheries beside having a life long experience in catching, curing and marketing fish and lobsters. Practically all his life has been spent working among and with the fishermen, studying their requirements and looking to the future improvement of the industry with an eye always to the best way to educate the fishermen's children.

I am only asking for an amount necessary to do efficient work in order that the department may improve the conditions on the Maine Coast annually instead of taking a step backward. It has been my experience that if we do not advance we surely will go backward and that very fast. The past few years have found us slipping because we have not had sufficient funds appropriated to carry on efficient work.

The state supports a college to educate the farmers as to the requirements of the land to produce maximum crops and how best to combat the pests that beset their harvests annually. Hundreds of thousands of dollars are appropriated each year to protect the farmers against anything that is liable to retard the future of agriculture and this is right and just because they furnish food.

The fishermen should be better protected if anything, at least equally so, for he is almost continually at the peril of the sea and his life is at stake much of the time, while the farmer has no such handicap to contend with and his earnings, work and losses are not so much controlled by weather conditions. To say the least, the fisherman should be protected against the violator as the farmer is protected against his pests which are only seasonal, whereas the violator is constantly at his occupation until apprehended and stopped in his work of retarding the progress of the industry, therefore an amount equal to the sum appropriated for agriculture should be appropriated for the fishermen because they also furnish an abundance of our food.

Please do not misunderstand me for I am not criticising agriculture in any way, nor do I think they have any more than they deserve. The agricultural department was mentioned merely as a means of comparison for I honestly believe the fisheries should have an equal appropriation because they are of equally vital importance, if not of more importance for when the fisheries have become exhausted they cannot be cleared, fertilized and made to produce abundantly in many seasons. It means generations, possibly ages and vast expenditures of money to bring them back to abundance again, if they can be brought back at all.

There is no college or institution of any kind in the state to educate the fishermen as to how they may best combat the pests that beset them or in what manner they may best improve and develop their industry.

At one time the Director and Commission compiled literature in pamphlet form and mailed copies to each fisherman to educate them in their work. Two copies only, were sent when the appropriation became so small this work had to be discontinued and no extra appropriation has been available since. In fact, the appropriation for "General Office Expense" was cut so much that the department was not able to print a full book of the fishery laws and only pamphlets of the lobster laws were available during the years of 1921 and 1922. I believe a bulletin should be mailed to each licensed fisherman on the coast every month. Education is the key to prosperity, happiness and the future progress of the state. The fisherboys especially should be educated.

What would have happened at the time the United States entered the World War if it had not been for the fishermen? They entered the service when war was declared and did not have to be drafted. They volunteered, took command of the ships that carried the soldiers and supplies to England and France, who in their turn did their duty well. The Marines who stopped the German advance and kept them from entering Paris were made up partly of fishermen. In that emergency it took courage and endurance and the fishermen were equal to the job and did not look for courage because their business requires courage and endurance very nearly every day in the year, and they are accused to hairbreadth escapes from death frequently as they go about their daily work. Shall we turn these boys down after the record they have made or shall we give them equal rights and privileges with the farmer boys and recommend a good, generous appropriation to guard and develop their industry, thus protecting them from the persistent violators, the worst pest and enemy they have to contend with, who keeps and sells the lobsters the honest fishermen throw back into the sea to grow?

The cod is a valuable food fish and we should have an appropriation sufficient and adequate laws to protect the parent cod as they come into the bays to spawn in the springtime. The cod is a pelagic spawning fish and for that reason they seek the protected bays for the purpose of producing their young because heavy storms destroy the young cod by millions. The parent cod are taken in large quantities annually when the female is laden with spawn and the male with milt and their instinct to reach shoal water at this time makes

them an exceptionally easy prey to the net fishermen. The cod furnishes a very valuable food supply also haddock and hake, the three species contributing millions of dollars to our fishermen annually as a result of which they should at least have some protection and care.

The smelt is another valuable fish which enters the brooks of Maine every spring to spawn. It is not only a food producing natural resource but also affords a great amount of pleasure in the catching. These fish although small in size furnish an abundant economical supply of food for the inhabitants of New England, as a result of which thousands of dollars are brought into the state, thus assisting materially in the support of hundreds of families. Smelt spawn deposited in the shallow brooks along our coast that would produce many thousands of dollars worth of fish is destroyed annually by men and boys who wade in the brooks and destroy it and oftentimes parent fish are taken, no use whatever being made of them other than the pleasure afforded the person catching them. A sufficient warden force should be maintained to protect and improve this valuable branch of the industry which is also a great natural food producing resource.

The alewives which migrate to the rivers to deposit their spawn are not protected as they should be and consequently bring only a small revenue into the state, whereas if properly protected and adequate fishways maintained these fish would increase in abundance by leaps and bounds. This fact has been demonstrated at Duck Trap Stream, a small stream which enters the ocean at Lincolnville. For a great many years two mills were maintained on this stream and tight dams prevented the alewives from ascending the river further than the first dam, consequently their spawning ground could not be reached and the spawn cast was immediately destroyed and for many years alewives were not known in or near Lincolnville. A few years ago the mills were closed, the dams went out and now every spring finds a larger number of alewives ascending the stream to spawn. Protection is all that is necessary to increase and bring back to normal an almost depleted industry which once was a valuable asset to the state and provided hundreds of families with the comforts of life and was available as an abundant, natural food supply for the people of not only Maine and New England but of the United States. Why should not a sufficient amount be appropriated to protect this branch of the industry?

The Penobscot River salmon known all over New England as one of the best game fish, also one of the most palatable, used to be so plentiful and the rivers of Maine so filled with them when on their way to the spawning grounds that the stronger and more active fish

would actually crowd the weaker and less active ones out on the river bank, there to die in large quantities. Today, what has become of the salmon? They are almost depleted, a few are taken in the Penobscot River at the Bangor Pool by sportsmen and a few are taken in weirs. Here is another of our valuable food fish that is capable of bringing thousands of dollars into the state annually and providing hundreds of families with a living besides bringing hundreds of sportsmen to our rivers from other states and yet these fish have been allowed to decline almost to the point of extinction when sufficient protection and good fishways would bring them back to a large degree as they once were and the rivers of Maine once more would be teeming with salmon as in the days of our grandfathers and greatgrandfathers. Are we going to let this valuable food supply slip from our last hold on it and go by default or are we going to give it the protection it deserves? The name "Penobscot River Salmon," is cherished by every New England family and so let us have sufficient funds to protect it from extinction. Please consider the value of the salmon to the sportsman, the income to the state and the quantity of excellent food it will provide the inhabitants of New England for future generations if properly protected.

The lobsters are among the most valuable fish caught on the Maine coast. Stringent laws have been enacted for their protection but no matter how perfect laws are if they are not enforced they do not amount to the paper they are printed on, and cannot be enforced properly unless there are a sufficient number of wardens to patrol the coast.

The name "Maine Lobster" comes foremost into the minds of every person in the United States when he is considering food to be supplied for a banquet or when he has a dear friend or relative he wishes to invite to lunch. All of the great banquets are never complete unless the Maine "Lobster" occupies a prominent place on the menu. When the great banquet given in honor of the diplomats who came to America to attend the disarmament conference was planned, it was not quite complete until lobsters were supplied. Maine is indeed honored by being the largest lobster producing state in the Union. Are we going to let the lobsters go by default until they also follow the path of the salmon and porgies or are we going to consider the importance of the vast lobster fisheries of Maine, which calls thousands of people to our coast in summer from other states, furnishing thousands of families of our own state with the necessities and some comforts of life, providing a luxury for every banquet of any importance in America and a living for approximately twenty thou-

sand people? This branch of the industry has been relied on to keep the wolf from the door when all else has failed. When the granite quarries shut down and the mills, factories and shops were closed, many of the inmates of those institutions turned to lobster fishing as a means of livelihood until business should pick up again and the manufacturers resume operation once more. This fact was brought home to us very forcefully after the World War. When all else failed the people turned to the lobster industry and it is helping them over the hard times. Are we going to give this valuable branch of the fishing industry proper protection by an adequate warden force and a generous appropriation?

The herring fishery is also another large branch of our fishing industry. These little fish are consumed in large quantities in the production of sardines, smoked herring and bait for the larger fish, especially in the salted and frozen state.

The sardine pack in 1917 amounted to approximately 2,300,000 cases and sold for \$12,150,000. The factories consumed 1,500,000 bushels of herring at a cost of approximately \$4,100,000 and the waste or by-product sold for \$12,500. Fifty-two factories were operated and they gave employment to five thousand people. The statistics of the year 1916 give us a fairly correct account of the smoked herring industry. There were eighty-three smoking houses and 899,280 boxes of scaled herring were cured and sold for \$98,920. There were also 5,308,250 pounds of boneless herring put on the market and sold for \$583,907. 374,700 bushels of herring were used at a cost of \$249,800 and 12,000 people were employed during the season. Vast quantities of herring were used for line fish, and lobster bait, also large quantities for food of which we have no accurate account. The herring business should be protected and the fishermen engaged in this industry encouraged.

The clam is also another very valuable food fish of which the inhabitants of the State may avail themselves. When properly protected and cultivated clams furnish an abundance of cheap wholesome food. It is estimated that there are at least ten thousand acres of clam flats on the Maine coast capable of producing one thousand bushels of clams per acre under ordinary conditions or ten million bushels of clams annually. This amount of clams if properly cultivated would feed all the inhabitants of the state two meals a day as long as Maine remains a state, and the most that has ever been appropriated for the "Propagation of Shell Fish" is \$3,000. Isn't this rather small for so valuable an industry which is capable of furnishing such an abundance of economical wholesome food to the less fortunate inhabitants of our state.

Comparatively few people seem to realize the vast resources and benefits that are derived from the great fishing business of the state. The majority of the people of Maine are familiar with our great agricultural resources but there are very few persons residing within the boundaries of Maine who realize that the fisheries are next in importance to agriculture. Maine has two thousand five hundred miles of coast line and along her shores reside approximately twelve thousand fishermen who are engaged in the catching of fish and lobsters for a livelihood.

The several species of these natural resources are lobsters, salmon, smelts, mackerel, scallops, clams, cod, haddock, hake, pollock and other line fish, and the value of this fishing industry reaches far into the millions when we stop and think, realizing the great amount of revenue derived and the vast abundance of food it supplies as a consequence of which the question arises, "Is this great industry worth anything to the state?" If we are going to protect this vast natural resource of ours how shall we do it? First we must have laws that will stand the test of enforcement and prosecution, second we must have a sufficient appropriation to enable us to enforce those laws to the letter.

The amount to be appropriated lies in the hands of the Legislature, and I trust and pray that you will read my plea which I have presented to you and will consider seriously the unlimited food supply this valuable industry is capable of producing, the revenue it brings into the state, the number of people who derive a benefit from it, the number of people it makes employment for and the number of families it feeds, clothes and educates, then compare it with agriculture and see if it does not at least justify the appropriation asked for.

FISHERMEN SHOULD BE LICENSED

The importance of the great Sea and Shore Fisheries is not fully realized by a majority of the inhabitants of the State of Maine, because we have been unable up to this time to obtain a correct statistical report. In years past the wardens were required to visit the different firms doing a fish business and procure all the data they could from them, also get all the information they could from the fishermen. This was a very unsatisfactory method to pursue because one was liable to get an account of a fisherman's catch from the man who caught the fish and also from the firm that bought the fish. It is almost impossible for a warden to see all the fishermen in the isolated places where they live and in olden days many of the fishermen con-

sidered the wardens their worst enemies and would not give them a correct report of their catch. As a result the report that was procured was of no value. Fishermen do not always like to have their good catches or poor catches advertised so would not give any report and they were not to blame at all, because with a number of men gathering statistics some are liable to talk more than they should about some of the good catches, the fishermen would hear of it and next time a warden asked for a report he would not get it. If a report was forwarded to the office that would not be liable to occur because the office force have no special interest in any particular locality or person.

Every fisherman and every person interested in the fisheries should know first hand if the different kinds of fish are increasing at a good healthy growth or are decreasing annually, and the only way we can be sure of this is by an annual statistical report obtained from each individual fisherman. This can only be done by licensing each man that makes a business of fishing, and when a man applies for a license require him to give the amount and value of his equipment and when he renews his license at the expiration of the fiscal year or when he retires from the fishing business render a report of his catch on blanks furnished by the department, said report to be a correct copy of records kept by him on a pamphlet furnished by the department. If the Legislature will pass such a law requiring every fisherman to be licensed and to render reports of equipment, catch in value and pounds, we will then know the amount of the annual catch, the number of men employed, the value of equipment, and the annual increase or decrease and the cost of producing a pound of fish. Until such a law is enacted we will be drifting regarding the magnitude of our fisheries as we have been in the past. A reasonable fee should be charged for each license issued.

The department is often asked for definite information on certain kinds of fish, also we are asked for a list of the fishermen on the Maine coast. The Government is continually trying to get a correct statistical report, now let's have Maine take the lead and be the first state to furnish a correct report of her fisheries as it will remove that question of uncertainty that is continually before us.

**APPROXIMATE AMOUNT EXPENDED BY
THE DEPARTMENT OF SEA AND SHORE FISHERIES**

July 1, 1932 to July 1, 1933

Salaries and Clerk Hire.....	\$7,165.35
General Office Expenses.....	5,081.00
Pay and Expenses of Wardens.....	42,411.91
Purchase of Seed Lobsters.....	11,965.79
Propagation of Shell Fish	2,526.36
	<hr/>
	\$69,150.41

July 1, 1933 to July 1, 1934

Salaries and Clerk Hire.....	\$6,214.26
General Office Expenses.....	9,231.80
Pay and Expenses of Wardens.....	38,757.04
Propagation of Shell Fish.....	2,301.98
	<hr/>
	\$56,505.08

Appropriations Asked for Next Two Years

	July 1, 1935 to July 1, 1936	July 1, 1936 to July 1, 1937
Salaries and Clerk Hire.....	\$ 6,500	\$ 6,500
General Office Expenses.....	5,500	5,500
Pay and Expenses of Wardens.....	60,700	60,700
Propagation of Shell Fish.....	2,300	2,300
Purchase of Seed Lobsters.....	13,000	13,000
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	\$88,000	\$88,000

Previous Appropriations

	July 1, 1932 to July 1, 1933	July 1, 1933 to July 1, 1934
Salaries and Clerk Hire.....	\$5,000	\$6,700
General Office Expenses.....	4,000	4,050
Pay and Expenses of Wardens.....	48,000	45,000
Purchase of Seed Lobsters.....	17,000	
Propagation of Shell Fish.....	2,500	2,250
	<hr/>	<hr/>
	\$76,500	\$58,000

Amount Received from Fines and Licenses

	July 1, 1932 to July 1, 1933	July 1, 1933 to July 1, 1934
Fines.....	\$ 580	\$ 712.53
Licenses.....	4,841	4,520.00
	<hr/>	<hr/>
	\$5,421	\$5,232.53

Different Kinds of Licenses Issued

Lobster Licenses:

	July 1, 1932 to July 1, 1933	July 1, 1933 to July 1, 1934
Fishermen.....	2927	2956
Dealers.....	155	165
Merchants.....	270	274
Hotels and Restaurants.....	461	444
Domestic Smacks and Trucks.....	65	63
Foreign Smacks and Trucks.....	28	39
	<hr/>	<hr/>
	3906	3939

Clam Licenses:

Merchants.....	655	
Shippers.....	76	47
Clam and Quohaug Cultivation Licenses ..		5
Lobster Meat Permits.....		14

Seed Lobsters Purchased by State of Maine

July 1, 1932 to July 1, 1933. 59,829 lbs. \$11,965.80 cost

THE GULF OF MAINE IS A RESOURCE OF WEALTH

The Gulf of Maine is a God given resource of wealth for the men who realize its possibilities to furnish food for the inland inhabitants. Since the days of Sebastian Cabot, who was the real discoverer of the Maine Coast, men have nibbled away at this great storage basin like rats in a pantry, taking much of the delicious food supply; consuming some near its coastal border; shipping quantities to other states and countries and wasting more than has really been used, while waiting for men to devise some method of supplying the farmers of the interior counties who are ready to consume quantities of fish, as soon as they can be had in a perfectly fresh and palatable condition.

The reason that more fish are not eaten by the people of the inland towns is because there has never been a way devised whereby they could receive a strictly fresh product.

Statistics show that seventy-five per cent of the fish eaten in Maine are by the coast dwellers. This condition was brought about years ago by the dealers who shipped the good fish to the consumers near the Maine seaboard because they knew it was no use to send poor food to them for they knew the difference between good and poor fish, so they always tried to work off the poor fish to people who were not familiar with the better product. These poorest of all business methods have been followed, until to-day only a comparatively small amount of sea food is consumed, where quantities should be used daily.

God gave this bountiful supply of food to the inhabitants of Maine, so why not get right down to business and do God's bidding? There has been placed at our disposal this great storehouse filled with a variety of wholesome food, awaiting the master mind to supply it to our own people instead of shipping to other states what rightfully belongs to our own inhabitants.

Sea food is rich in all the ingredients that promote a good healthy diet. The parts that have been wasted and are still being wasted should be made into fish meal, to supply a cheap wholesome food for the farmers' stock. Quantities of such foods are supplied to the Western farmers by other states. The Westerners feed oil extracted from the liver and fats of the fish and also mix it with food for their poultry while the Maine farmers are buying grain from the west to feed their stock. Just how long such conditions are going to exist only time can tell. There surely must be some man in Maine with a broad business mind who can grasp this great opportunity. There seems no good reason why the fishing industry cannot be developed along the same lines as the packing business.

If there is a surplus of sea food after every nook and corner of our native state has been supplied it might then be well to supply neighboring states, but until such a time comes, let's attend to home consumption.

Fifty years ago the meat business of the nation was conducted in a haphazard way. Dealers were selling their products much the same as the fish dealers are selling theirs to-day, making no use whatever, of the by-products, and creating an enormous waste of a most valuable part of the animal as has been proven in recent years. Mr. Swift was the pioneer in the packing business. He and other men of broad business ability decided that the small dealers were not doing it right so they grasped the idea of supplying the immense population in an

entirely different manner, by placing before the people meats in attractive packages and calling attention to the fact that absolute cleanliness was practiced at all times in packing the meats.

Now, why can't the fish business be handled in practically the same manner, by giving the consumer an attractive package, insuring cleanliness and quality?

Fish in an entirely fresh state is as palatable as any food on the market to-day. In the United States only about ten pounds of fish per person is eaten annually while in Europe from forty to fifty pounds is consumed annually by each person. Germany and Japan have exploited with their fisheries with a good deal of skill and thoughtfulness because they have been driven to relying on their marine storehouses for food.

The time has come when our Maine people should rely more on the products from the Gulf of Maine for their food supply. Nothing can be so cheap as fish to the consumer, if properly handled, because they feed themselves. They should also contribute quantities of wholesome food to the cattle, sheep and swine when housed for the winter months. The chickens and other domestic birds should also come in for their share of the by-products produced from fish. Seventy-five per cent of the waste which is being thrown into harbors and coves never to be used other than to food the sculpins, the scavengers of the Maine coast inlets, could be made into food for stock.

Our inland brothers have no appetites for fish for the sole reason that they have never been supplied with that class of food direct from the Gulf of which they are part owners. We fishermen must have their potatoes to go with our fish, and when we can supply them with our product, in the same palatable condition that they supply us with theirs, they will demand the fish.

I do not see any reason why fish cannot be delivered in Aroostook County fresh from the crystal waters of Maine after they have been filleted and transported in refrigerator trucks to remote inland towns and on the return trip farm produce delivered to the coast dwellers, the fish waste made into animal meal and the oil used for poultry. The by-product could be transported in an ordinary truck and the return truck could be loaded with turnips, potatoes, etc. In this way low transportation would be available which would reduce the price to the consumer and establish a market for the farmer and the fisherman who are brothers in the production of food.

HORATIO D. CRIE,
Commissioner Sea and Shore Fisheries

RECOMMENDATIONS

1

Salmon

Every salmon caught in the weirs should be purchased from the fishermen; their eggs should be artificially hatched and when the fry becomes sufficient size should be liberated in waters free from pollution and natural enemies.

I understand that the weir fishermen on the Penobscot will give one hundred fish if the state will do its part by appropriating sufficient funds for the purchase and protection of the fish by providing adequate fish ways which are to be kept clear of rubbish and having a sufficient warden force patrol the river.

2

Seal

There should be a bounty on seals because they destroy the salmon, lobsters and many other edible fish. It is claimed that a seal will destroy three times its weight in fish every twenty-four hours.

3

Lobsters

We believe that many of the bays are the natural breeding places for lobsters because investigation shows that approximately nine-tenths of the lobsters taken from the head waters of the bays are large females often laden with many thousands of eggs and that very few small lobsters are caught, showing that protection should be given parent lobsters in the bays by closing certain waters permanently for future breeding grounds.

4

Clams

I believe the protection of clams should come under three headings:

1. Repeal of all special town laws.
2. Protection by limiting the size of clams to be taken to $2\frac{1}{2}$ inches, because at that size clams produce approximately 40,000,000 and we surely must allow them to produce if the supply is to be continued.

3. By enacting a law giving the residents the right to plant and cultivate clams and to have full control over said flats, for when a man goes to the expense of planting clams he will surely protect them by allowing them to propagate for in so doing he will receive a profit from his investment. The state now provides a limit of $\frac{1}{4}$ of the flats which can be cultivated, therefore if $\frac{1}{4}$ of the flats were planted and allowed to grow to producing size the other $\frac{3}{4}$ would be helped materially by the clam spat from the planted areas.

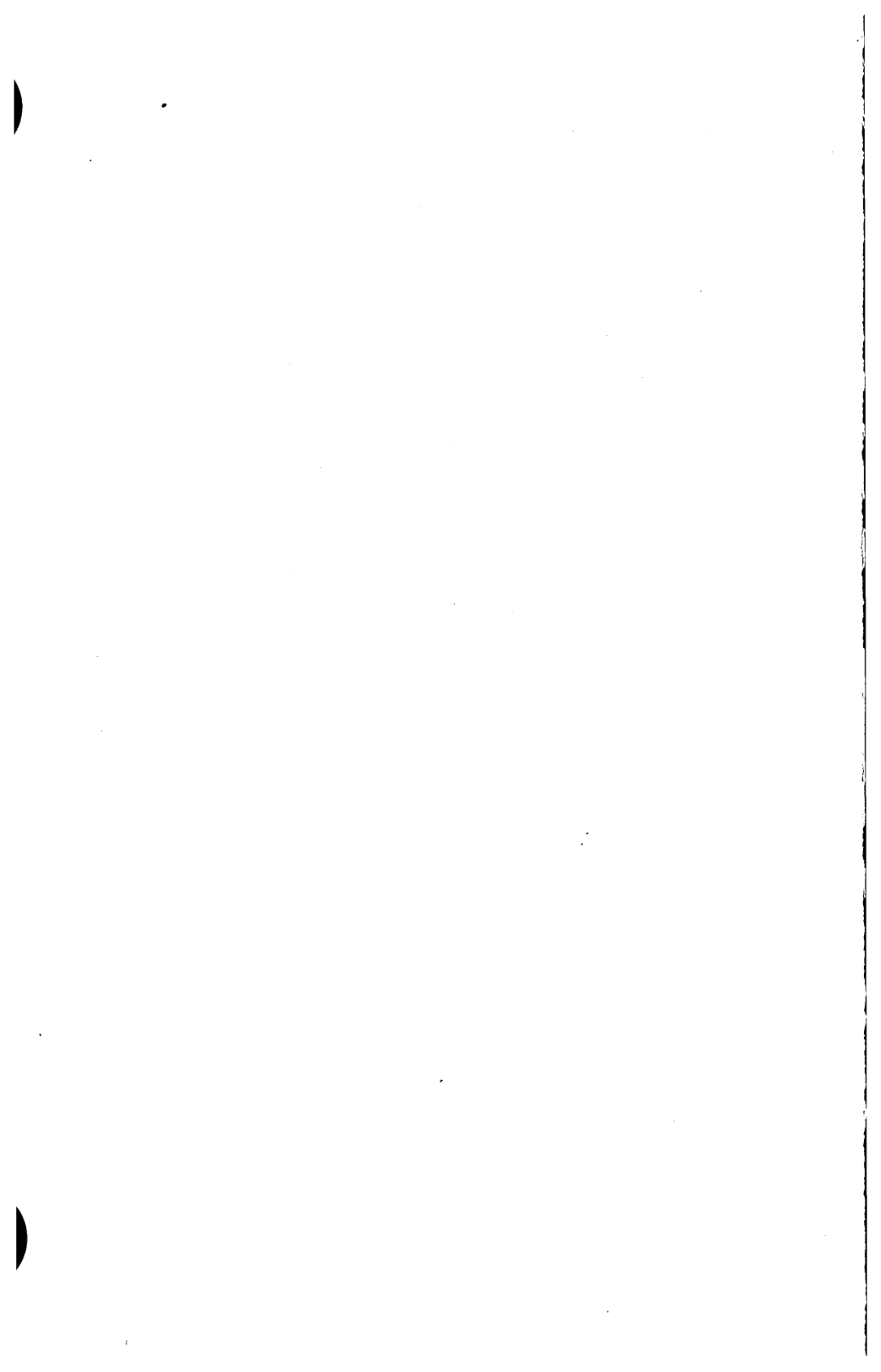
5

Gulls

The work on the gulls should be continued and should also include loons, sheldrakes and seals as these are all very destructive to salmon, lobsters, herring and practically all edible fish of the ocean and the gulls, loons and sheldrakes also destroy quantities of fresh water fish of the lakes and rivers of Maine.

SUMMARY

A condensed report such as this does not do justice to the great Sea and Shore Fisheries Department of the State of Maine, but the present appropriation is not sufficient to allow a more detailed record of this department and its work.



**The Relationship of Certain Sea Birds
to the Fishing Industry
of the State of Maine**

By

HOWARD LEWIS MENDALL

Department of Zoölogy

University of Maine

Orono, Maine

FOREWORD

This report is the result of a survey by the author covering a period of two summers—1933 and 1934. The work on gulls and terns was undertaken at the request of Mr. H. D. Crie, Commissioner of Sea and Shore Fisheries for the State of Maine, and was financed by his department. The material on the double-crested cormorant is part of the results of an eight-week study of this bird by the author and his wife, and was financed by the Coe Research Fund of the University of Maine. It is included in this paper, however, because of its direct relationship to the fishing industry.

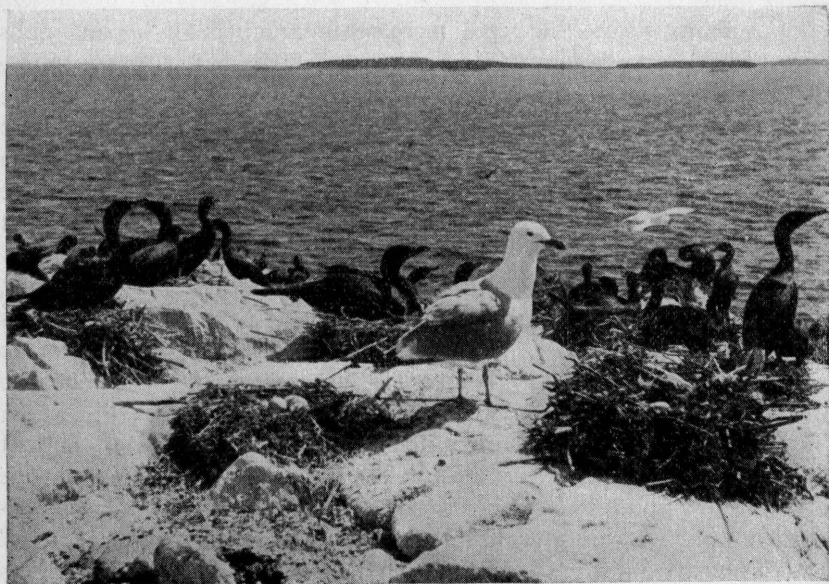
During the time spent in the study of the gulls and terns, much assistance was given by the Commissioner of Sea and Shore Fisheries and several of the wardens of that department. To the Commissioner and to all of these wardens, especially Messrs. Simmons and Dunbar, the wholehearted thanks of the author are given.

INTRODUCTION

For many years the rapid increase in numbers of herring gulls (*Larus argentatus argentatus*) on the coast of Maine has been a source of uneasiness among the fishermen. Complaints against the damage done by this bird have been widespread in their origin. As long ago as 1901, the Journal of the Maine Ornithological Society recorded a charge that these birds were destroying young lobsters (1).^{*} In more recent years the herring gull has been accused of destroying great quantities of blueberries.

In 1932, Commissioner Crie of the Maine Sea and Shore Fisheries, who has always been keenly interested in the conservation of Maine's natural resources, decided to investigate these charges in order to substantiate or repudiate them. The author was commissioned to undertake the survey and work was started the first of July, 1933. Since the status of the herring gull was to be studied, it was thought advisable to carry on a certain amount of research at the same time on two other species of sea birds, namely the laughing gull or "black-headed gull" (*Larus atricilla*) and the common tern or "medrick" (*Sterna hirundo hirundo*). This report, then, constitutes the author's findings from analyses of the stomach contents of the above mentioned birds, together with a section dealing with the double-crested cormorant or "shag" (*Phalacrocorax auritus auritus*).

^{*}References indicated are listed at the end of the paper.



Herring Gull about to Rob a Nest of
Double-Crested Cormorant

BRIEF RESUMÉ OF THE FOUR BIRDS IN QUESTION

Herring Gull (*Larus argentatus argentatus*)

This is the common "sea gull" found on the coast of Maine, on the various rivers leading to the coast, and at our larger inland lakes.

The herring gull adapts itself very easily to a variety of conditions during the breeding season. O. W. Knight and Frank Chapman, writing in the early part of the twentieth century, tell us that if unmolested, this bird nests on the ground on sea islands (2). In many places, however, the gulls were shot and their eggs gathered for market purposes. For this reason, the birds were forced to seek homes in remote places or to place them in trees, sometimes fifty feet above the ground. Mr. A. C. Bent, who has contributed greatly to our knowledge of American ornithology, has given several instances of the adaptations of herring gulls in Maine colonies (3).

Today these gulls enjoy the protection of the law, and the need for great resourcefulness is not very keen. They are found nesting either on the mainland or on islands at the seashore, and along rivers or large inland lakes. It has been the author's observation that very few gulls nest in trees at the present time, at least in Maine, although many pairs nest on the ground along the edges of woods and in clumps of bushes. The great majority of gulls, however, seek no protection at all, merely making a rough nest in the grass or among the rocks.

As is the case with most sea birds, herring gulls are gregarious in habit, nesting in large colonies, sometimes so close together that two nests may touch each other. While one or two scattered pairs of herring gulls may be found nesting almost anywhere along the coast, the majority of the birds in each locality congregate on one of the many uninhabited islands which dot the coast line. The same observation was made by Bent, who stated that single nests are rare, usually pointing to the breaking up and scattering of a colony (4).

The nesting dates vary greatly, June and July being the most likely months, although according to Bent, nests containing eggs may be found as early as May or as late as August (5). In fact, within the same colony it is very common to find nests containing fresh eggs, and to see half-grown young running through the grass.

Laughing Gull (*Larus atricilla*)

The laughing gull, also known as the black-headed gull, is only locally common in Maine. It is much smaller than the herring gull; the back and wings are dark gray; the head and throat are deep slate-

colored, appearing black at a distance; the bill and feet are dusky red. The laughing gull is found in Maine only during the breeding season.

This species of gull, according to Forbush and Chapman, usually seeks flat, marshy islands for the nesting sites (6). It may be added that the islands are nearly always some distance from the mainland, at least within their northern range. Only two or three colonies of laughing gulls exist on the Maine coast, the largest one being at Little Green Island, about ten miles southeast of Port Clyde and seven miles from the nearest mainland. Here, in the midst of heavy, jungle-like marsh reeds which often reach a height of six or seven feet, the laughing gull makes its nest of grass, sticks and seaweed.

Common Tern (*Sterno hirundo hirundo*)

This bird is known to the Maine fishermen by many different names, such as medrick, mackerel gull, and sea swallow. It is fairly common all along the Maine coast during the summer months. Terns differ from gulls in that they feed their young directly as the food is obtained. For this reason, much of the food can be seen in the beaks of the birds as they are carrying it to the young.

Double-crested Cormorant

(*Phalacrocorax auritus auritus*)

Two species of cormorants are found in Maine, the European Cormorant (*P. carbo*) being a winter resident and the Double-crested Cormorant (*P. auritus auritus*) being found in the summer. Both species are known almost universally on the coast as "shags." Their size (larger than any of our ducks), long necks, rapid wing-strokes when in flight, and dark coloration which appears black at a little distance, enables these birds to be easily recognized. In the early part of the twentieth century, less than a dozen pairs of double-crested cormorants nested in Maine. About 1905 or 1906, the breeding birds disappeared entirely from their Maine colony and only non-breeding birds and migrants were seen. About 1928 this cormorant returned to Maine to nest. The species has steadily increased in population until 1933 when the author estimated that there were at least 1200 pairs of birds breeding on various islands off the coast of Maine from Muscongus Bay eastward. In 1934, however, these birds suffered extensively from attacks by herring gulls. This point will be considered in more detail later.

METHODS OF INVESTIGATION

The principal methods used in working out the economic positions of the four species of birds were observation and stomach analyses, the latter method necessitating the killing of the birds. Since the double-crested cormorant frequently regurgitates the crop and gullet contents onto the ground, it was not necessary to resort to stomach analyses in this species, examination being made of the regurgitated material.

The author has endeavored to make this paper more than a mere report of stomach analyses of the birds. While such work must form the foundation of economic ornithology, careful and accurate observations are of the utmost importance in the interpretation of the analyses. Mr. E. R. Kalmbach, of the Biological Survey, emphasizes this need in a recent paper dealing with the subject of economic ornithology (7). He says, "Knowledge of field conditions and the circumstances surrounding the collecting of stomach material is the key to the proper interpretation of food items. Were it possible for the examiner of bird stomachs personally to collect every specimen which he later examines, many of the uncertainties of our work would never arise." He points out the difficulty of trying to state whether animal life found in bird stomachs was captured by the birds or whether such matter was carrion.

The author has been aware of the difficulty in evaluating stomach contents, and therefore he put in a great deal of time in observing the habits of the birds studied as well as reading all available literature concerning these birds, especially that bearing on their feeding habits. Before any specimens were taken, two weeks were spent in observing the habits of the herring gull from a bird blind in one of their large colonies located in Frenchman's Bay. In a similar manner, the common tern has been studied. The work on the double-crested cormorant, as has already been stated, was part of a very detailed study lasting two months and covering all phases of the home life of this species. The only species considered in this paper which was not studied to a considerable extent was the laughing gull.

In addition to this type of study, the writer personally took, or was present at and directed the taking of, all of the specimens included in the report with the exception of about 200 specimens of the herring gull, these birds being taken while he was concentrating on the double-crested cormorant.

With respect to Kalmbach's report, it may be seen that had it not been for personal observation, the author would not be able to

state so conclusively that herring gulls destroyed great numbers of other birds. In fact, following the results of 1933, the writer expressed the opinion that the herring gull probably did not take a great deal of bird life other than carrion (8). Following the work on cormorants, however, when an alarming situation was witnessed, as will be described later, an effort was made to observe the relationship of the gulls to neighboring birds. These observations resulted in bringing to light many interesting facts. Herring gulls have been observed making deliberate raids on several species of land birds as well as sea birds.

Enough has been said on this subject. The author wished, however, to point out that he had a great advantage in being in a position to supervise the collecting of specimens as well as to study personally the habits of the birds.

Regarding the preparation of the data, no attempt was made to present a quantitative picture. This type of work has many difficulties. It would have necessitated weighing the various contents of each stomach and the present worker did not have the equipment for this procedure. It seemed sufficient merely to show what kind of food was eaten, and to give the number of stomachs which contained the various items. Kalmbach, in the same paper referred to above, says, "Workers in economic ornithology freely admit that food percentages, however computed, still must be interpreted by the investigator before decision on the status of a species may be determined. Abstract decimal or fractional values can not be subjected to mathematical formulae and results computed therefrom as can be done in problems of engineering or chemistry."

The tables given in this paper do not show the complete findings from each individual specimen except in the case of the laughing gull. Similar data are, of course, on file regarding the other species. These data are not included because of the large number of specimens taken and because there seemed to be no need for their inclusion. The tables consist of a summary of the total findings.

The author freely admits that this paper is incomplete in many details, but feels that enough material is given to show the relative importance of the four species of birds with which we are concerned.

SUMMARY OF DATA ON FEEDING HABITS

A summary of the findings of the author with respect to the feeding habits of the birds in question is given in Tables I to IV.

Table I deals with the common tern. A list is presented showing the localities where specimens were obtained. Following this is a

tabulation of the items of food which appeared in the analyses, together with the numbers and percentages of stomachs containing each item.

Table II shows the results of investigation of the laughing gull. Since only 40 specimens were taken, the complete data for each specimen is given. The second part of Table II is a tabulation of the items of food, following the same plan as that used in the case of the common tern.

Table III deals with the herring gull and is prepared in the same manner as Table I, except that the results of 1934 are compared with those of 1933, in addition to giving the total percentages.

Table IV is a tabulation of the data obtained by examining the regurgitated material of the double-crested cormorant.

TABLE I
Common Tern (*Sterno hirundo hirundo*)
Number of Specimens from Various Localities

Locality	No. Specimens in 1933	No. Specimens in 1934
Ballast Island	5	—
Halibut Rock	5	—
Great Spoon Island	6	—
Garden Island	62	23
Monument Rock	2	—
Tenants Harbor	10	—
Little Green Island	2	—
Wooden Ball Island	33	—
Duck Island (Isles of Shoals)	—	4
Fisherman's Island	—	3
Total	125	30

Stomach Contents

Item	No. of Stomachs containing Items	Percentage
Fish (a)	71	45.8
Shrimp	62	40.0
Insects	17	10.9
Small Crustaceans (b)	16	10.3
Mollusks (c)	12	7.7
Empty	11	7.1
Berries and vegetation	3	1.9
Young lobsters	3	1.9
Echinoderms (d)	2	1.3

(a) Chiefly herring and mackerel.

(b) Chiefly water fleas and small shrimp-like forms. Lobster and shrimp listed separately.

(c) Chiefly snails and mussels.

(d) Chiefly sea urchins and starfish.

TABLE II

Laughing Gull (*Larus atricilla*)

Record of Specimens Taken, 1933

Bird No.	Date	Location taken	Stomach Contents
LG 1	Aug. 4	Garden Island	Shrimp, beetles, ants, crustaceans, young lobster.
2	5	Tenant's Harbor	Ants, herring, young lobster.
3	5	Tenant's Harbor	Herring, mollusks.
4	5	Monument Rock	Crustaceans, herring, mollusks.
5	8	Spruce Head	Ants, beetles, mollusks.
6	8	Spruce Head	Fish, mollusks, crustaceans.
7	12	Little Green Island	Herring.
8	12	" " "	Shrimp, herring.
9	12	" " "	Herring, insects.
10	12	" " "	Shrimp.
11	12	" " "	Shrimp.
12	12	" " "	Shrimp.
13	12	" " "	Shrimp, herring.
14	12	" " "	Shrimp.
15	12	" " "	Mollusks, crustaceans, echinoderms.
16	12	" " "	Shrimp.
17	12	" " "	Herring.
18	12	" " "	Insects, mollusks.
19	12	" " "	Herring, shrimp, insects.
20	12	" " "	Shrimp.
21	12	" " "	Mollusks, echinoderms.
22	12	" " "	Shrimp.
23	12	" " "	Mollusks.
24	12	" " "	Insects, shrimp.
25	12	" " "	Mollusks, echinoderms.
26	12	" " "	Herring.
27	12	" " "	Insects, mollusks.
28	12	" " "	Empty.
29	11*	" " "	Insects.
30	11	" " "	Mollusks, herring, echinoderms.
31	11	" " "	Insects.
32	11	" " "	Shrimp.
33	11	" " "	Mollusks.
34	11	" " "	Insects, fish.
35	11	" " "	Mollusks, echinoderms.
36	11	" " "	Mollusks, insects.
37	11	" " "	Herring.
38	11	" " "	Mollusks, echinoderms.
39	11	" " "	Shrimp.
40	11	" " "	Herring, crustaceans.

*The birds numbered Lg 29 to Lg 40 were shot August 11 and preserved at that time, but were not examined until August 15.

TABLE II—Concluded
Stomach Contents

Item	No. of Stomachs containing Item	Percentage
Mollusks*	15	37.5
Fish*	15	37.5
Shrimp	14	35
Insects	12	30
Echinoderms*	6	15
Small crustaceans*	5	12.5
Young lobsters	2	5
Empty	1	2.5

*See footnote on page 45.

TABLE III
Herring Gull (*Larus argentatus argentatus*)
Number of Specimens from Various Localities

Locality	No. Specimens in 1933	No. Specimens in 1934
Frenchmen's Bay	6	—
Great Spoon Island	3	—
Fishermen's Island	62	144
Garden Island	1	—
Tenant's Harbor	1	—
Monument Rock	3	—
Spruce Head	1	—
The Brothers	25	38
Little Green Island	5	—
Green Ledge	22	—
Vinal Haven	2	—
Brimstone Island	4	—
Damiscove Island	5	—
White Island	17	41
Marblehead Island	—	4
Crescent Island	—	3
Eastern Egg Rock	—	74
Duck Island (Isles of Shoals)	—	45
Gunning Rock	—	14
Shag Ledges	—	13
Old Hump Ledge	—	2
Otter Island	—	76
Monhegan Island	—	8
Saco Bay	—	29
Green Islands (Casco Bay)	—	32
West Brown Cow	—	13
Elm Island	—	36
Sheep Island	—	1
Pumpkin Island	—	100
Total	157	673

Stomach Contents

A

Percentage of Stomachs Containing Food Items

Studies of 1934 Compared with those of 1933

Item	Percentage of Stomachs 1934	Percentage of Stomachs 1933
Mollusks*	40.1	54.1
Fish*	35.5	39.4
Crustaceans*	27.3	24.2
Vegetation and berries	17.7	12.7
Echinoderms*	15.5	21.7
Lobsters	14.9	9.5
Shrimp	10.8	14.6
Insects	9.5	21.6
Empty	5.9	1.3
Birds	3.7	2.5
Garbage	2.2	5.1

B

Total Summary of Stomach Analyses

Number of Stomachs Examined—830

Item	No. of Stomachs containing Item	Percentage
Mollusks	335	42.8
Fish	301	36.3
Small Crustaceans	222	26.8
Vegetation	139	16.8
Echinoderms	138	16.6
Lobsters	115	13.9
Insects	98	11.8
Shrimp	96	11.6
Empty	42	5.1
Birds	29	3.5
Waste	23	2.8

*See footnote on page 45.

TABLE IV

Double-crested Cormorant (*Phalacrocorax auritus auritus*)

Observations of Regurgitated Matter

Number of Regurgitations Examined—130

Item	Number of Regurgitations containing Items	Percentage
Sculpin.....	56	43.1
Cunner.....	48	36.9
Eel.....	24	18.5
Flounder.....	20	15.4
Vegetation.....	13	10.0
Herring.....	8	6.2
Stones.....	5	3.8
Tom Cod.....	3	2.3
Shrimp.....	2	1.5

DISCUSSION OF THE RESULTS OF THE SURVEY

Sterna hirundo hirundo

From a study of Table I, we may see at a glance that the only possible detrimental habit that the common tern (medrick) might have is in the amount of fish which is taken. Only three out of 155 birds had young lobsters in their stomachs and these were undoubtedly accidental occurrences since but one lobster was found in each case. The same percentage of stomachs (1.9%) contained berries or vegetation. We need say nothing further about this phase of the bird's feeding habits. The shrimps found off the Maine coast have little or no economic significance, and consideration of this item may likewise be dispensed with.

The author feels that this species does not take enough fish to warrant any action on our part other than protection of the terns. Since insects rank third in the diet of these birds, according to the results of our investigation, we are thus receiving valuable services in the control of these pests. Moreover, this species is abundant only in scattered colonies and is not widespread over the coast as is the herring gull. Finally, these terns are migratory, and are with us but a few months each year, thus giving them only a short time in which to do any damage. Surely, after taking all these facts into consideration, we should not begrudge the common tern his small share of herring and mackerel.

Larus atricilla

It appears that the laughing gull may be dispensed with as far as possible damage to fisheries is concerned. There are several reasons for taking this stand. In the first place, insects were found in 30% of the specimens, this being the highest percentage in any of the birds studied. The laughing gull is probably the most insectivorous of all our gulls. The author's observations on this point have been borne out by those of other investigators including the late E. H. Forbush, a noted worker in economic ornithology. In an article dealing with the destruction of cicadas by laughing gulls and several species of terns he says, "Laughing gulls and the common terns are well known to feed largely on insects at certain times of the year" (9). Fish appeared in only a few more cases than insects, 37.5 being the percentage. Again, the lobster count in laughing gulls was very low. In fact, but two birds with a single lobster each were taken during the season. Since these specimens contained insects as well as the lob-

sters, the author feels that these two cases were entirely accidental. Another strong point to support this view is the fact that many young lobsters were taken in the tow net off the shores of Little Green Island where the majority of the laughing gulls feed, but not a bird shot here contained these crustaceans, *even though they were feeding in the same waters which contained the lobsters*. Lastly, the laughing gulls are not common in Maine except in two or three colonies, of which the one at Little Green Island is by far the largest. Few laughing gulls were observed east of Rockland.

Larus argentatus argentatus

The Herring Gull as a Menace to Fisheries

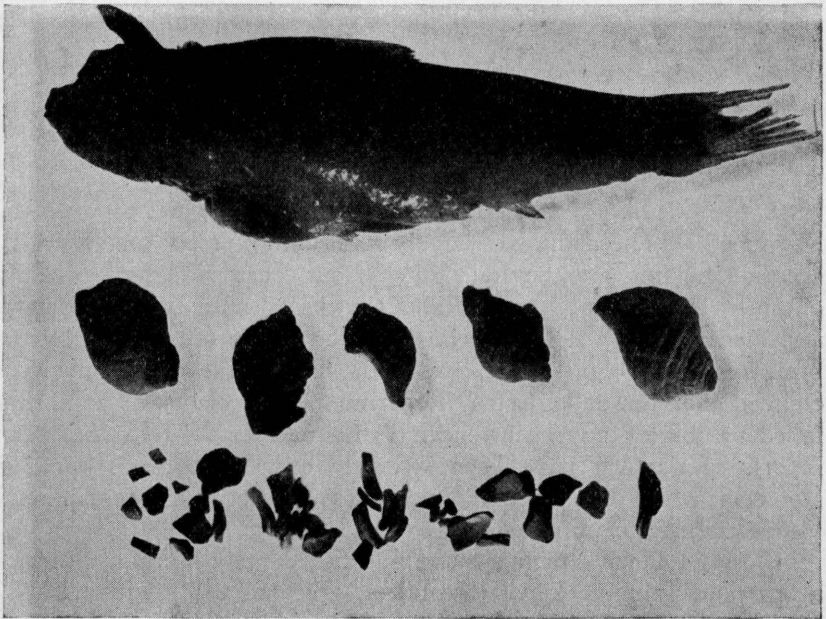
Table III shows that mollusks constitute the chief food of the herring gull. These animals, largely snails and mussels, together with occasional clams, are abundant all over our coast and may be readily obtained by birds at low tide about rocks or mud flats. Mollusca appeared in 42.8% of the specimens. The taking of mollusks by the birds has no real significance, despite the fact that several people have claimed that the gulls destroy large numbers of clams. The author failed to observe any occurrences of this nature and feels that such reports of damage have been seriously exaggerated. Of the 335 stomachs which contained mollusks, less than two dozen had any visible traces of clam remains.

Closely following mollusks, we find fish, largely herring, although a few pollock or mackerel were taken. Fish were present in 36.3% of the cases, a fact which requires serious consideration. If herring gulls were no more numerous than some of our other sea birds, the terns for example, we should find no occasion to be alarmed. But with the tremendous population of gulls that exists today, there is no question but that a great many fish are taken. The author makes no claim of having an adequate knowledge of fishing conditions, and consequently he is in no position to state at what point the removal of fish from the sea constitutes serious damage to the industry. However, the State Commissioner of Sea and Shore Fisheries and other authorities who are familiar with the results of this survey, have expressed the opinion that the fish taken by the herring gulls do have a noticeable effect on the status of herring, at least.

The fact that nearly 15% of the stomachs contained young lobsters is worthy of our attention. It is true that the actual number of lobsters was very small ranging only from one to ten per specimen, yet even a small toll would prove harmful in view of the large numbers

of gulls. Especially should we remember that the herring gull is the only one of the four species of birds studied which were found to eat lobsters in any noticeable amount.

A brief explanation of the habits of the larval lobster is given at this time in order that the uninformed reader will understand how it is possible for birds to destroy these crustaceans. This section of



Photograph of the stomach contents of a herring gull. The specimen is number G.120 and contained herring, mollusks, and echinoderms. The mollusks, seen in the second row, were snails. Fragments of sea urchin shells, echinoderms, appear in the lower row.

the paper is an abstract of the writings of Dr. F. H. Herrick and Dr. A. D. Mead who are recognized authorities on the habits of this animal (10).

The American lobster is found along the Atlantic coast from Labrador to Delaware. It attains its largest size and is most abundant in the northern part of this range, Nova Scotia and Maine. The female lobster spawns once in two years and the majority of the animals lay eggs in August. These eggs are carried externally on swimmerets for ten or eleven months before they hatch, although this period varies a little with the temperature of the water. Upon hatching the larval lobsters pass through five or six moulting stages which

last from four to seven weeks. During these moulting periods the young lobsters are found very near the surface of the water, and would thus form a possible source of food for birds.

In observing the relationship of gulls and terns to lobsters, a great many towings were made in the water with a Standard Plankton tow net in order to determine the presence or absence of lobsters in the



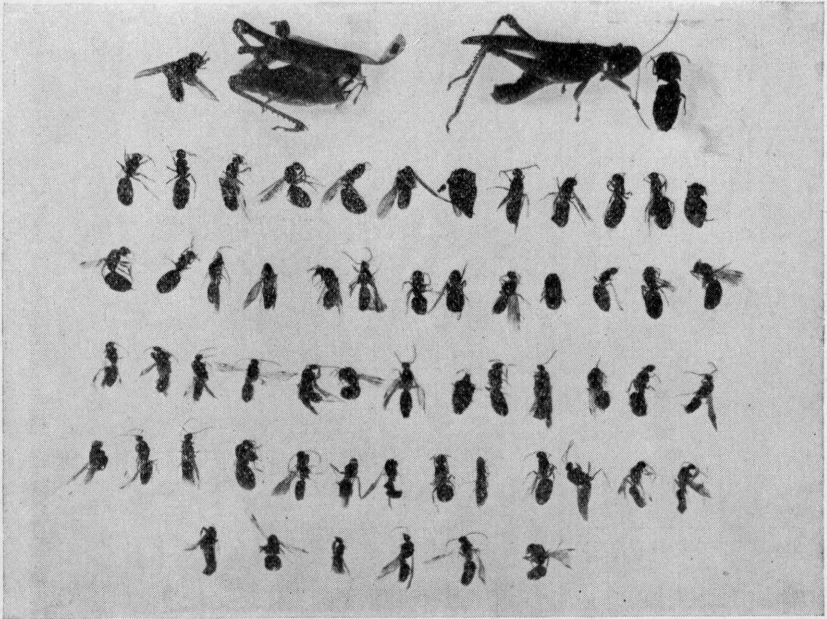
Photograph of the stomach contents of a common tern, number T.82. Shrimp and the partially digested remains of a fish make up the bulk of the food. A few snail shells were present, but mollusks do not constitute an important item in the diet of the common tern.

water. Some very interesting and variable data resulted. In certain regions very few lobsters were obtained, while in other localities a great many of these crustaceans were found in the net. In the same way, a great deal of variation was observed from time to time, some bays or inlets having many lobsters on a given day and none at all a day or two later. This is undoubtedly due to the fact that the larvae are largely dependent on the prevailing tides and currents for movement.

In a like manner a great deal of variation was seen in the presence of lobsters in the stomachs of herring gulls. For example, as many

as 56 consecutive birds have been taken which did not show traces of lobster. On the other hand, some localities have yielded a high percentage in lobster count, such as Saco Bay with 27.6% from 29 specimens.

No definite correlation appears to exist between the presence of lobsters in the stomachs of the gulls and their presence in the water



Photograph of the stomach contents of a laughing gull, specimen number LG.29. Insects had made up the entire meal of this bird.

in which the birds were feeding. One observation, nevertheless, is worthy of mention; when the percentage of lobsters found by stomach analyses was high, the results of towing showed lobsters to be unusually numerous in the water.

The Herring Gull as a Menace to Agriculture

Vegetation, largely berries, seeds, grass and weeds, was found in 16.8% of the stomachs. The berries were, in most cases, blueberries, which from an agricultural standpoint leads to serious consequences. The author did not take any specimens from blueberry fields, preferring to keep the limits of the survey down to a normal consideration, that is, the taking of birds only at or near their breeding colonies.

It was felt that any other action would tend to give the impression that the evidence was being selected. However, observation trips have been made to several blueberry plantations by the author during the past four years and there is no question but that the herring gulls make serious inroads each year against this industry. On one plantation which was visited in Knox County, it was estimated that 500



This view, taken from Fisherman's Island, shows a few of the gulls from this colony. In the center of the picture, Marblehead Island may be seen. It was on this island that the great destruction of cormorants, described in the text, took place. (Photograph by Cecil Ogden)

gulls were feeding on about five acres of blueberry field. One point should be given in connection with this type of occurrence. Not only do the gulls eat the berries, but they beat down the frail bushes with their heavy wings, thus shaking off many of the ripe berries as well as breaking the twigs containing unripe fruit. The reports of this type of destruction by these birds have been very numerous and while some of them are undoubtedly exaggerated, many of them have been investigated and found to be true.

Since a relatively small number of the breeding birds which were taken showed evidences of having eaten blueberries, the author is of the opinion that the bulk of this damage is done by the hordes of

non-breeding gulls which spend the greater part of their time near the mainland. This view was strengthened by the observations made at inland blueberry fields.

Further damage to agriculture by herring gulls has often occurred when fish have been used for increasing the nutritive content of the soil. Use of this type of fertilizer is quite common on farms located near the coast, and it appears that unless the fish are plowed under the soil immediately, there is great danger of losing the fertilizer to the gulls.

The Herring Gull as a Menace to Other Birds

One of the strongest points against the herring gulls, and one which concerns all bird lovers, is the fact that this species is exceedingly destructive to other birds. 3.5% of the specimens examined showed birds to have been eaten. This figure fails to do justice to the situation, for with the exception of seven gulls taken at Marblehead and Crescent Islands, no attempt was made to single out particular specimens to show this destruction. The reason for this is the same as that given in the section dealing with the blueberry industry, every effort being made to be perfectly fair in not selecting the evidence. The writer desires, however, to relate a few instances of actual observation regarding this predatory habit of the species.

On June 18, 1934, approximately 350 nests of the double-crested cormorant existed on Marblehead Island in Penobscot Bay. All these nests contained eggs or young or both. A week later less than 60 of these nests remained. This terrific destruction was entirely carried out by herring gulls and much of it was observed by the author and his wife from blinds. Although crows are listed among the enemies of cormorants, no crows were observed on Marblehead Island at any time except at the last end of the breeding season when the few young which were left were able to defend themselves. Moreover, no mammals were present on the island, and the total damage was from herring gulls. It has been pointed out to the author that his presence on the island may have caused the cormorants to remain away from their nests. This fact, however, had absolutely nothing to do with the case as the cormorants had no fear whatever of the blinds, returning to their nests (some of which were but four feet from the blind) almost before the author could close the opening. In fact the lowest death rate was among the nests which were under closest observation, where the author could thrust his hand or a stick out of the blind when gulls appeared near these nests. The chief danger to the cormorants lies in the fact that they move so slowly on land that the

wary gulls, hovering overhead or standing nearby, snatch up an egg or a young cormorant the moment a nest is left unguarded. Moreover, cormorants make no effort to protect any nest other than their own; consequently if both parent birds are absent at the same time, they are quite likely to find part or all of their nest contents gone when they return.

About 50 pairs of double-crested cormorants, whose homes had been destroyed on Marblehead Island, built second nests on another islet near by, but the last time the writer visited the site only 19 nests remained.

At Old Hump Ledge, in Muscongus Bay, about half of the original 200 cormorants' nests were destroyed by herring gulls.

On Tommy's Island, at the mouth of the Weskeag River, a small colony of terns, evidently stragglers from a larger colony nearby, attempted to establish themselves. The author estimated that about 40 pairs were nesting on June 20, but as nearly as could be determined, the gulls reduced the output from this colony to exactly zero.

Among our land birds, the song sparrow appears to be the most frequent victim of the gulls, as practically every island occupied by the herring gulls also has nesting song sparrows.

Destruction of birds by the herring gull has been observed by many workers. Sutton noticed in the Hudson Bay region that small adult birds were taken, especially during the winter and spring (11). He says, in connection with this point, "Larger birds are not, as a rule, destroyed by storms as often as the smaller birds. Herring gulls, for instance, succeed in capturing lemmings or small birds, even though there is no open water." Sutton also observed that the shore birds suffered greatly from loss of their eggs by the ravagings of the herring gulls. "It [the herring gull] is an enemy of bird-life chiefly because of its eating the eggs of the various ducks, geese, and shore birds."

Dawson and Chapman, off the California coast, observed much of this predatory activity on the part of the Western gull, which is very closely allied to the Eastern herring gull (12). They noted, especially, the destruction of the eggs of murrelets and cormorants. Referring to the gull, Chapman says, "Never have I seen more relentless, brazen, destructive enemies of bird-life than these immaculate, snowy-breasted, pearl-backed birds."

A list is presented at this point, showing a record of birds which were found in the stomachs of herring gulls during the present study:

Number of stomachs containing birds or traces of birds . . .	29
Total number of birds found	53*
Number of species identified	7

*In cases where unidentified masses of feathers were found, the author gave the gull the benefit of the doubt and assumed that the remains of only one bird was present in the stomach.

Double-crested cormorant:	
Juveniles	10
Embryos	12
Semi-palmated sandpiper:	
Adults	3
Spotted sandpiper:	
Adults	1
Common tern:	
Juveniles	3
Embryos	2
Black guillemot:	
Juveniles	1
Song sparrow:	
Adults	3
Juveniles	5
Black-throated green warbler:	
Adults	1
Unidentified	12

Beneficial Habits of the Herring Gull

From an economic standpoint, only three points appear to be in favor of the herring gull. One of these is seen in the fact that 16.6% of the birds had eaten echinoderms. A few of these animals, about 25%, were starfish, forms which cause some damage to our shellfish. The second point is the service rendered by the gulls as scavengers. There is no doubt but that many gulls keep the shores and harbors relatively free from waste. Since no birds were taken in the harbors, this item does not appear to have a very high value in Table III.

The author now wishes to point out that these services might not be as valuable to us as we suppose. Almost as high a percentage of echinoderms appeared in the diet of the laughing gulls. Moreover, from experiments in feeding laughing gulls, the author is convinced that this species is nearly, if not wholly, as good a scavenger as the herring gull. At the present time the laughing gulls have only one large nesting colony in Maine, and they are often driven from harbors by the larger herring gulls. However, by controlling the latter and reducing their numbers, and at the same time giving more adequate protection to the few colonies of *Larus atricilla*, there is no reason to suppose that this bird will not increase in numbers. Thus we would have another scavenger in the form of the laughing gull and one which did not have the undesirable qualities of the herring gull.

The only characteristic of the herring gull which cannot be attacked is its insectivorous habits. 11.8% of the stomachs examined contained insects. In almost every case, however, these animals formed only a minor part of the total stomach contents. This service on the part of the gulls does not even attempt to offset the total damage done.

In summarizing, the author believes that the herring gull presents a menace to the fishing industry, to agriculture, and to the welfare of our birds. The beneficial aspects of this species have been given in full and an attempt has been made to show that these benefits are purely superficial and cannot hope to make up for the detrimental habits.

Control of Herring Gull

The writer wishes to emphasize that he is not in favor of extermination of the species. He would not advocate the extermination of any bird, regardless of its economic status. However, he desires to emphasize equally as strongly that a strenuous and carefully supervised program of control should be undertaken with respect to the herring gull without delay.

Several well-meaning people have pointed out that man should not attempt to slaughter animal forms. They argue that each has his place in nature even though it may be to prey upon other forms. They say that interference with the survival of the fittest in wild life is to upset the balance of nature. To such arguments, the author would reply that *man upset the balance of nature many years ago*. He has been upsetting it ever since he rose to dominate the world of living things. Man has already depleted many of our natural resources and it is now his duty to restore this balance as best he can by conservation programs. To quote from Dr. A. A. Allen, an outstanding figure in ornithological education, "Man upset the balance that had existed for thousands of years. The weight of all the human agencies of destruction was too much for the reproductive capacity of wild life to bear up, and wherever man trod, the balance was ruthlessly upset. First came lumbering and then agriculture, with restriction of wild land. With it came the forest fires and the drainage of the marshes and the pollution of the streams. Then came an ever-increasing host of hunters and fishermen with improved guns and ammunition—" (13).

This interference by man is clearly shown with respect to sea birds. Man has always persecuted these fowl, by robbing their nests and by shooting the birds, by pollution of their feeding waters and by the introduction of mammals onto their breeding islands. Then came a realization that many sea birds were becoming rare and some had

already been extirpated. Laws were enacted to protect a few of the species, including the herring gull. But man continued his practice of persecuting the birds in the manner described above, especially those species which were unprotected. Meanwhile, the herring gull continued to flourish. An extremely hardy bird, he was able to withstand adverse climatic conditions. Modifiable in habits, he adapted himself to changing environmental conditions much after the fashion of the English sparrow and the European starling. These factors, plus the protection which the law afforded, enabled this species to increase rapidly. Mr. Robert P. Allen, field agent for the National Audubon Societies in a report of a cruise along the Maine coast in 1931 comments on the great increase in herring gulls in this state (14). He also observed that these birds were in some cases driving terns from long-established colonies.

Any program for the control of herring gulls should be under the direction of someone who is in a position to carry out the work along efficient lines, such as an official of the Biological Survey. The work should be complete, and would obviously occupy a period of years.

Suggestions have been voiced that a small bounty should be placed on the birds, but the writer is strongly against this type of procedure. If this were done, a great many birds, other than herring gulls, would be killed, to say nothing of the terrorizing of breeding birds all over the coast which would be occasioned by the discharge of firearms and the invasion of coastal islands by the gull-shooting parties which would be certain to be organized. Rather, let us have efficient and relatively economical control of these birds by the Biological Survey or some other organization qualified to undertake such a task. Moreover, a professional ornithologist would be able to judge when control measures had proceeded far enough, although in the writer's opinion, there would be little danger of over-doing the control for several years, at least.

Phalacrocorax auritus auritus

From eight weeks of concentrated study of the double-crested cormorant (known to the fishermen as shag) by the writer and his wife, as well as a close examination of the regurgitative material from 130 individual cases, it appears that this is a decidedly beneficial bird. 104 out of the total number of cases showed either cunners or sculpins to have been eaten, or to phrase it another way, exactly 80% of the birds, whose food was examined, had eaten one or both of these species of fish. It is a well-known fact that cunners and sculpins prey upon some of our economically important fish, while these two species them-

selves have no commercial use. Therefore, the double-crested cormorant is rendering considerable aid to the fishing industry. Continuing a study of Table IV, it is seen that eels rank third in the diet of the cormorant. Here again we find the same condition existing—a fish having no economic importance which preys on our beneficial species. Thus with respect to the three leading items in this bird's diet, a definite service is rendered to the fishing industry. The only fish of any economic importance appearing in the regurgitative matter examined were flounders, and this species was not taken often enough to have any serious significance, especially since it is very abundant and does not have a very high commercial value.

In considering complaints against this bird, there appear to be two definite charges, both of which may be dismissed as groundless. In the first place, it has been frequently stated that cormorants destroyed salmon. In 1914, the Canadian Geological Survey detailed Mr. Percy A. Taverner, internationally known ornithologist and a member of the staff of the Canadian National Museum, to investigate these charges. Mr. Taverner and two assistants spent more than two months studying the feeding habits of the double-crested cormorant and taking specimens of the birds for purposes of stomach analyses. The writer will repeat several of Taverner's findings at this time since they have a direct bearing on the present problem and since the present findings were, in many respects, parallel to those of Taverner (15).

In the first place, Taverner did not find a single trace of salmon in the stomachs of the birds nor did he observe many cormorants in the waters which were occupied by salmon. He attributes this to the fact that salmon, trout and the like are extremely agile and would prove much more difficult to catch than such sluggish fish as sculpins, cunners or flounders.

In the second place, Taverner found sculpins were predominant in the diet of these birds, as did the author in his work of 1934.

With respect to the fish themselves, Taverner points out that the fingerling salmon or "parr" eat great quantities of fry of their own species. Continuing he says, "The shelldrakes (mergansers) are accused of devouring the salmon ova. Considering that the ova is buried in the sand immediately after being fertilized and is guarded by the male, while this is in process, it is not likely that the number taken by these birds can be a very large proportion of the whole and must be small in comparison with the number of fry taken by the parr. At this stage the worst enemy of the salmon is undoubtedly the salmon itself."

The author further desires to point out the work of Dr. Harrison F. Lewis, who is Chief Migratory Bird Officer for Ontario and Quebec, on the habits of the double-crested cormorant (16). Dr. Lewis is probably the best living authority on this species. His method of observing the regurgitative matter was similar to that of the author although Dr. Lewis made many more observations, having examined over 550 regurgitations. Here again we find that the fish of little or no economic importance make up the bulk of the food.

The second charge against these birds is that they frequently enter fish weirs, in pursuit of the herring. This charge is admitted by Taverner in the above mentioned report, but he feels that in only a very few cases, such as occasions when herring are scarce, does any harm result. The present writer, during his study of the recent summer, passed five weirs while going to and from the cormorant colony. From the observation blinds within the colony itself, two weirs were in constant view. Records were kept as to the direction taken by the cormorants when they left the island to feed. *During the entire eight weeks of study*, a total of two birds only were seen within a weir and neither was fishing at the time that they were watched; one was perched on the frame work of the weir and the other was swimming in the water.

A great deal of space has been devoted in this paper to a consideration of the double-crested cormorant, but the author feels that this bird is deserving of a great deal more consideration. He believes, from his own results as well as from the investigations of Taverner and Lewis, that this species is beneficial to mankind. The regrettable point is that the bird is not protected by law. Numerous instances have been related to the author by coastal residents regarding the destruction of the nests and eggs of this species by fishermen simply because the herring gull is exceedingly annoying in robbing them of their catches and destroying some of their crops; they feel, therefore, that all sea birds are detrimental!

Taking all the above points into consideration, it would seem that laws protecting the double-crested cormorant should be put into effect as soon as possible.

CONCLUSIONS

The investigations of 1933 and 1934 may be summed up in the following conclusions:

1. The common tern, *Sterna hirundo hirundo*, does not appear to have any serious economic significance. The protection now given this species should be continued.

2. The laughing gull, *Larus atricilla*, appears to be a beneficial bird, and should receive the full protection of the law.

3. The herring gull, *Larus argentatus argentatus*, appears to present a menace to the fishing industry, to the blueberry industry, and to the welfare of some of our more beneficial birds. Detailed control measures should be undertaken as soon as possible.

4. The double-crested cormorant, *Phalacrocorax auritus auritus*, appears to be a beneficial bird to the fishing industry. Laws should be put into effect to protect this species.

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