

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF COMMERCIAL FISHERIES

OPERATING PROGRAM

Field Station or Office of Origin Woods Hole, Massachusetts	Region or Area Region 3, Gloucester, Massachusetts
Subactivity (Symbol and Title) 431 Coastal and Offshore Research	Program Title: Population Dynamics Program No. 431.20

PROGRAM COMPONENTS OF COST	Previous Program	This Action	Current Program
10. Personal Services (Detail on reverse side) - - - - -		41,084	41,084
21. Travel and Transportation of Persons - - - - -		200	200
22. Transportation of Things - - - - -			
23. Rent, Communications & Utility Services - - - - -			
24. Printing and Reproduction - - - - -			
25. Other Services - - - - -			
26. Supplies and Materials - - - - -		600	600
31. Equipment - - - - -		200	200
Other - - - - - <del>Computer</del>		5,000	5,000
Sub Total Program Direct Cost - - - - -		47,084	47,084
Program Indirect Cost - - - - - 2%		28,900	28,900
<b>TOTAL OPERATING PROGRAM</b>		<b>75,984</b>	<b>75,984</b>

BREAKDOWN BY PROGRAM FEATURE

NUMBER	PROJECT	Previous Program	This Action	Current Program
	Est. Effects of Fishing		28,250.40	28,250.40
B	Theoretical Studies		9,416.80	9,416.80
C	Tagging		9,416.80	9,416.80
	Sub Total Program Direct Cost - - - - -		47,084.00	47,084.00
	Program Indirect Cost - - - - - 5%		28,900.00	28,900.00
	<b>TOTAL OPERATING PROGRAM</b>		<b>75,984.00</b>	<b>75,984.00</b>

NOTED BY REGIONAL OFFICE

ESTIMATE OF EXPENDITURES BY QUARTERS - F.Y. 19

Object Class	First	Second	Third	Fourth
Personal Services				
All Other Expenditures				
Total Operating Program				

Prepared By: \_\_\_\_\_ Name \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_  
 Approved By: \_\_\_\_\_ Name Richard W. Graham Title Laboratory Director Date 7/29/63

<b>Personnel (name)</b>	<b>Grade</b>	<b>Cost</b>
<b>Hessomath</b>	<b>GS 13</b>	<b>12,353</b>
<b>Brown</b>	<b>8</b>	<b>7,506</b>
<b>Callahan</b>	<b>6</b>	<b>6,665</b>
<b>Dryer</b>	<b>7</b>	<b>7,147</b>
<b>Cogswell</b>	<b>7</b>	<b>7,353</b>
<b>Total personal services</b>		<b>41,024</b>

Briefing Statement  
(In thousands of dollars)

Region #3

Coastal and Offshore Research

Program Without Increase

(Subactivity)

No.	Title		1965	1964	1963	1962
		\$	78.0	73.0	72.0	76.0
431	Population Dynamics	PF	5	5	5	5

Program:

**Work plan:** Biological data on landings in all New England fishing ports are transmitted to Woods Hole Laboratory for analysis. These data along with information collected by research vessel ALBATROSS IV are used in measuring the changing abundance of cod, haddock, redfish, silver hake, flounders, and sea scallops.

**Objective:** To determine the effect of fishing on the stocks of the above species; to assess the possible effects of regulation of the fisheries; and to make recommendations for management of these fisheries.

**Accomplishments FY 1963:** Processing of data from the ports has been kept current. Annual biostatistical reports have been submitted to ICNAF. Assessment of effects of different mesh sizes on the stocks of groundfish in the area has been made.

**Base of operations:** Woods Hole, Massachusetts.

## POPULATION DYNAMICS PROGRAM--REVIEW OF PAST WORK

### Georges Bank Haddock

Herrington (1948) attempted to define the relationship between adult biomass, food, and recruitment. His study indicated that maximum recruitment resulted from medium stock biomass and that food was a limiting factor at high densities. The analysis however, was not wholly convincing.

Schuck (1949) demonstrated that there was a significant relationship between removals by the fishery and decrease in population size on an annual basis. Thus, the annual catches of 75 million pounds or more were affecting the stock significantly.

Graham (1952) presented estimates of growth rate, mortality rate, average age of entry into the catch, and the yield-per-recruit as a function thereof. These studies indicated a substantial increase in yield per recruit could be obtained by delaying the age of first capture from 1 1/2 to 3 years of age. The magnitude of natural and fishing mortality rates were, however, only considered opinions, hence the actual expected yields were somewhat uncertain. This study formed the biological basis of the present mesh regulation, begun in 1953.

Subsequent studies to determine the effects of the mesh regulation (Graham, 1958; Graham and Premetz, 1955; and other processed reports) established the effective release of small fish, and somewhat increased catches of larger sized fish. The expected increase in yield-per-recruit could not be discerned from the available data. Taylor (1958) attempted to estimate natural and fishing mortality components, but was not successful.

### Other fisheries

Royce, Buller, and Premetz (1959) attempted to determine if the changes in yellowtail flounder population were related to fishing pressure. The study disclosed apparent fishery-independent variations in stock magnitude which could not be explained. Gulland (1961) reviewed some aspects of estimating the effects of fishing on redfish. His analysis of abundance and effort for redfish in the Gulf of Maine indicated that the maximum average annual effort thus far imposed had not reached the level corresponding to maximum sustained yields.

The report of working groups of scientists on fishery assessment in relation to regulation problems (Beverton and Hodder, 1961) attempted to evaluate effects of mesh regulation and fishing on the yields of major species in the ICNAF area. The report concluded:

- 1) Mesh size for the various species in various areas could not be uniformly regulated to produce maximum yields-per-recruit. For cod mesh size up to 5 or 6 inches would be most beneficial. For haddock a mesh size of 4 1/2 appeared optimal. The estimated gains in yield were, on the whole, small. Long term assessments for redfish were not possible.

- 2) The fishery had, in many cases, significantly reduced the abundance, but in no instance was it possible to relate accurately the maximum sustainable yield point to a given fishery intensity.
- 3) For almost all stocks, the information required for adequate assessment of effects of fishery was lacking.

#### Literature cited

- Beverton, R. J. H., and V. M. Hodder, editors.  
1962. Report of working group of scientists on fishery assessment in relation to regulation problems. Suppl. to Annual Proceedings of ICNAF, vol. 11, 81 p.
- Graham, H. W.  
1952. Mesh regulation to increase the yield of the Georges Bank haddock fishery. International Commission for the Northwest Atlantic Fishery, Second Annual Report, p. 23-33.
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1958. Effects of haddock mesh regulation in Subarea 5. In Some problems for biological fishery survey and techniques for their solution. ICNAF, Special Publication No. 1, p. 111.
- Graham, H. W., and E. D. Premetz.  
1955. First year of mesh regulation in the Georges Bank haddock fishery. Special Scientific Report--Fisheries no. 142, 29 p.
- Gulland, J. H.  
1961. A note on the population dynamics of the redfish, with special reference to the problem of age determination. In ICES/ICNAF Redfish Symposium, ICNAF Special Publication No. 3, p. 254-257.
- Herrington, W. C.  
1948. Limiting factors for fish populations. In A Symposium on Fish Populations. Bull. Bingham Oceanographic Collection, vol. 11, p. 229-279.
- Royce, W. F., R. J. Buller, and E. D. Premetz.  
1959. Decline of the yellowtail flounder off New England. U. S. Fish and Wildlife Service, Fishery Bulletin, vol. 59, p. 169-266.
- Schuck, H. A.  
1949. Relationship of catch to changes in population size of New England haddock. Biometrics, vol. 5, p. 213-231.
- Taylor, C. C.  
1958. Natural mortality rate of Georges Bank haddock. U. S. Fish and Wildlife Service, Fishery Bulletin, vol. 58, p. 1-7.

## REGIONAL ADP UNIT

The automatic data processing unit became operational in November, 1962. The unit is designed to handle (1) the basic compilations of fishery statistics for the Regional activities, ICNAF and Woods Hole Laboratory, and (2) data reduction for research projects within the Region's laboratories.

The unit is equipped with the following machines: an Alpha printing punch located in Gloucester, and the following at Woods Hole:

- 1) Alpha printing punch
- 2) 1000 card per minute Alpha Sorter
- 3) 100/150 card per minute Alpha Accounting Machine
- 4) 150 card per minute Reproducing Punch
- 5) 150 card per minute Collator

The unit is currently handling on a routine basis the following jobs:

### A. Commercial Fishery Statistics.

1. Dealer Weighout Schedules. Provides total landings and effort of New England fleet, 150,000 cards-per-year. Reports prepared for the Washington, the Office of Statistical Services, Gloucester (OSS), for ICNAF and for the Woods Hole Laboratory.
2. Vessel Interviews. Provides details of each trip interviewed, 75,000 cards-per-year. Mostly for Woods Hole Laboratory use.
3. Length and age composition of landings, 30,000 cards-per-year. Reports prepared for ICNAF Sampling Yearbook, and Laboratory use.

### B. Research Vessel Surveys.

1. Groundfish species records and hydrography.
2. Benthos species records and environmental factors.

In addition, many special sets of data are processed for research projects; e.g., Mid-Atlantic temperatures, length-weight analyses for groundfish, industrial fishery study. A tremendous backlog of important historical data on the New England fisheries exists which we are slowly punching and processing in order to provide rapid retrieval and analysis of the data.