*Florida Board of Conservation*

# MARINE RESEARCH LABORATORY
## ST. PETERSBURG, FLORIDA

GENERAL PROSPECTUS
PELAGIC FISH STUDIES

October 1967

*Emphasis will be placed on king mackerel, Spanish mackerel, and bonito (false albacore). Thread herring and other clupeids will be included, if possible.*

King and Spanish mackerel are presently exploited by a sport and commercial hook and line fishery and a commercial gill net fishery. Bonito have recently been fished with purse seines for a new canning industry. The future exploitation of these stocks will be greatly increased as modern fishing methods are employed and as present industries expand. Little is currently known about the life history of these species. Only the Spanish mackerel has been studied to any extent and these investigations were restricted to the upper Keys and the Miami area. The basic taxonomy of these species is fairly well understood, but this applies only to the adult fish. The reader is referred to Special Scientific Report No. 20 of the Florida Board of Conservation Marine Laboratory for pertinent information on the need and rationale for basic research on these fishes.

The project areas established below pertain primarily to king and Spanish mackerel. Work with other species will be included as time, equipment, opportunity, and personnel are available. Intensive research programs on these other species may vary a little from the programs described.

1. Population dynamics.

   A. Research goals

      1. Determination of general age and growth of the species and proof of the validity of the aging method.

      2. Determination of population size and delimitation.

      3. Analysis of the population structure at various geographical localities, Caribbean Sea, Yucatan Straits, and both Florida coasts, and determination of the degree of population separations.

      4. Determination of the year classes available to the fishery and the per cent of abundance of each year class.

   B. Research methods

      1. Otoliths, length (fork length) and weight, gonadal tissue, catch and locality data, and taxonomic information will be taken from the commercial and/or sport catch at various geographical localities. Fifty to 100 fish should be sampled each month from each locality, but fewer numbers can be utilized if fish are scarce. Also see Reproduction B, below.

2. Reproduction

    A. Research goals

        1. Determination of the time and places of spawning activity.

        2. Description of the structure and development of the gonads.

        3. Determination of average egg numbers (fecundity) of various age and size groups.

    B. Research methods

        1. Histological analysis of gonadal tissue from 15 to 20 specimens of various sizes each month. Maturity of the gonad and time of spawning can be determined. Macroscopic observations of gonads of other fish will supplement histological observations. Areas for larval collections can be based on the presence of ripe and spent gonads in adult fish.

        2. Whole ripe gonads will be taken and placed in 10 per cent formalin for egg counts. The fecundity of various sized individuals will be correlated with age and fork length.

        3. See No. 4 below.

3. Migration

    A. Research goals

        1. Determination of the annual pattern of movement of fish schools.

        2. Determination of various factors associated with this movement, i. e., temperature, availability of bait, spawning migration, etc.

    B. Research methods

        1. Tagging of many individuals will provide positive proof of movement and travel time if enough returns are obtained. Tagging will take place in the Caribbean, Yucatan Straits, and off the Florida coasts.

        2. Aerial observation flights will provide data on presence of fish schools in various areas at various times. These aerial observations can be correlated with surface water temperatures taken from the air by infrared temperature sensing units and commercial catches from localities along the coast. Sampling these catches will provide information on the populations observed from the air.

4. Larval development and juvenile and larval ecology

   A. Research goals

      1. Description of the larval stages of development.

      2. Distribution of pelagic larva.

      3. Estimation of duration of the larval stages.

      4. Duration and habitat of juvenile stages.

      5. Evaluation of important taxonomic characters of adults to determine if various populations differ taxonomically and to find characters valuable for identification of larvae and juveniles.

   B. Research methods

      1. Collection of larvae and juveniles by plankton and nekton nets, night lighting and seining in all possible spawning areas.

      2. Capture of adults in the spawning areas and correlation of gonadal condition with the presence of eggs and larvae.

      3. Systematic plankton collections during the months or weeks of spawning activity.

5. General ecology

   A. Research goals

      1. Analysis of food sources at various areas and times.

      2. Determination of predator and competitor species.

      3. Increase in the natural mortality rate by fishing pressure.

   B. Research methods

      1. Field observations during tagging activities and during sample collections from the commercial catch.

      2. Analysis of changes in the population structure after years of exploitation.

6. Effects of exploitation

   A. Research goals

      1. Determination of the total yield of the sport and commercial fishery.

2. Determination of the yield of various geographical areas.

3. Determination of the average annual catch per unit effort from each area.

4. Description of the fishery, catch methods, processing and utilization.

5. Value of the sport and commercial fishery.

B. Research methods

1. Analysis of landings and marketing data and survey techniques.

2. Recorded field observations of the commercial fishery.


The above programs are all necessary for careful management of the fisheries, but available funds, time, and personnel limit the possible research effort. Initial research efforts will be expended on the first four of the above programs to develop the necessary information on the life histories of the species.

-Martin A. Moe, Jr.