

# CHANGE IN GROUPER (SERRANIDAE) STOCKS IN PUERTO REAL, CABO ROJO (PUERTO RICO): A TEST OF TWO DATABASES AS PART OF THE DISSERTATION

“FINDING FISH AND FISHERMEN: SPACES OF INTER-DISCIPLINARITY CONSTRUCTION OF MANAGEMENT SYSTEMS”.

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## INTRODUCTION

We present preliminary results from an ongoing dissertation research dealing with the interaction between human behavior and environmental factors for explaining the decrease of coral reef fish stocks in Puerto Rico (PR). Some basic research questions are:

1. How has fishing catches changed over time at Puerto Real, Puerto Rico?
2. Can existing fisheries databases be used to assess the actual and future status of the fisheries at Puerto Real?
3. How have land use and marine ecosystem changes affected Puerto Real fishery stocks?
4. How Local Ecological Knowledge (LEK) can improve or increase our scientific knowledge of the stocks?
5. How does fishermen’s LEK of fish stocks and associated environmental conditions compare with existing independent databases?
6. What existing management policies might be best for managing the Puerto Real fishery?

## PRELIMINARY RESULTS: QUESTION 2

This assessment focuses in documenting and interpreting the status of fish stocks of the Serranidae family in landing areas used by commercial fishermen in the most productive port of P.R., Puerto Real.

## METHODOLOGY

1. For documenting the historical catches of Serranids, we used landing statistics published by the FRL (Fisheries Research Laboratory, Department of Natural and Environmental Resources). Catch weight is grouped for all individuals in each species. Although this data has been recorded by fishermen since the late 1970’s, we used the records since 1983 onwards.
2. To estimate the availability and the average weight of red hind (Epinephelus guttatus) groupers , we used data from the independent abundance assessment SEAMAP (Southeast Area Monitoring and Assessment Program, National Marine Fisheries Service) which has been recorded since 1991 for the western shelf of Puerto Rico in cells of 2x2 miles . Data was selected from the fishing areas used by the Puerto Real fishers (as revealed by interviews) Since overfishing should reduce the average size of fish in the population, we calculated the average weight per specimen per year as an index of overfishing.

## RESULTS

Landings of groupers decreased dramatically from 1984 to 1988. Since 1988 the catch has remained low but stable, oscillating between 200,000 to 100,000 pounds (Figure 1).

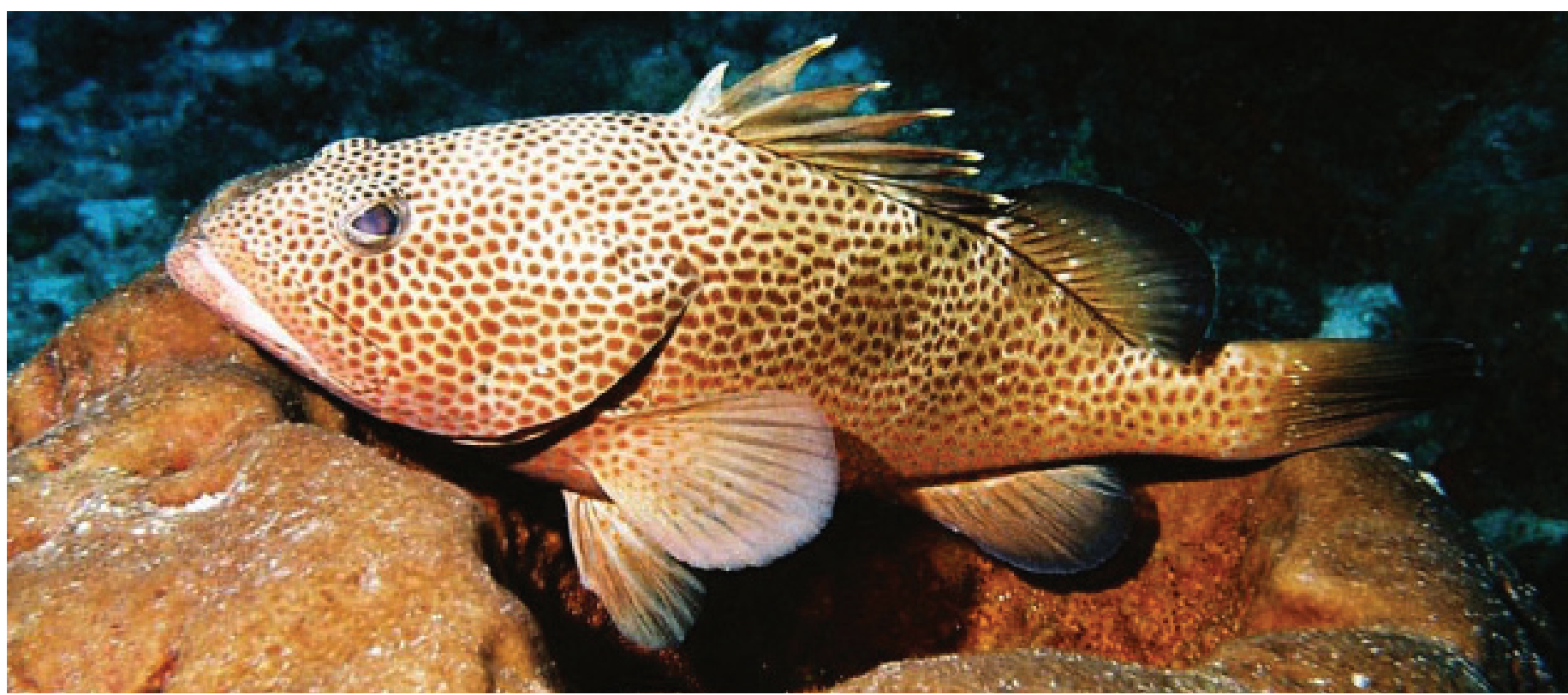
According to FRL data, since 1988 Serranids have comprised between 10 to 16% of the total fish catch per year. This occurs in apparently periodic cycles that need further investigation (Figure 2).

Spatial analysis indicates great variability in grouper abundance in the fished area used by Puerto Real fishermen (Figure 4). Those places coincides with areas in which coral reefs are predominant.

## CONCLUSIONS

1. Grouper landings, although crashing in 1984, appear stable for the last two decades.
2. Catch regulations could be partially related to this observation, though other explanations are feasible such as the substitution of Serranids by other species of economic value, reducing the fishing effort on groupers.
3. The reasonable stable average weight of red hind groupers during the analyzed period is not consistent with an increasingly overfished stock, but rather with a stable fishing effort and perhaps equilibrium abundances.
3. Detailed spatial analysis of availability, fishing effort and catch appears feasible fields of inquiry for developing further explanations on these problems.
4. We need to evaluate the shift from groupers and other reef fishes to conch or lobsters, and diving as the main gear.
5. We see the need to establish relationships between fishers' behaviors and fish stocks, such as the elaboration of indexes of catch per unit effort analysis.

SEAMAP database offers the possibility of doing this analysis while LIP database (information provided by the fishers) do not count with clear data on this aspect.



*Epinephelus guttatus*



*Cephalopholis fulva*



*Myxotoxotes punctatus*

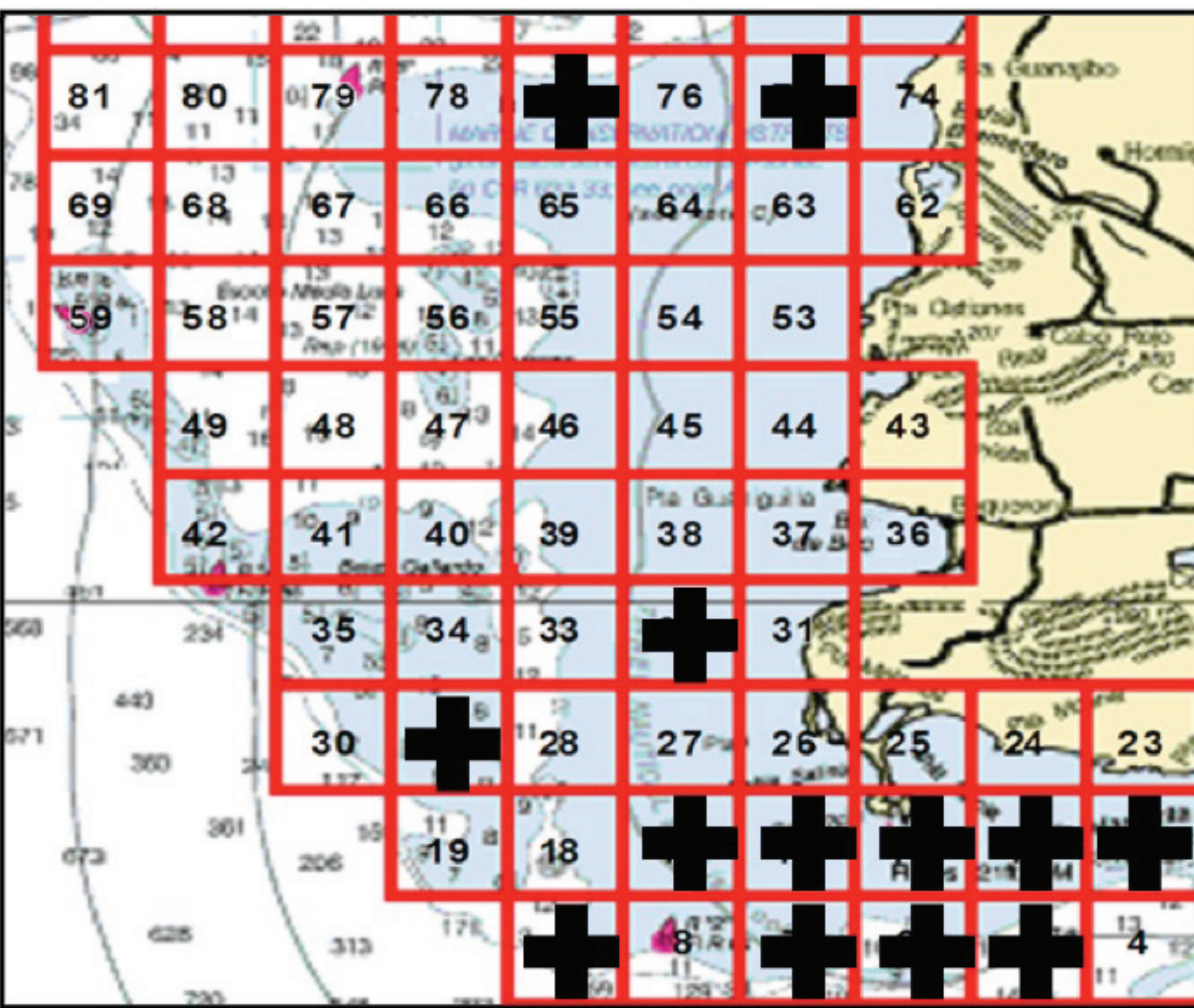


Figure 4: Puerto Real fishing area. Squares represents 2x2 miles SEAMAP cells. + Cells with the highest abundance of Serranids catching.

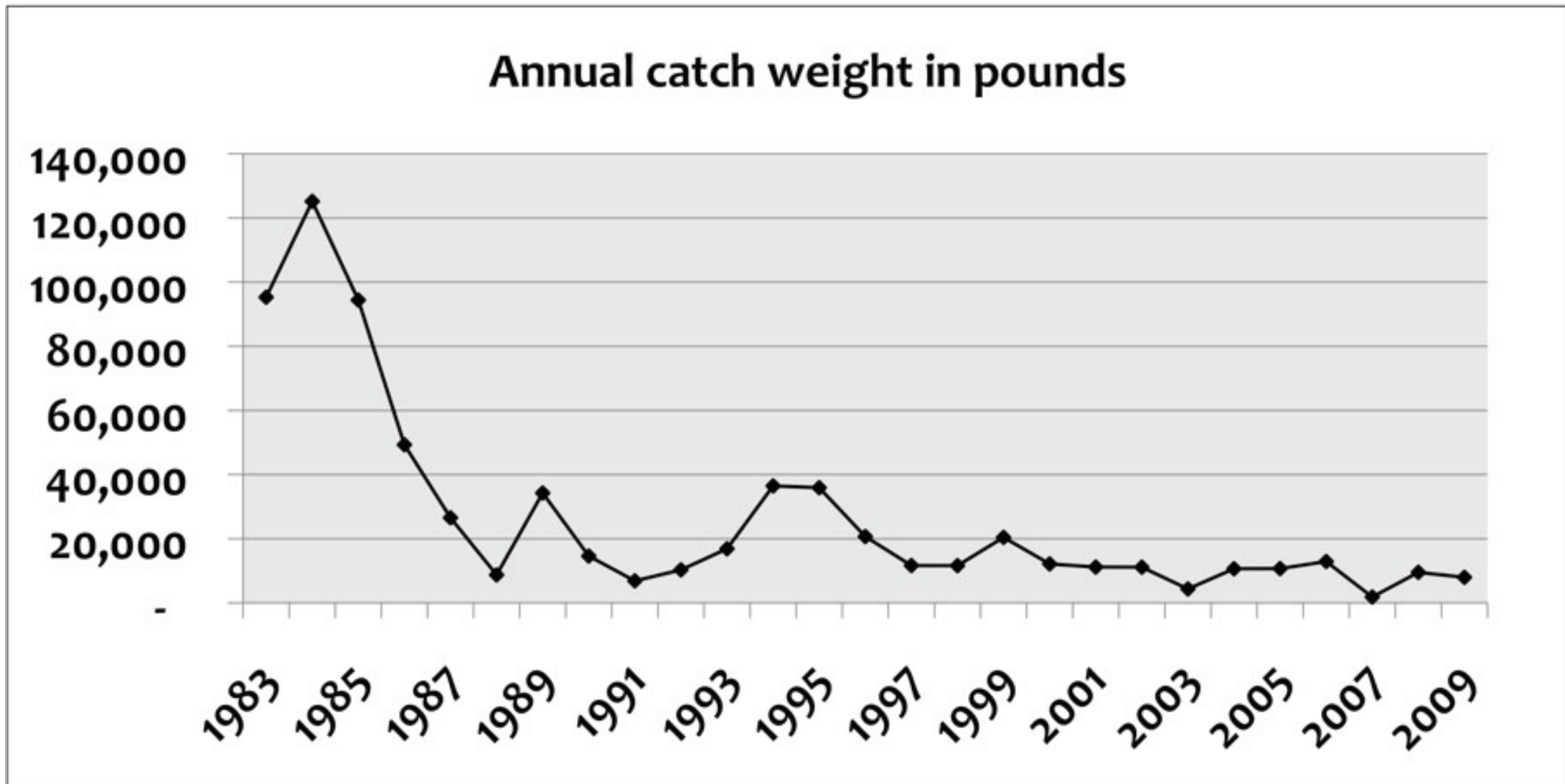


Figure 1: Annual catch of Serranidae, FRL data Puerto Real.

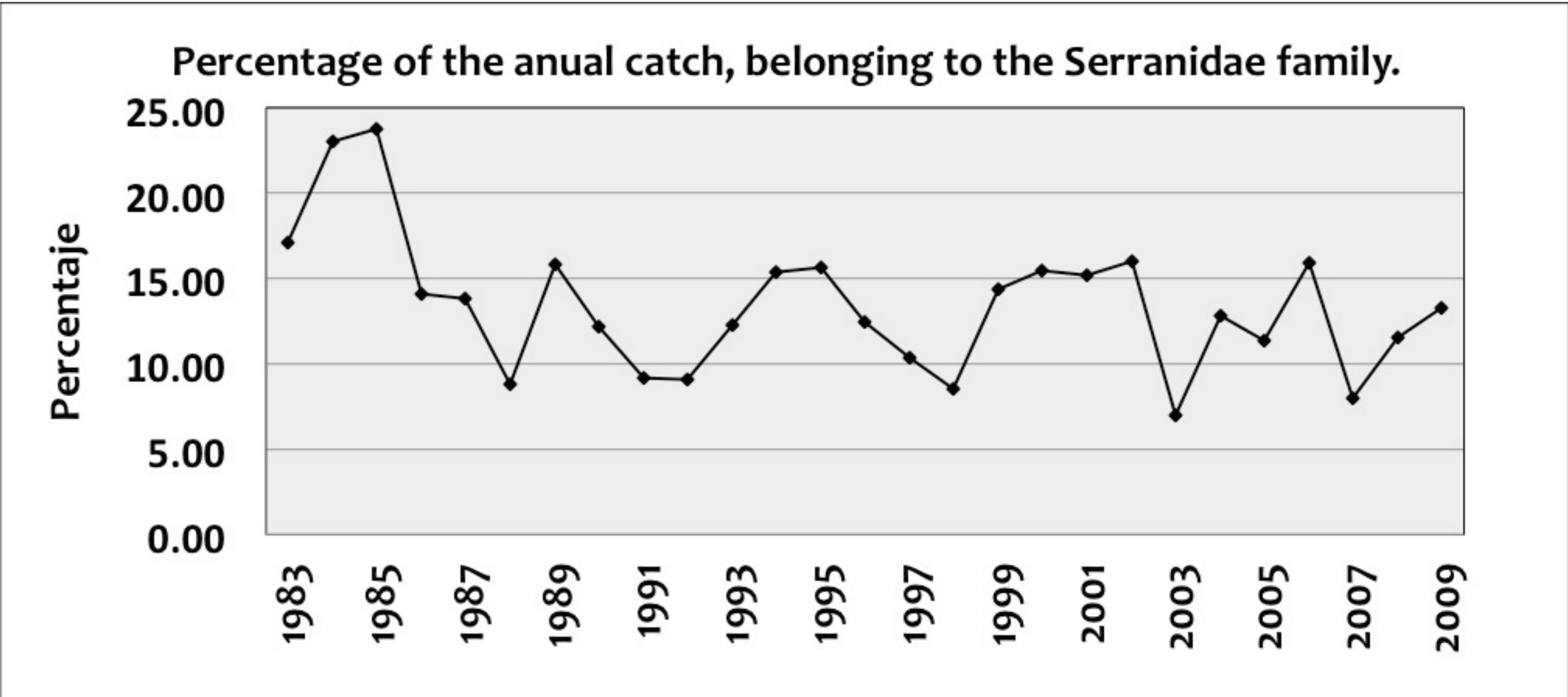


Figure 2: Percentage of the annual catch of fishes (mollusks and crustaceans excluded) belonging to Serranidae, FRL data Puerto Real.

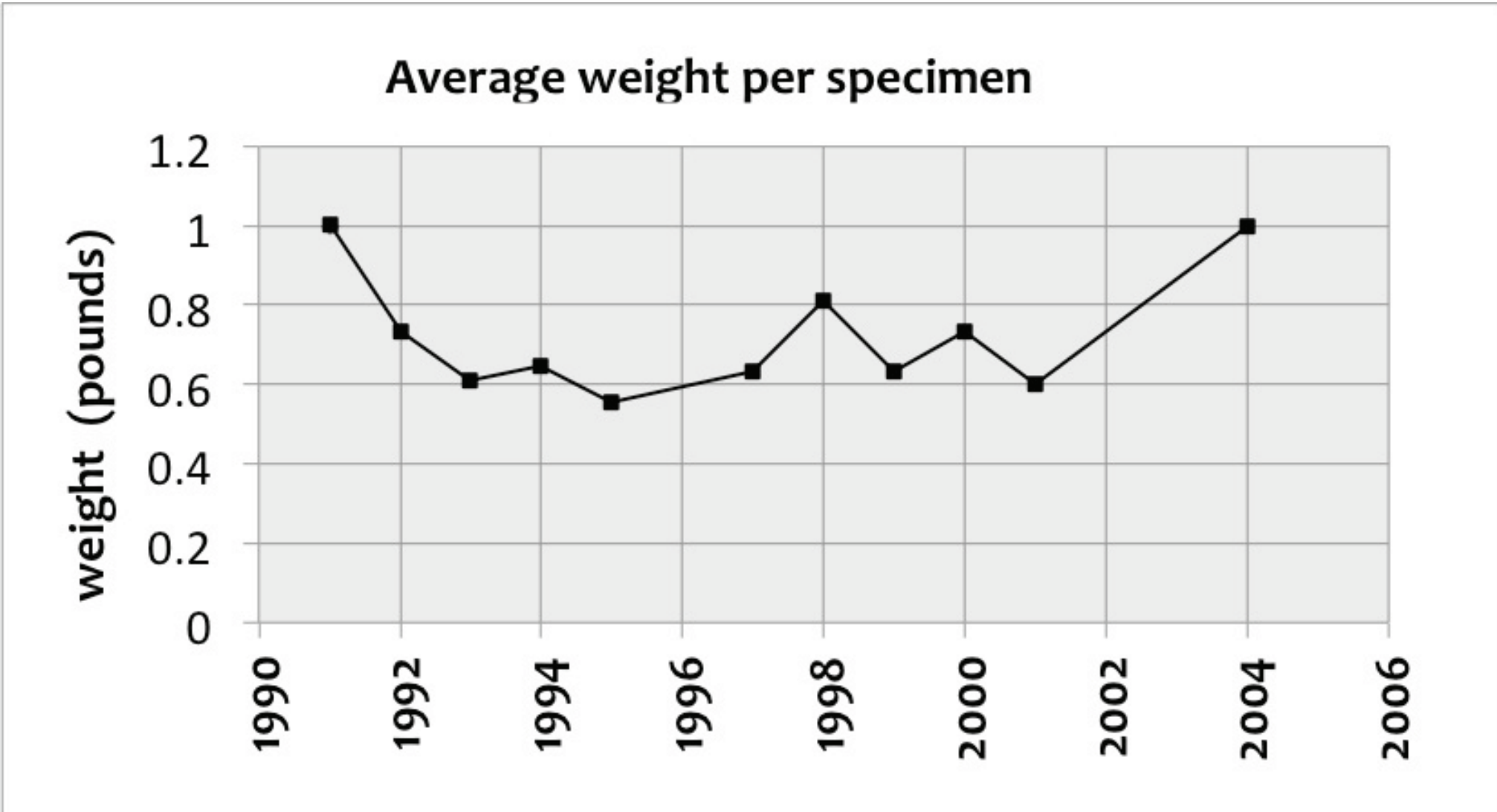


Figure 3: Average weight per specimen of Serranidae at Puerto Real fishing area, SEAMAP data

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