

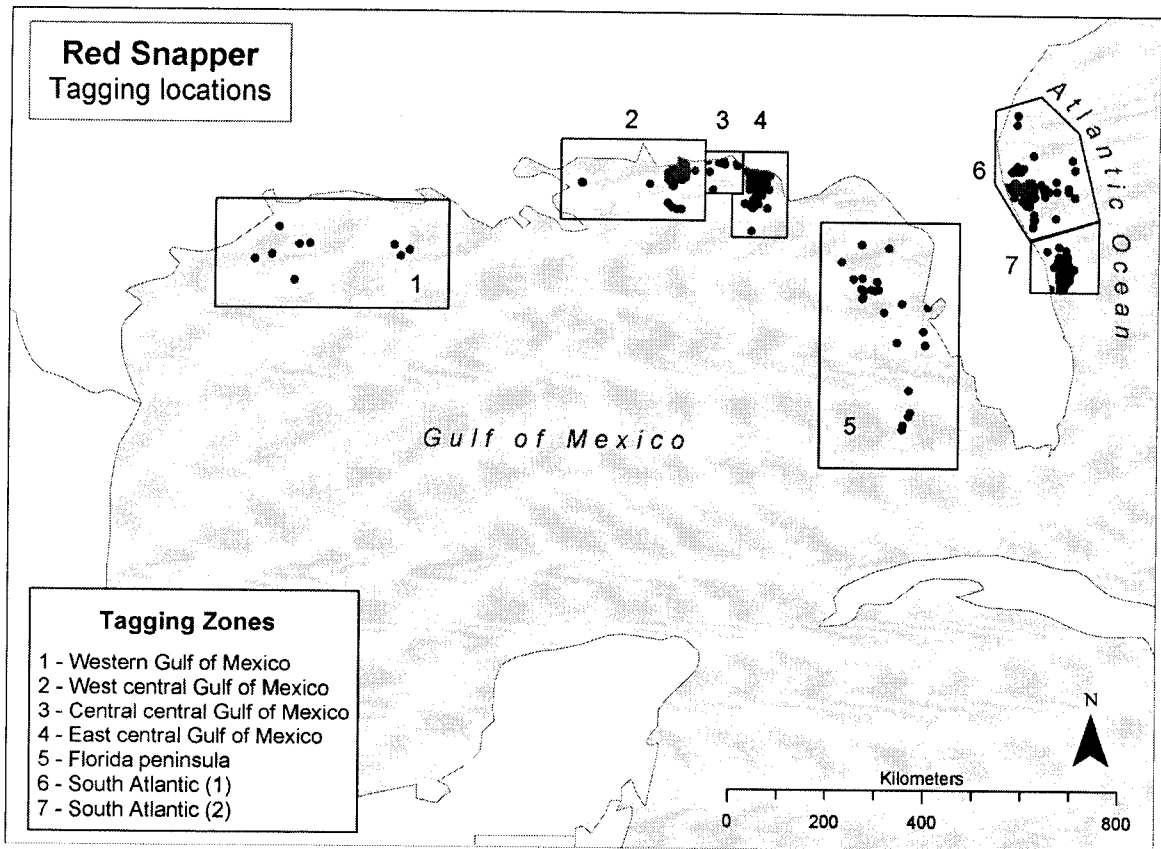
Red Snapper Movements Based on Tag Recovery Data

Preliminary results submitted by
Karen Burns, Mote Laboratory

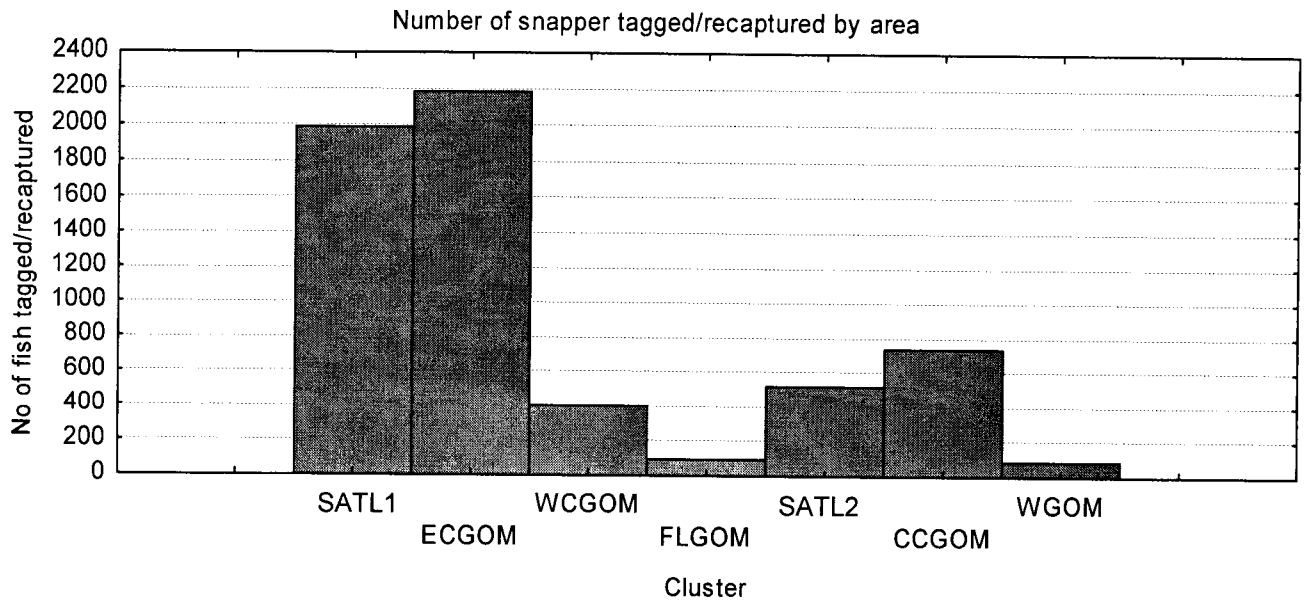
Introduction

The following information comes from GIS analyses of red snapper data collected during a Florida Sea Grant (NA76RG0120) and various MARFIN (NA87FF0421, NA97FF0349, NA17FF2010, and NA17FF2881), funded studies. Data are still being collected under the last two MARFIN funded studies.

These images are just the beginning of the analyses, which are scheduled to be conducted on the data. These images will be part of Karen Burns' doctoral dissertation as well as a manuscript, which will be sent out for publication in a scientific journal. Images and data from this contribution should be cited as Burns, K.M., B.D. Robbins, N.F. Parnell, J.G. Gannon and P.W. Simmons III. Analyzing red snapper, *Lutjanus campechanus*, / red grouper, *Epinephelus morio*, movements using GIS (in prep).



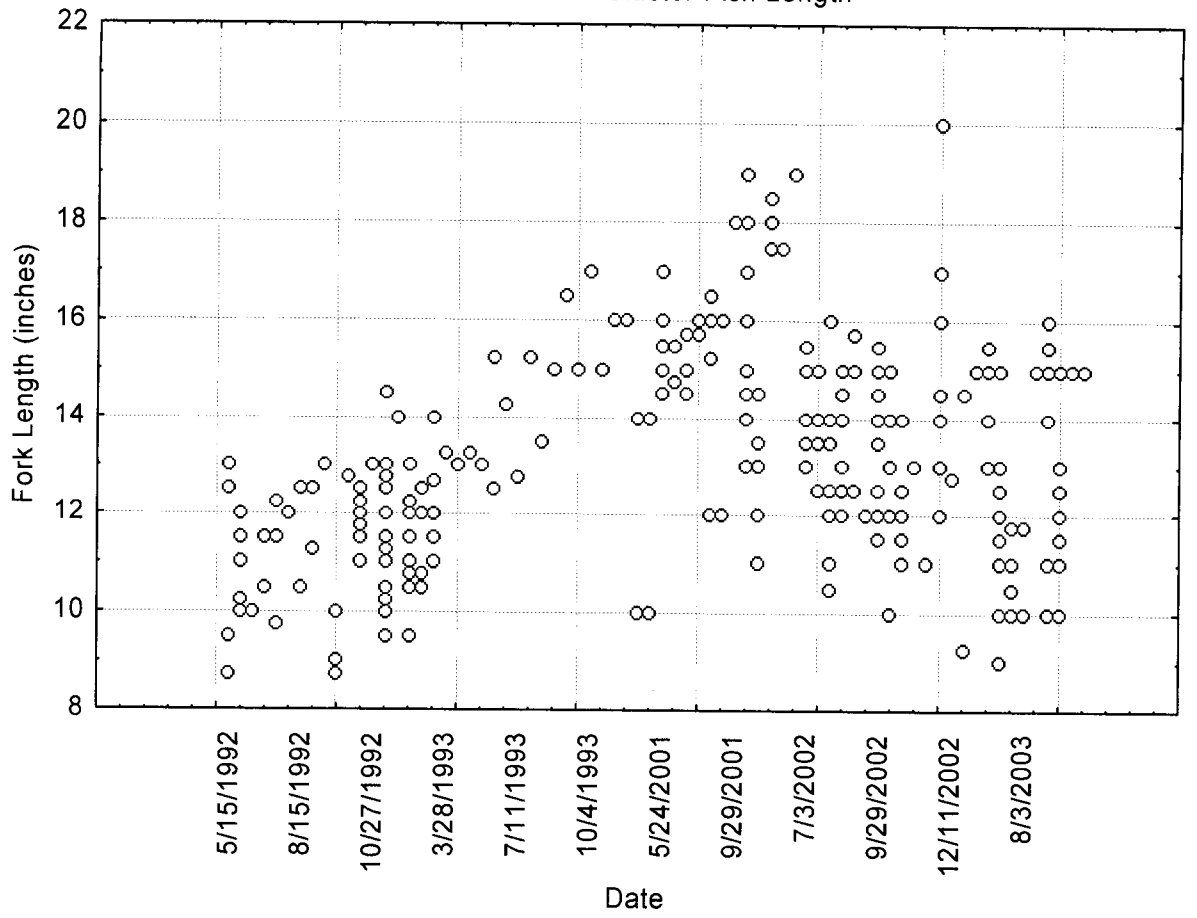
Red snapper data represents thirteen years of the tagging program. Snapper were tagged in the Gulf of Mexico and the Atlantic Ocean (off the coast of Florida and Georgia). Snapper tagging and recaptures were categorized into 7 areas, as highlighted above. Tagging and recapture are fisheries dependent; therefore distribution of tagged animals should not be taken to be synonymous with distribution of the entire red snapper population in these areas.



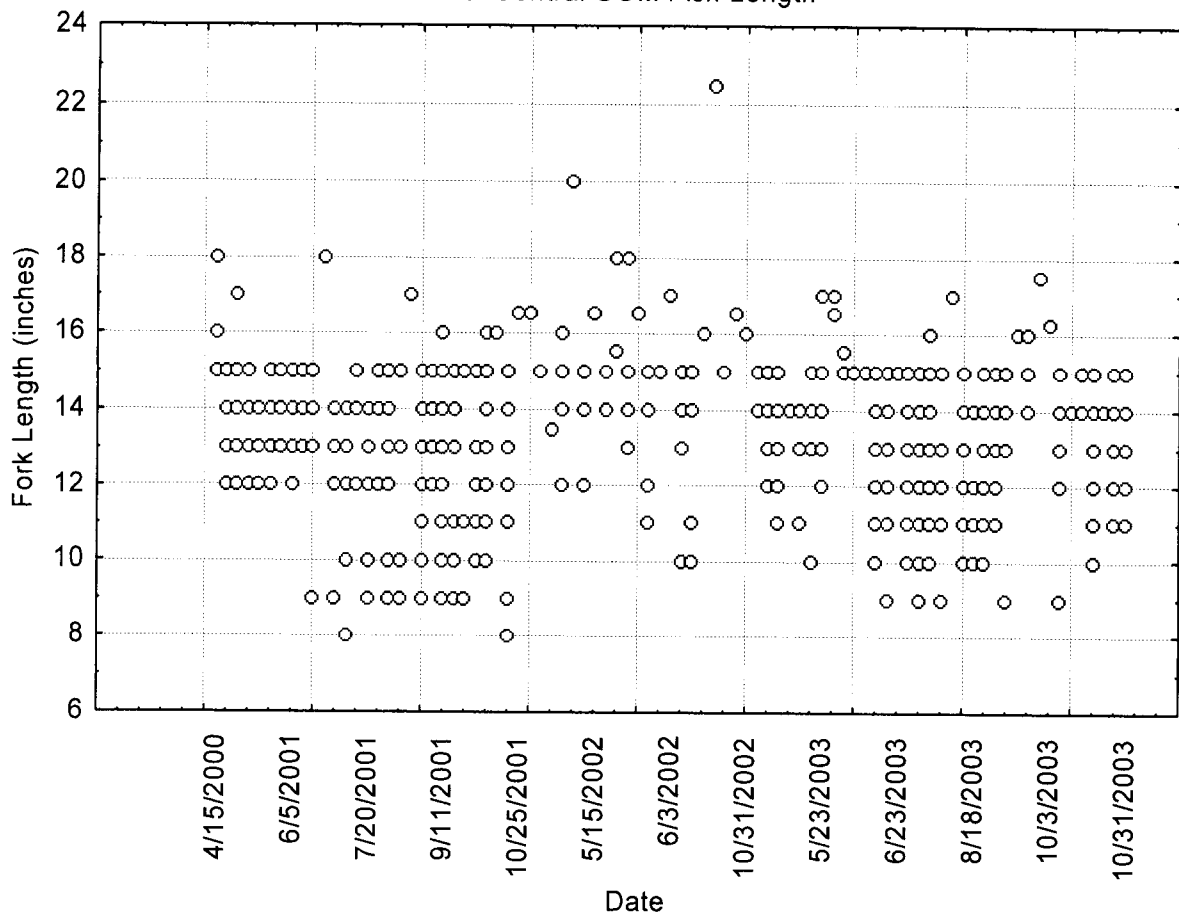
Proportion of fish tagged in each area.

- WGOM – Western Gulf of Mexico
- WCGOM – Western Central Gulf of Mexico
- CCGOM – Central Central Gulf of Mexico
- ECGOM – Eastern Central Gulf of Mexico
- SATL1 – Atlantic off the coast of Georgia and northern Florida
- SATL2 – Atlantic off the coast of central Florida

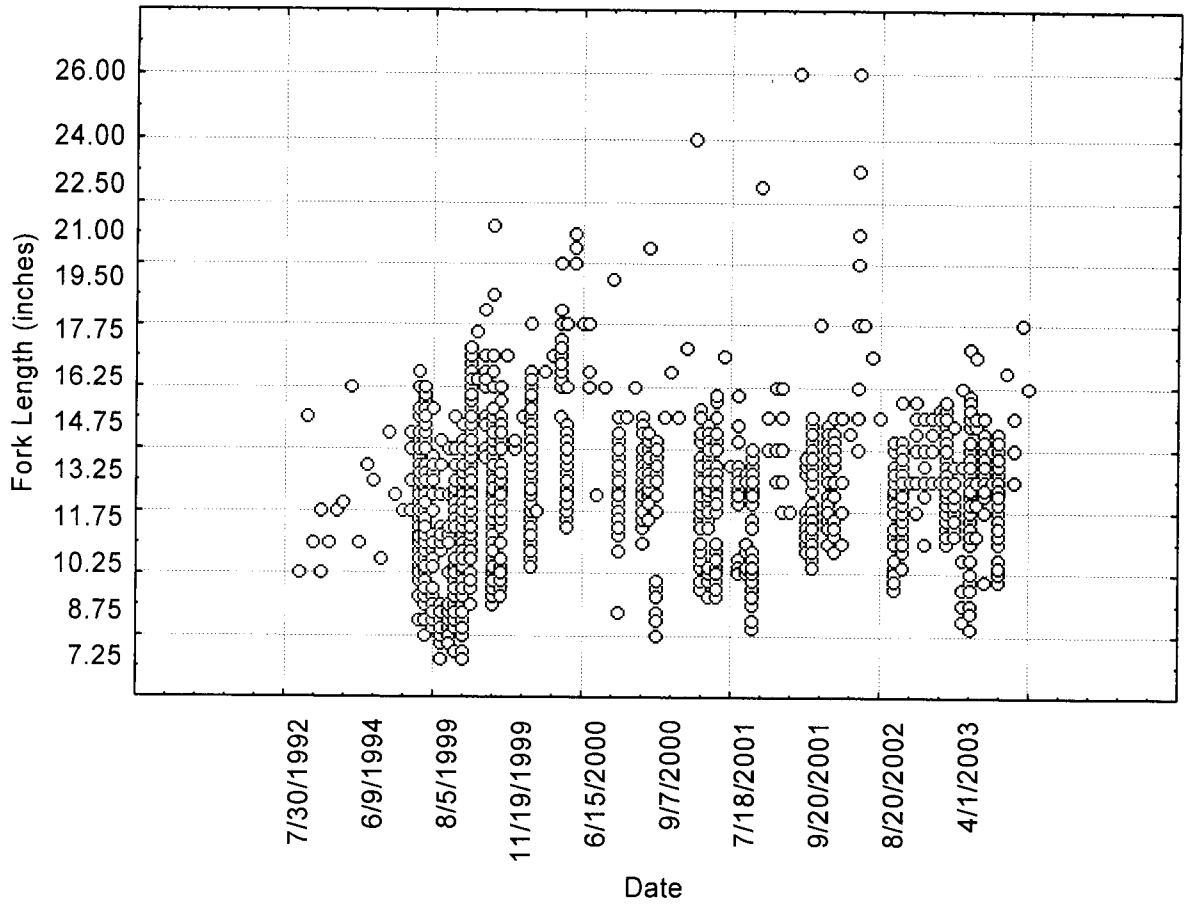
West Central GOM Cluster Fish Length



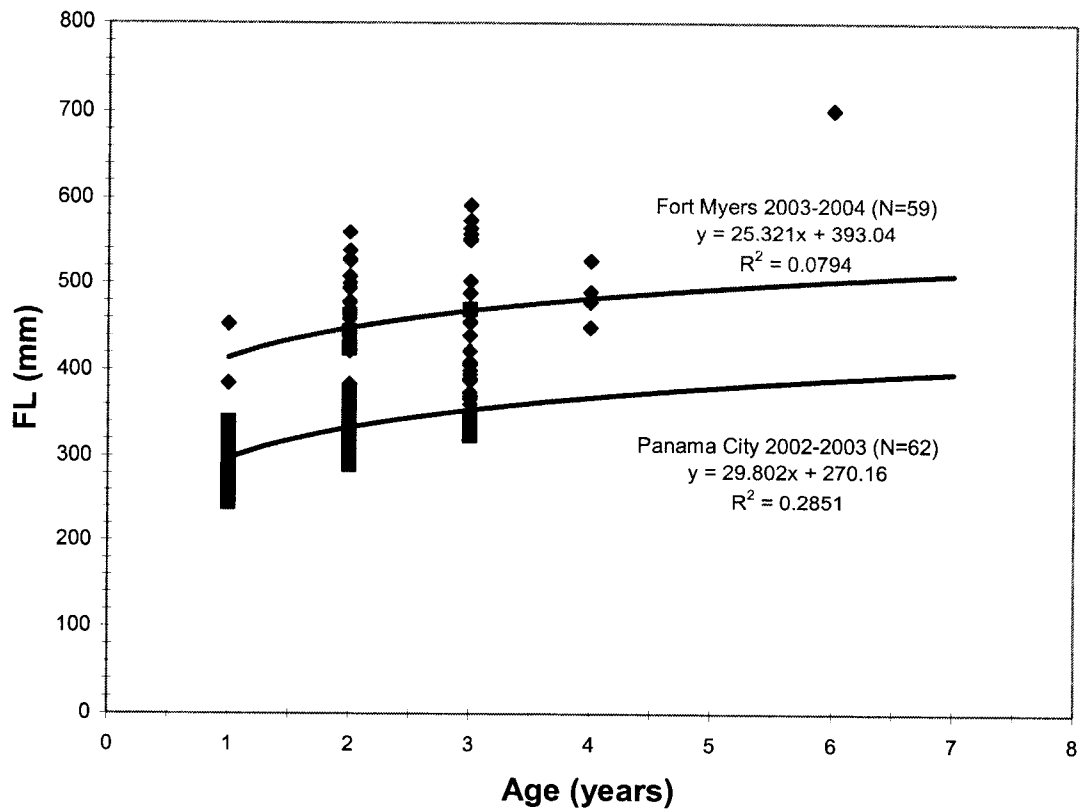
Central Central GOM Fish Length



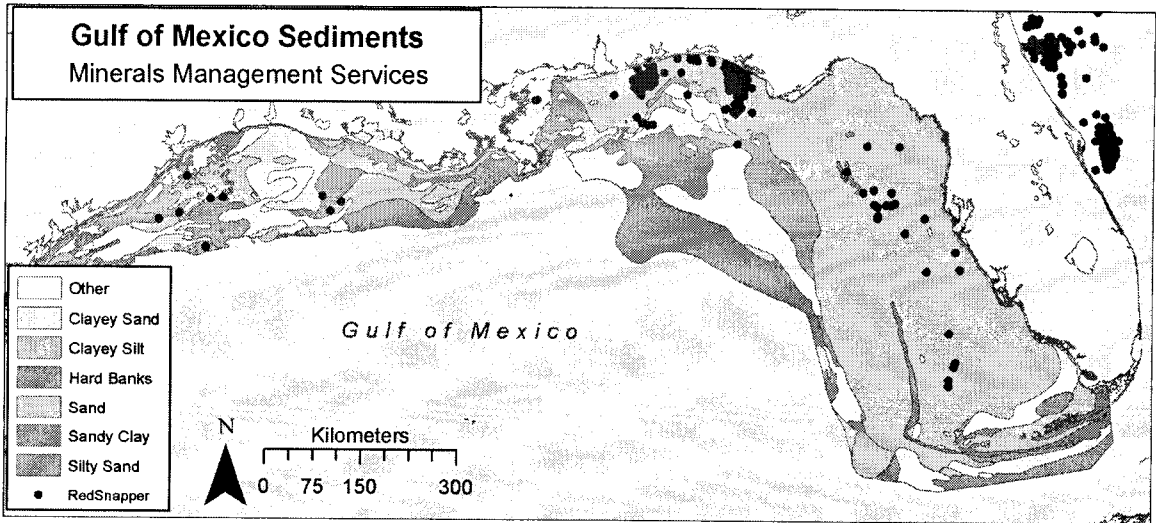
Eastern Central GOM Fish Length



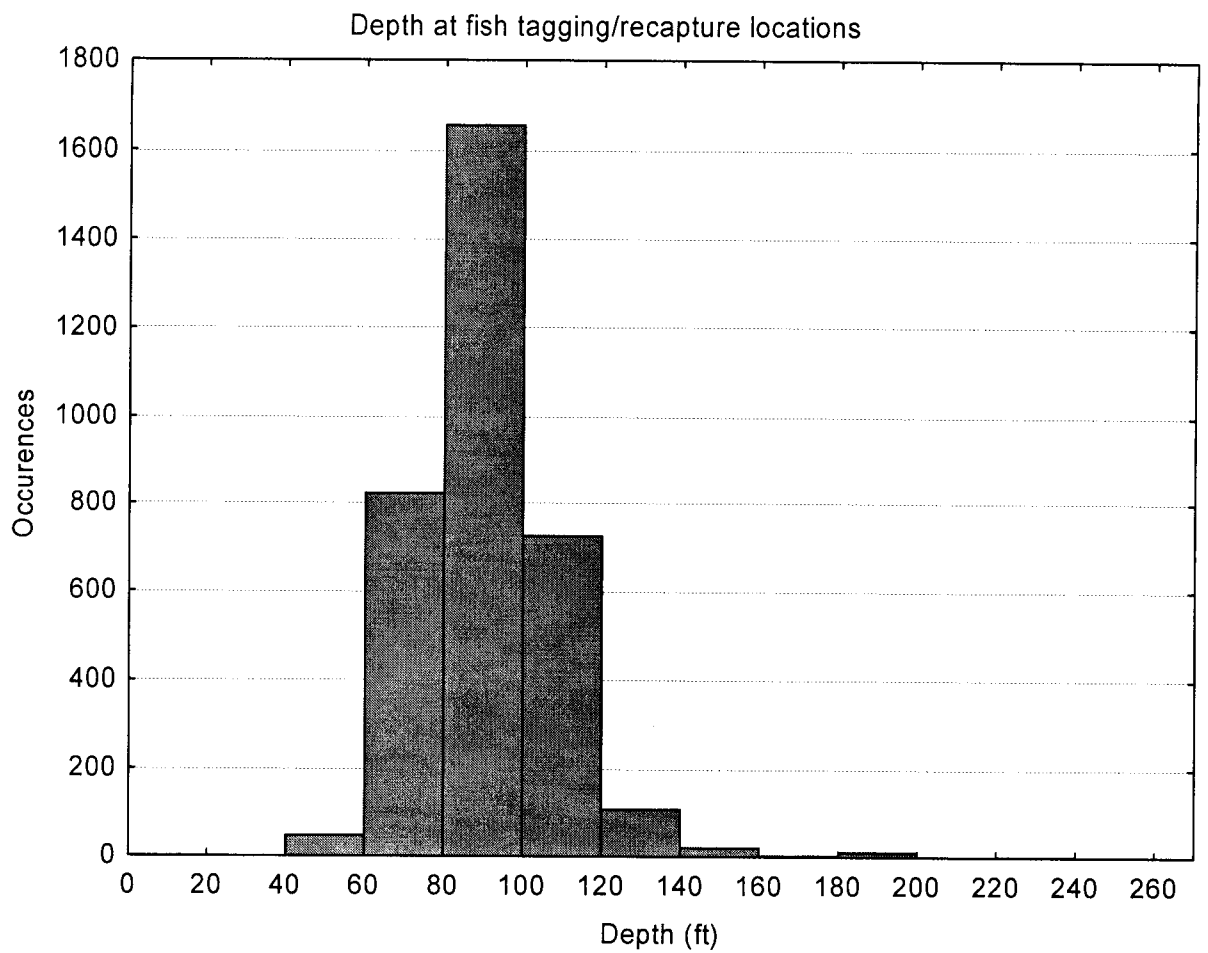
Red Snapper Length vs. Age



Age at length for red snapper from two locations: Fort Myers and Panama City, FL. Fish ages were determined from otolith analysis. Data are preliminary as can be seen from the small sample size. Data collection will continue over the next year and a half.

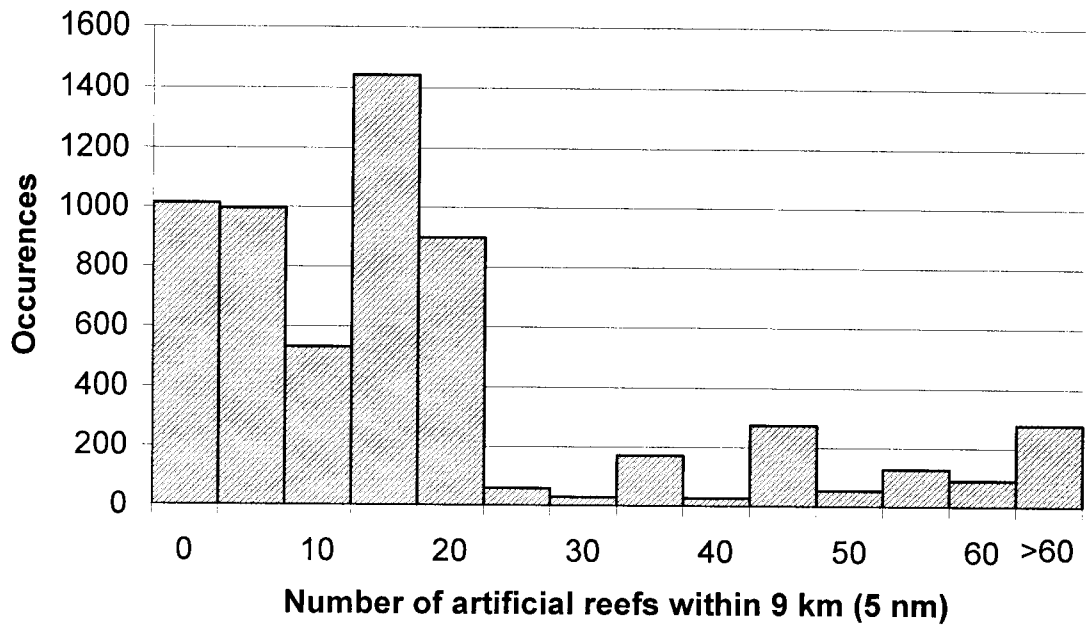


Sediments in the Gulf of Mexico. Red snapper were tagged and recaptured primarily over sandy sediments. However, artificial reefs, platforms, and other structures are commonly found within this area of sandy sediments. Sediment type is based on the best available data for bottom type and should not necessarily be taken as an indication of snapper preference.

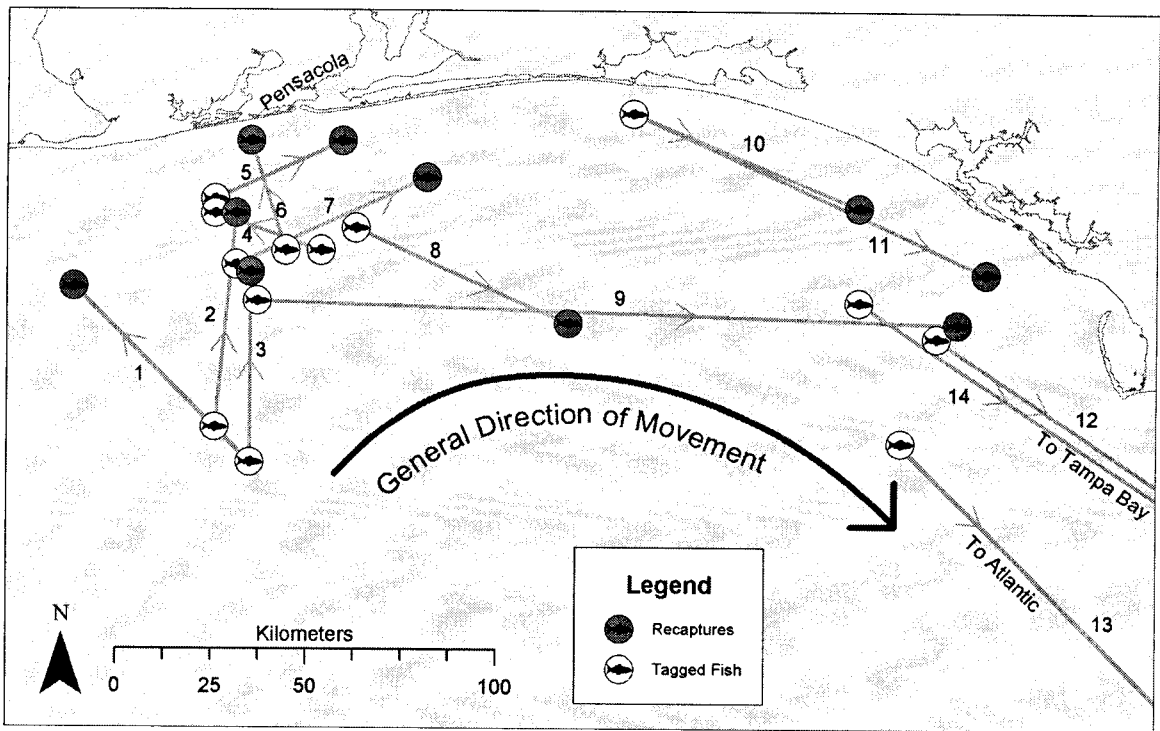


Depth reflects fishing effort and should not be taken as an indication of depth preference for snapper.

Proximity of fish to artificial reefs



The majority of fish were captured in the vicinity of some sort of structure, artificial reefs being the most common.



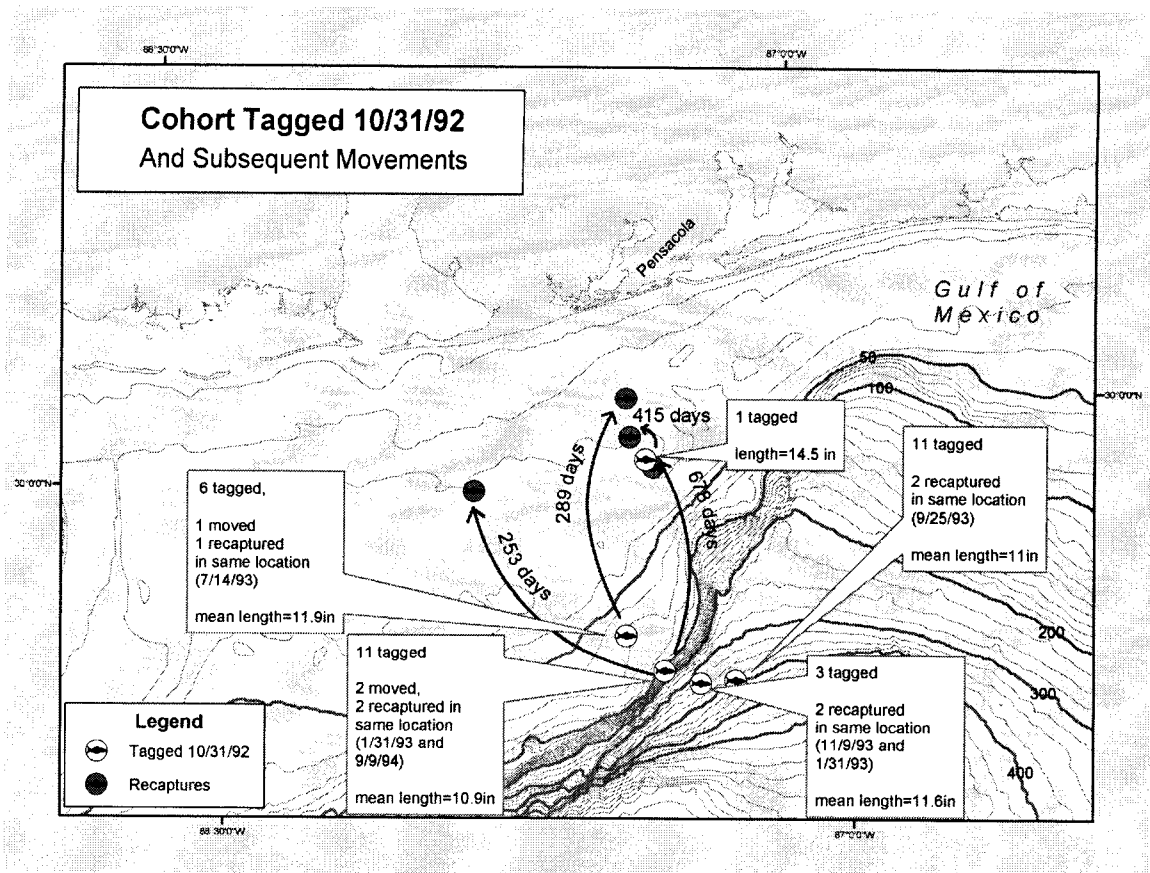
Direction of movement. We included only movements greater than 20 km, as smaller movements are affected more profoundly by the limits of sampling precision (figure 1). Those fish observed moving longer distances in the Gulf of Mexico generally exhibited an eastward trend. In order to test the effects of sampling timelines, we examined the dates sampled for each of the clusters in the central Gulf (figure 2). Sampling timelines did not seem to account for the eastward trend.

Figure 1
Distance traveled by fish and size change

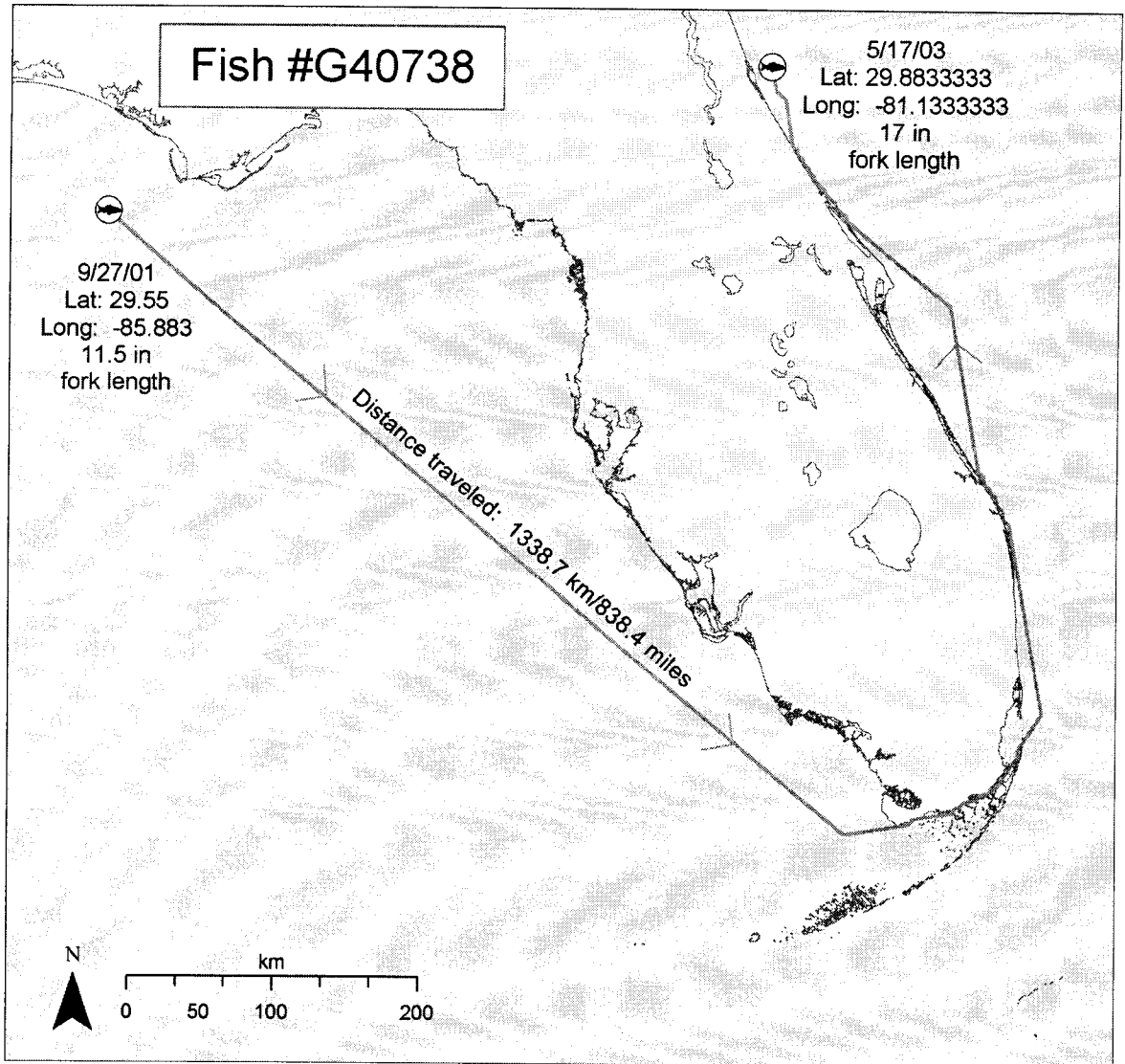
Fish	Distance (km)	Fork length at tagging (in)	Fork length at recapture (in)
1	61	10	12.5
2	55.24	12.5	15
3	49.5	11.5	16
4	25.7	13	13
5	32.4	12	13
6	28.6	10.5	13
7	48.5	12.5	12.5
8	53.8	12	NA
9	159.3	11.75	12.25
10	56.5	15	NA
11	89.7	14	17
12	382.4	12.75	NA
13	251.9	11.5	17
14	1338.6	14.25	NA

Figure 2
Sampling days off Florida panhandle

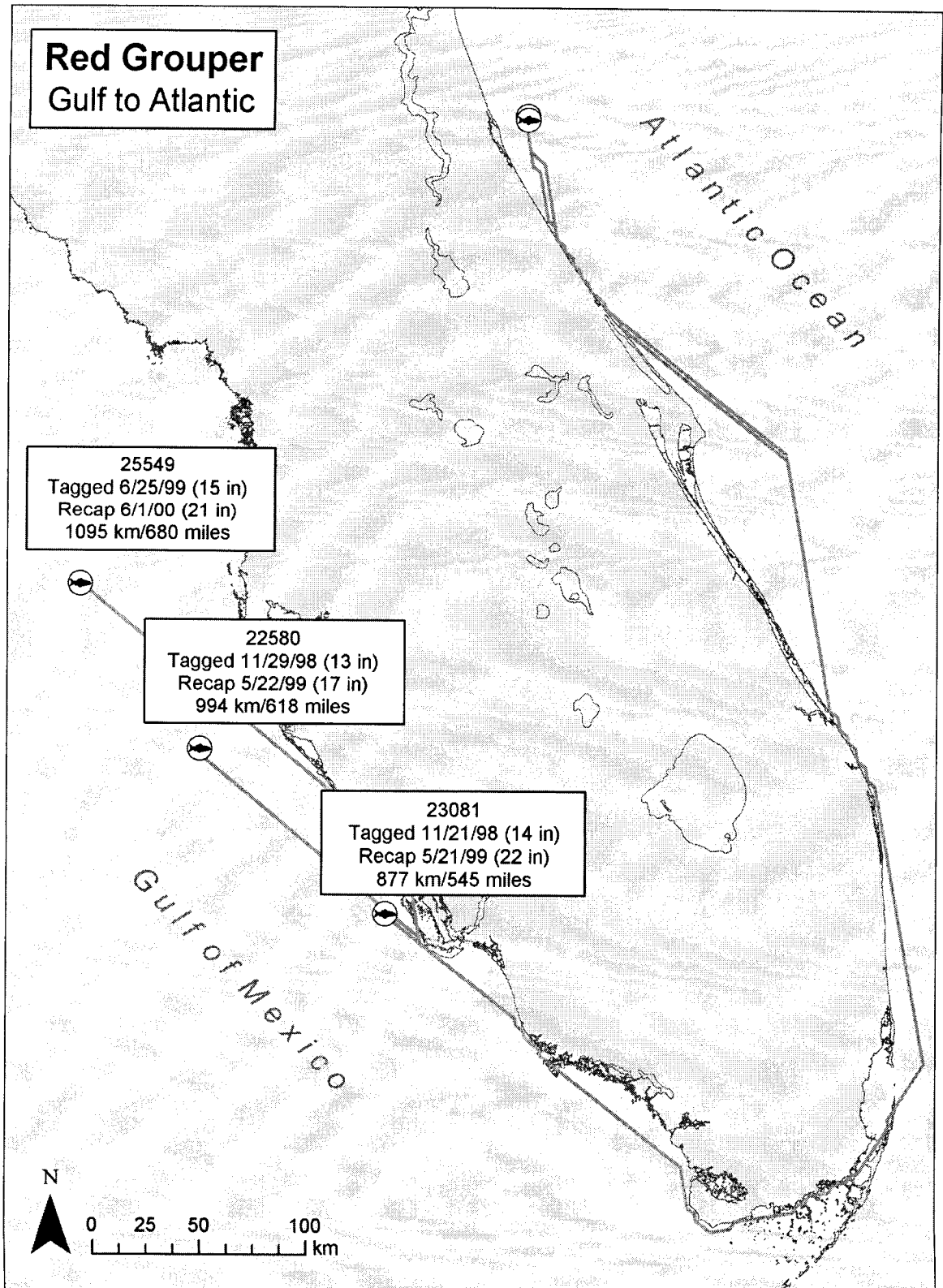
	West Central	Central Central	East Central
1992	78		2
1993	60		6
1994	1		7
1997			1
1999			17
2000		2	19
2001	49	30	25
2002	124	18	13
2003	87	35	9



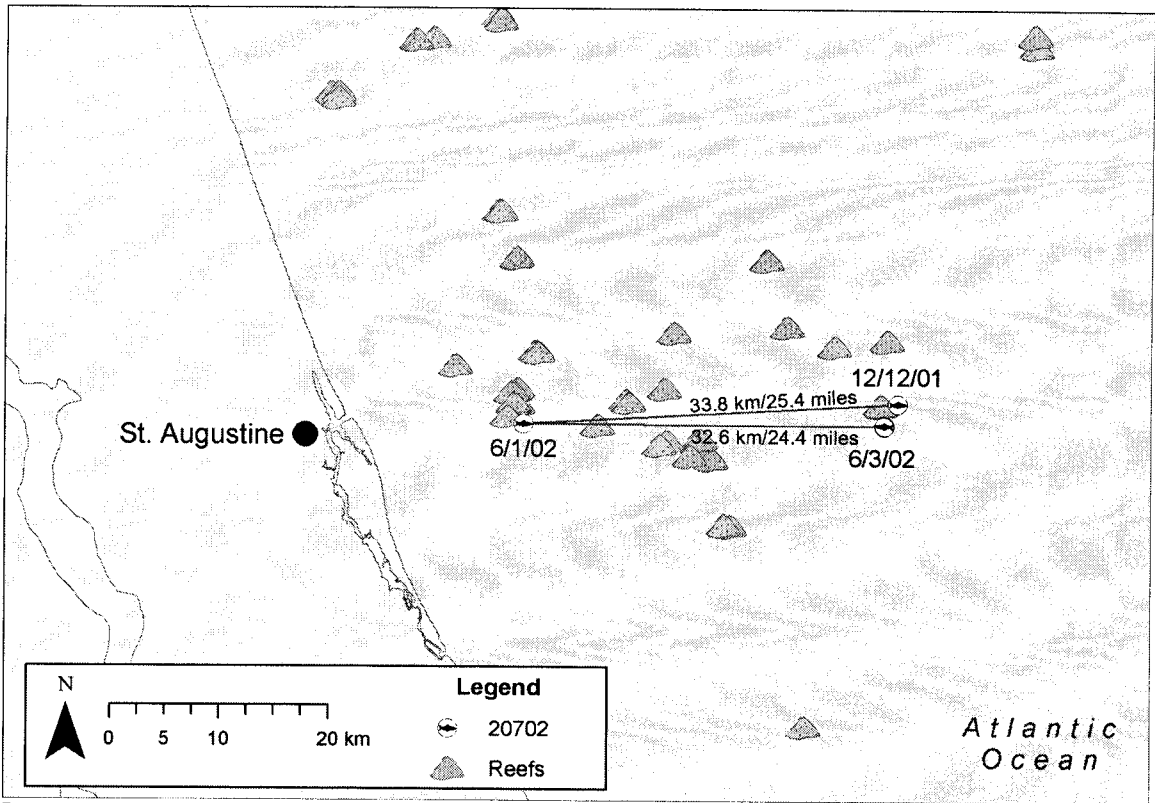
Tracking groups of fish: This group was tagged on 10/31/92 on the shelf break off Pensacola, FL. These fish were relatively small (~11"-12" fork length). Many of those recaptured moved onto the shelf.



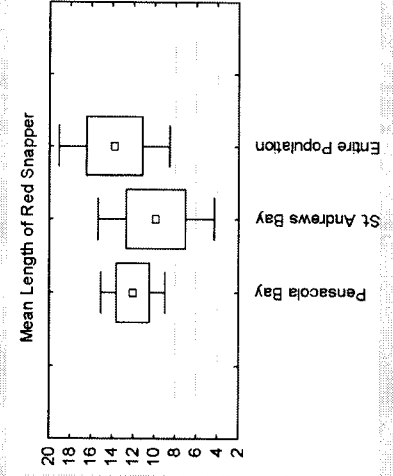
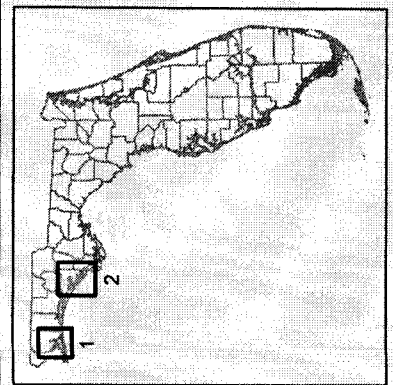
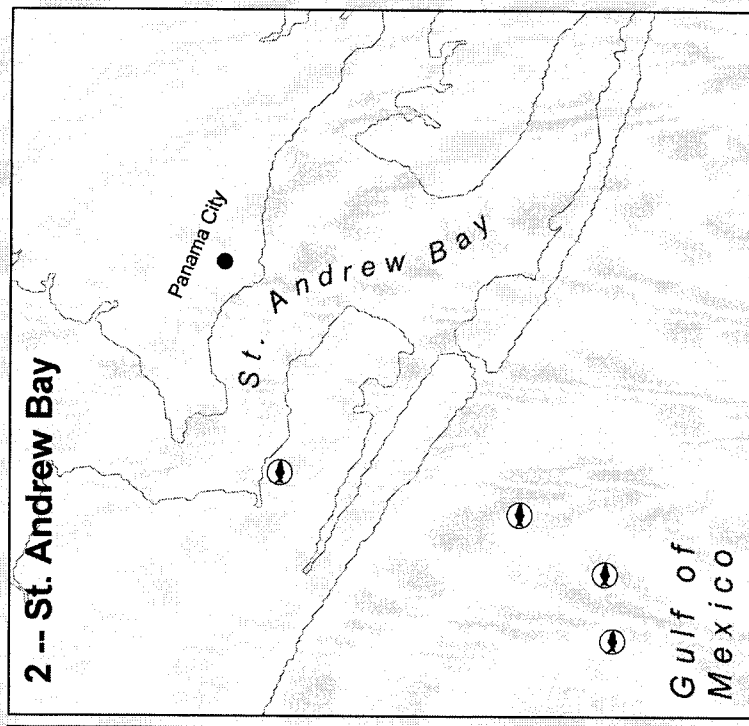
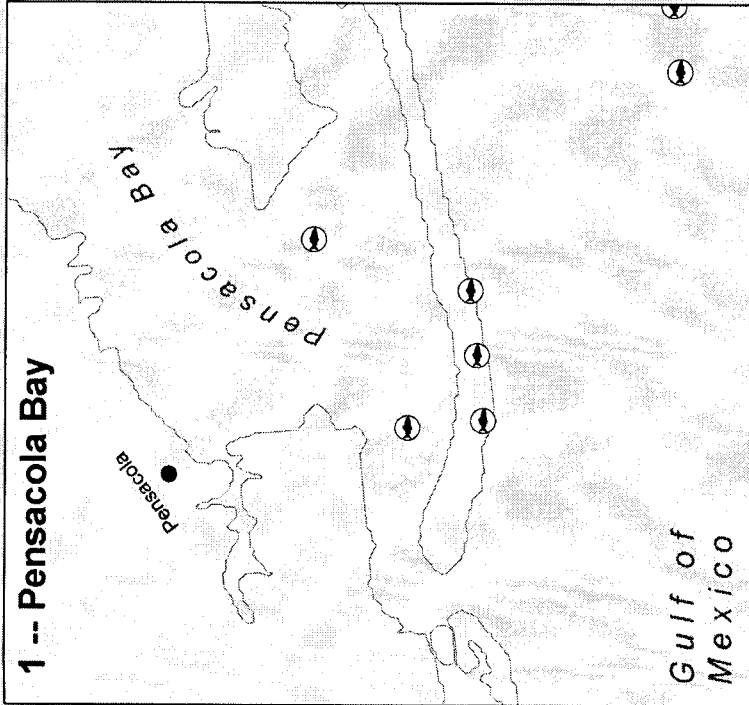
A least cost path was constructed for fish G40738, which was tagged in the Gulf of Mexico near Panama City, FL on 9/27/01 and recaptured off the coast of St. Augustine, FL in the Atlantic on 5/17/03. The path was constructed using a conic equidistant projection. G40738 traveled a minimum of 1338.7 km (838.4 miles) between these two locations.



Red grouper (*Epinephelus morio*) were also documented migrating from the Gulf of Mexico to the Atlantic.



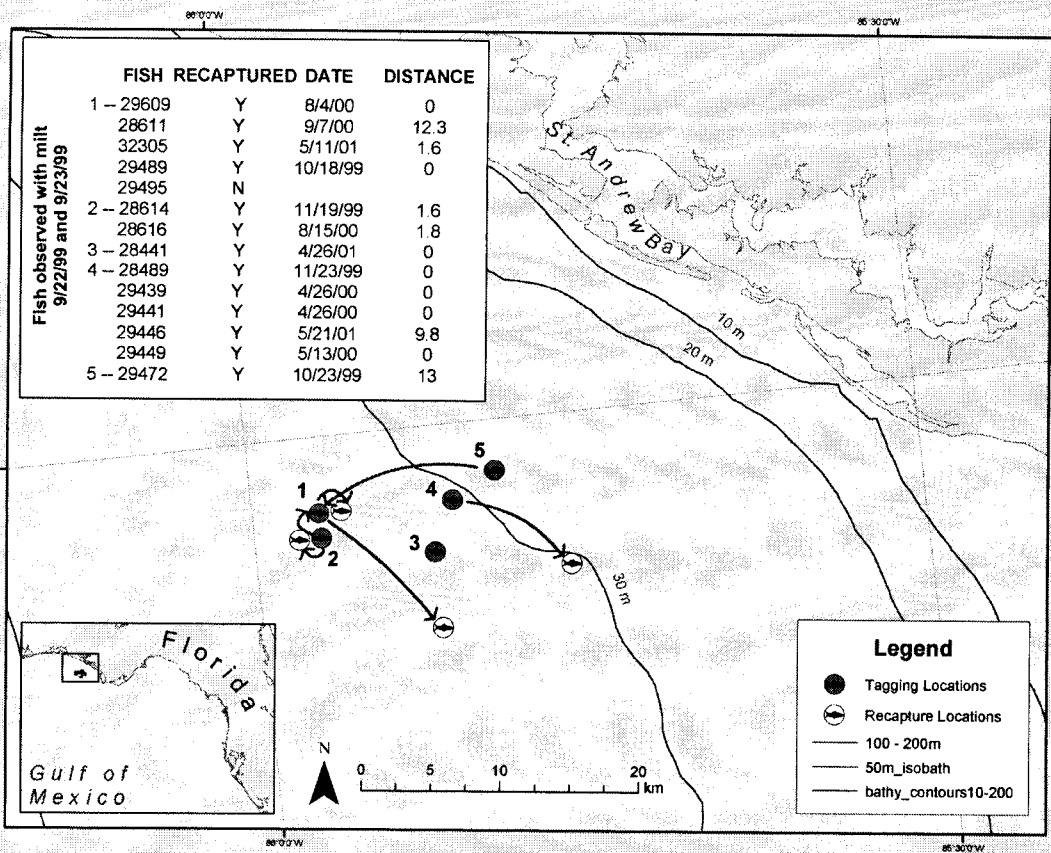
Track of fish 20702. Six months after initial tagging (in artificial reef area) 20702 was recaptured near an artificial reef area ~32 km away. 20702 was recaptured a second time, having returned to the artificial reef it was tagged at. Distance was calculated in a conic equidistant projection.



Red Snapper in Estuaries -- The size of red snapper in two Gulf estuaries appeared to be smaller than the general population.

Fish may appear to be on land due to the precision at which data was collected.

Pensacola Bay (n=35) - mean = 12.0 in, s.d. = 1.6
 St. Andrew's Bay (n=8) - mean = 9.8 in, s.d. = 2.8
 All others (n=5994) - mean = 13.8 in, s.d. = 2.9



Red snapper observed with milt during tagging on 9/22/99 and 9/23/99. All red snapper observed were "running ripe" on those days. (See below) All but one were recaptured, the majority in the same locations (within the limitations of our precision) where they were tagged.

