

NOAA Gray's Reef National Marine Sanctuary Acoustic Fish Tagging Project

Activity: Interpretation of Data and Graphs – Grades 9-12

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Teachers copy

Use the available graphs or online sources to answer the following questions. The table and graphs are real data collected by scientists at Gray's Reef National Marine Sanctuary.

More information on the particular acoustic tagging project at Gray's Reef can be found at the Gray's Reef Website:

(http://graysreef.noaa.gov/science/research/fish_tagging/welcome.html) and NOAA's FishWatch website (<http://www.nmfs.noaa.gov/fishwatch/>).

** Please note that scamp grouper cannot be found on Wikipedia. General fish information for scamp can be found at http://scaquarium.org/SSI/PDFS/fact_sheets/scamp.pdf or at the South Atlantic Fisheries Management Council (SAFMC) at <http://www.safmc.net/>. Both sites can be found through Google search engine.

1. What are the scientific names of red snapper, gag grouper, and scamp grouper?

Red snapper—*Lutjanus campechanus*
Gag grouper—*Mycteroperca microlepis*
Scamp grouper—*Mycteroperca phenax*

** Remember to inform students that proper scientific names are *italicized* when typed and underlined when hand written. Also, the genus is capitalized but the species is not.

2. What families do red snapper, gag grouper, and scamp belong to?

Red snapper are family Lutjanidae, while gag and scamp are family Serranidae

3. What are the current fishing regulations for these fish according to the Southeastern Atlantic Fisheries Management Council (SAFMC)?

Gag— 24" TL size limit.

Must be landed with heads and fins intact.

Included in the 5 grouper per person bag limit, although no more than 2 fish may be gag or black grouper, individually or combined.

Scamp— 20" TL size limit.

Included in 10 snapper per person limit

Red snapper— 20" TL size limit.

Included in the 10 snapper per person retention limit, with a maximum of 2 red snapper per person.

Must be landed with heads and fins intact.

4. Scamp and gag are considered to be protogynous hermaphrodites. What does this mean?

Protogynous hermaphrodites are animals that are born female and can become male at a particular age or size. This transition only occurs when the population is in need of males and scientists are just beginning to understand the triggers that may cause it.

5. Fishermen have the goal to capture the largest fish they can. Since gag and scamp are protogynous hermaphrodites, what problem has overfishing caused?

Gag and scamp can only become males at a certain size (gag) or age (scamp). Since fishermen want the largest and usually oldest fish, this removes a lot of the males from the population. With a reduced number of males, the ability for these fish to reproduce is limited.

6. The size of the fish caught and tagged by Gray's Reef NMS has been recorded in the table below. Can "Rare Treat" the gag (49895) be a male? Remember that 1 in (also written as 1") equals 2.54 cm.

The gag is definitely a female. Gag grouper do not start to transform into males until they are about 90 cm (35 in) in length. The gag tagged by GRNMS is only 63 cm (25 in).

7. Gag grouper usually move offshore to spawn. "Rare Treat" the gag (49895) tagged by Gray's Reef has not moved from the same ledge for a

full year. What is your hypothesis as to why the gag did not leave? When do you think it will leave?

It is not large enough to spawn yet. The gag grouper tagged by Gray's Reef is only 63 cm. At this size, only half of the gag grouper are able to spawn. Over the next year, the gag should develop reproductively and be able to spawn next year.

8. The unnamed scamp (49903), which is not a yearlong resident, has not been detected by any receivers since October. Provide three reasons as to why the scamp is no longer detected. Remember that the receivers can only determine if the tagged fish is absent or present.
 - i) The scamp has moved out of the area.
 - ii) The scamp has been eaten by something else that moved out of the area.
 - iii) The scamp was captured by a fisherman.
 - iv) The tag fell out of the scamp and is lying on the bottom, outside of the detection range.
 - v) The tag has malfunctioned and no longer works.

9. "Sergio Snapper" the red snapper (49899) moved around to different receiver areas. What do you think would persuade the fish to do this?
 - i) Food became scarce in one area so they moved to find more.
 - ii) Competition for habitat increased.
 - iii) It was spawning season.
 - iv) Predators were more prevalent at other sites.

10. "Rare Treat" the gag (49895) can be detected 720 times per day. On the day with the most detections what was its % detection and on the day with least detections (not including zero) what was its % detection.
 11. The most number of detections in one day was 583 with an 81% detection rate and the lowest amount of detections was 1 with a 0.138% detection rate. The small red peak in early May of 2008 may be hard for students to see. The next lowest amount of detections was 14 with a 1.94% detection rate. My calculations were done using the numerical data used to make the graph. Students' answers will be a rough estimate of the real data.

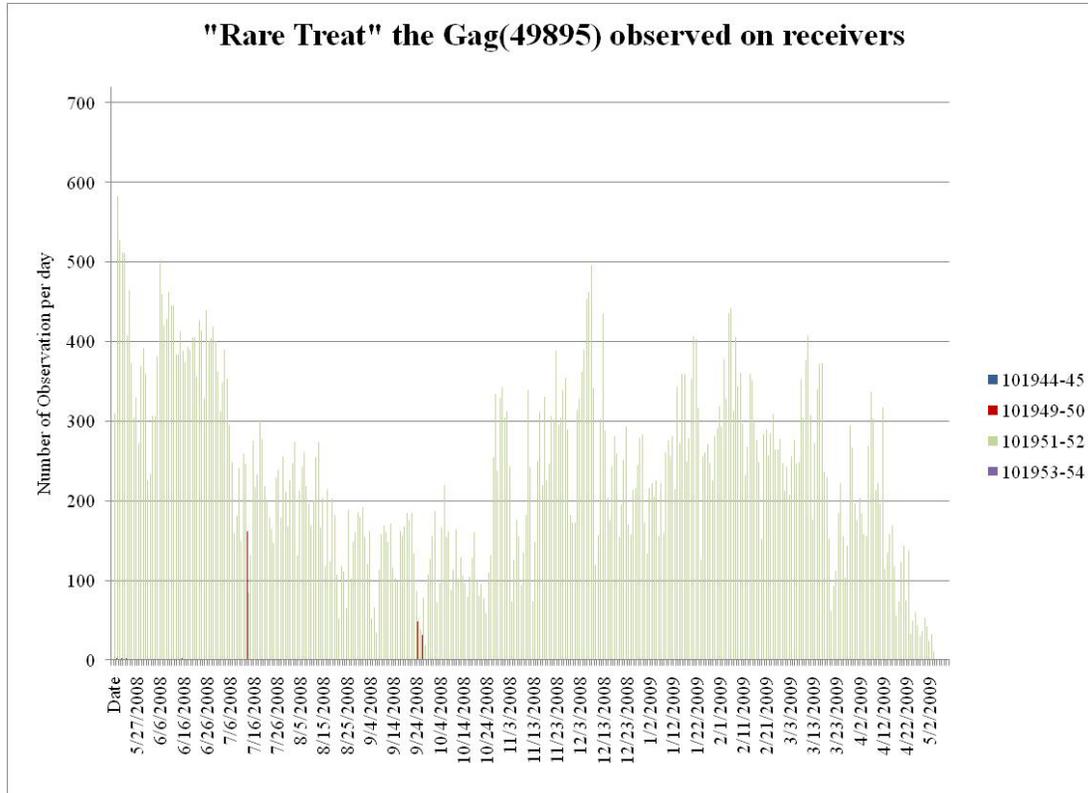
12. How long did "Sergio Snapper" the red snapper (49899) stay in the detection area? Do you think "Sergio Snapper" the red snapper (49899) would benefit from a protected area around receiver 101953-54?

"Sergio Snapper" the red snapper (49899) was present 7 to 8 months. A protected area could be beneficial to the red snapper, but only for the 7 to 8 months it is present in the area. When it leaves, there is no benefit. More information about where it goes and when it goes would be needed to make this assumption.

13. Which fish stayed at receiver 101951-52 the longest? Which stayed at receiver 101944-45 the shortest?

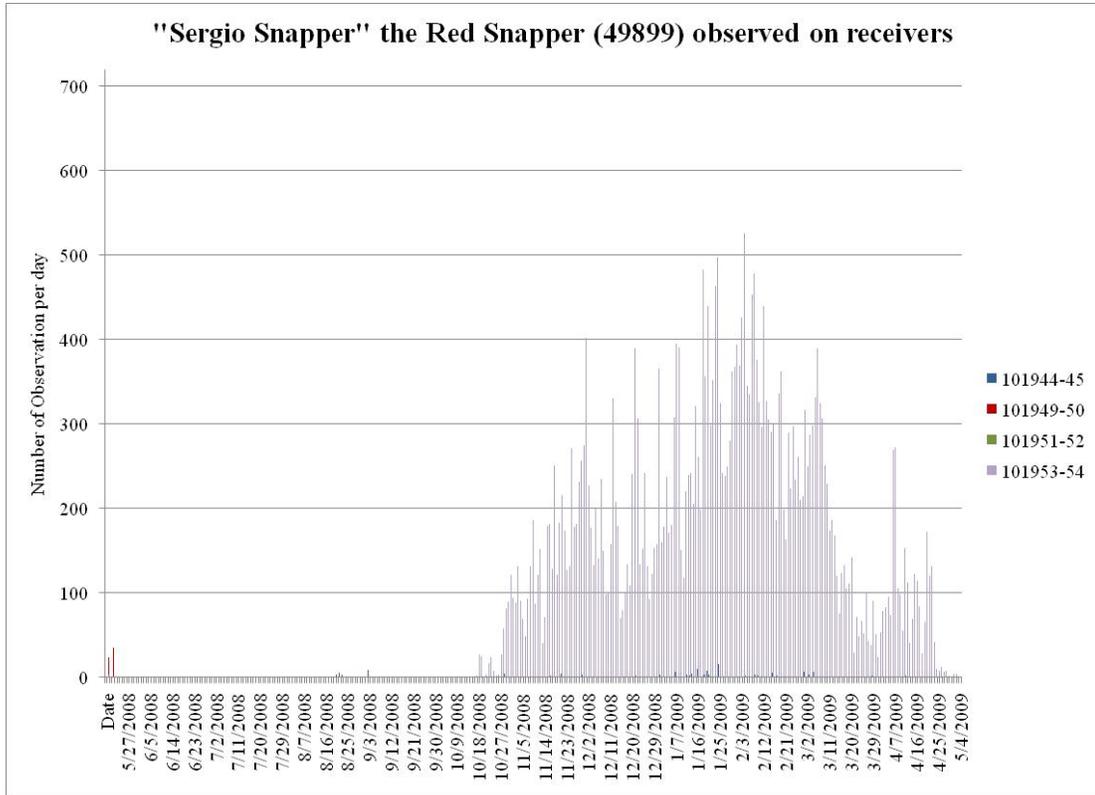
"Rare Treat" the gag (49895) stayed at receiver 101951-52 the longest. "Sergio Snapper" the red snapper (49899) stayed at receiver 101944-45 the shortest amount of time.

Date Tagged	Species	Name	Forklength (cm)	Transmitter number	Date Released
5/14/2008	<i>Mycteroperca phenax</i>	Killer Grouper	58	49898	5/15/2008
5/14/2008	<i>Mycteroperca phenax</i>	--	85.5	49903	5/15/2008
5/15/2008	<i>Mycteroperca phenax</i>	--	84	49901	5/16/2008
5/17/2008	<i>Mycteroperca phenax</i>	Snappy Striper	74	49894	5/18/2008
5/17/2008	<i>Mycteroperca microlepis</i>	Rare Treat	63	49895	5/18/2008
5/17/2008	<i>Mycteroperca phenax</i>	--	75	49896	5/18/2008
5/18/2008	<i>Mycteroperca phenax</i>	--	83	49897	5/19/2008
5/18/2008	<i>Lutjanus campechanus</i>	Sergio Snapper	59	49899	5/19/2008



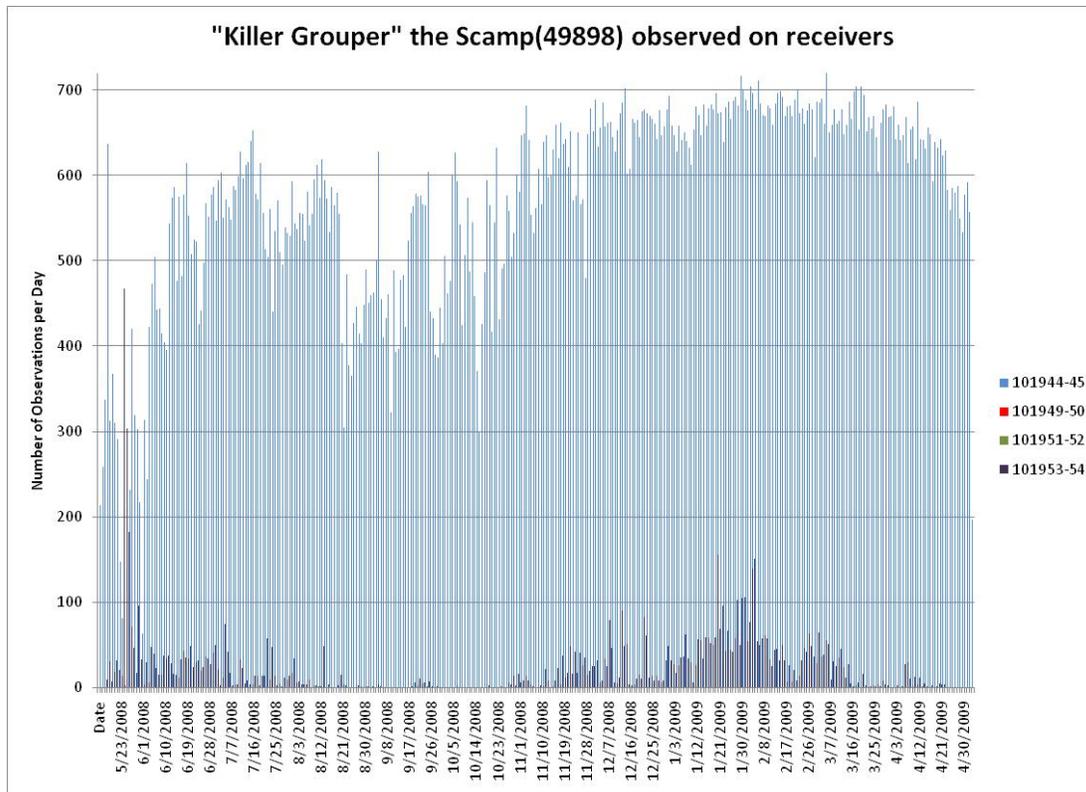
["Rare Treat" the Gag \(49895\) observed on receiver](#)

This graph represents present-absent data of a gag grouper in select areas of Gray's Reef National Marine Sanctuary. The numbers in the legend on the right side of a graph represent a receiver placed in the sanctuary. Each vertical bar is a single day of the year and it is the number of times the gag was detected around that receiver (match the colors to the numbers on the right). As you can see the gag was mostly detected on receiver number 101951-52, and was picked up a few times on receiver 101949-50.



["Sergio Snapper" the Red Snapper \(49899\) observed on receivers](#)

This graph represents present-absent data of a red snapper in select areas of Gray's Reef National Marine Sanctuary. The numbers in the legend on the right side of a graph represent a receiver placed in the sanctuary. Each vertical bar is a single day of the year and it is the number of times the red snapper was detected around that receiver (match the colors to the numbers on the right).



["Killer Grouper" the Scamp \(49898\) observed on receiver](#)

This graph represents present-absent data of a scamp in select areas of Gray's Reef National Marine Sanctuary. The numbers in the legend on the right side of a graph represent a receiver placed in the sanctuary. Each vertical bar is a single day of the year and it is the number of times the scamp was detected around that receiver (match the colors to the numbers on the right).

