

Student Resource Closing Glacier Bay

Directions: Read the information below, and then answer the questions about the numbers and types of crabs in the bay before/after closing. Briefly, write your opinion on closing the park to crab fishing. What questions for further study do you think should be researched? Be prepared to use your information in a discussion of the question of closure.

Introduction

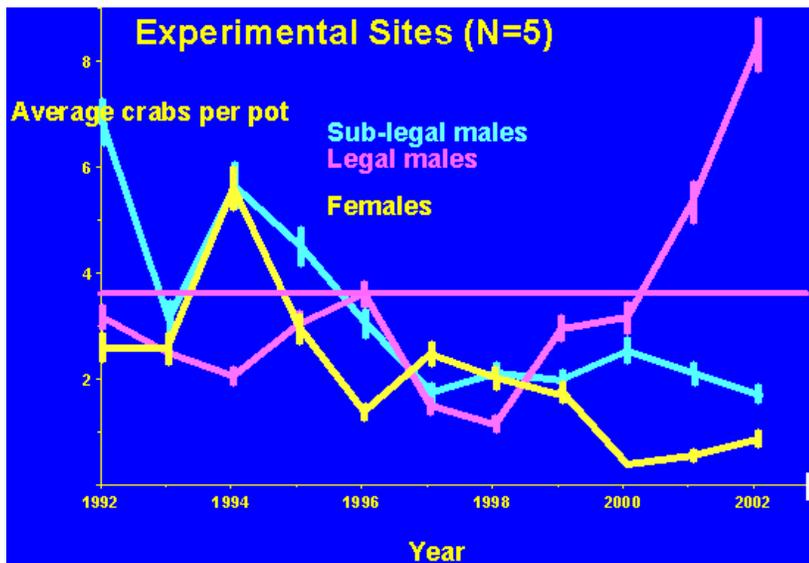
In 1988, after 7 years of debate, Congress closed commercial fishing in Glacier Bay, creating one of North America's largest marine reserves.

In 1992 scientists began a study to document changes in the population of Dungeness crabs. Study sites were selected inside and outside Glacier Bay. The study continued for 11 years, 7 years before the park was closed and 4 years after the park was closed.

Studies carried out before the park was closed to commercial fishing of Dungeness crabs provided baseline data against which to compare the results of the studies that followed the closing in 1999.



Discussion



More and more scientific studies suggest that a marine reserve with a "no-take policy" could improve the long-term biodiversity of those reserves.

Look at the graph. It was created by researchers in Glacier Bay showing the average number and size of crabs found in 5 experimental sites observed between 1992 (before closing the Bay) and 2002 (Glacier Bay closed in 1999.) Based on the graph, answer the questions below. Do you agree that the trends shown in the graph are caused by the fishing ban? Explain.

- What does the pink line represent?
- What does the yellow line represent?
- What does the light blue line represent?
- After the closure of Glacier Bay to commercial fishing in 1999, what happened to the number and size of legal-sized male Dungeness crabs? Female Dungeness crabs? Sub-legal Dungeness crabs?
- During the 7 years before closing the bay to commercial fishing for Dungeness crabs, what kind of crab was the most abundant: sub-legal males, females, legal males?
- How did this change after the closure in 1999?
- Which one of the 3 categories of crabs demonstrated the most dramatic change?
- How can you explain what happened to the sub-legal males to decrease their numbers after closing? What about females?

Closing Glacier Bay to commercial Dungeness crab fishing might also result in two other outcomes.

1. As large males increase in number, the fertility of large females also increases.
2. If reserves protect adult animals they will grow to a larger size. Large males have higher reproductive success than small males. Therefore, biodiversity in the population of Dungeness crabs will improve because there will be more large males in that population.

How do you think closing Glacier Bay could impact the environment of the entire biosphere? Explain. Will it be a positive impact or a negative impact?

What about the impact on the marine environment beyond the bays' borders? Might there be a positive or negative impact? Explain.

On the basis of your reading, make a case for continuing to protect Glacier Bay's Dungeness crab population.