

Lesson 2- ANSWER KEY

Zebra mussels & the food web

After dividing into groups, you will use a graphing tool on the AMNH Website to investigate the following relationships and answer the questions below. Be sure that each group member takes notes of what they observe so they can share with others in Part 4.

Part 1: How will your organism's population change?

Share the graphs that you made as part of your homework. As a group, decide what you think will happen to your organism's population and explain your reasoning.

Student answers will vary.

Part 3 – Summarizing results:

- 1) Was the claim that you made in Part 1 supported by the results from the line graph? Why or why not?

Student answers will vary.

- 2) Are there other trends or patterns in your graph that you didn't anticipate? What might explain these trends?

Student answers will vary.

- 3) Does the bar graph support the claim you made in Part 1? Why or why not?

Student answers will vary.

- 4) Compare and contrast the two graphs you created using the graphing tool (line graph vs. split date bar graph).

Benefits of the line graph:	Benefits of the bar graph:
<u>The line graph shows you all of the available data over time.</u>	<u>The bar graph allows you to compare two different time periods very easily.</u>
Drawbacks of the line graph:	Drawbacks of the bar graph:
<u>It is difficult to see a trend without using statistics because there are so much data.</u>	<u>You don't know how much variability there is within each time period.</u>

- 5) Using what you have learned, make a claim, supported by evidence and explained through reasoning, about how your organism's population was affected by zebra mussels. The scientific question is: How was your organism affected by the zebra mussel invasion?

Claim (A scientific claim is an answer to the scientific question)	Zebra mussels cause the concentration of phytoplankton (as measured by chlorophyll) to decrease.
Evidence (Data and observations that support the claim)	Phytoplankton prior to the arrival of zebra mussels in 1992 was between 15-17 mg/L. After the invasion, the concentrations were less than 5 mg/L.
Reasoning (Reasoning describes how science connects the evidence to the claim)	Zebra mussels are filter feeders that eat plankton, including phytoplankton. Zebra mussel population numbers increased dramatically in the Hudson River after 1991.

- 6) Is there enough evidence to support your claim? What else would you like to know in order to be more confident? (For example, do you need more data? Has the study been conducted over a long enough time period?)

Although student answers will vary, students should pay attention to the fact that although these data are for many years, they are only for one ecosystem and thus should be compared with other ecosystems.

Part 4: Sharing Results

Organism	Change: Increase? Decrease? No change?
Unionidae (freshwater pearly mussels)	DECLINED (showed recovery after 2006)
Sphaeriidae (fingernail clams)	DECLINED
Centrarchidae (fish in vegetated shallows e.g. sunfish, pumpkinseed)	DECLINED (recovered later- not shown on graph)
Alosa (open water fish, e.g. shad)	DECLINED
Phytoplankton/ Chlorophyll A	DECLINED
Copepods (zooplankton)	NO CLEAR TREND
Copepod nauplii (larval stage of zooplankton)	DECLINED (showed recovery later in invasion)
Bacterial Abundance (decomposers)	INCREASED (unexpected result)
Rotifers (Zooplankton)	DECLINED
Cladocera (zooplankton)	DECLINED (may be too big for smaller zebra mussels to eat)

*** Sample Graphs in the following pages***

Make another Prediction:

What other effects might zebra mussels have on the environment, besides animal and plant life? Think of abiotic (non-living) factors that may be affected by zebra mussels.

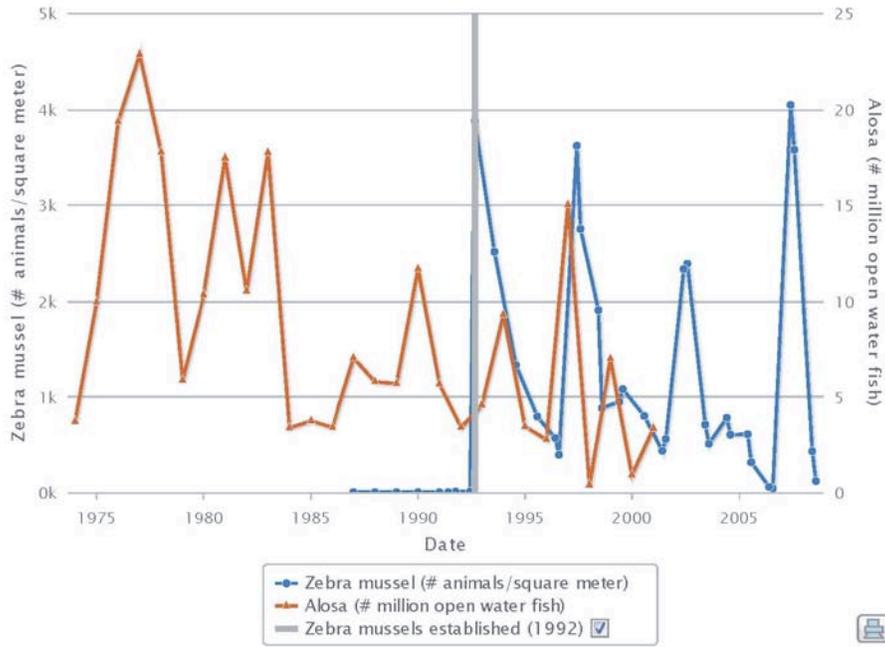
Student answers may vary but students should mention dissolved oxygen declining (due to respiration) and increasing transparency.



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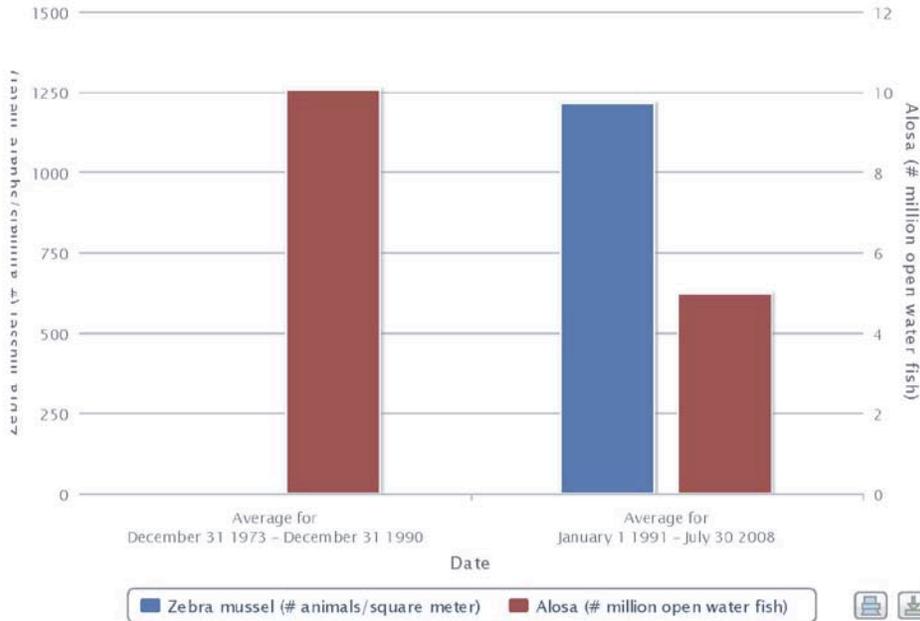
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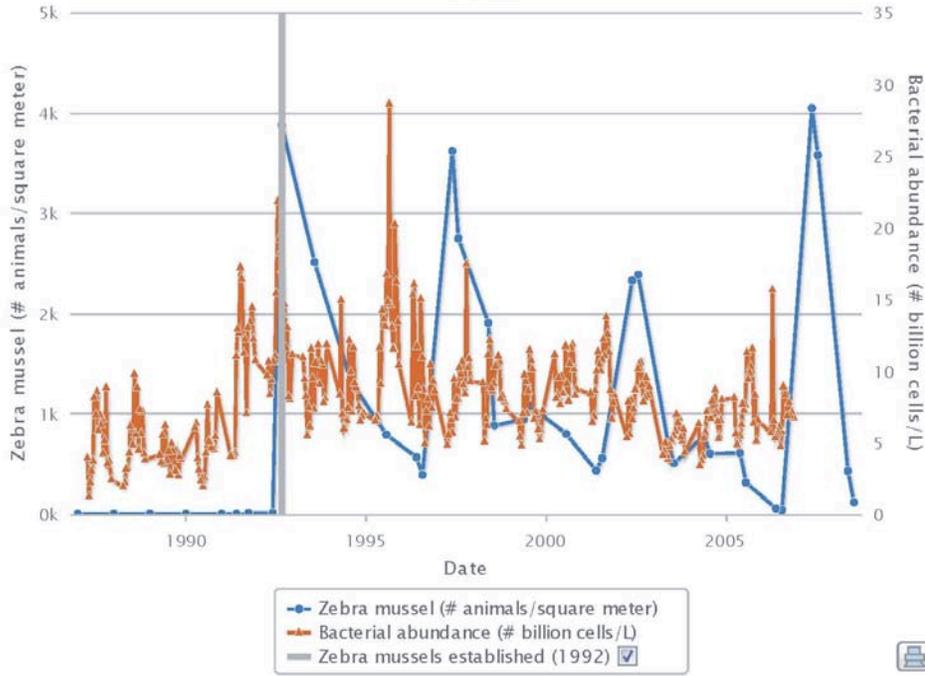




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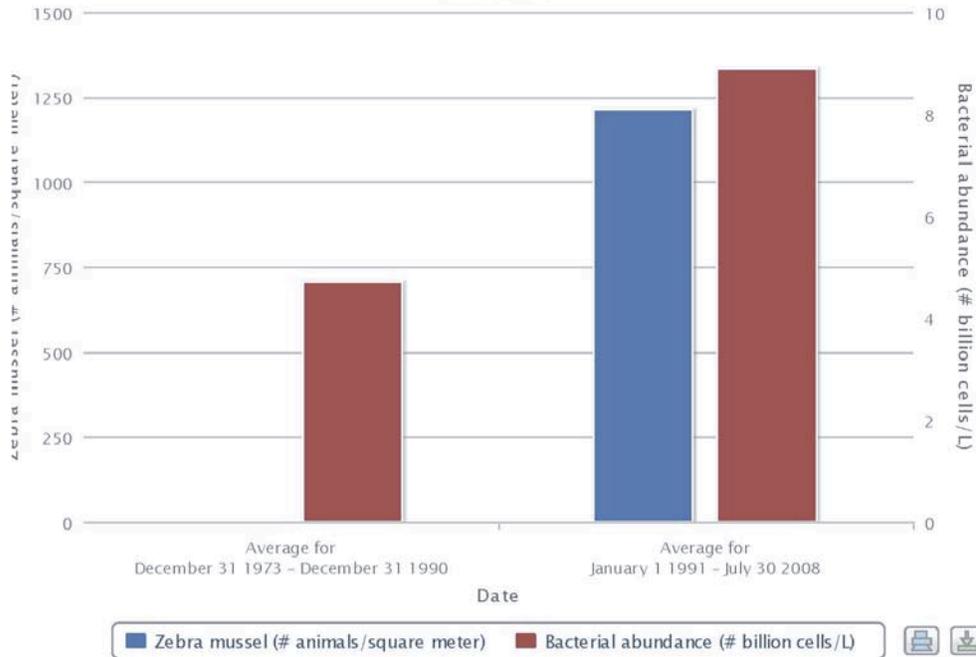
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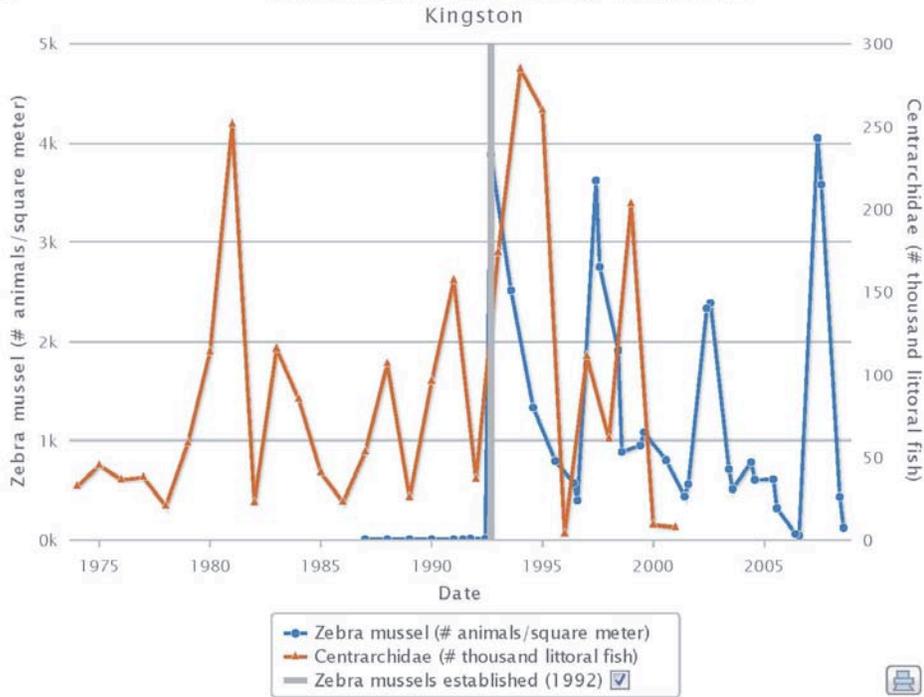
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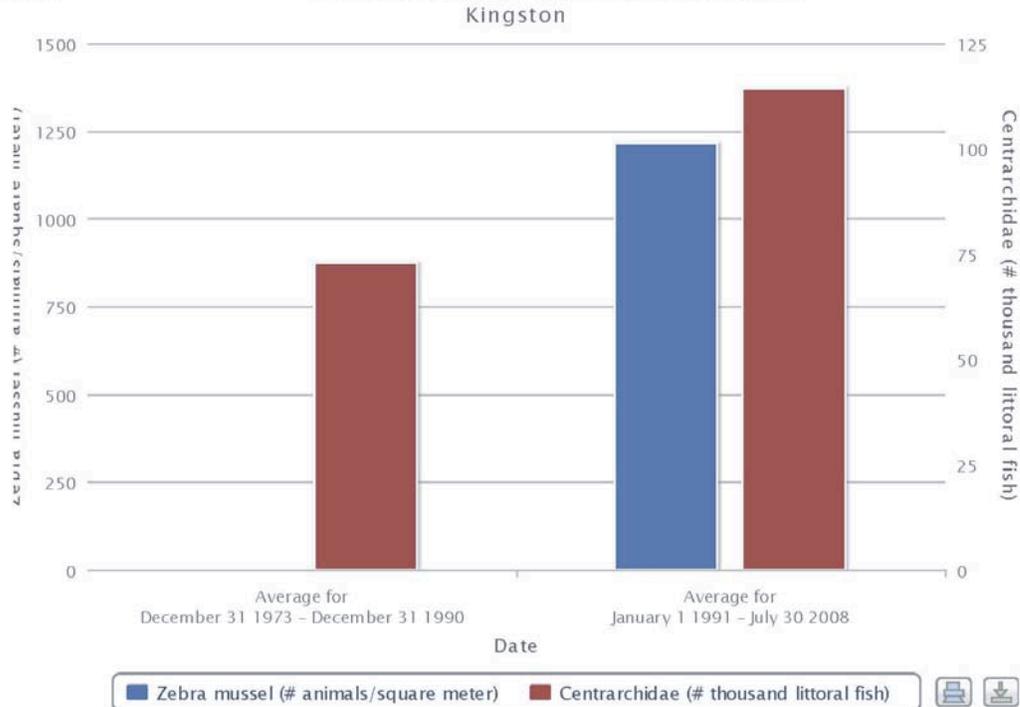
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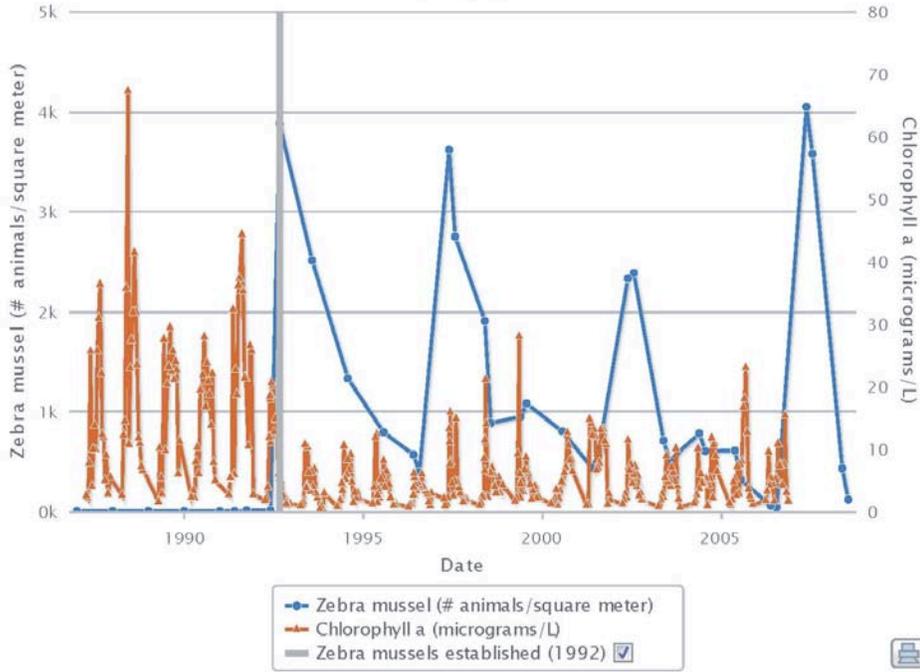
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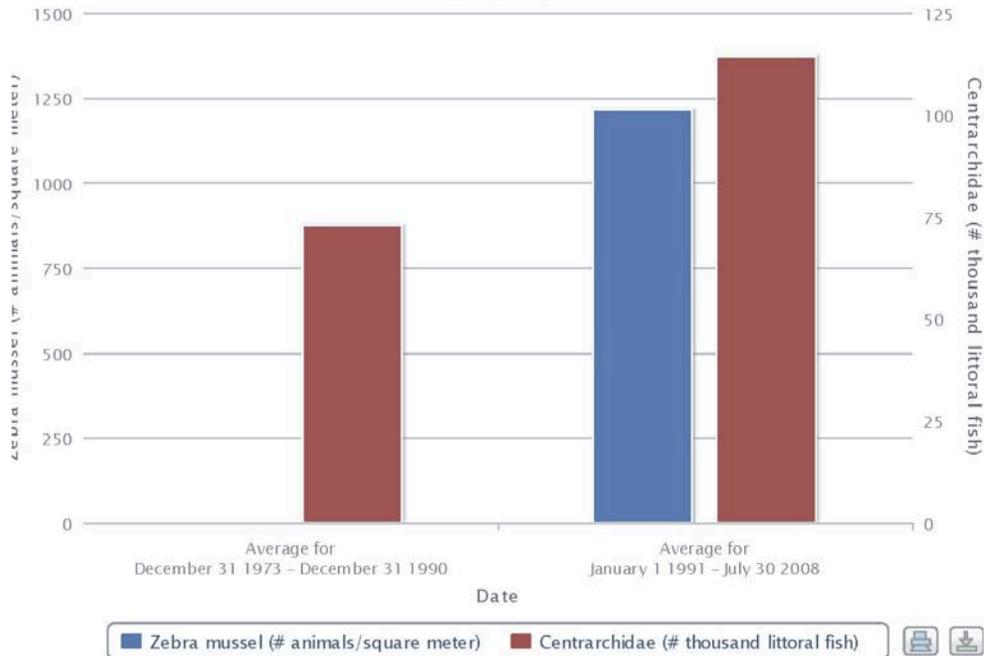
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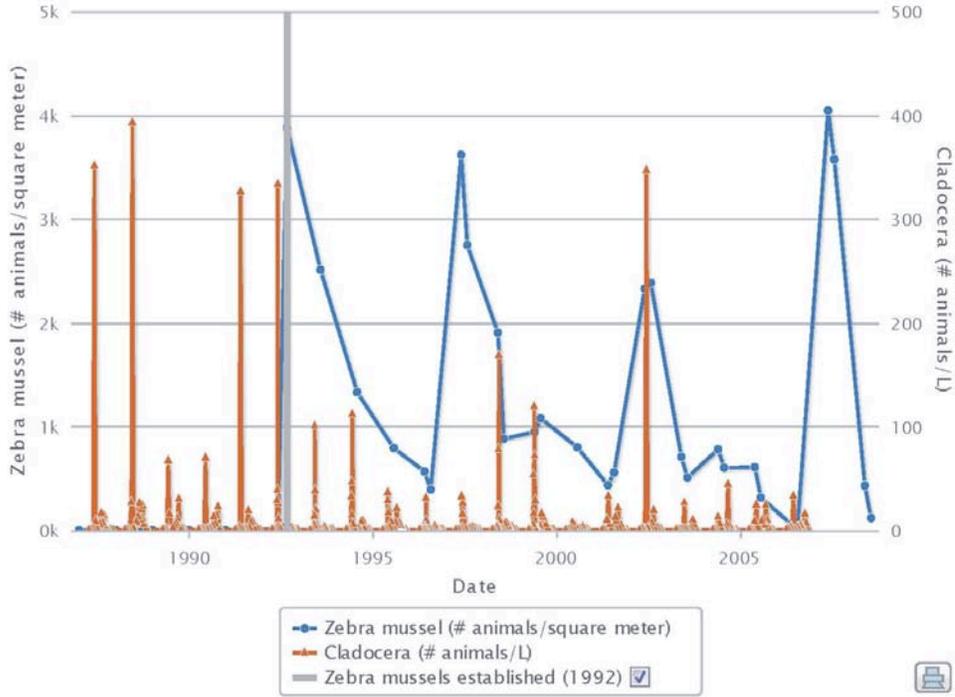
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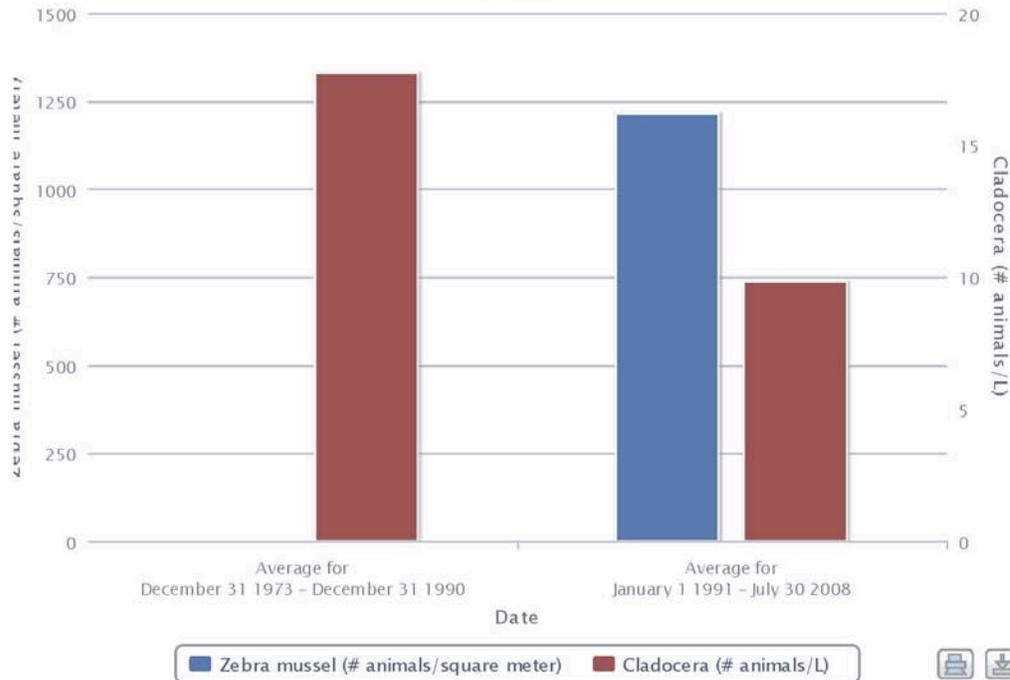
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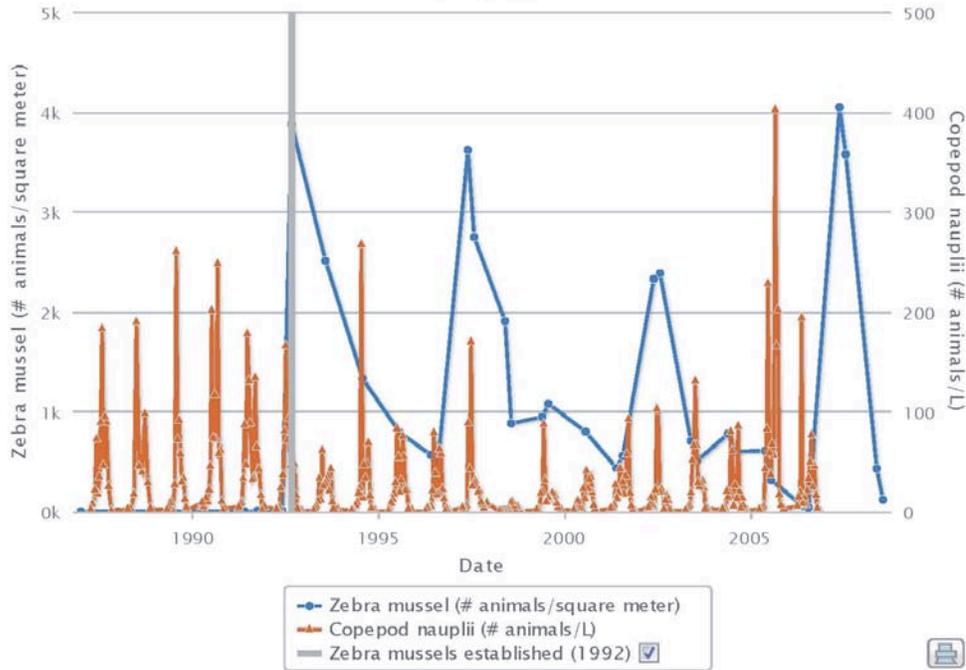
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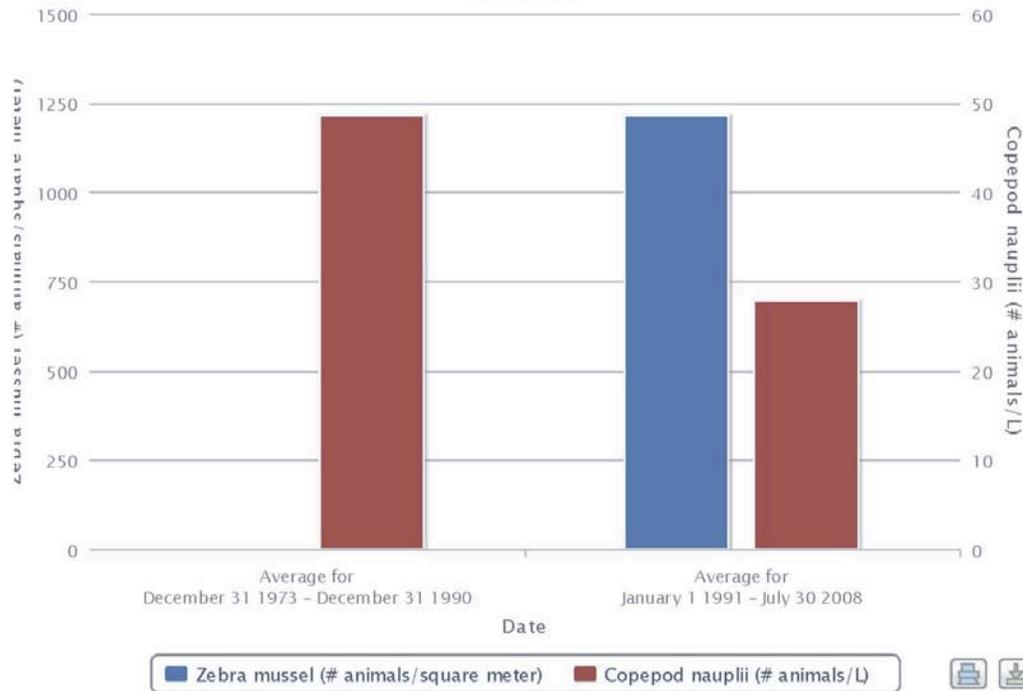
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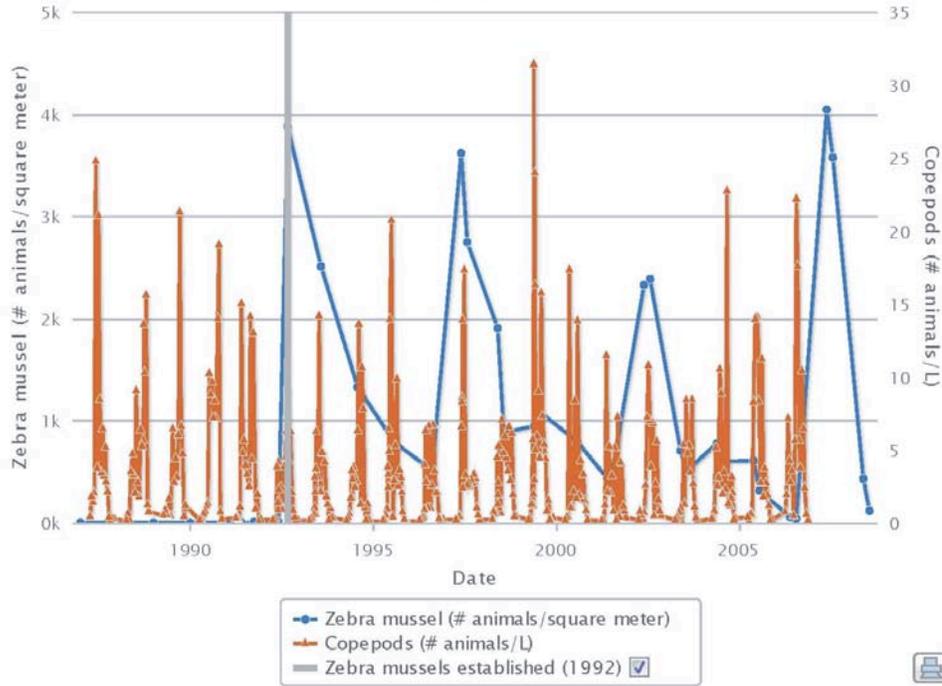
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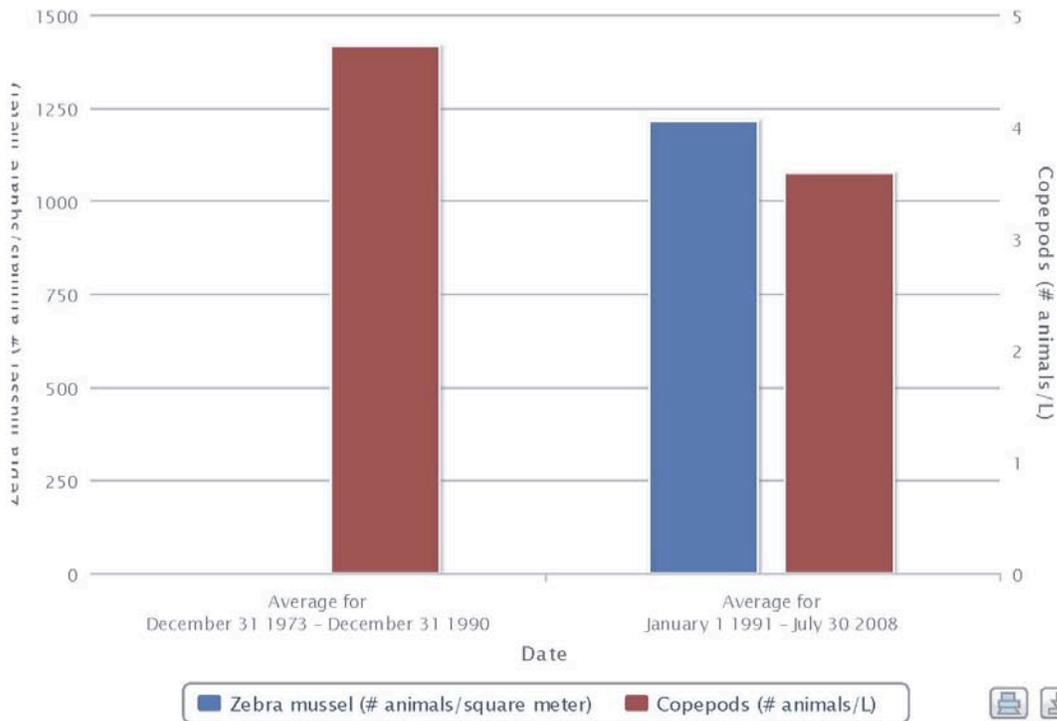
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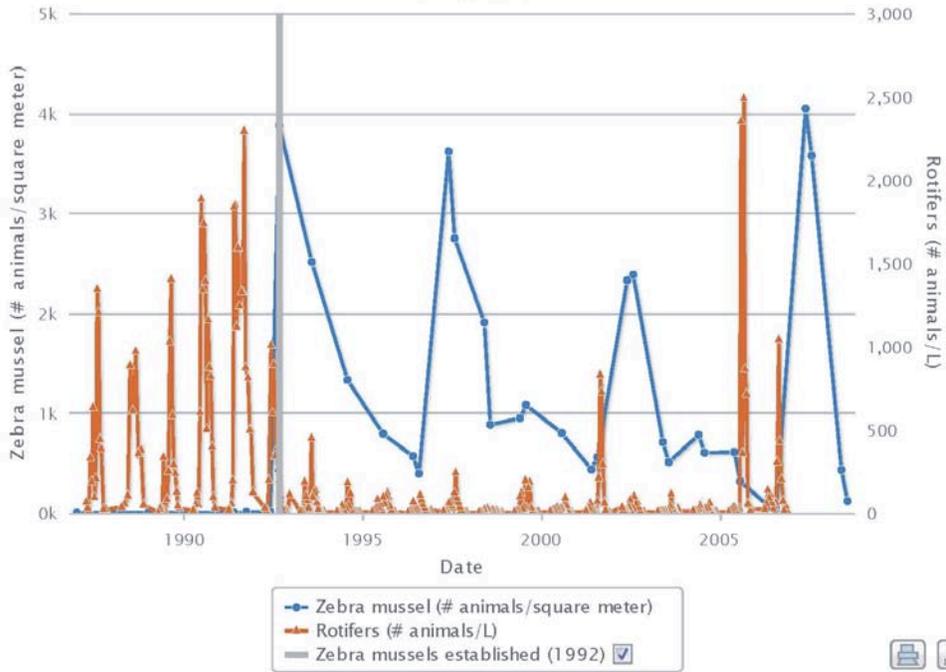
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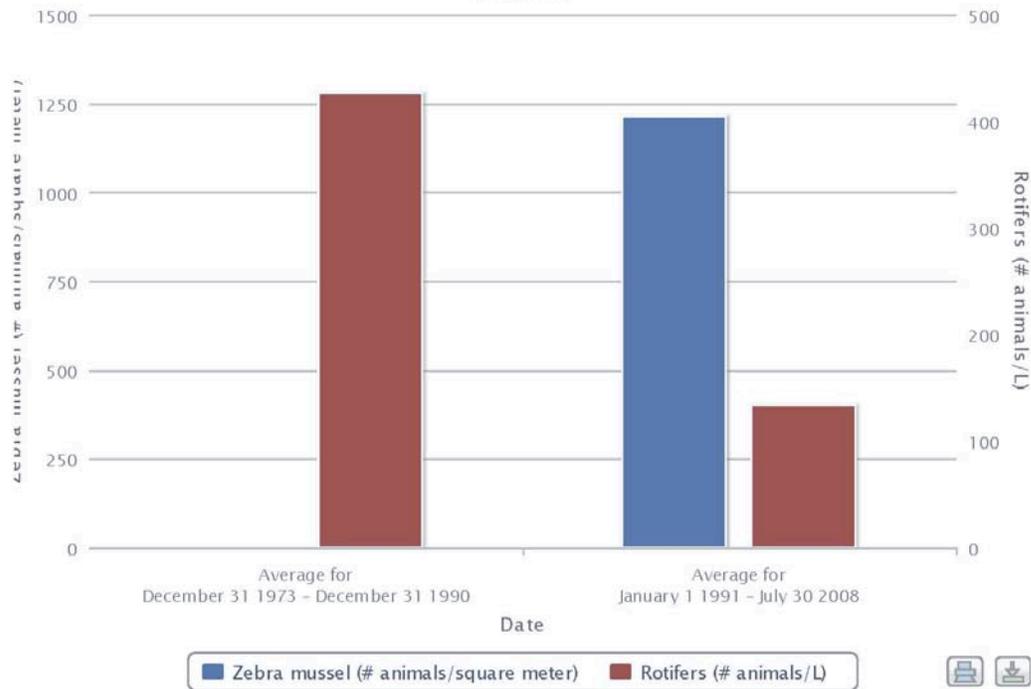
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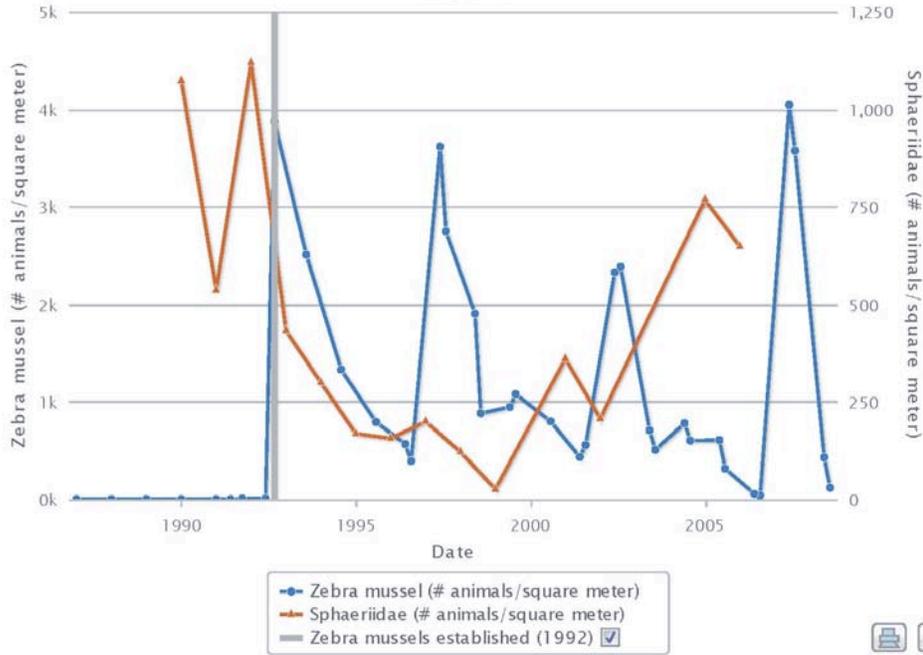




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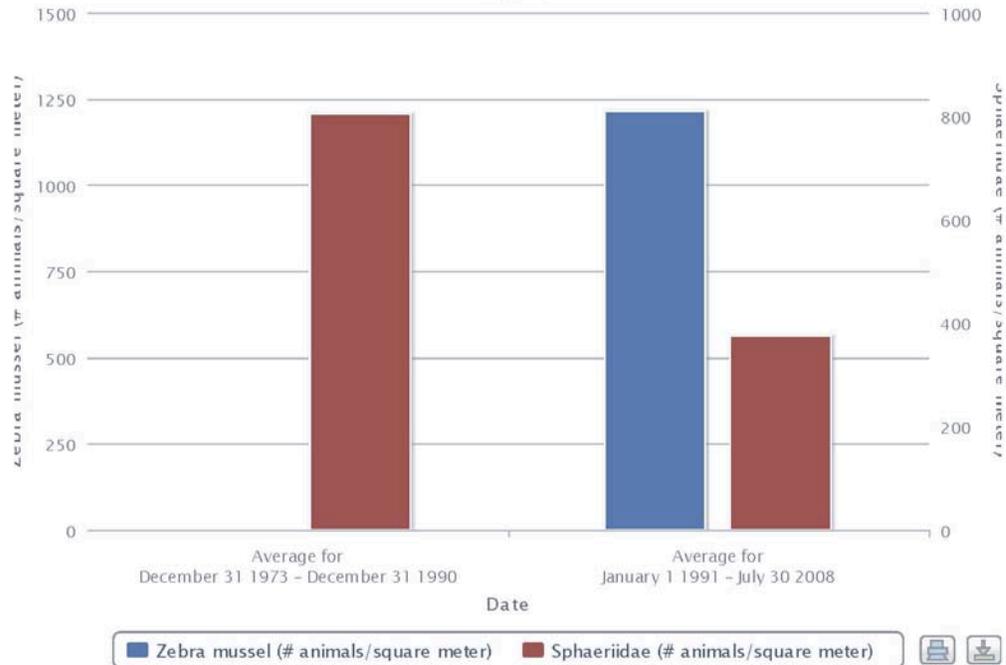
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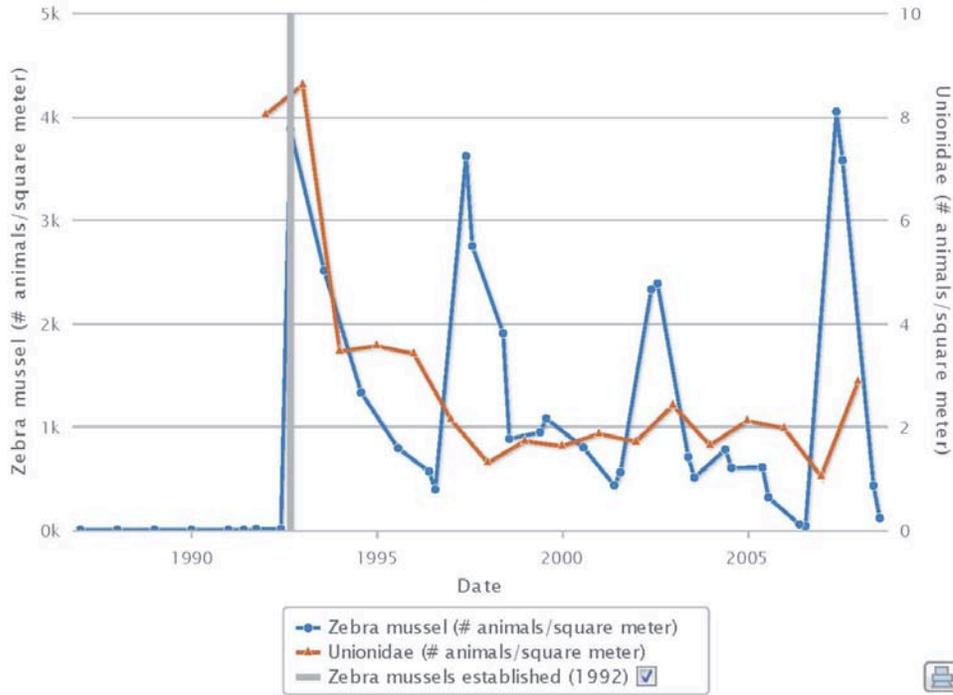
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