Ecosystem Engineer

- Engage
  1. Define ecosystem engineer in your own words. Besides a fiddler crab, what is another example of an ecosystem engineer? How does the animal you chose “engineer” its habitat?

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  2. Based on your knowledge of fiddler crab size, how many crabs do you predict live in a square meter of marsh sediment on Hog Island, Virginia? __________

- Explore
  1. To test your prediction, choose two methods and collect data for each method twice over 48 hours. Also, gather density estimates for the standard image. Record your data in the table below:

<table>
<thead>
<tr>
<th>Date (Time, Month, Day, Year)</th>
<th>Total Site Area (m²)</th>
<th>Visual Crab Count (individuals/m²)</th>
<th>Visual Burrow Count (individuals/m²)</th>
<th>Marsh Excavation (individuals/m²)</th>
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**Explain**

1. Was the burrow data similar to the crab data? Why might there be a discrepancy between burrow density and crab density? Which method provides a more accurate estimate of the crab population?

2. Are density estimates similar for different dates and times? Why might there be a temporal effect on fiddler crab density?

3. How did the tidal cycle effect your measurements?

4. Did you and your classmates obtain the same density estimates for the standard image? How can you explain the observer bias when you all received the same instructions and information?
Elaborate

(1) Describe an alternate method for estimating fiddler crab density.

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(2) When are fiddler crab abundances the greatest? When are abundances the smallest? Can you extrapolate daily, seasonal, annual patterns or other trends (i.e. weather or shore bird effects)?

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(3) How do fiddler crabs increase the production of the marsh grass Spartina? How does increased Spartina production affect nutrient cycling and the energy flow from the land to the sea?

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(4) Why do you think that engineering behavior of the fiddler crabs is important to this ecosystem as a whole?

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