Part 2: Data Analysis

Data analysis is the process of inspecting data to generate conclusions. You need to find the specific data you need from a large dataset, arrange the data systematically, graph the data correctly, and interpret the graph to draw conclusions. The LiMPETS database portal can do most of this work for you!

LET'S START by pulling up a graph related to your question. Go to the Sandy Beach Monitoring Results page on LiMPETS Website and pull up a graph from your monitoring site. More data is usually better so select the option to look at data from "All Schools."

WHICH METHOD?

What method should you choose? It depends on what your question is.

- If you are looking at the amount of sand crab over time, use "abundance" data.
- For investigating the sex ratio or how many females are gravid (pregnant), make sure you include life history data.

FINDING (OR CREATING) THE RIGHT GRAPH

Does your question involve change over time? Probably. What time frame? It's best to try a few time specifications and compare graphs - which one demonstrates your point most clearly.

While the LiMPETS website gives you many different graphical views of the data, it may not provide the best graph for your question. For example, if you want to look at seasonality of the mole crab population (and the website-generated graphs only display yearly averages), you must look at the data table view.

Data tables are usually not an easy way to present the data especially for your communication project. To create a graph, download data from the LiMPETS database and then open the .csv file in Excel, Apple's Numbers, or GoogleSheets.

MAKING CONNECTIONS

When you hypothesize why sand crab abundance has changed over time, think about the challenges on the sandy beach (temperature, wave action, water quality, sand-grain size, competition, and predation). Has a challenge changed (examples: the introduction of a predator, or surge in large storms)? These changes affect sand crabs' ability to survive.

This is when it is good to know some facts about your organism(s). What are its predators? What factors affect it when it is in its larval stage as plankton? How do they respond to environmental changes as adults? Go to the Species Page of the LiMPETS website to see the basic facts about the Pacific mole crab.

Complete this worksheet using the LiMPETS Website: Sandy Beach Data Portal and the Part 2: Data Analysis Handout.

IDENTIFY WHAT YOU NEED

Before you start generating graphs, answer the four questions below.

1. Monitoring site(s):
2. Organism(s):
3. 3. What information are you examining? Check all that apply.

☐ Amount of crabs (abundance)

☐ Size of crabs

☐ Sex or life-stage of crabs

☐ Distribution of crabs (where they are in the swash zone)

4. Time frame:

☐ Over 5 or more years

☐ Before, during, and after a specific event

☐ Over a year, monthly, or seasonally

☐ A one-day snapshot

GENERATE YOUR GRAPH(S)

Go to the LiMPETS Sandy Beach Results Page and pull up your desired graph. Consider two things:

- If there are not enough data at a certain site or during a certain time, rework your question; you can look at another monitoring site or time frame.
- Is this graph the best way to visualize this data? If not, pull up another view on the LiMPETS website or create your own graph using the Data Tables.

Then, answer the following questions: [These will form the basis of your Figure caption.]

5. The x-axis is_____in_____(units).
6. The y-axis is_____in_____(units).
7. The graph shows a(n) increase / decrease /no change in _____

MAKE CONNECTIONS

8. Could this trend be influenced by what happens in the larval stage in the ocean?

9. Trends in the graph could be due to an increase or decrease in:

☐ Wave action

☐ Extreme high or low temperature

☐ Changing tides or sea level

☐ Change in water quality

☐ Competition

☐ Predation

☐ Food availability

☐ Human impact

EXPLORE POSSIBLE CONNECTIONS

Is the trend you are seeing happening at other sites in California? Use the database to check out other LiMPETS monitoring sites to find out. Go to the LiMPETS website and click "Sandy Beach Monitoring Sites" to see a map.

Read scientific papers to see if other scientists have found trends similar to what you found in the LiMPETS database. Use Part 3: Summarizing Relevant Research to take notes.