MPA Watch

Sandy Shore - Grades 9-12

Learning Objectives

A) Students will collect data on human use of coastal marine resources through the MPA Watch community science program and data on terns and plovers for San Diego Zoo Global (Part 1).
B) Students will use Excel to create pie charts illustrating the numerical proportion of activities observed as well as calculating average people observed in terms of survey effort (Part 2).
C) Students will use their results to create a scientific display and complete an oral presentation with study and management recommendations (Part 3).

NGSS: DCI (Disciplinary Core Ideas):
HS-LS2-2
HS-LS2-7
HS-ESS3-1

Time: Four to nine 50-minute class periods plus one and a half to two hour field trip

Materials for the Teacher
-Life in the Sand: Field Guide to Sandy Shores

Materials for the Students
-MPA Watch data sheet
-MPA Watch data sets provided in teacher toolkit or by e-mailing
-MPA outreach materials (included in teacher toolkit or can be downloaded here: http://californiampas.org/south-coast-brochures)
    ~Southern California MPA Guide
    ~Marine Recreational Brochure San Diego

Part 1: Data Collection

Background information:
(recommended one to six 50-minute class periods)
See Life in the Sand: Field Guide to Sandy Shores for more background information and classroom activities that may accompany this lesson. It is recommended you take one 50-minute class period to cover each of the topics covered in the field guide

Marine Protected Areas (MPAs)

We can think of marine protected areas, or MPAs, as underwater parks. Just like we have national, state, and regional parks on land, there are many different types of MPAs. Different parks allow different activities - same with MPAs! In some of them you can fish, while in others you can't. Some MPAs allow all kinds of activities (fishing, swimming, boating, etc.) while others are much stricter. By restricting what people can do and take in these underwater parks, we can protect California's natural resources.

California has 124 MPAs all along the coast. These MPAs protect many different habitats where many different animals live. MPAs give marine species a safe place to breed and grow. Animals inside of MPAs may be larger than those found outside of MPAs, allowing them to have more offspring than smaller animals. Offspring born within MPAs may also have access to more food, space, and other resources, allowing offspring to be healthier.

 MPAs also provide opportunities for people to see beautiful, protected ocean spaces through snorkeling, scuba diving, swimming, kayaking etc. Sometimes, people don't know that they are in an MPA and accidentally do something they aren't supposed to do. That's why it is important to understand what MPAs are, why we have them, and where they are - so you know if you are in one!

Sandy Shore

Sandy shores are areas where deposits of sand or other sediments cover the shoreline. To beachgoers, sandy shores often appear to be devoid of life, made up only of sand, shells, and the occasional piece of driftwood. But in reality, this dynamic habitat is home to a diversity of species, each specially adapted for life above or below the sand. These organisms must contend with pounding waves, changing tides, and constantly shifting sand particles - not to mention people who love to visit and develop beaches!

Community Science

Community science (also known as citizen science) involves members of the general public (that's you and me!) collecting data that can then be used in scientific research. Anyone can participate in community science.It's a great way for people to help out professional scientists!

There are many different types of community science. Some involve using an app on your phone to take pictures or measurements that are then sent to professional scientists. Today, we are going to do a type of community science that involves taking notes about what you see.

MPA Watch

We already talked about why we create MPAs and how they can help protect ocean animals. Now that California has created these underwater parks, it's important for us to see how people are using them. Are people visiting MPAs? If they are, what kind of activities are they doing there? The answers to these questions will help us to figure out if the MPAs are working and help in the creation of future MPAs. We are all going to be community scientists and help collect some information about what people are doing in this MPA for a statewide program called MPA Watch.

MPA Watch uses a method of scientific sampling referred to as a transect. A transect is a fixed path (with a start and end point) along which an observer counts and records scientific data. In the case of MPA Watch, observers record all the people they pass while walking along the transect. This allows us to create replicable, unbiased data.

The observed activity that each person is performing is recorded using an ethogram, a list of possible behaviors that may be observed. For example, MPA Watch worked with scientists to create an ethogram of the human behaviors that may be observed at the beach including beach recreation, wildlife watching, fishing, surfing, or snorkeling.

Suggested procedure:
Pre-Trip Discussion
Have the class discuss the following:
1) What would happen to a natural area (i.e. a forest or a beach) if humans were allowed to do whatever they wanted?
2) Are the things that we use from the ocean unlimited? Can we run out?
3) Have students brainstorm examples of activities that could deplete coastal

~Fishing Guide San Diego

~MPA Watch South Coast Snapshot Report
-Computers: one per every two to four students
-Access to the internet
-Graphic design software (Canva is a great free online program – canva.com)
-Poster board, butcher paper, or project board
-Glue
-Tape
-Scissors
-Colored paper
-Any other presentation supplies available

Vocabulary
-*Marine Protected Area (MPA)*: MPAs are areas in or near the ocean made to protect or conserve marine life and habitat, safeguard cultural sites, and provide enhanced recreational opportunities.
-*Take*: To hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill any natural resources.

and/or marine resources (i.e. fishing, collecting, etc.)

4) Have students brainstorm examples of activities that would not deplete coastal and/or marine resources (i.e. swimming, snorkeling, surfing, recreational SCUBA diving, playing at the beach, etc).

5) Would you rather swim/snorkel/kayak/etc. somewhere with lots of species or few species?

6.   Key Question: How are humans using coastal and marine resources in marine protected areas?

-*Community (or citizen) Science*: The collection and/or analysis of scientific data by everyday people.

-*MPA Watch*: A community science project that collects data on how humans are using the coast and ocean.

-*Replicable data*: Data that is collected following strict methods so that studies may be repeated independently and achieve the same result.

-*Unbiased data*: Data that represents the true condition of the population without being subject to human error.

-*Ethogram*: A list of the possible kinds of behavior or activity that may be observed in an animal.

-*Experimental site*: The site receiving experimental treatment (in our case the protection afforded by MPAs).

Control site: The site not receiving experimental treatment.

Consumptive: An activity that involves the removal or use of a resource.

Field Trip (recommended 1.5-2 hours in the field)

MPA Watch

1) **Meet at the cul-de-sac at the southernmost end of Seacoast Drive in Imperial Beach. Approximate address:**
1698 Seacoast Drive,
Imperial Beach, CA 91932

2) Break students into research groups of approximately four people. Assign half the research groups to the **control site** (OUT 2) and half the research groups to the **experimental site** (TRM 1). Make sure a chaperone accompanies each group.

3) Both groups will begin their surveys on the beach directly adjacent to the parking lot. Walk onto the beach and look for the rock wall at the end of the houses. This demarcates the boundary between the control survey (OUT 2) and the experimental survey (TRM 1). *Note: while both groups start in the same place, they will be collecting data in different orders along different transects.

     a. **Instructions for Control Site Groups**:

Control survey begins on the beach at the rock wall along the houses at the end of Seacoast Drive and runs north until the Imperial Beach Pier (approximately 1.8 miles round trip). From south to north collect San Diego Zoo bird data. On return trip from north to south collect MPA Watch human use data for site OUT 2. Note, during medium to high tide the southern end of the beach (where you begin and end) may be inaccessible. Groups may walk north along Seacoast Drive and use the next access point instead.

     b. **Instructions for Experimental Site Groups**:

Experimental survey begins on the beach at the rock wall along the houses at the end of Seacoast Drive and runs south until the Tijuana River Mouth (the river mouth is obvious; approximately 2.0 miles round trip). From north to south collect MPA Watch human use data for TRM 1. On return trip from south to north collect San Diego Zoo bird data. Note: This survey is within the Tijuana River Mouth State Marine Conservation Area.

MPA Watch Data Collection Instructions for All Groups

1) Each research group should get a clipboard, pencil, and MPA Watch data collection sheet (see appendix).

2) Within each group designate the following roles (or similar based on your beach conditions):

Researcher #1: Surfers/Boogie Boarders

Researcher #2: Beach Recreation

Researcher #3: All Other Activity

Researcher #4: Note Taker

3) Fill out the metadata section of the datasheet (Names, Date, Transect ID (see transect information), Start Time, Clouds, Precipitation, Air Temperature, Wind, Tide Level, Visibility, Beach Status, Sea State.

4) From the start point, walk south toward the end point.

5) As you walk Researchers #1-3 will count how many people they see doing their assigned activity and tell Researcher #4.

6) Researcher #4 will record the data on the datasheet in the appropriate row. *Note: tally marks or numbers may be used as long as the method is consistent.

7) Collect data on what a person is doing only as you pass them or they pass you. Do not look ahead or behind.

8) Count each person only once, even if they pass you multiple times.

9) Data is collected for anyone on the sand and in the water, not in parking lots or on cliffs.

10) Each kayak/boat counts as one, even if there is more than one person in it.

11) Domestic animals (i.e. dogs) are counted separately from their human. So if you see a person walking their dog on-leash, the dog would count as one tally for "Domestic Animal On-Leash" and the human would count as "Beach Recreation."

12) "Hand Collection of Biota" means the collection of anything that is alive.

13) The back of the page may be used if additional space is needed, just make sure to label the activities.

14) Stop at the stop point, fill in the end time at the top of the datasheet, and total all activities.

San Diego Zoo Bird Data Collection

1) As you walk south to north along your assigned transect fill out the SDZG Terns and Plovers Datasheet. Record how many of each species are seen, their activity, if any birds seemed in distress, and nearby human activity.

PART 2: Data Analysis

(recommended two 50-minute class periods)

Entering Data

MPA Watch

1) Make a master data sheet by averaging the number of observations made for each category across groups.

2) E-mail the master data sheet to angela@wildcoast.org

San Diego Zoo Birds

1) Follow the same steps as for MPA Watch.

-*Non-Consumptive*: An activity that does not involve the removal or use of a resource.

-*Effort*: A way to calculate data that eliminates discrepancies based on the effort put into collecting the data (in our case the differing length of the transects). Expressed in terms of "per unit of effort;" i.e. people per mile.

California Department of Fish and Wildlife Key Messages:

-To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.

-To ensure that California's MPAs have clearly defined objectives, effective management measures, adequate enforcement, and are based on sound scientific guidelines.

Downloading Data for Analysis

MPA Watch

1) A copy of the MPA Watch data for San Diego County is included with the digital version of this toolkit. To receive more current data please email angela@wildcoast.org. *Note: If you submitted a master data sheet from your groups' field trip you will automatically receive an email with the most current data.

Analyzing the Data

1) Provide a computer to each research group.

2) Give each group a copy of the data file for their site (either OUT 2 for the control site or TRM 1 for the experimental site).

3) Have students open the data file in Excel.
Have students identify the following groups of

4) Have students identify the following groups of columns in the data file: Metadata (columns A-X), activity counts (columns Y-DG), general activities (columns DH-DL), and violation reports (columns DM-DW).

5) For this activity we will only be looking at the activity count data. Have students select columns A-X. Right click and select "Hide." Do the same for columns DH-DW. *Note: If you left click on a column heading you can then hold and drag across multiple column headings to select multiple columns at once.

HINT: To "freeze" the top row (keep it visible while the other rows scroll) click on View > Freeze Panes > Freeze Top Row

6) Have students work in their groups to explore the activity data. Have them identify what each column represents. Clarify any activities if necessary. Point out that columns Y-AG are totals of various other columns rather than activity counts themselves.

7) In their groups have students brainstorm different ways to categorize the data.

5

8) For this analysis we will divide the data between **consumptive activities** (those that use resources) and **non-consumptive activities** (those that do not use resources) as well as land-based activities and water-based activities. Therefore, the four types of data categories are: land-based consumptive, water-based consumptive, land-based non-consumptive and water-based non-consumptive. Have students assign each category a color and highlight each column according to the category in which it belongs.

-Allow students to conduct a separate inquiry project using the datasets.
-If you have enough time visit the Tijuana Estuary Visitor Center located a few blocks away at 301 Caspian Way, Imperial Beach, CA 91932. Entrance is free. The visitor center is closed Monday and Tuesday. There are also hiking trails near the visitor center that explore the endangered wetland.

Consumptive vs. Non-Consumptive

1) The first analysis we will conduct is the proportion of consumptive activities to non-consumptive activities. This will be represented with a pie chart. We will use the data from column Z "TOTAL Nonconsumptive Activities" and column AD "TOTAL Consumptive Activities."

2) To do this we must find the totals for each column. To do this for non-consumptive activities have students select a cell in column Z below the data then enter the formula =SUM(Z2:Z#). Replace the # sign with the number of the last row in that column. Push Enter. Repeat for column AD =SUM(AD2:AD#)

3) To make the pie chart of this data, make a small table below your data with the data labels (Consumptive and Non-consumptive) and the totals you just calculated in step 2.

	TOTAL Activities	TOTAL Nonconsumptive Activities	TOTAL Nonconsumptive Land	TOTAL Nonconsumptive Water	TOTAL Nonconsumptive Boat	TOTAL Consumptive Activities	TOTAL Consumptive Land	TOTAL Consumptive Water	TOTAL Consumptive Boat	Beach Rec; Sandy	Beach Rec; Rocky
1											
317	10	10	8	2	0	0	0	0	0	7	
318	5	5	1	3	1	0	0	0	0	0	
319	7	7	6	1	0	0	0	0	0	6	
320	4	3	2	1	0	1	0	0	1	1	
321	2	2	2	0	0	0	0	0	0	2	
322	5	5	5	0	0	0	0	0	0	5	
323	18	18	18	0	0	0	0	0	0	13	
324	9	9	5	4	0	0	0	0	0	3	
325	23	20	12	7	1	3	3	0	0	11	
326	5	5	5	0	0	0	0	0	0	2	
327	2	2	2	0	0	0	0	0	0	1	
328	6	6	2	4	0	0	0	0	0	1	
329		6053				461					
330											
331											
332											
333						Non-consumptive	6053				
334						Consumptive	461				
335											
336											

4) Select Insert from the top menu, click on the pie chart icon, then select the type of pie chart you would like to make. Change the title of the pie chart to "Consumptive vs Non-Consumptive Resource Use in San Diego County MPAs" and the data labels to Consumptive and Non-consumptive appropriately.

Consumptive vs Non-Consumptive Resource Use in San Diego County MPAs

■ Non-consumptive ■ Consumptive
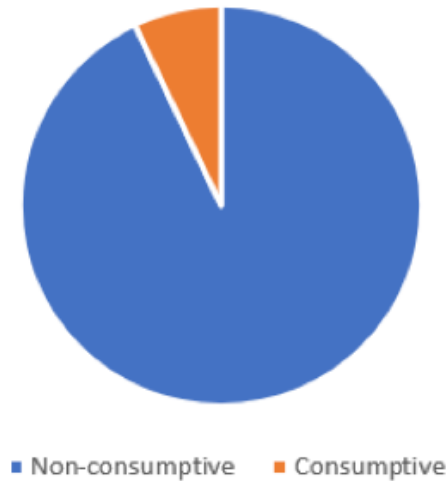
5) Compare results between the control site (not in the MPA) and the experimental site (in the MPA). Are there any differences?

Most Common Activities

In addition to determining if most of the activity is consumptive or non-consumptive, we also want to know which activities are most common at each site so that we may better focus our outreach efforts. In this activity we will create a snapshot of the types of activities people are doing at our survey sites.

1) Tell students to find the totals for each of the activity columns (AH-DG) using the method described in step 2 above. Hint: students do not have to enter the formula for each activity. Rather, enter the formula for the first activity, AH Beach Rec; Sandy, and then click and drag the little green box in the bottom right hand corner of the cell across the other columns you wish to calculate. Excel will automatically copy the formula to each of those cells and change the formula to calculate each specific column.

2) Have students look at the totals for each of the columns. Identify the five most common activities and create a table with the name of the activity and the number of people observed doing that activity.

3) Use the table to create a pie chart for the five most common activities observed following the instructions from steps 3 and 4 above.

4) Compare results between the control site (not in the MPA) and the experimental site (in the MPA). Are there any differences?

Calculating Effort

The above calculations are a simple way to provide a snapshot of activity along our coast. They are easy to calculate and read. This type of analysis (pie charts!) is what is preferred by our data partners at the California Department of Fish and Wildlife.

This type of data analysis is limited in that it does not offer an idea of how many people were observed participating in a certain activity, just whether it was seen more frequently than other activities. However, we cannot simply compare the number of

people from the control site to the number of people from the experimental site, since their distances are not equal. Think about this: is seeing 500 people on a beach a mile long the same thing as seeing 500 people on a beach that is a quarter mile long?

For this next analysis we will re-calculate what we did above to incorporate effort. Fortunately, effort is actually relatively easy to calculate.

The formula for effort is:

$$\frac{\text{Average \# People Observed Per Survey}}{\text{Survey Distance}}$$

Note that the total number of people could actually refer to the total number of people observed or it could refer to the total number of people observed doing one type of activity (i.e. the total number of people you saw on the entire survey or the number of people you saw doing beach recreation on the survey). The unit for effort is average # people per survey mile and can be used to make bar charts comparing surveys of different distances since it eliminates distance as a variable.

Consumptive vs. Non-Consumptive - Effort

1) The first step in determining effort is to find the average number of people for each activity, in this case the average number of people observed participating in some kind of consumptive activity and the average number of people observed participating in some kind of non-consumptive activity. Note, in this context average will be calculated using the mean.

2) To calculate the average we will use the same columns we did for the calculations above, Z "TOTAL Nonconsumptive Activities" and column AD "TOTAL Consumptive Activities."

3) Select a cell below Z "TOTAL Nonconsumptive Activities" and enter the following formula - =average(Z2:Z#). Replace the # sign with the number of the last row in that column. Push Enter.

	Y	Z	AA	AB	AC	AD	AE	AF
								=average(Z2:Z328)
1	TOTAL Activities	TOTAL Nonconsumptive Activities	TOTAL Nonconsumptive Land	TOTAL Nonconsumptive Water	TOTAL Nonconsumptive Boat	TOTAL Consumptive Activities	TOTAL Consumptive Land	TOTAL Consumptive Water
317	10	10	8	2	0	0	0	
318	5	5	1	3	1	0	0	
319	7	7	6	1	0	0	0	
320	4	3	2	1	0	1	0	
321	2	2	2	0	0	0	0	
322	5	5	5	0	0	0	0	
323	18	18	18	0	0	0	0	
324	9	9	5	4	0	0	0	
325	23	20	12	7	1	3	3	
326	5	5	5	0	0	0	0	
327	2	2	2	0	0	0	0	
328	6	6	2	4	0	0	0	
329		=average(Z2:Z328)						
330								

4) Repeat for column AD "TOTAL Consumptive Activities" =average(AD2:AD#)

5) Now that we have calculated the top half of the equation, Average # People Observed Per Survey, we need to calculate the survey distance. This is actually easy! It is simply the distance of the transect you walked in one direction.

      a. OUT 2 = 0.92 miles

      b. TRM 1 = 0.84 miles

6)Alternatively, you could have students get on Google Earth and calculate the distance themselves.

7) Finally, to calculate effort divide the totals from steps 3 and 4 by the distance of the appropriate survey.

	Y	Z	AA	AB	AC	AD	AE	AF
	TOTAL Activities	TOTAL Nonconsumptive Activities	TOTAL Nonconsumptive Land	TOTAL Nonconsumptive Water	TOTAL Nonconsumptive Boat	TOTAL Consumptive Activities	TOTAL Consumptive Land	TOTAL Consumptive Water
1								
317	10	10	8	2	0	0	0	
318	5	5	1	3	1	0	0	
319	7	7	6	1	0	0	0	
320	4	3	2	1	0	1	0	
321	2	2	2	0	0	0	0	
322	5	5	5	0	0	0	0	
323	18	18	18	0	0	0	0	
324	9	9	5	4	0	0	0	
325	23	20	12	7	1	3	3	
326	5	5	5	0	0	0	0	
327	2	2	2	0	0	0	0	
328	6	6	2	4	0	0	0	
329	Average	18.51070336						
330								
331	Effort	=Z329/0.84						
332								

Cell reference: Z331, formula: =Z329/0.84

8) Now that we have calculated effort we will create a bar chart comparing the average number of non-consumptive activities vs the average number of consumptive activities observed at our site.

9) To create the bar chart make a table with your data labels and effort totals and then click on Insert > Bar Chart icon > then select which type of bar chart you would like.

10) If the bar chart does have a title or axis labels click on the plus sign next to the chart and select them. The x-axis should already be labeled with Non-consumptive and consumptive. Label the Y-axis "Average # People per Survey Mile."
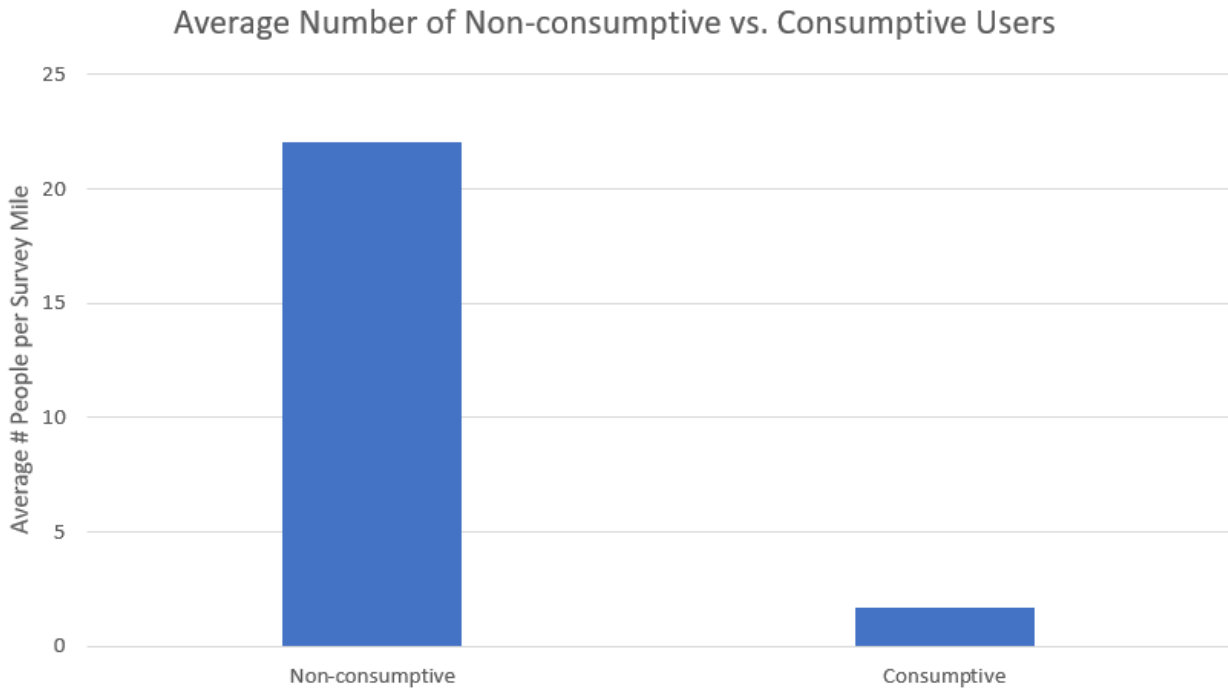
Most Common Activities – Effort

1) Complete the steps above for the five most common activities you identified during the first part of data analysis.

San Diego Zoo Terns and Plovers

1) Ask students if it would make more sense to analyze the amount of terns and plovers seen as a pie chart or as a bar chart (per unit of effort). Should terns and plovers be grouped or separated? Create the appropriate chart.

Student Choice

1) Have students identify a question they would like to answer from the data. Students should write out the question, a hypothesis, run the proper analysis, and create the correct type of chart.

2) Have each group discuss their charts. Which activities were seen most frequently? Which were seen least frequently?

3) What impact might these activities have on the environment? What further questions do you have? What further analysis needs to be done to answer this question?

PART 3: Drawing Conclusions

(*recommended two to three 50-minute class period*)

Activity

-Have students create a poster (or other display) outlining their research using the format of a peer-reviewed journal article:

     o   Introduction (Background on the topic, why it is important to study, what we already know)

     o   Methods (How the data was collected)

     o   Results (Include pie charts here)

     o   Conclusions (What does your data tell us? Why is it important?

-What future studies should be done? What were some possible sources of error?)

-Posters should also include a map of the MPA and a picture of their beach as well as any other relevant items.

-Students will provide an oral presentation of their group project.

Class Discussion

- How do the two types of data analysis compare? When would be an appropriate time to use each method?

-How do MPAs protect ocean ecosystems?

-What type of human activities interfere with the protection of MPAs?

-How do these activities interfere?

-How did human activity compare between the control site (outside of the MPA) and the experimental site (inside the MPA)?

-Did the amount of birds seen inside vs outside the MPA differ? Did you notice any corresponding trends with human use?
-How might different types of human use affect biodiversity? Did you see any evidence for this?
-Is there value in allowing recreation within MPAs?
-What steps can we take to balance protection of natural resources with the importance of allowing recreation in MPAs?
-What are some possible sources of error in your study?
-What do you recommend for future studies?

Did some of your students come up with awesome questions and displays? MPA Watch would love to see them! Please send pictures to angela@wildcoast.org !

Engage: Play one of the games or complete one of the activities from Life in the Sand: Field Guide to Sandy Shores.
Explore: Collect MPA Watch data.
Explain: Explain how different types of human use can impact the environment. Which types of human use are harmful? Which are beneficial?
Elaborate: Have students compare the amount of human use and types of human use inside vs. outside the MPA.
Evaluate: Ask the students questions relating to what they have learned (more questions may be found in Part 3 of this lesson plan).
Q1: How do MPAs protect ocean ecosystems?
Q2: What type of human activities interfere with the protection of MPAs?
Q3: How did human activity compare between the control site (outside the MPA) and the experimental site (inside the MPA)?
Q4: What steps can we take to balance protection of natural resources with the importance of allowing recreation?

NGSS Alignment

HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-ESS3-1. Earth and Human Activity Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

Science and Engineering Practices

Asking Questions: Ask questions that arise from examining models or a theory to clarify and/or seek additional information to determine relationships, including quantitative relationships between independent and dependent variables, and/or evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the sustainability of a design.
Analyzing and Interpreting Data: Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution, apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data, and evaluate the impact of new data on a working explanation and/or model.
Using Mathematics and Computational Thinking: Apply techniques of algebra and functions to represent and solve scientific and engineering problems.
Constructing Explanations and Designing Solutions: Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables. Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.
Engaging in Argument from Evidence: Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence and make and defend a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge.

Crosscutting Concepts

Patterns. Observed patterns of forms and events guide organization and classification and prompt questions about relationships and the factors that influence them.

Online Resources

MPA Watch: www.mpawatch.org ; www.wildcoast.org/mpawatch

Terns and Plovers Datasheet

WILDCOAST COSTASALVAJE

Site: Control or Experimental

Site Name:

Group:

Date:

Start Time:

End Time:

Snowy Plover

The western snowy plover is a small shorebird, about 6 inches long, with a thin dark bill, pale brown to gray upper parts, white or buff colored belly, and darker patches on its shoulders and head, white forehead and supercilium (eyebrow line).
U.S. Fish and Wildlife Service

# Birds in Group	Bird Activity	Human Activity

California Least Tern

The CA Least Tern has a distinctive black cap. It has black stripes running from the cap across the eyes to the beak. These contrast with a white forehead. 8¼ to 9 inches long. Its wingspan is 19 to 21 inches. Has a forked tail.
U.S. Fish and Wildlife Service

# Birds in Group	Bird Activity	Human Activity

MPA Watch Data Sheet

MPA WATCH | **WILDCOAST COSTASALVAJE**

Name(s):		Date: ___/___/_____	Transect ID:
Start Time:	End Time:	Clouds: clear (0%)/ partly cloudy (1-50%)/ cloudy (>50%cover)	Precipitation: yes / no
Air Temperature: cold / cool / mild / warm / hot		Wind: calm / breezy / windy	Tide Level: low / med / high
Visibility: perfect / limited / shore only		Beach Status: open / posted / closed	Sea State: 0-2ft 2-4ft 4-6ft 6ft+

On-Shore Activities	Rocky	Sandy
Recreation (walking, resting, playing, etc. NOT tidepooling)		
Wildlife Watching		
Domestic animals on-leash		
Domestic animals off-leash		
Driving on the Beach		
Tide-pooling (not collecting)		
Hand collection of biota		
Shore-based fishing (describe gear in comments)		

Off-Shore Activities (Non-Boating)	
Surfing/Boogie Boarding	
Offshore Recreation (e.g., swimming, bodysurfing)	
Stand Up Paddle Boarding	
Non-Consumptive SCUBA and snorkeling	
Spear Fishing (free diving or SCUBA)	
Other Consumptive Diving (e.g., nets, poles, traps)	

Boating	
Boat Fishing (Describe gear in comments)	
Kayak/Canoe/Dinghy	
Dive Boat (stationary – flag up)	
Whale Watching Boat	
Work Boat (e.g., life-guard, DFW, research, coast guard)	
Commercial Passenger Fishing Vessel (5+ people)	
Other Boating (e.g., powerboat, sail boat, jet ski)	

Comments

Did you observe: ☐ scientific research; ☐ education; ☐ beach closure; ☐ large gatherings (e.g., beach cleanup); ☐ enforcement activity

Did you report a violation: ☐ yes ☐ no   If yes, how many violations did you report _____

Who did you report the violation to (mark all that apply): ☐ DFW ☐ State Parks ☐ other entity (e.g., lifeguard, harbor patrol)

Which method did you use to report your violation (mark all that apply): ☐ phone call ☐ text ☐ mobile app ☐ website ☐ email ☐ in person

TO REPORT POTENTIAL VIOLATIONS CALL CalTIP: 888-334-2258