Program Overview

Timeline:

9:00AM- arrival 9:05-9:15 Canyon to Coastline program Introduction 9:20-9:50- LCF Program (30 min) 10:00- get on the bus and travel to Montage. 10:15-walk to Treasure Island/Christmas Cove 10:30-11:00-LOF Program (30 min) 11:00- walk to PMMC (5 minutes if LOF's station is at Christmas Cove. If we're at Treasure Island, then we'll cut our program by 5 minutes and make it 10 for walking instead) 11:05--11:35 PMMC Program (30 min) 11:35-11:45 Canyon to Coastline program wrap up 11:45-12:00 Walk back to bus and leave

Objectives for program as a whole:

- Define MPA
- What are the living and non-living parts of an MPA?
- Why do we need an MPA?
- How can I affect an MPA?

Procedure:

After an introduction and safety talk, students will be broken up into small groups and participate in the following activities. In their last activity station, there will be a conclusion/ program wrap up and then student will head to the bus.



Healthy Estuaries Lesson

Presented by Laguna Canyon Foundation

Objectives:

- Describe Aliso Creek watershed:
- Define what an estuary is.
- give examples of how an estuary affects the MPA (+ and -)
- Report on how this watershed/ estuary has changed over time and hypothesize on its health.
- List at least one thing LCF is doing to restore the estuary/creek to health.

Vocabulary:

Creek, Estuary, Watershed, Nutrients, Marine Protected Area

Materials:

- a. Past pictures of the Aliso creek watershed
- b. Data of aquatic life found on site
- c. Heal the Bay water quality data
- d. Some examples of native estuary plants
- e. Diagram of an estuary or wetland area
- f. Pictures of native waterfowl?

Guiding Question/ Challenge:

Is Aliso creek/estuary heathy?



Healthy Estuaries (cont.)

Procedure:

Introduction: 10 min

- What is a watershed? Aliso creek ranges from the foothills to where we stand, it is 19.8 miles long. (Show poster)
- Where does the water come from? Rain, maybe snow and human use runoff.
- Where is the water going to? COASTLINE

What role does an estuary play in a healthy ecosystem

<u>"</u>The area where a freshwater river or stream meets the ocean- where we are right now is called an estuary. Today we are looking at Marine Protected Areas so what are we doing in a canyon looking at an Estuary? How does an affect the MPA? There are 2 main ways:

- 1. Water travels from land to ocean, carrying soil, sand, debris and potentially pollution and nutrients.
- 2. Some Aquatic species travel between the fresh and salt water as a part of their life cycle: some fish begin life in the fresh water of rivers and streams, migrate to the ocean to grow into adults, and then return to fresh water to spawn. Some fish species that migrate from fresh water down into the sea to spawn, such as eels

Native anadromous fishes are jawless lampreys, bony-plated sturgeons and the small, short-lived smelts."

Describe a healthy estuary:

"In a heathy estuary, certain species of plants grow in the water and along the banks that slow the water down allowing sand and dirt suspended in the water to sink. This means that as the water slowly seeps into the ocean on the coastline – it does not fill the sea with dirt and debris from the land. These plants soak up the water and use nutrients and filter out some pollution.

Without these plants, nutrients from the land would cause massive algae growth in the waters along the coast, killing marine life. Additionally, in a healthy estuary fresh water and saltwater combine and create a home for species of fish and other small marine creatures and they in turn create a food source for marine birds and other predators". (show fish and bird pictures)

Body: 10 min

"Today we are going to ask you to be scientists. By looking at the types of plant life, the clarity and speed of the water movement, testing the water for excessive nutrient loads and pollutants, reviewing the types of aquatic life in an estuary we can tell if it is healthy."

Student Activity:

Decide if Aliso creek estuary is healthy or not for yourself. Take 5-10 minutes to review the following:

- g. Past pictures of the Aliso creek watershed
- h. Heal the Bay quality data
- i. Observe the current estuary looking at water speed and clarity.
- j. Look for the type of plants that are typical of an estuary.
- k. Look at the physical space is there enough room for water to stand still and plants to grow?

5 min- After reviewing the materials have students choose sides, healthy or unhealthy. (have them stand in two separate areas)

Then Discuss why they made their decision.

What animals do we see? What manmade structures/behaviors do we observe? What is water quality? What manmade behaviors affect water quality? What can we do to help?

Conclusion: LCF has been actively restoring Aliso Creek by removing invasive species such as *Arundo donax*, a giant reed, and replacing it with native plants like arroyo willow and mulefat. Arundo grows in dense stands and monopolizes the banks of the creek of space, water, and sunlight. Native plants and wildlife have been displaced because of how quick and dense Arundo can grow. One example is the southwestern pond turtle, a native turtle species that is considered threatened under the Endangered Species Act of 1973. Before restoration began on Aliso Creek, the southwestern pond turtle population was very low due to the turtles being unable to nest in the dense Arundo. Now, the population has been able to rise due to habitat restoration projects in the creek and the removal of the Arundo. (show Aliso Creek restoration and turtle pictures)



Nurdle Collection Activity

Presented by Laguna Ocean Foundation

Objectives:

- Students will be introduced to marine debris and learn how they can help reduce the amount of trash that ends up in the ocean
- Students will learn what a nurdle is and how plastic pollution impacts tidepool species
- Students will learn how to appreciate the animals in an MPA without disturbing them

Time: 20-25 minutes

Materials:

- Sifting shovels (two different sizes)
- Forceps
- Clipboards
- Laminated ID sheets
- Laminated data sheets
- Markers
- Example vials with nurdles, styrofoam, and hard-plastics
- Labeled vials for nurdles, other plastics, non-plastic items
- Bucket for trash
- Cones to mark station locations

Set-Up:

Select different locations along the beach for each group's location, place a cone and draw a line in the sand to help specify the boundaries. Place supplies for each group inside of their location to make it easy for them to spot where they need to go.

Procedure:

- a. Provide background information on MPAs, what the rules are, and why you shouldn't litter. Ask the group if they think the beach looks dirty. Do they see a lot of trash and if so, is it large pieces or small pieces of trash?
 - a. Highlight marine debris and plastic pollution and how it impacts tidepool ecosystems (chemical breakdown, animals eating it, introduction of bacteria)
 - b. Highlight the fact that we're only allowed to take human made objects when collecting
- b. Introduce the term nurdle, what they are, and pass around a vial of nurdles, Styrofoam, and hard plastics to show examples.
- c. Explain the materials and show how to sift through sand, pull out a piece of debris and collect it in a vial. Go over the data sheet and how to fill it in.
- d. Break students into groups of 5 with each one having a special role:

- i. Sand sifter (has the shovels)
- ii. Identifier (has the forceps and ID sheet)
- iii. Nurdle and other-plastic holder (has a nurdle vial and other plastic vial)
- iv. Non-nurdle and plastic holder (has two non-nurdle/plastic vials)
- v. Data Collector (has the clipboard and marker)
- e. Point out the bucket for trash if they find anything too large to put in the vials because we don't want to put any trash back into the sand if we find any.
- f. Ask if they have any questions before beginning.
- g. Set timer for 10 minutes and let them start collecting. Give a 1 minute warning when time is almost up.
- h. Have the students all gather back together and share what they found. Make sure to have at least 5 minutes set aside for discussion.
- i. Based on what they found, ask students and discuss:
 - a. After doing the activity, is the beach cleaner or dirtier than you originally thought?
 - b. How do you think certain items ended up there?
 - c. What can you do to help prevent touch. In addition these items from being found on the beach?
 - d. What can you do if you see trash on the beach in the future?

Tidepool Exploration

After the completion of the Nurdle Activity, bring students over to the tidepools to explore. Remind students of the good tidepooler rules and why it's important for everyone to be mindful of where they step and what they, ask them to keep in mind what they just learned about nurdles regarding the size and appearance. Seeing the size and natural habitat for the tidepool species, how could nurdles have a negative impact on them?

*The length of this station is flexible and highly dependent on the length of the nurdle activity, location of activities, and time to get over to the PMMC station. *



Seal Survey Activity

Presented by Pacific Marine Mammal Center

Objectives:

- Students will be introduced to the Harbor Seals at Goff Island
- Students will learn the difference between seals and sea lions
- Students will learn the human impacts on the seal population
- Students will learn how the MPA benefits the seal population
- Students will learn how to conduct field research on seal populations

Time: 10-15 minutes

Materials:

- Binoculars
- Seal survey data sheets
- Pencils

Procedure:

- Introduce the Harbor Seals at Goff Island
- Discuss the difference between seals & sea lions (only with the first group)
- Briefly discuss the life history of harbor seals
- Discuss human impacts
 - Harbor seals: human disturbance
 - o Marine mammal entanglement in fishing gear (gillnets)
 - Climate change affecting food sources (fish fleeing to colder water and ocean acidification killing bottom of the food chain-shelled animals cannot build shells)
 - Discuss why research on animal populations helps our understanding of its status and life history parameters, etc.
 - o Explain and conduct field research activity
 - Discuss ocean stewardship actions & advocacy (Seafood watch, share the shore, anti-climate change actions, clean watershed actions)
 - Discuss how MPAs help provide food for apex predators (fish in MPAs grow bigger and more plentiful and more resilient to environmental disturbances)
- Students will conduct seal survey every 2 minutes (about 3-4 times) using binoculars and data sheets
- Have the students all gather back together and share what they found



Mock Rehabilitation Activity

Objectives:

- Students will learn about human impacts on seals
- Students will learn about seal rehabilitation process
- Students will learn about ocean stewardship actions and advocacy

Time: 10-15 minutes

Materials:

- Stuffed seal
- Seal admission chart
- Stethoscope
- Thermometer
- Bandages
- Mock syringe
- Scissors

Procedure:

- Discuss human impacts (things we see our animals come in for—particularly those below)
 - Sea lions: fertilizer runoff-DA poisoning/cancers tied to chemical contamination o Marine mammal entanglement in fishing gear (gillnets)
 - Climate change affecting food sources (fish fleeing to colder water and ocean acidification killing bottom of the food chain-shelled animals cannot build shells)
- Ask the students if they can determine what is wrong with the sea lion. Prompt them if needed.
- Discuss rehab process & show picture boards
- Discuss how we learn about ocean health through the animals we rehabilitate
- Discuss ocean stewardship actions & advocacy
 - Discuss how MPAs help provide food for apex predators (fish in MPAs grow bigger and more plentiful and more resilient to environmental disturbances)
 - Discuss ocean stewardship actions & advocacy (Seafood watch, anti-climate change actions, clean watershed actions



Program Conclusion

Caring for the watershed and respecting MPAs are beneficial for all marine life and humankind. The nutrient runoff and chemical contaminants that enter our watershed can negatively affect the organisms living in the ocean. Marine mammals, birds, and intertidal creatures can become sick and die from these pollutants, breaking down the ecosystem. When animals live in a marine protected area, it can promote a healthy ecosystem by increasing food resources, limiting entanglements, and decreasing other human impacts. The implementation of a clean watershed and enforced MPA not only promotes a healthy home for marine life but encourages biodiversity and a positive relationship with humans.

