



# EMERALD KEEPERS

## Making Coronado Emerald Green, Ocean Blue

### A MESSAGE FROM EMERALD KEEPERS

This week we look at the transfer of energy through food chains, more specifically, trophic cascades. It is important to note the negative impact plastics have on food chains. Problems occur when food chains are interrupted by plastics. When smaller species ingest microplastics and larger species ingest both these smaller species and plastics, by the time we enjoy a grilled fish dinner, the plastics have accumulated in the fish we eat. This is called bioaccumulation. It doesn't take a scientist to tell you this is not good!

Be an Emerald Keeper. Your choice of paper, tin, and aluminum over plastics makes a difference!

### JUST THE FACTS, NADO!

Since 1969 . . .

- Global population has doubled.
- Waste of edible food has increased such that it now equals the amount of food needed to adequately feed all of the undernourished people on Earth.
- The miles traveled by car each year has more than doubled; there are currently almost one billion motor vehicles on the planet.
- Global fossil fuel use has nearly tripled.
- The production of plastic has increased tenfold.
- The invention of new plastics has grown to consume 10 percent of the fossil fuels used each year.
- One trillion tons of carbon dioxide have been released into the atmosphere from the burning of fossil fuels.

- from *The Story of More* by Hope Jahren



### VISIT OUR EMERALD GREEN, OCEAN BLUE RESTAURANTS

- Bluewater Grill
- Coronado Yacht Club
- Feast & Fareway
- Leroy's Kitchen + Lounge
- Little Frenchie
- MooTime
- Nicky Rottens Bar & Burger Joint
- Night and Day Cafe
- Poké 1-2-3
- Stake Chophouse & Bar
- Tartine
- Tent City
- Village Pizzeria

Visit [EmeraldKeepers.org](http://EmeraldKeepers.org) to learn more.

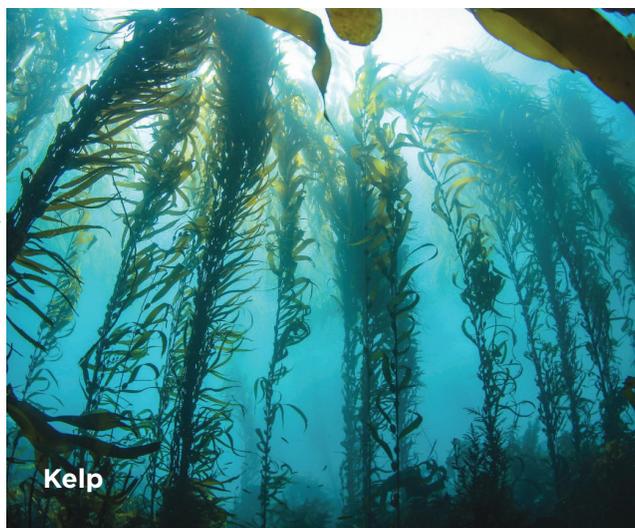
## TROPHIC CASCADES NATURE'S BALANCING ACT



Otter



Sea urchin



Kelp

**THE SUN IS THE SOURCE OF ALL ENERGY.** It enables plants to produce its own food through a process called photosynthesis.

**EVERYTHING IN NATURE IS CONNECTED.** This can be understood and visualized through trophic cascades. Trophic cascades are comprised of direct and indirect interactions. Trophic cascades are like food chains - the transfer of energy from one species to another. For example, the snail eats the sea grass and the crab eats the snail. This simple food chain describes important interactions in the ecosystem.

**LET'S BREAK IT DOWN.** The crab eating the snail is a negative interaction because the snail population is decreased. The snail eating the seagrass is also a negative interaction because the sea grass population is decreased. However, looking at both interactions, the crab has an overall positive interaction on the sea grass. By reducing the snail population, the crab helps protect the sea grass by reducing the number of snails that feed on sea grass. This is a trophic cascade! The interaction of species with negative interactions has an overall positive interaction on the sea grass.

**LET'S TRY ANOTHER EXAMPLE.** Sea otters feed on sea urchins. Sea urchins feed on the roots of kelp causing the kelp to lose contact with the sea floor and float away. As the sea otters eat the urchins, more kelp is able to survive and stay connected. We can identify interactions like this everywhere. They are what keep ecosystems balanced.

**TRY YOUR HAND.** What trophic interactions can you identify?

Species 1 \_\_\_\_\_

Species 2 \_\_\_\_\_

Species 3 \_\_\_\_\_

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For more information visit [EMERALDKEEPERS.ORG](http://EMERALDKEEPERS.ORG)