The orcas' typical food source, seals, are less abundant which causes them to move further inland and prey on more sea otters.

Unmanaged commercial fishing leads to overharvest.

Remove 1 yellow block.

Remove 1 orange block

Increased burning of fossil fuels by humans leads to decreased ocean pH and warmer temperatures. This process of ocean acidification makes it difficult for urchins to build their exoskeletons.

Fertilizer from farms runs into the ocean and leads to overgrowth of algae. The algae releases a poison that is toxic to sea otters.

Remove 1 orange block

Remove 1 purple block

People don't clean up after their pets and cat poop gets into the water. It carries a disease that infects sea urchins and kills sea otters. Fertilizer from people's lawns washes into the ocean and causes an algal bloom that blocks sunlight and prevents kelp from growing.

Remove 1 **purple** block and 1 **orange** block

Remove 1 green block

| As ocean surface temperatures rise, storms become more severe. A massive storm destroys kelp forests. | A large ship creates an oil spill off the coast. Remove 1 block of each color (except blue) |
|---|--|
| Remove 2 green blocks | |
| A ship from a different port | Sea otters are dying from |
| introduces invasive crabs | diseases. This leads to an explosion of sea urchins and a |
| which outcompete sea urchins and fish for food. | decrease in kelp. |
| Remove 1 purple and 1 | Remove 1 orange block and 2 |
| yellow block | green blocks |
| | Add 1 purple block |
| Declines in kelp eliminate | Restrictions under the Marine |
| hiding spaces for fish, leading | Mammal Protection Act are lifted. Humans are allowed to |
| to more predation by orcas. | hunt orcas and sea otters |
| Remove 1 yellow block | again. |
| Add 1 red block | |
| | Remove 1 red block and 1 |
| | orange block |
| ı | <u>,</u> |

| Overharvest of large fish leaves mainly smaller fish in the oceans. This results in less profit for fishermen. Remove 1 blue block | Poisoning of fish and sea urchins from urban run-off causes a recreational fisherman to get sick from consuming these animals. Remove 1 blue block |
|---|---|
| Warming ocean temperatures reduce the number of fish eggs that successfully hatch. Remove 1 yellow block | Disturbance from kayakers causes otters to focus on swimming away instead of searching for food, leading to starvation. Remove 1 orange block |
| Noise from large ships disrupts sonar communication among orcas, reducing their hunting efficiency. Remove 1 red block | Humans overharvest kelp for pharmaceutical and food products. Remove 1 green block |

| Rising temperatures reduce kelp's defense against bacterial infections. Remove 1 green block | Local schools and businesses agree to use renewable energy sources to cut down on greenhouse gas emissions. Add 1 green block |
|---|--|
| The Sea Otter Savvy conservation group increases awareness about keeping a safe distance from sea otters while kayaking. Add 1 orange block | Local farmers agree to reduce fertilizer use. Add 1 green block |
| Students organize a bike-to- school event to reduce CO ₂ emissions from cars, helping to limit ocean acidification. Add 1 purple block | Researchers are given money to study sustainable harvest levels for fish. Add 1 yellow block and 1 blue block |

| Engineers discover a new way to reduce noise from commercial ships, creating less disturbance for orcas. Add 1 red block | The school establishes a recycling program so less trash ends up in the ocean, reducing plastic ingestion by fish. Add 1 yellow block |
|---|--|
| An oil pipeline bursts, releasing oil into the water. Roll the dice 3 times to | Rising ocean temperatures impact all levels of this system. |
| determine what color blocks | Roll the dice 2 times to |
| to remove | determine what color blocks |
| | to remove |
| During a rainstorm, trash is | A new marine protected area |
| washed into the ocean. | is established, benefiting all levels of the food chain. |
| Roll the dice 1 time to | |
| determine what color block to | Roll the dice 2 times to |
| remove | determine which color blocks to add |
| | |