



MPAs and the Future of Commercial Fishing

> Section A) MPAs and Commercial Fishing

MPAs are designed to protect areas of the ocean, and in doing so, protect the habitats of many kinds of ocean life. MPAs often include spawning and nursing grounds where species of fish lay eggs. They provide safe spots where fish can reproduce, and juvenile fish can grow to maturity.

In an MPA, because young fish are safe from fishers in the no-take zones, they can survive until they are mature enough to reproduce. Some eggs, larvae and mature fish often leave the MPA and replenish nearby fishing grounds. This benefits fishers and the communities that rely on them. This spillover effect results in larger, healthier populations of fish both inside and outside the reserve/MPA.

However, sometimes MPAs prevent fishing communities from using areas of the ocean they have been harvesting for centuries. Fishers can become frustrated if they have to travel further to find fish. Since so many fish stocks are already low or in decline, many fishers' nets are coming up empty, and fishers everywhere are worried for their future. For this reason, it's very important that scientists and governments work closely with local fishers when they decide where MPAs are needed, and to help fishers understand the long-term benefits of creating safe spots for fish to breed and grow.

Fishing communities must be able to sit down with those who create MPAs to develop a plan that takes their livelihoods into consideration. They can be very helpful in the process, since in some cases fishers can offer a wealth of knowledge about ocean species and geography. They can help scientists learn more about marine ecosystems and identify the areas that need to be protected.



Name: _____

1. Describe the frustrations or concerns that you think fishers might have with MPAs where fishing is not allowed.

2. How might MPAs benefit fishers?

3. Do you think fishing near an MPA would result in a smaller or a bigger catch? Why?





> **Section B) Fishing Technology: Reducing Bycatch**

We use many fishing methods to catch various types of seafood from the ocean. We have always treated the ocean as a limitless source of food. So, many of the techniques we use to fish can be very wasteful and result in what we call “bycatch”. Bycatch is any marine creature that’s accidentally caught on a fishing line, or in a net that’s intended for other species. These unwanted catch include fish and other marine creatures, many of which are thrown back into the water, dead or dying, as waste. About 25% of what fishers catch on lines and in nets is bycatch. Included in this huge amount of waste are many at-risk and endangered species, and many young animals that have not had a chance to breed.

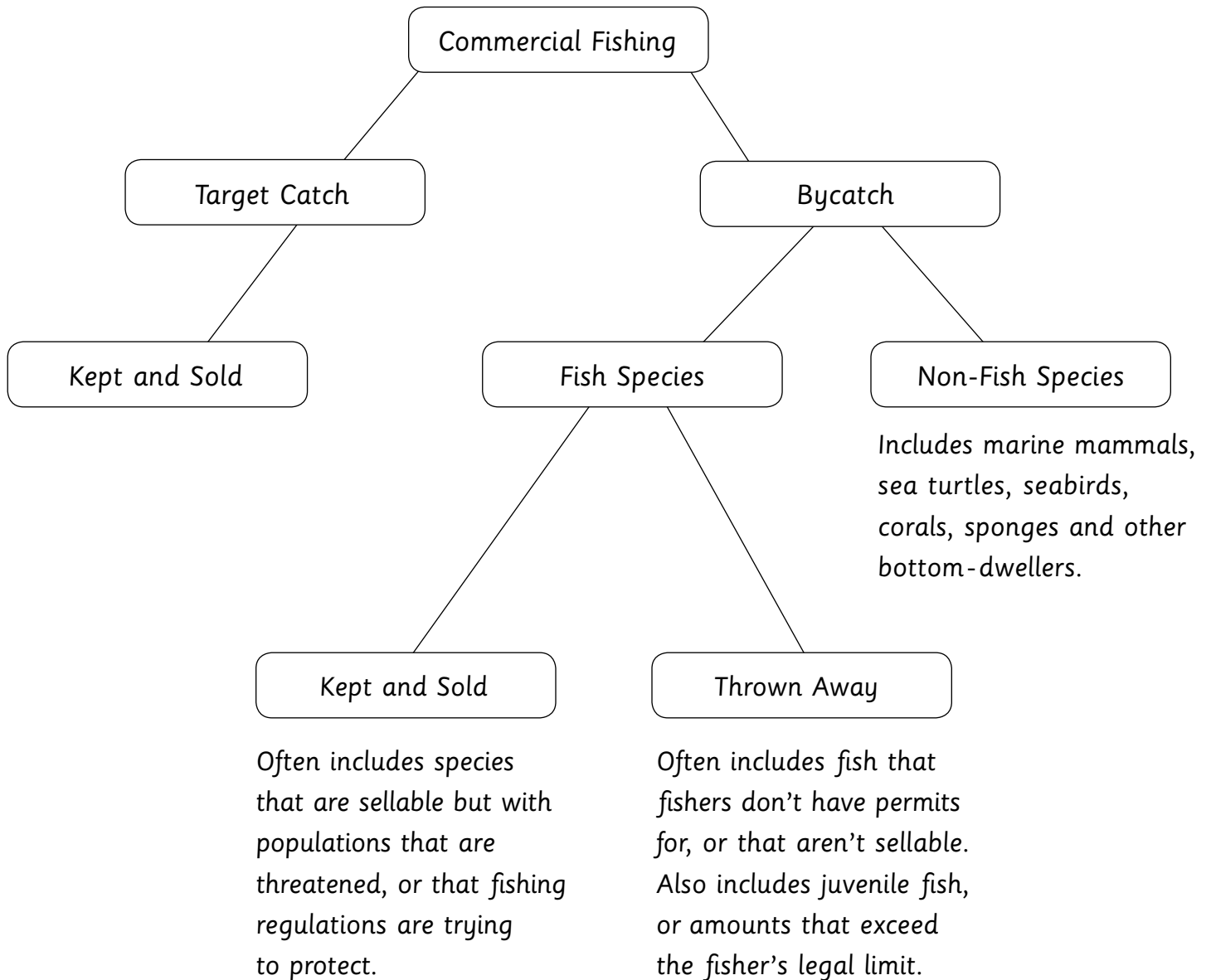
Bycatch poses a significant conservation problem. We need to change the methods that we use in commercial fishing to reduce waste, and protect marine species, particularly those that are endangered or recovering from population declines. With the right gear, fishing in the right place and at the right time, we can drastically reduce bycatch everywhere. MPAs provide marine creatures with protected areas in which to breed and grow, allowing their populations to recover from wasteful fishing practices, like those that result in so much bycatch.





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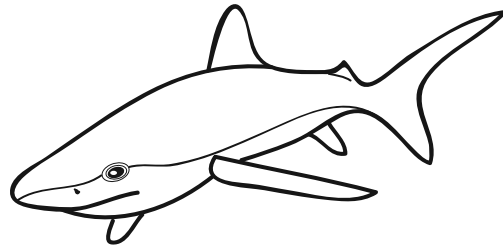
Bycatch



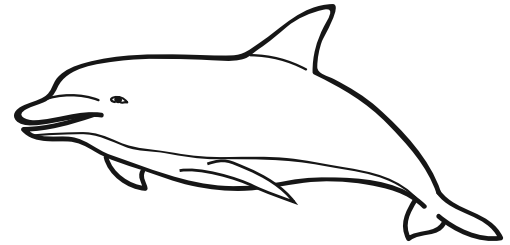


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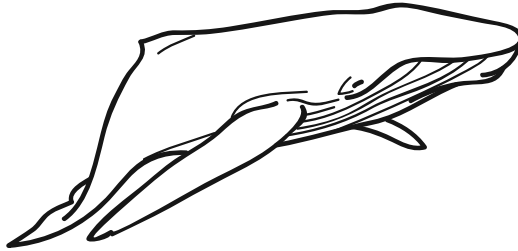
Some of the ocean creatures caught as bycatch include:



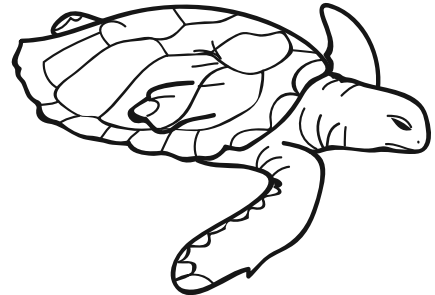
Sharks



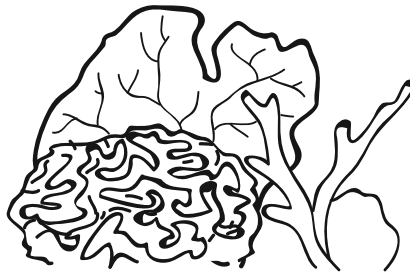
Porpoises and dolphins



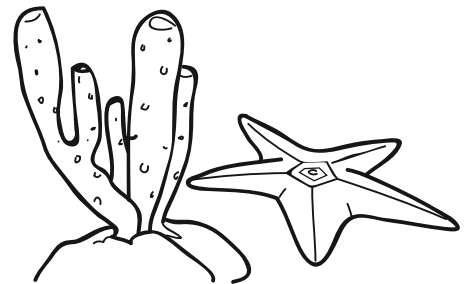
Whales



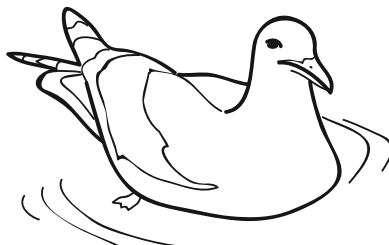
Sea turtles



Corals



Sea stars or sponges



Seabirds



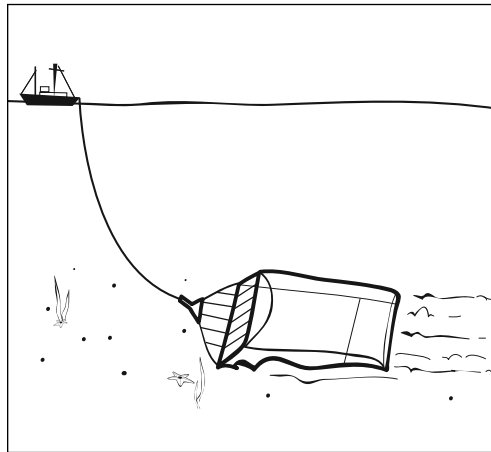
Seaweed



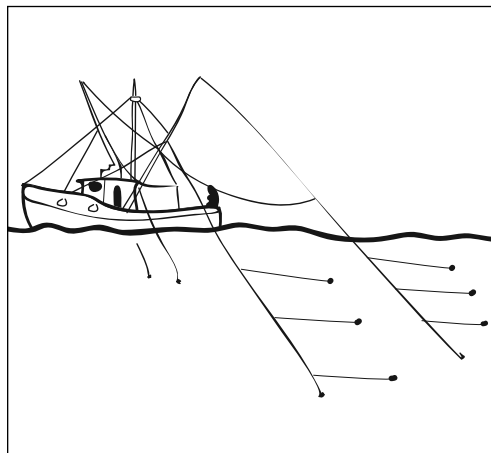


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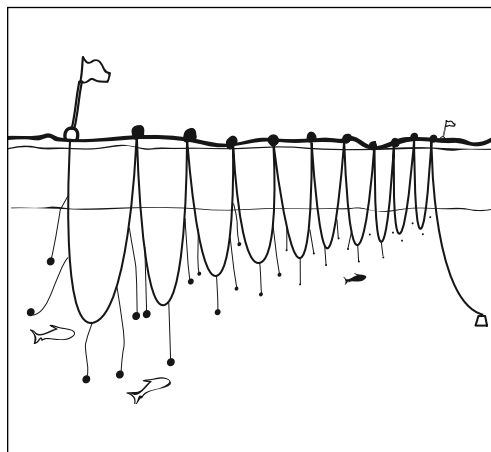
1. See if you can determine which types of fishing methods are less wasteful, and which types result in high losses from bycatch. Add drawings of the creatures that you think might be caught as bycatch in each image.



Dredging: A metal frame with a chain mesh bag attached is dragged across the ocean floor to catch scallops, clams, oysters and urchins.



Trolling: Baited fishing line is towed behind a boat to catch tuna, mackerel or any fish that swims in the open sea.



Longlining: Long lengths of fishing line floats on the water, or is weighted to the bottom. Baited hooks catch tuna and swordfish on the surface, and cod, halibut and haddock near the bottom.

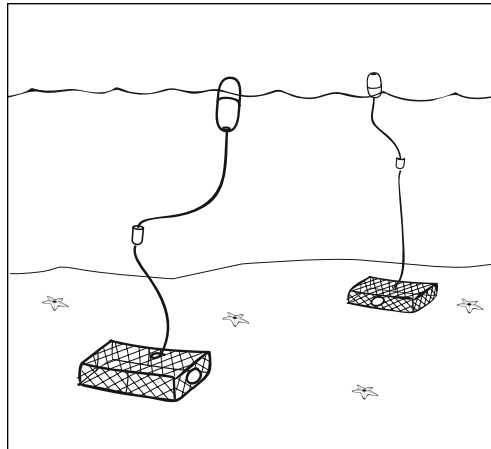
Canon



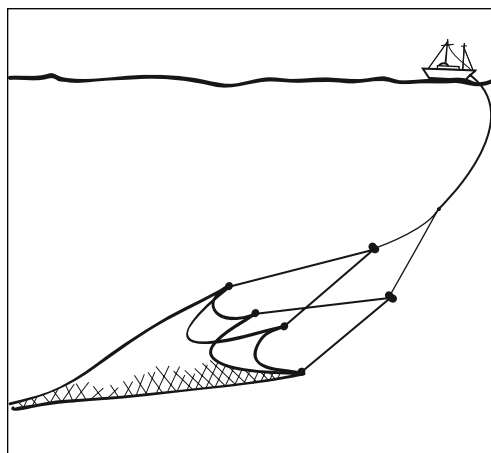
Name: _____



Diving: Divers handpick lobsters, sea urchins and sponges.



Traps: Baited cages on the ocean floor attract lobsters, crab and shrimp.



Trawling: A cone-shaped net is dragged through the water to catch schools of pollock, or along the ocean floor to catch cod, flounder, redfish or shrimp.

Canon



Name: _____

2. Which types of fishing methods do you think result in the most/least amount of bycatch?

i) Mark X's with a red coloured pencil beside the two types that you think might be the most wasteful types of fishing methods.

ii) Put check marks with a green coloured pencil beside the two fishing methods that you think might result in the least amount of bycatch.

3. Innovations That Reduce Bycatch

Here are some solutions that have been created to reduce bycatch.

i) Circle hooks: Research circle hooks. Draw a diagram below that describes how they work.



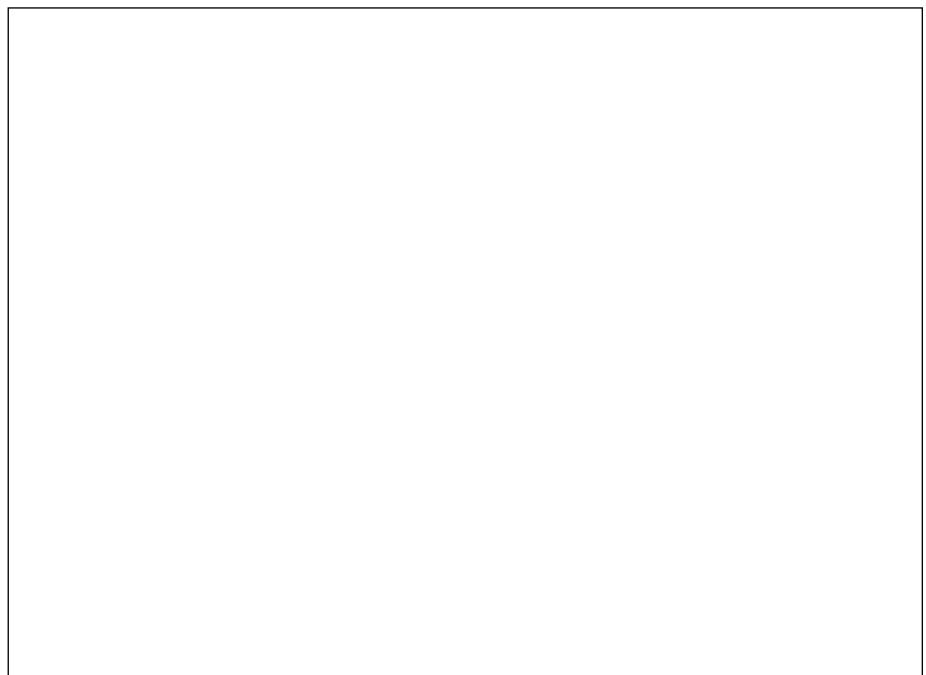


Name: _____

ii) The Turtle Excluder Device (TED): Research the TED. Draw a diagram below that describes how it works.



iii) Pingers: Research pingers. Draw a diagram below that describes how they work.





Name: _____

iv) Be an inventor! Draw a diagram of your very own invention and describe how it will help fishers to reduce bycatch. Don't forget to give your invention a catchy name!

Have an in-class competition where you rate each other's designs, with points for originality, simplicity, affordability of materials, and how effective you think the design would be.

The one with the highest overall score will be named Fishing Invention of the Year!

Fishing Invention of the Year!

Canon



Name: _____

> **Section C) Stewardship of the Oceans**

A steward is a person who is responsible for the care of something. We are all stewards of the Earth. It has been entrusted to us, and we are all responsible for its health and well-being. When we overfish our oceans, we are not doing a good job of caring for the Earth and its resources. So, what can each of us do to help?

Even if you are not a fisher, there are ways you can take responsibility for the care of our oceans. Did you know that every time you buy a can of tuna at the store, your choice can make a difference? Your choice sends a message to the fishing industry that you will only buy products that support sustainable fishing.

1. Out To Lunch

Take a look at the menu to read about some commonly eaten kinds of seafood. Using what you've learned about fishing technology, decide which items on the menu would be a good choice, and which ones to avoid.





Name: _____

Le Menu

Bluefin Tuna

Canned white tuna. Overfished and caught on surface longlines.

Skipjack or Albacore Tuna

Canned light tuna: Often caught by trolling worldwide. Except when imported from Hawaii or the Pacific, where it's caught on surface longlines.

Sea Scallops

Still abundant in the North Atlantic but overfished in the Mid-Atlantic. Caught by dredging.

Coho Salmon

Wild-caught Coho are still abundant, although in California some species of Coho salmon are endangered.

Atlantic Salmon

Most salmon fishfarming releases waste into the ocean. Salmon in farms are fed fish from the ocean. They consume more fish than is produced by farming them.

Rainbow Trout

If from North America, they are farmed in an ecologically responsible way.

Crab

King crabs or Snow crabs, if caught in Canada or Alaska, come from fisheries that are well-managed. They are caught in traps. Imported king crabs from Russia often come from overfished or mismanaged fisheries.

Atlantic Cod

Overfished, and in most places endangered or threatened. Often caught by trawling.

Pacific Cod

Populations are not yet depleted. Unlike Atlantic cod, these are often caught by hook-and-line or new types of bottom longlines that reduce bycatch.

Canon



Name: _____

i) Your waiter offers you a delicious, creamy soup made from Coho salmon. Would you ask your waiter any questions before deciding if you wanted it? Would you order it? Why or why not?

ii) You're really hungry for a tuna salad sandwich! What kind of tuna should you order, and why?

iii) The waiter offers you a delicious stew made from Russian king crab legs. Do you order it?





Name: _____

iv) You really want fish and chips, but the fish they offer is cod. What should you ask before you order your fish and chips?

v) Captain Hook's, a local seafood restaurant, is serving an all-you-can-eat scallop buffet. You ask where they're from, and the waiter tells you they're imported from the Mid-Atlantic. Take a piece of paper and write the Captain a letter telling him why you do or don't support his menu choice. Explain your reasoning, talk about how scallops are harvested, and offer alternative suggestions for the menu.

2. Here are a few more actions you can take to help be a steward of the ocean:

- Talk to your parents. Inform them so they can choose to buy certain types of seafood over others, avoiding species that are overfished, or that are harvested in ways that hurt the marine environment.
- You can help educate others about the importance of our ocean, how it is being threatened, and the various marine species that need protection.





Answers: MPAs and the Future of Commercial Fishing

Section A) MPAs and Commercial Fishing

1. Open

- Fishers feel the pinch of declining fishing populations. Being told they can't fish in areas they've fished for years provokes fear of losing their income and possibly their livelihood, having to travel further for fewer fish and therefore raising the cost of fishing and increasing competition between fishers.
- Fishers might fear that MPAs creators/legislators lack understanding about the fishing industry, stock statuses and ocean geography to make decisions about where fishers should and should not be allowed to fish.

2. Open

- By protecting breeding grounds and nurseries, fish populations can build up over time in the MPA. Spillover of fish into surrounding fishing grounds will benefit fishers. Long-term, MPAs help to create stronger, healthier populations of fish both inside and outside the MPA.
- MPAs protect the marine ecosystem – species, habitats and vital processes and interactions, to keep it intact, healthy and thriving, which benefits all of us.
- Create areas of controlled tourism that generate money and help educate people about the ocean.
- Protect habitat for both commercial and non-commercial species.

3. Open

- Bigger catch will result by fishing near a MPA.
- Fish that breed in MPAs often travel through the fishing grounds to get there.
- Large and healthy fish populations inside the MPA mean eggs, larvae and mature fish often leave the MPA and spillover into surrounding fishing grounds (to use this term, make sure to introduce it in the Section A passage) to benefit fishers fishing in the area.

Section B) Fishing Technology: Reducing Bycatch

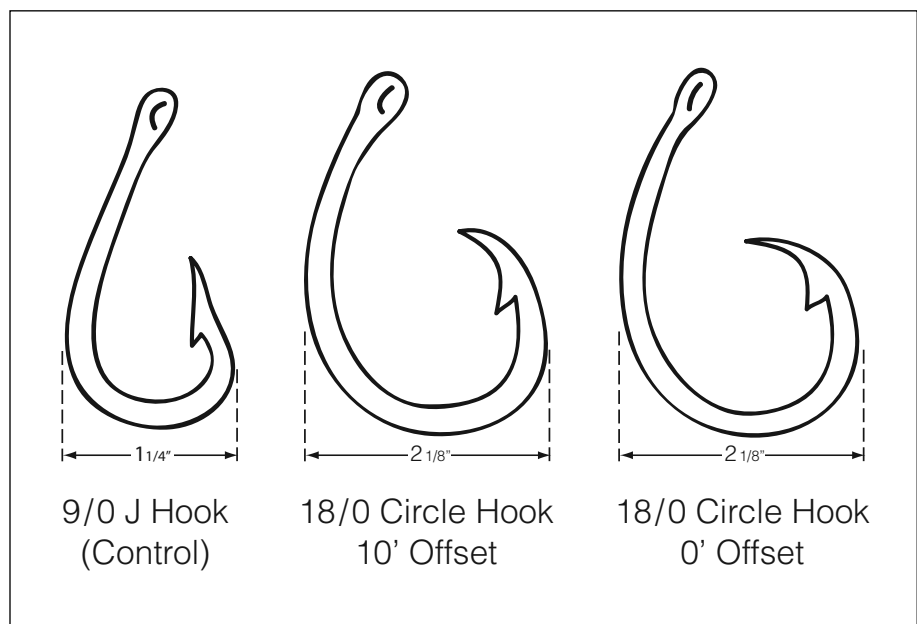
- **Dredging:** seaweed, sea stars, coral.
- **Trolling:** can catch sharks, porpoises or dolphins which is stressful for the animals, but they can be released without harm.





Answers: MPAs and the Future of Commercial Fishing (continued)

- **Longlining:** sharks, porpoises, dolphins, sea turtles.
 - **Traps:** could cause a little damage to seaweed or sea stars where traps are dropped on the ocean floor. Sharks, dolphins, whales and porpoises can occasionally get tangled in ropes.
 - **Trawling:** if along the ocean floor, trawling damages sponges, sea stars and coral. Trawling through the water scoops up sea turtles, sharks, porpoises, dolphins and small whales.
 - **Diving:** as long as divers are responsible about what they take, very little bycatch.
2. Which of the types of fishing above do you think result in the most/least amount of bycatch?
- i) **X** = Trawling, dredging and longlining are the most wasteful types of fishing.
- ii) **✓** = Diving, trolling and traps produce less bycatch.
3. i) Circle Hooks:
- Replace J-hooks on lines with circular shaped hooks that are more difficult for large animals to swallow and easier to remove. These prevent sea turtles from being caught as often, and allow them to be set free more easily if they do get caught.

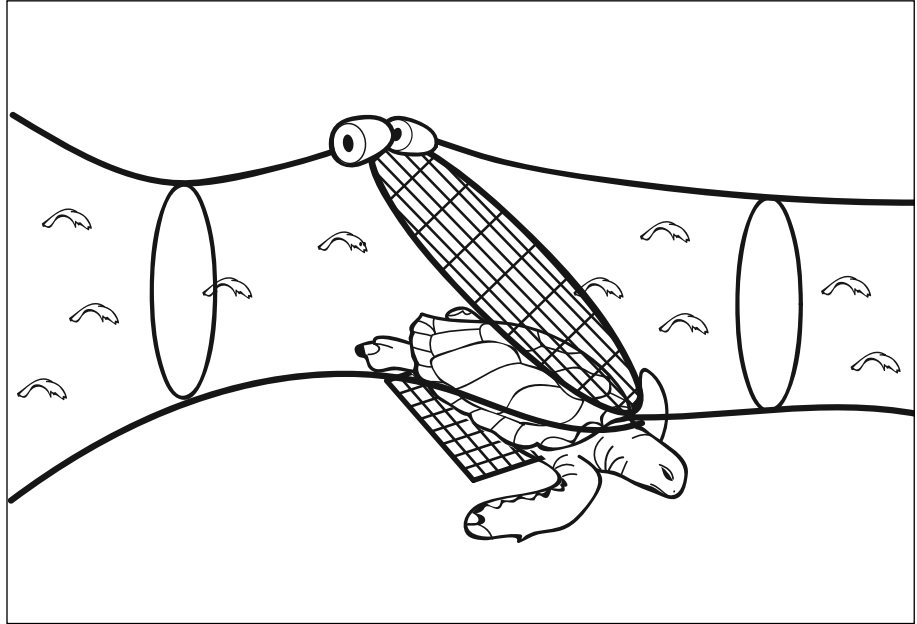


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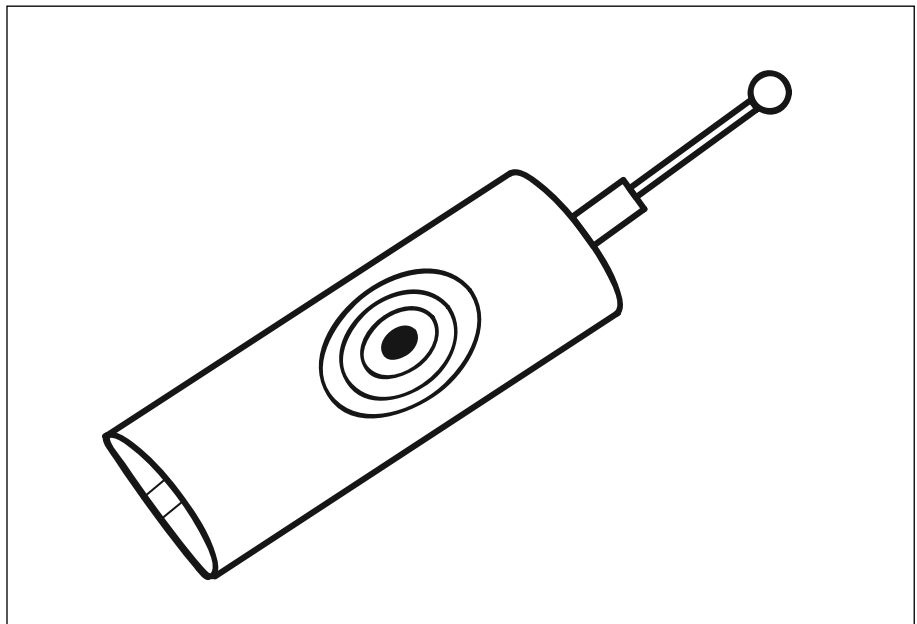


Answers: MPAs and the Future of Commercial Fishing (continued)

- ii) TED: A row of metal bars that stretch across the neck of nets to prevent bigger animals such as sea turtles from entering too far where they become caught or trapped, and directs them to an escape hole.



- iii) Pinger: Alarms that are attached to nets. They make warning sounds that alert sea creatures like dolphins and porpoises to their presence so they can avoid getting entangled in these fishing nets.



Canon



Answers: MPAs and the Future of Commercial Fishing (continued)

Section C) Stewardship of the Oceans

1. Out To Lunch

i) Open

- Student should think about which kinds of salmon are still okay to fish and eat.
- Student should ask the waiter if the Coho salmon is from California. If not, then it's okay to order it.

ii) Open

- Student should think about which kinds of tuna are still okay to fish and eat. Bluefin tuna is overfished, so should be avoided. Skipjack and albacore are okay as long as they are not imported from Hawaii or the Pacific.

iii) Open

- No, Russian king crab are overfished or come from mismanaged fishing industries.

iv) Open

- You should ask if the cod is Atlantic or Pacific cod. If it's Pacific cod, order the fish and chips. If not, tell the waiter that the restaurant should not be serving an overfished stock like Atlantic cod.

v) Open

- Letter should express concern that Captain Hook's is serving overfished scallops from the Mid-Atlantic.
- Student should suggest that the restaurant choose scallops from the North Atlantic where they are still abundant.
- Might also mention that dredging, used to harvest scallops, is a wasteful form of fishing that results in bycatch and damage to the ocean floor.
- Might suggest that serving all-you-can-eat scallops from the Mid-Atlantic is especially wasteful and encourages people to overeat a kind of seafood that's depleted, thereby threatening their survival.

Canon