



Threats to Biodiversity/Sustainability

WHAT IS





Biodiversity measures the variety of life in an ecosystem.

The more biodiversity there is, the higher the number of *unique* species in the ecosystem.



An ecosystem's health is typically measured by how much biodiversity it has.

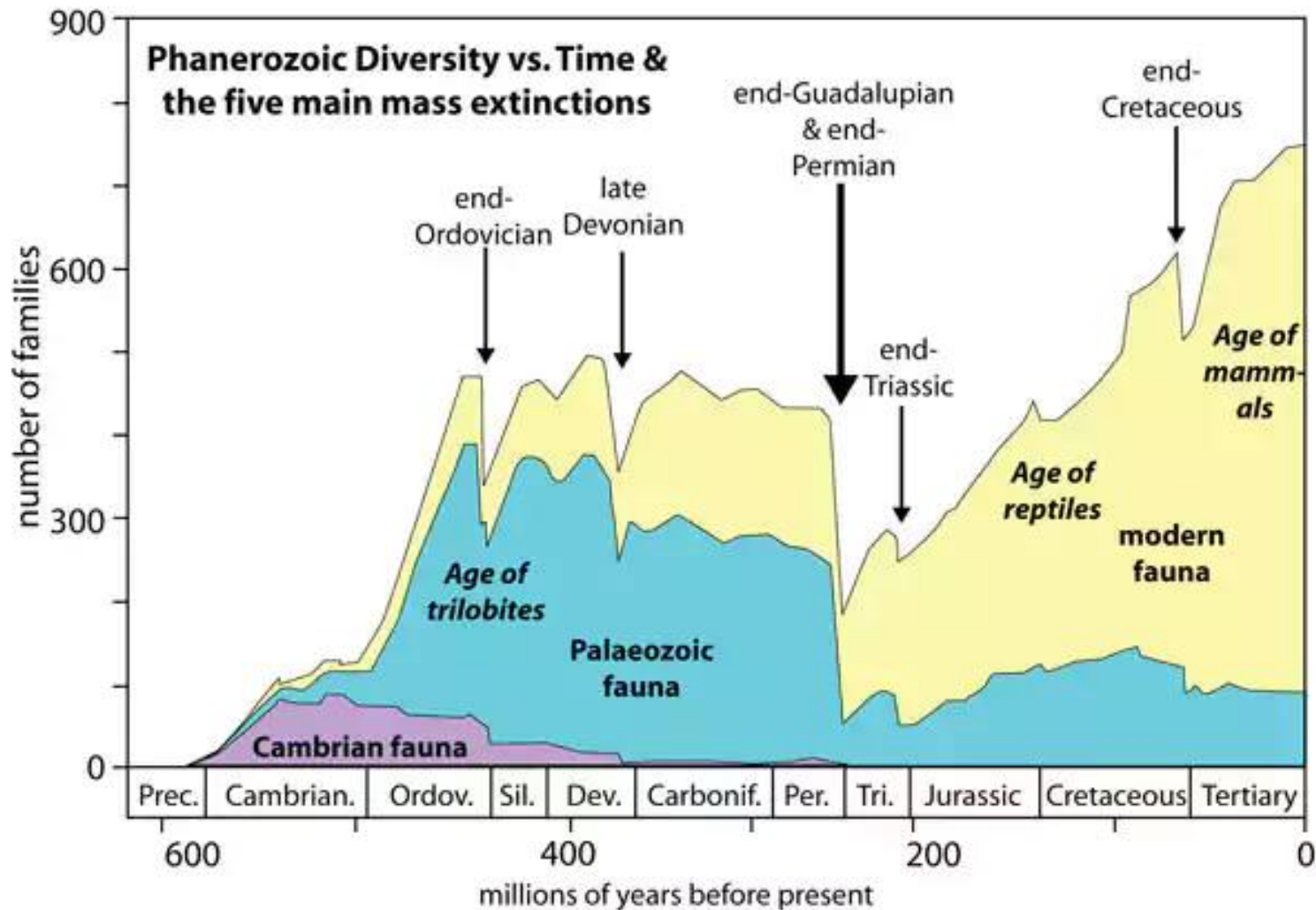
The loss of even a single species can threaten the overall stability of an ecosystem.

Earth has had
moments of massive
biodiversity loss in the
past.

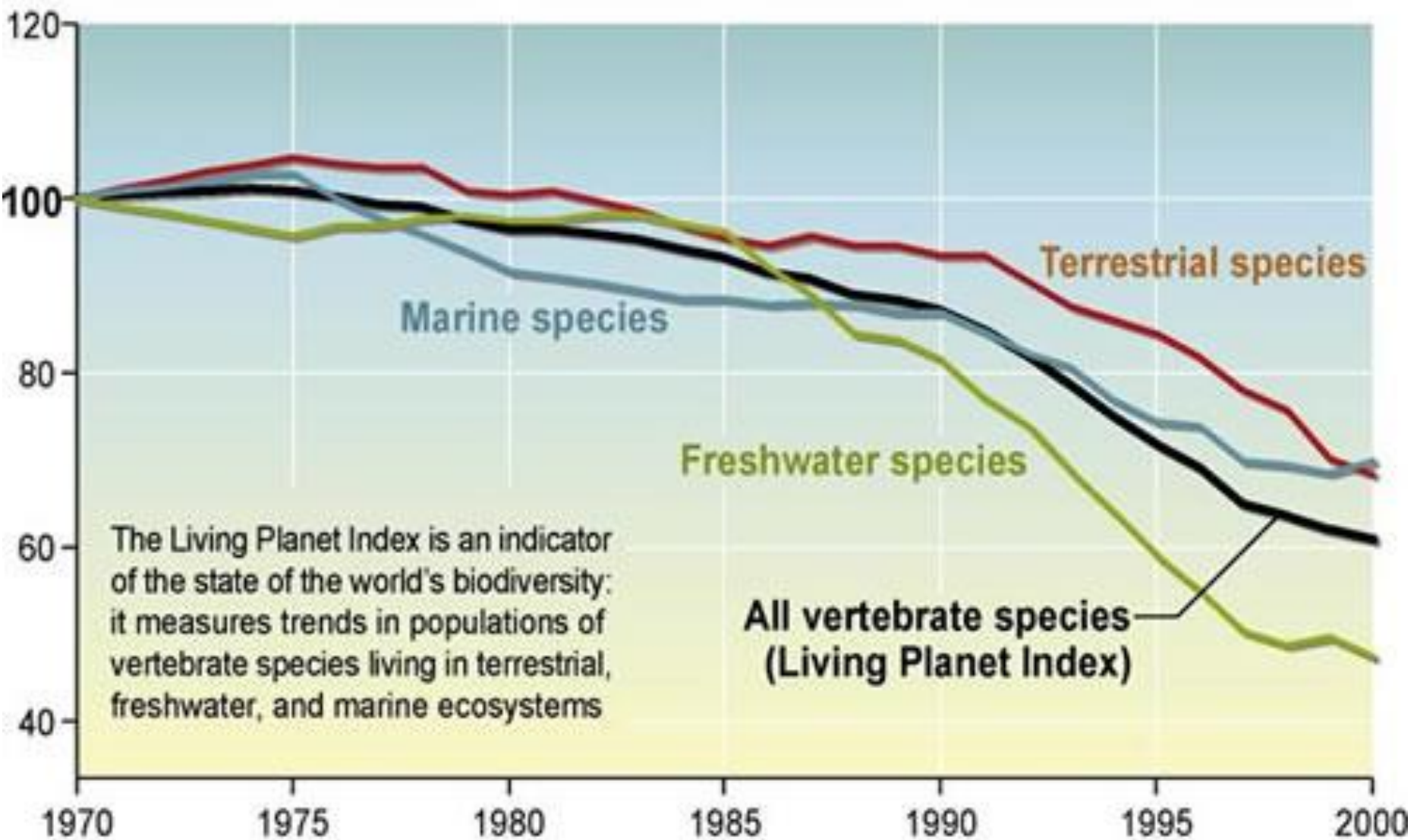
These events are called Mass Extinctions



Previous Mass Extinctions



Population Index = 100 in 1970



Source: WWF, UNEP-WCMC

Are We in the Midst Of a Sixth Mass Extinction?

A Tally of Life Under Threat

The International Union for Conservation of Nature has evaluated 52,205 species, depicted here, for their ability to survive. [Related Article »](#)

Each symbol represents 100 species assessed:

THREATENED

NOT THREATENED

BIRDS

99% of known species assessed
8,601 not threatened

1,253 threatened:

13%

of those assessed

MAMMALS

85% of known species assessed
3,448 not threatened

1,138 threatened:

25%

of those assessed

Stark Indicators Of Extinction Risks

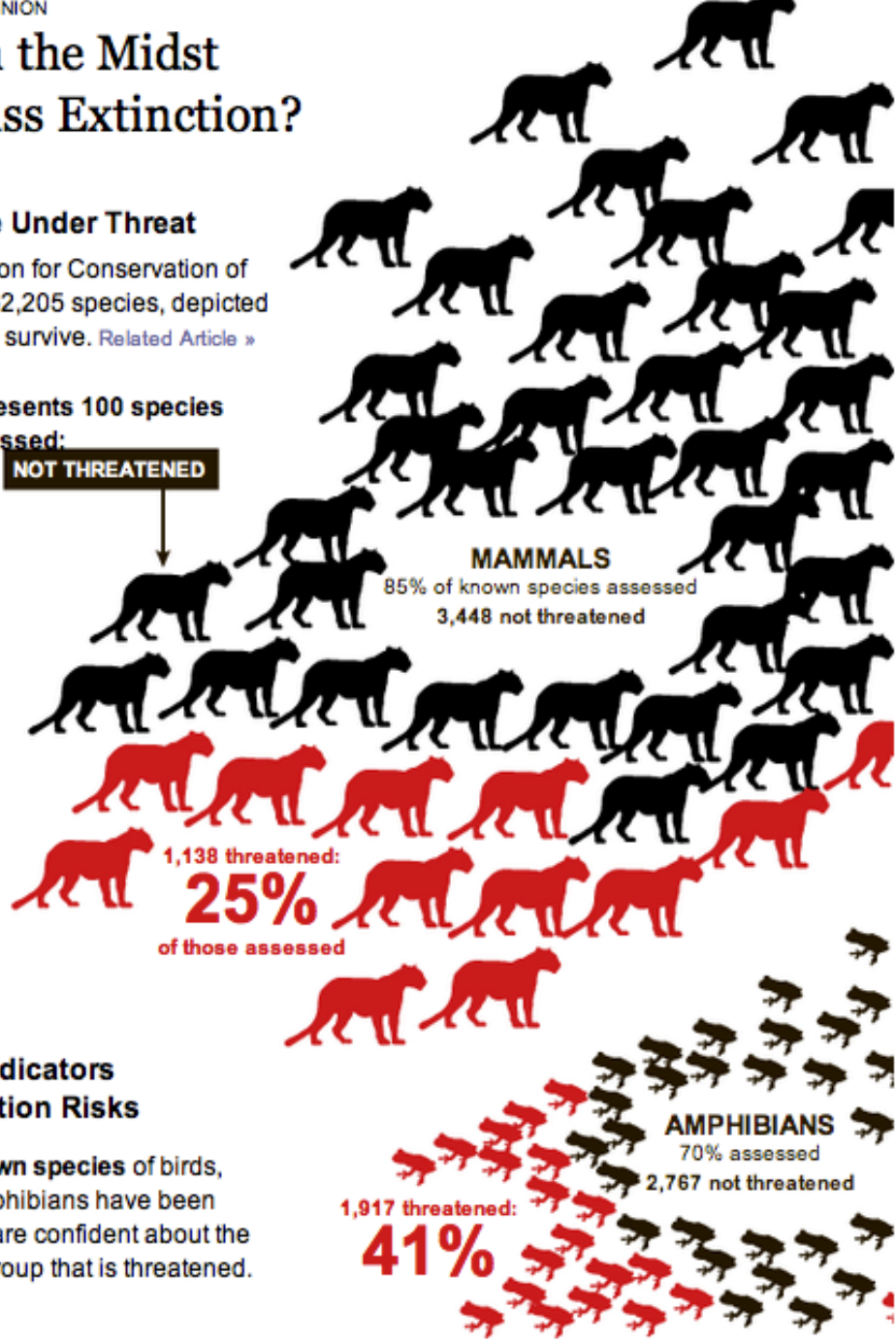
Because most known species of birds, mammals and amphibians have been evaluated, scientists are confident about the percentage of each group that is threatened.

AMPHIBIANS

70% assessed
2,767 not threatened

1,917 threatened:

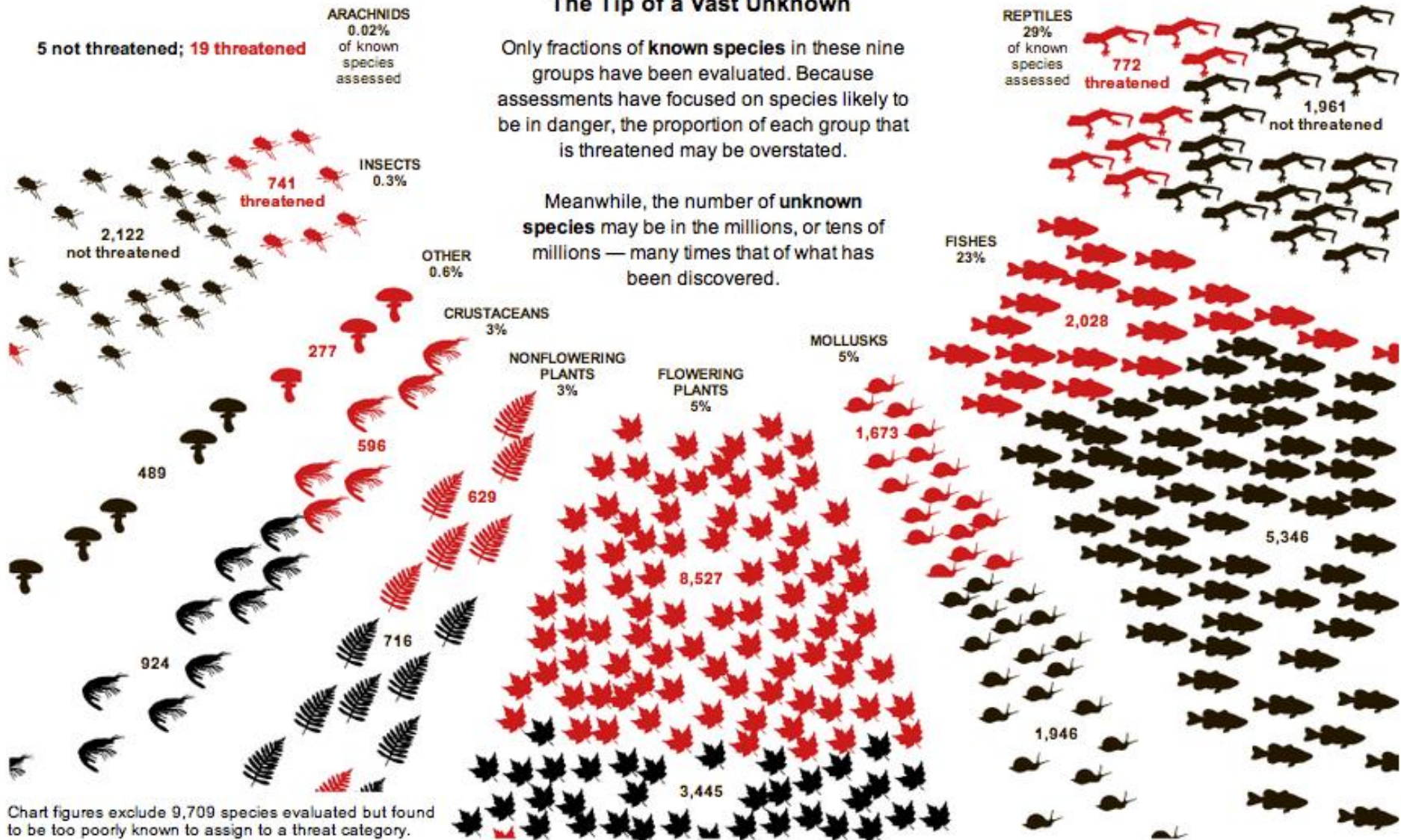
41%



Other Threatened Life: The Tip of a Vast Unknown

Only fractions of **known species** in these nine groups have been evaluated. Because assessments have focused on species likely to be in danger, the proportion of each group that is threatened may be overstated.

Meanwhile, the number of **unknown species** may be in the millions, or tens of millions — many times that of what has been discovered.



Already Gone

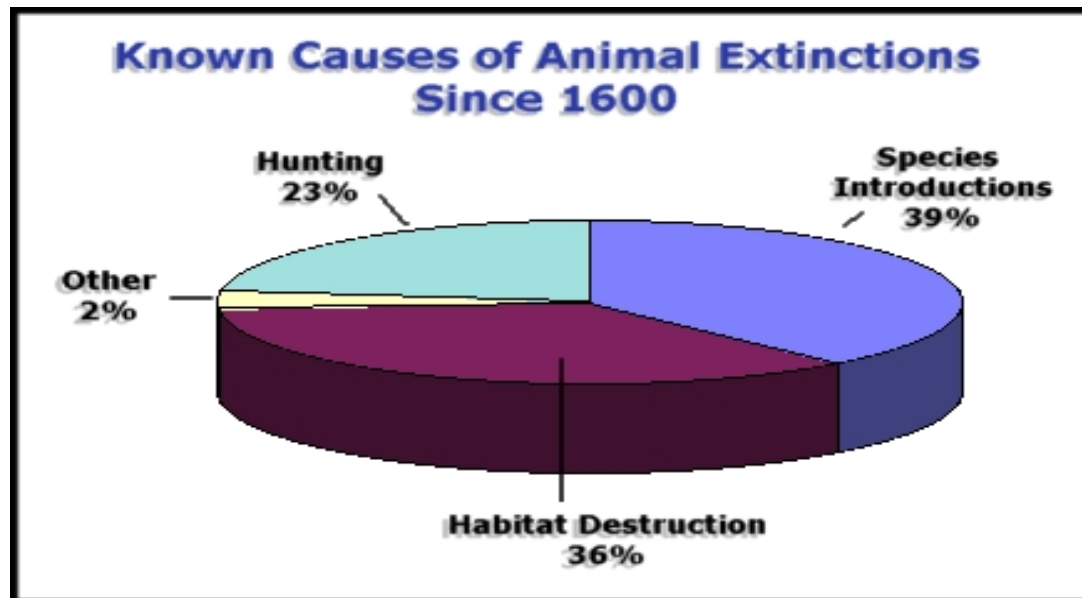
Species known to be extinct, or extinct in the wild, since 1500:

Mollusks	Birds	Flowering plants	Mammals	Fishes	Insects	Amphibians	Reptiles	Crustaceans	Nonflowering plants	Others	No known arachnid extinctions.
327	136	110	79	68	60	39	22	12	10	2	

WHAT DECREASES BIODIVERSITY?

The three big ones are:

- Habitat Loss
- Introduction of new species
- Poaching



Habitat Loss

As humans take up more and more land, there is less wilderness available for organisms and many risk going extinct.

Habitat fragmentation occurs when a barrier forms that prevents an organism from accessing its home range.



Habitat Loss

We can reduce this by increasing the size of fragments, and protecting land containing the most vulnerable of species.



Wildlife crossings to prevent fragmentation.

Wildlife crossings can also be used to help animals access their home ranges across roads.

YOU CAN ALSO STOP BUYING PRODUCTS LIKE PALM OIL THAT CONTRIBUTE TO HABITAT DESTRUCTION.

The Problem with Palm Oil



Invasive Species

Invasive Species are organisms released to a habitat they **did not** originate in, either intentionally or unintentionally by humans.

Since these organisms did not evolve in this habitat they typically have no natural predators and grow out of control, devastating the biodiversity in the area.



Lionfish in Florida



Nile Perch

Invasive Species

There are a number of characteristics all invasives have in common:

- 1) Non-native
- 2) Have no natural predators in the area
- 3) Reproduce often
- 4) Have a wide range of food available
- 5) Are highly adaptive to different environments
- 6) Decrease biodiversity in the area



Kudzu



Burmese Python



European Starling

Invasive Species



We can help, by not supporting the exotic pet trade.

There are also invasive species roundups in your local area.

- Lake Sammamish Park has volunteer opportunities where you can help remove invasives and replace them with local trees and plants.

<https://www.lakesammamishfriends.org/volunteer-opportunities/>

- King County also has a number of volunteer opportunities around Seattle to help remove invasives:

<https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/volunteer-information.aspx>

Poaching



Poaching is the illegal hunting, capturing or killing of wild animals.

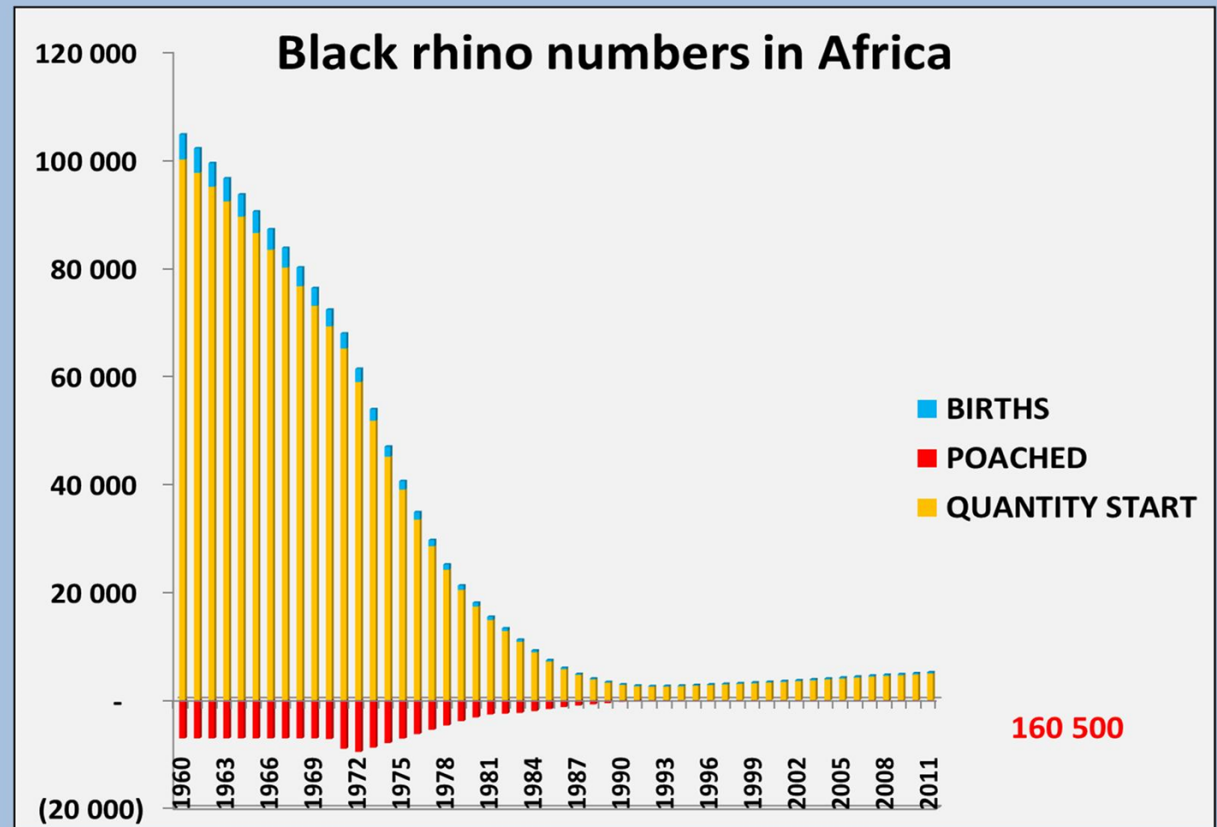
People may poach for:

- Food
- To sell products from the animal on the international market
- The animal may be considered dangerous or a pest
- Traditional medicines or ceremonies



Poaching

The black rhino in Africa, is good example of a population that has declined dramatically do to poaching. Current numbers are at 5,055



Poaching

- You can help by not purchasing exotic furs or items like ivory from the black market.

-You can also donate to non-profit companies like the WWF that help set aside protected habitats for these animals.



DON'T BUY FUR OR FUR TRIM

PETA

Sustainability and Conservation

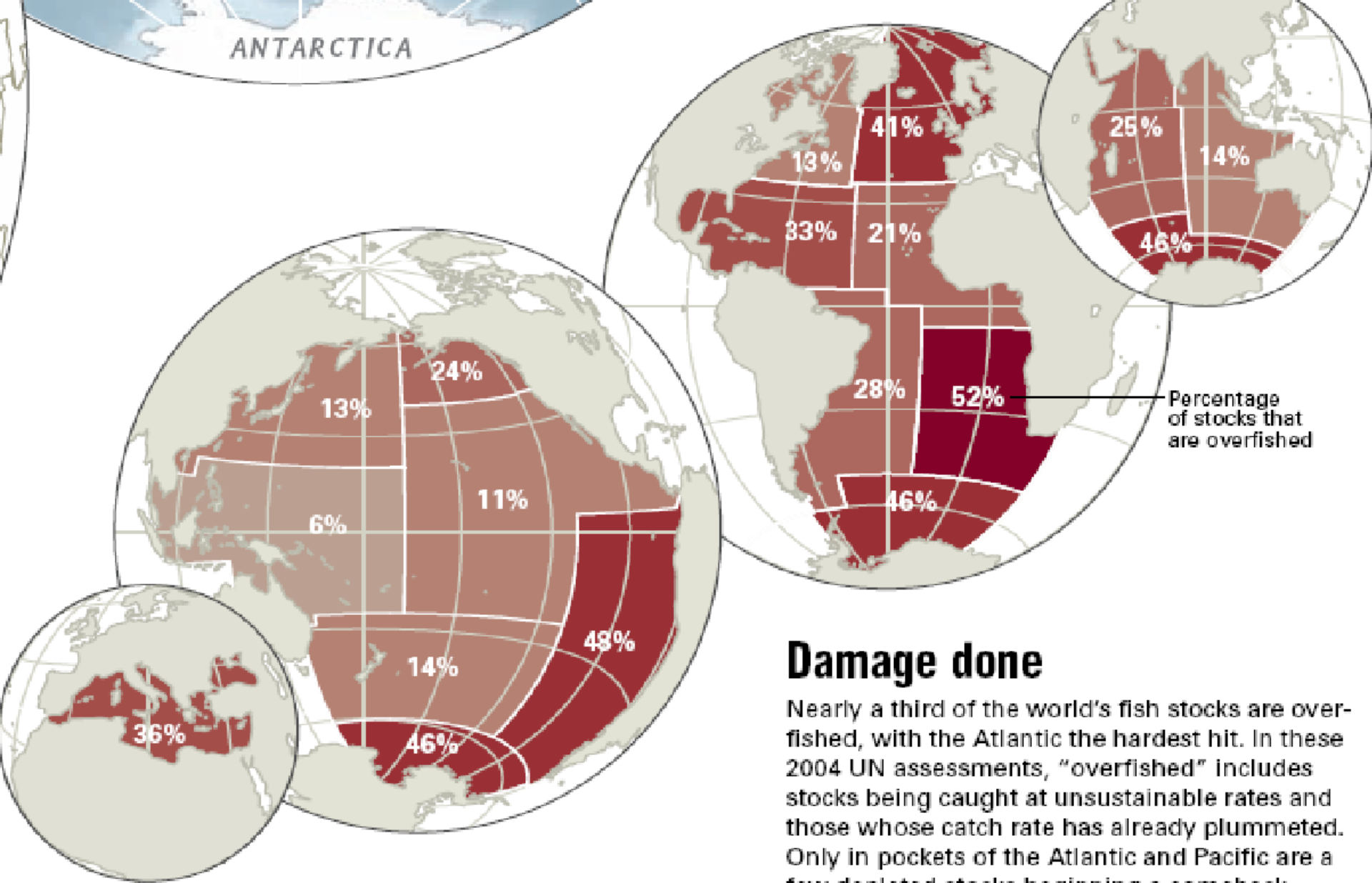
Sustainable development is a practice in which natural resources are used and managed in a way that meets current needs without harming future generations.

Example of sustainable development: Global Fisheries:

Overfishing has depleted fish populations worldwide.

Fish stocks are not as hardy as they once were. One reason for this is that the fish that are caught represent the healthy, reproducing age groups of the fish population.





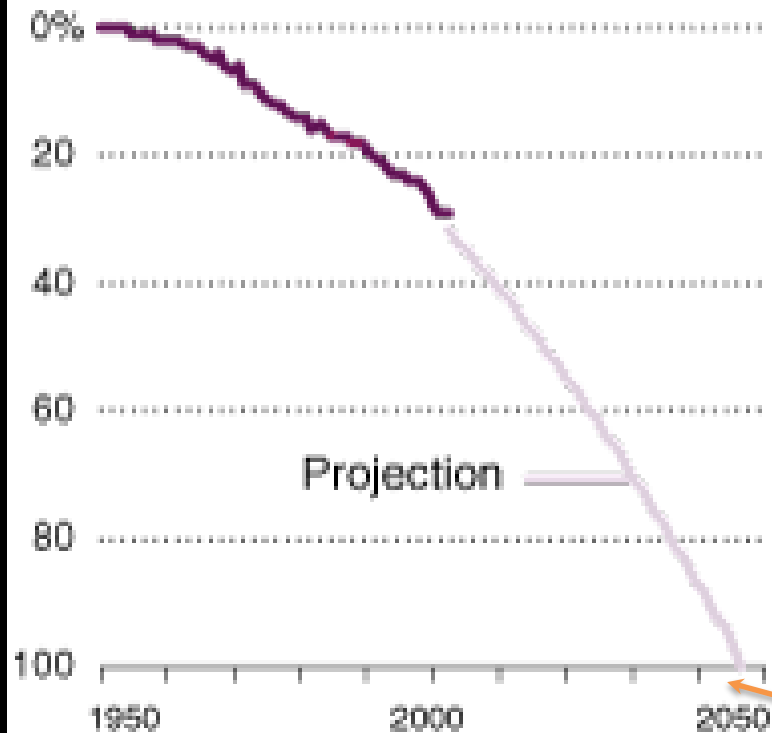
Damage done

Nearly a third of the world's fish stocks are overfished, with the Atlantic the hardest hit. In these 2004 UN assessments, "overfished" includes stocks being caught at unsustainable rates and those whose catch rate has already plummeted. Only in pockets of the Atlantic and Pacific are a few depleted stocks beginning a comeback.

A Future Without Fish

A new study suggests that overfishing could lead to a catastrophic loss of marine species as soon as the middle of the century.

Percentage of species collapsed
(defined as less than 10% left)



Source: SeaWeb

Researchers found that 29 percent of species had been fished so heavily or were so affected by pollution or habitat loss that they were down to 10 percent of previous levels, their definition of “collapse.”

To continue fishing at our current rate, the year we see a collapse in 100% of species is quite surprisingly within our lifetimes: 2048

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Study: Only 10 percent of big ocean fish remain

By Marsha Walton
CNN
Wednesday, May 14, 2003 Posted: 10:29 PM EDT (0229 GMT)

(CNN) -- A new global study concludes that 90 percent of all large fishes have disappeared from the world's oceans in the past half century, the devastating result of industrial fishing.

The study, which took 10 years to complete and was published in the international journal Nature this week, paints a grim picture of the Earth's current populations of such species as sharks, swordfish, tuna and marlin.

The authors used data going back 47 years from nine oceanic and four continental shelf systems, ranging from the tropics to the Antarctic. Whether off the coast of Newfoundland, Canada, or in the Gulf of Thailand, the findings were dire, according to the authors.

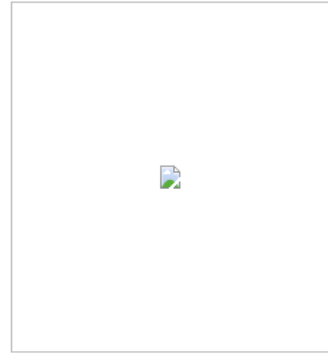
"I think the point is there is nowhere left in the ocean not overfished," said Ransom Myers, a fisheries biologist at Dalhousie University in Halifax, Nova Scotia and lead author of the study.

Some in the fishing industry took issue with the tone of the report.

"I'm sure there are areas of the world with that level of depletion, but other areas are in good shape," said Lorne Clayton, with the Canadian Highly Migratory Species Foundation, a foundation that supports the sustainable development of the tuna industry.

He said some abuses of the past have ended: Long drift nets are illegal, untended longlines are illegal, and many countries adhere to elaborate systems of licensing, quotas and third party observers working on boats.

Yet Clayton agreed that there remains much room for improvement.



Industrial fishing can reduce a particular fish population to one-tenth its original size in only 10 or 15 years, according to scientists.

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MORE VIDEO

A new report says the ocean's biggest fish species are down about 90 percent. CNN's Kyra Phillips reports (May 14)

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Interactive: [More on the species at risk](#)

In fact 90% of large ocean fish are already gone according to a recent study.



The Atlantic cod has, for many centuries, sustained major fisheries on both sides of the Atlantic. However, the North American fisheries have now largely collapsed.

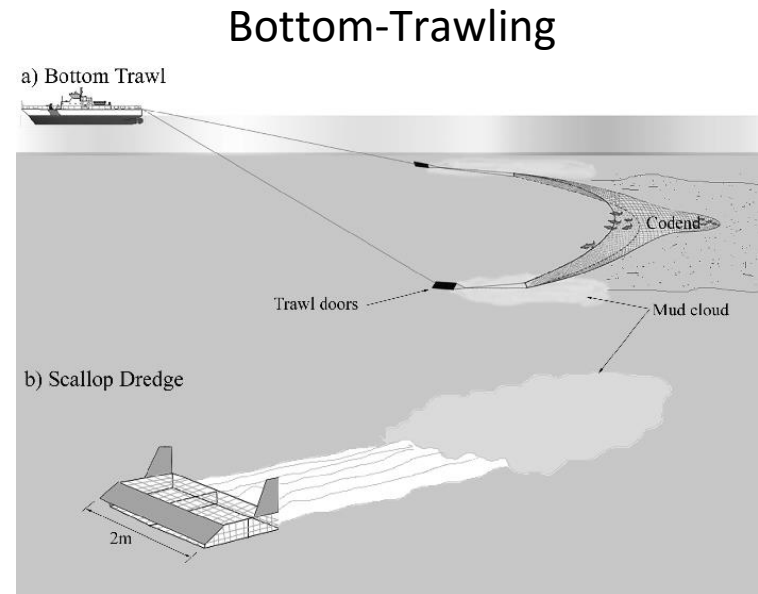
Fish landings in tons



Source: Millennium Ecosystem Assessment

Making Fisheries Sustainable

- 1) Rotation: rotating catches between different species gives the “off” species time to recover their numbers.
- 1) Fishing Gear Review: choosing gear that doesn't hurt the seafloor or unintentionally catch other species.
- 1) Harvest Reduction: Slowing the harvests of deep-water species that grow very slowly allows more time for them to recover.
- 1) Fishing Bans: Creating and enforcing bans in certain areas and on certain species helps to replenish numerous populations in the area.



Bottom-Trawling catch



How You Can Help Make Fisheries Sustainable

1) Look for the Marine Stewardship Council's checkmark when you buy seafood.



2) Get the Monterey Bay Seafood Watch App.

This tells you when ordering seafood what is considered both safe and sustainable.



3) Know where your seafood comes from!

You should be able to ask your waiter at a restaurant or the person behind the seafood counter where the fish they sell comes from. If they can't answer, that's a big red flag.

BEST CHOICES

- Abalone
- Arctic Char (farmed)
- Bass: Striped (US hook & line, farmed)
- Catfish (US)
- Clams, Mussels, Oysters
- Cod: Pacific (US)
- Crab: Dungeness & Stone
- Halibut: Pacific (US)
- Lobster: Spiny (CA, FL & Mexico)
- Sablefish/Black Cod (AK & Canada)
- Salmon (AK)
- Sardines: Pacific (Canada & US)
- Scallops (farmed)
- Shrimp: Pink (OR)
- Tilapia (Ecuador & US)
- Trout: Rainbow (US farmed)
- Tuna: Albacore/White canned (Canada & US troll, pole)
- Tuna: Skipjack/Light canned (US troll, pole)
- Tuna: Yellowfin (US troll, pole)

GOOD ALTERNATIVES

- Basa/Pangasius/Swai
- Cod: Atlantic (imported wild)
- Cod: Pacific (US troll)
- Crab: Blue
- Crab: King (US)
- Flounders, Soles (US Pacific)
- Grouper: Red (US Gulf of Mexico)
- Lobster: American
- Mahi Mahi (US)
- Monkfish (US)
- Pollock: Alaska (US)
- Salmon (CA, OR & WA wild)
- Scallops (wild)
- Shrimp (Canada & US wild)
- Squid (US)
- Swordfish (US)
- Tilapia (China & Taiwan)
- Tuna: Albacore/White canned (US longline)
- Tuna: Skipjack/Light canned (imported troll, pole and US longline)
- Tuna: Yellowfin (imported troll, pole and US longline)

AVOID

- Abalone (China & Japan)
- Caviar, Sturgeon (imported wild)
- Cod: Pacific (imported)
- Crab: Red King (Russia)
- Lobster: Spiny (Brazil)
- Mahi Mahi (imported)
- Orange Roughy
- Salmon: Atlantic (farmed)
- Sharks
- Shrimp (imported)
- Snapper: Red (US)
- Squid (imported)
- Swordfish (imported)
- Tuna: Albacore/White canned (except Canada & US troll, pole and US longline)
- Tuna: Bluefin
- Tuna: Skipjack/Light canned (except troll, pole and US longline)
- Tuna: Yellowfin (except troll, pole and US longline)

This guide has a limited number of seafood items due to its size. For a full list of our recommendations please visit us online or download the app.

Check every column, your favorite seafood could be in more than one.

Best Choices
Well managed, caught or farmed in environmentally responsible ways.

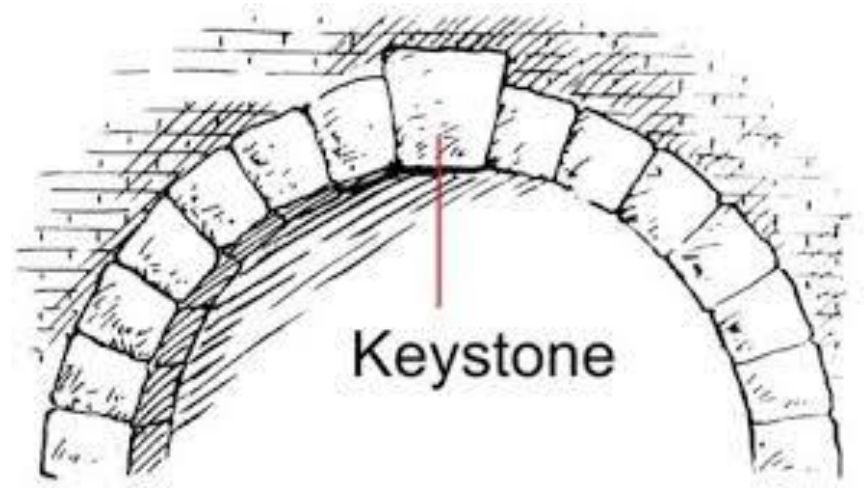
Good Alternatives
Some concerns with how they are caught or farmed.

Avoid
Overfished, or strong concerns with how they are caught or farmed.

Which species *do* we save?

Some species are so clearly critical to the functioning of an ecosystem that they are called **keystone species**.

This term comes from the keystone on an arch, that locks all the other stones into place. Without it the arch falls apart.



Which species *do* we save?

In the 1800's, sea otters were hunted for their fur. They disappeared from the Pacific coast of the U.S. Sea Urchins, with no more predators, multiplied and ate all of the kelp. The kelp beds began to disappear from the area.

In 1937, a small group of surviving otters was discovered. With protection and scientific efforts, the otter population grew.

The otters once again preyed on the sea urchins. The kelp beds regenerated.

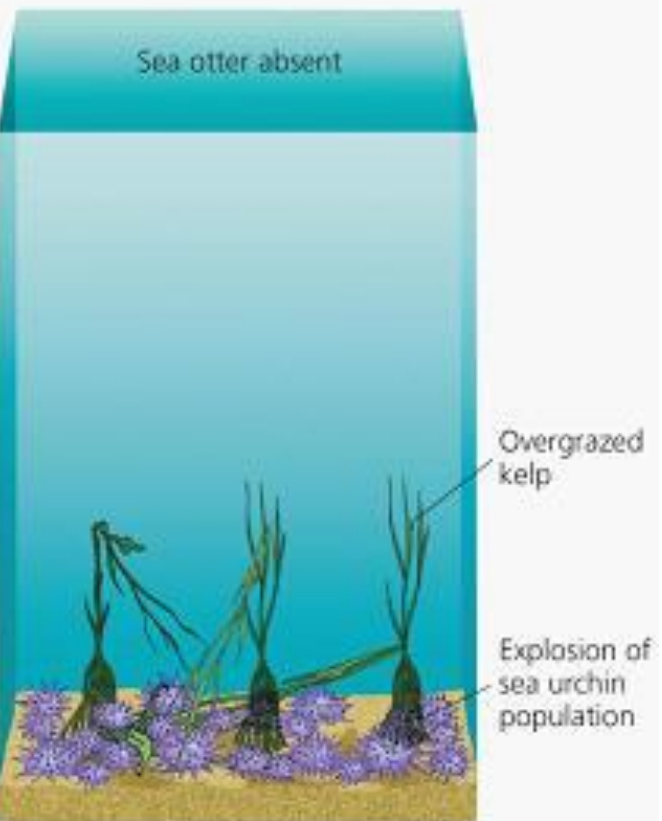
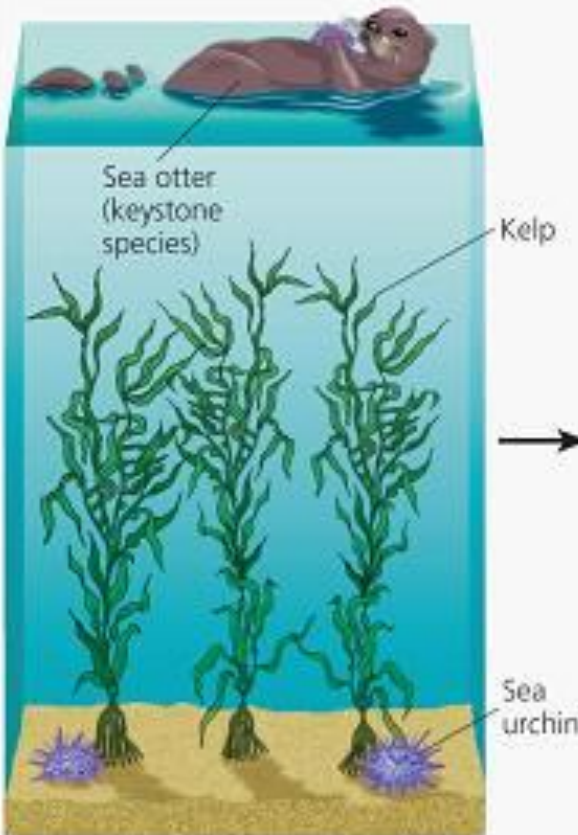




Keystone
absent



(a) Keystone



(b) A keystone species

Which species *do* we save?

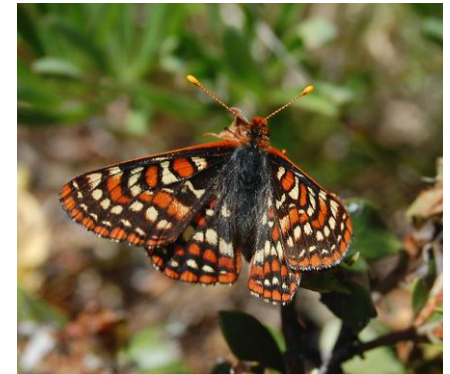
Conservationists try to focus efforts on **umbrella species**, which are species whose being protected leads to the preservation of its habitat and all the other organisms in its community.



Northern Spotted Owl



Amur Tiger



Bay Checkerspot
Butterfly

