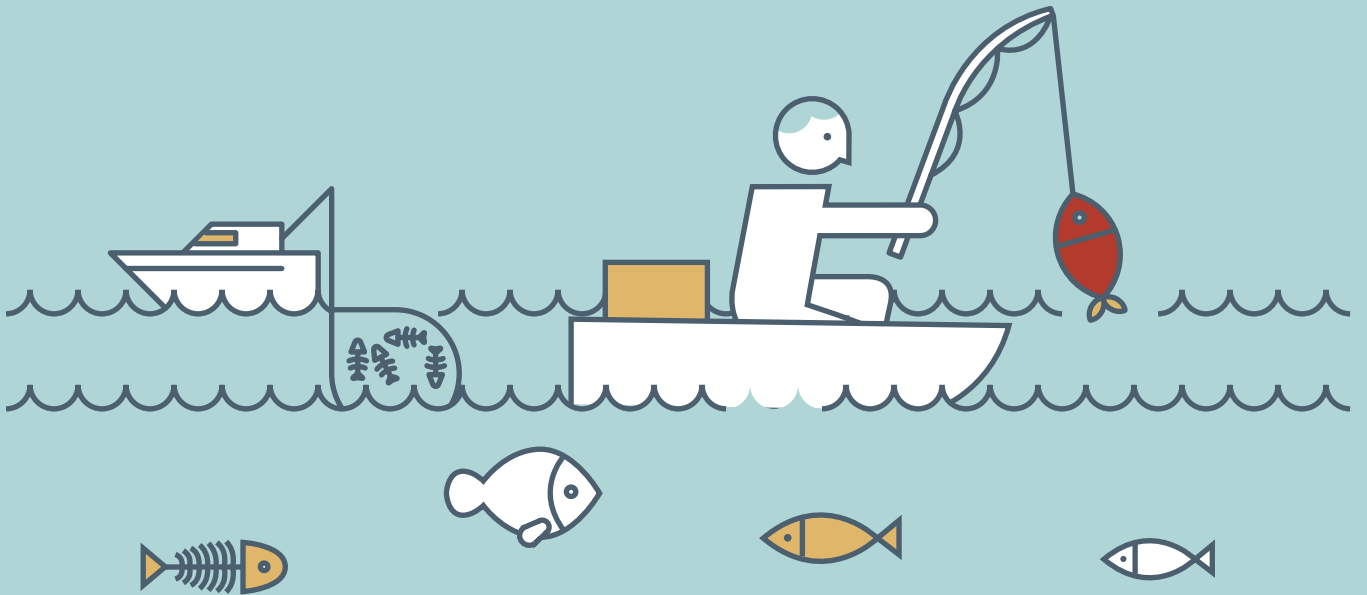


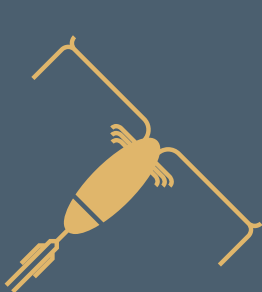
# OCEAN SECURITY



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# OCEAN SECURITY

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# INTRODUCTION

The oceans are dying, and we have caused it. As we wipe out one species of fish, we move on to another and this has been the continuing trend in recent decades, today 90% of the worlds large fish are now gone.

Oceanic dead zones (from agricultural runoff, particularly livestock), overfishing, and ocean acidification can all be moderated or reversed by a change in diet from animal based to plant based.



## OCEANS SUPPORT LIFE ON EARTH, THEY ARE BEING DESTROYED

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“Oceans are essential for supporting life on Earth and for human well being... their importance cannot be underestimated... the world’s oceans and seas are changing. Human activities are taking a terrible toll. Marine ecosystems are being damaged by over-exploitation, illegal, unreported and unregulated fishing, destructive fishing practices and marine pollution. Increased sea temperatures and sea-level rise, caused by climate change, as well as ocean acidification, pose a further threat to marine life, coastal and island communities, and national economies. And yet we all, wherever we live, rely on these oceans and seas for our very livelihoods”

*United Nations Convention on Biological Diversity, 2015*

– 6 –

## Ocean Security

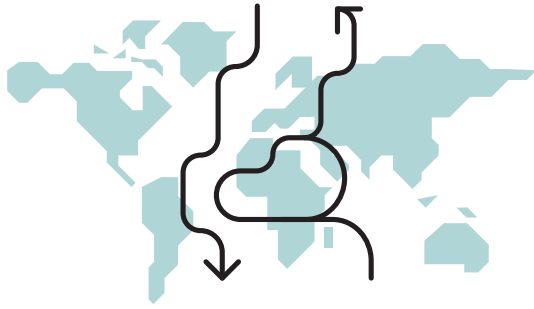
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# PROBLEM

## Oceanic Warming

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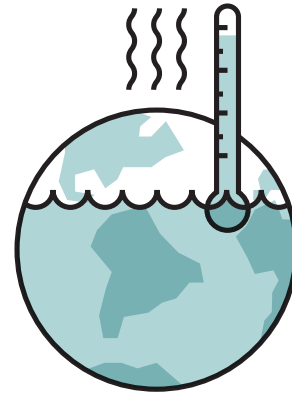




## COLLAPSING OCEAN CURRENTS TO TRIGGER CATASTROPHIC WARMING

“Warmer water could interrupt the so-called ocean conveyor belt, the system of global currents that is largely responsible for regulating Earth’s temperature. Its collapse could trigger catastrophically rapid climate changes”

*National Geographic, 2015*



## 90% OF LAND WARMING IS CAUSED BY OCEAN WARMING

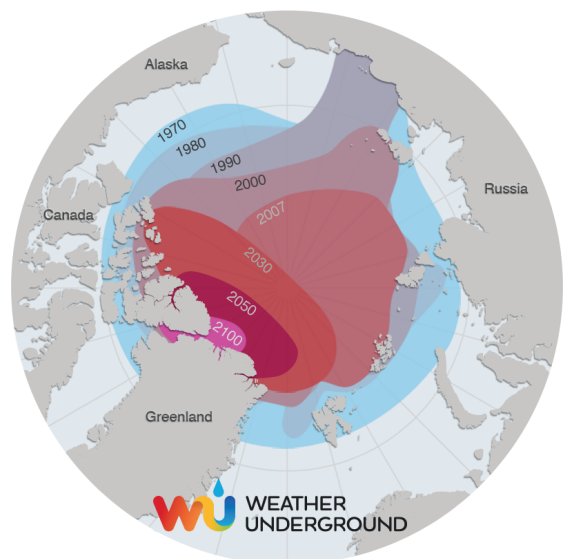
“Ocean warming exerts a large influence on the continents: 80% to 90% of warming over land has been estimated to be indirectly driven by ocean warming”

*World Bank, 2013*

# SEA ICE EXTENT OBSERVATIONS

“Sea ice extent observations (1970 to 2007) and forecast (2030 to 2100) reproduced using data from the NOAA GFDL model”

*Weather Underground, 2015*



– 6 –

## Ocean Security

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# PROBLEM

## Sea Levels Are Rising

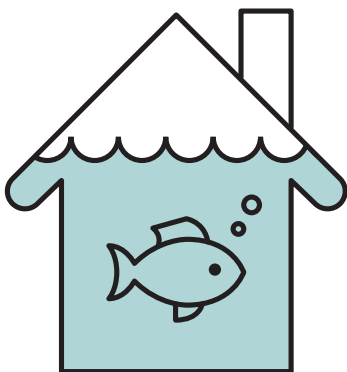
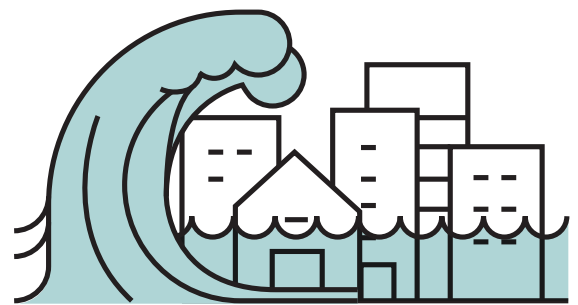
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# ICE SHELF COLLAPSE WOULD RAISE GLOBAL SEA LEVELS BY 16 FEET, THREATENING MILLIONS OF PEOPLE

“Since the 1970’s warming ocean waters have melted a significant section of ice in the Amundsen Sea in the Southern Ocean, so much that collapse of a far greater mass of ice may be inevitable. Scientists from NASA and elsewhere, based on a half-dozen studies in the past two years, now believe it may be too late to stop so much Antarctic ice from melting that it would send sea levels rising 16 feet more, inundating regions home to hundreds of millions of people. What may still be possible, however, is for humans to control just when that might happen”

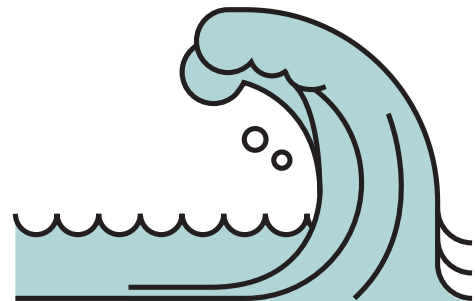
*National Geographic, 2015*



## SEA LEVELS TO RISE 20 FEET EVEN IF WE LIMIT GLOBAL WARMING TO 2°C

“Even if world manages to limit global warming to 2°C, the target number for current climate negotiations, sea levels may still rise at least 6 meters (20ft) above their current heights, radically reshaping the world’s coastline and affecting millions in the process”

*The Guardian, 2015*



## HISTORICAL DATA SHOWS OCEANS HAVE RISEN 20 FEET WHEN GLOBAL TEMPERATURES ARE JUST 1°C OR 2°C HIGHER THAN AVERAGE

“Global sea levels have risen at least six meters, or about 20 feet, above present levels on multiple occasions over the past three million years. What is most concerning is that amount of melting was caused by an increase of only 1-2 degrees (Celsius) in global mean temperatures”

*Science Daily, 2015*



– 6 –

## Ocean Security

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# CAUSE

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## LIVESTOCK IS RESPONSIBLE FOR 51% OF GREENHOUSE GASES

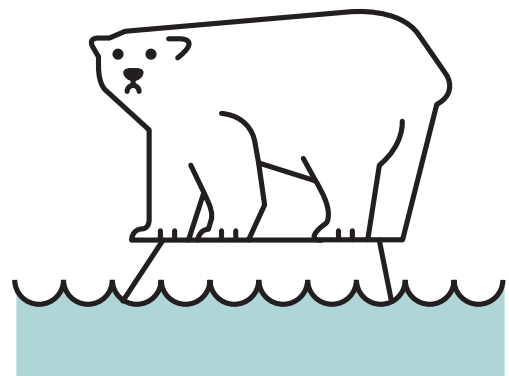
“Livestock and their by-products actually account for at least 32.6 billion tons of carbon dioxide per year, or 51% of annual worldwide GHG emission”



*Worldwatch Institute, 2009*

## OCEANS ABSORB 93% OF ANTHROPOGENIC HEAT

“The world’s oceans have been taking up approximately 93% of the additional heat caused by anthropogenic climate change”



*World Bank, 2013*

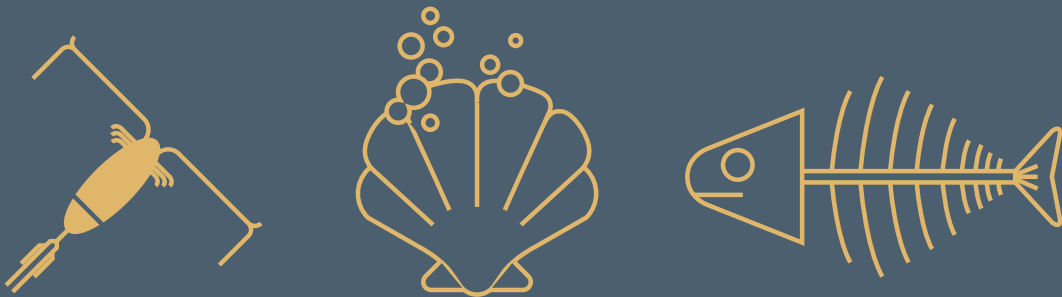
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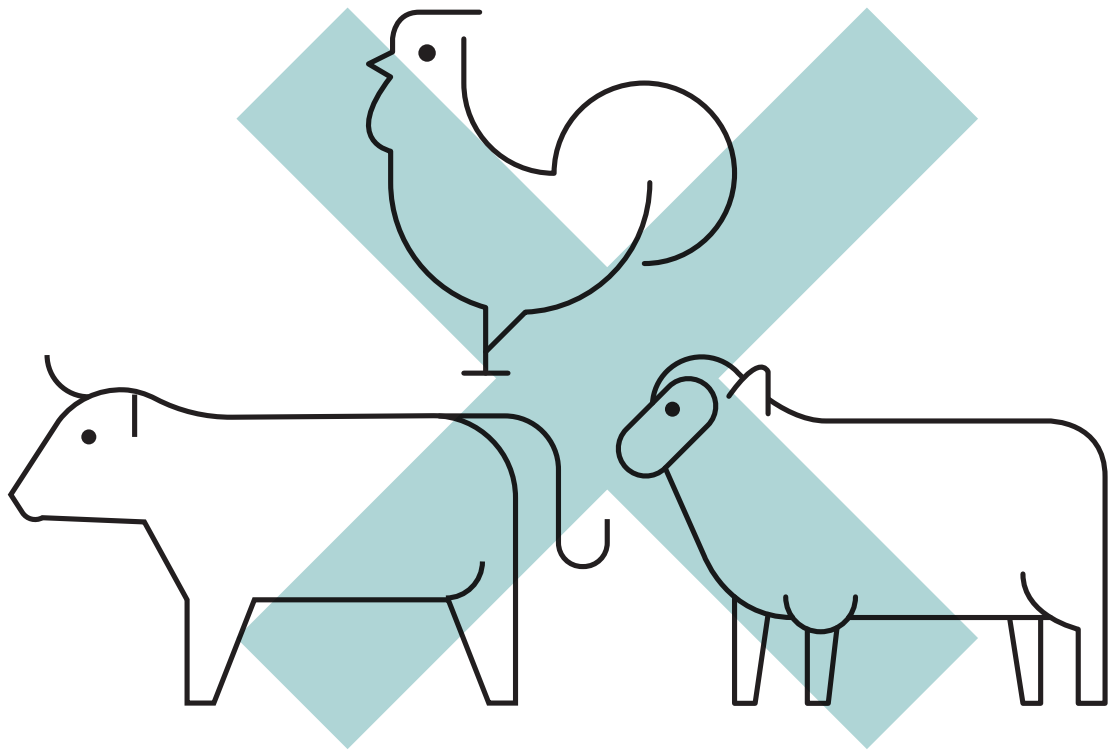
## Ocean Security

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# SOLUTION

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## STOP PRODUCING GHG'S TO REDUCE HEAT

“The only way to reduce ocean temperatures is to dramatically reign in our emission of greenhouse gases. However, even if we immediately dropped carbon dioxide emissions to zero, the gases we've already released would take decades or longer to dissipate”

*National Geographic, 2015*

– 6 –

## Ocean Security

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# PROBLEM

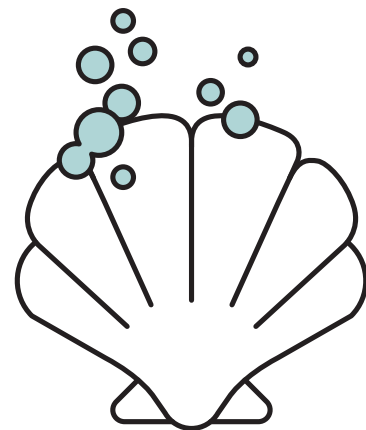
## Ocean Acidification

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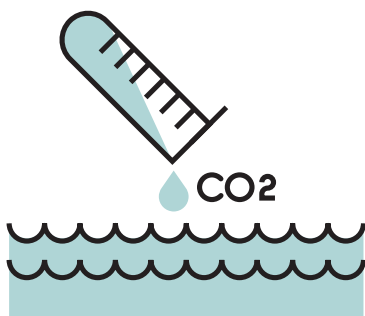


# OCEAN ACIDIFICATION REDUCES BIODIVERSITY

“The potential consequences of ocean acidification on marine organisms are complex. A major concern is the response of calcifying organisms, such as corals, algae, molluscs and some plankton, because their ability to build shell or skeletal material (via calcification) depends on the abundance of carbonate ion. For many organisms, calcification declines with increased acidification. Other impacts of acidification include reduced survival, development, and growth rates as well as changes in physiological functions and reduced biodiversity”



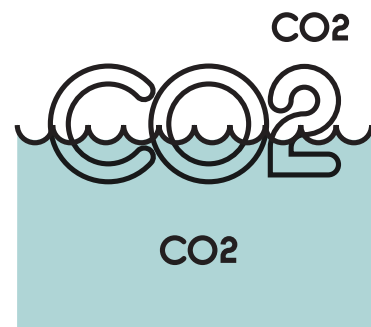
*United Nations World  
Meteorological Organization, 2014*



## CO<sub>2</sub> ABSORPTION DRIVES ACIDIFICATION

“The oceans are absorbing carbon dioxide (CO<sub>2</sub>) from the atmosphere and this is causing chemical changes by making them more acidic”

*The Royal Society*



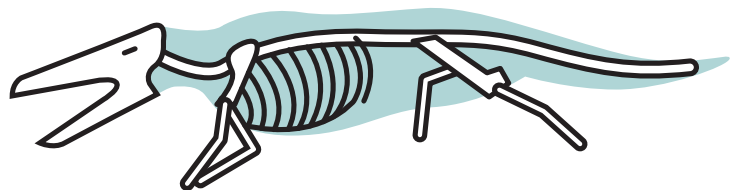
## OCEANS ABSORB 50% OF CO<sub>2</sub>

“Oceans absorb half of all man made carbon dioxide”

*National Geographic, 2004*

# OCEAN ACIDIFICATION CAUSED GLOBAL EXTINCTION 252 MILLION YEARS AGO

“252 million years ago the Permian-Triassic Boundary extinction caused by ocean acidification wiped out more than 90% of marine species and more than two-thirds of the animals living on land”



*National Geographic, 2015*



## OCEANS 30% MORE ACIDIC

“In the past 200 years alone, ocean water has become 30% more acidic”

*Smithsonian Ocean Portal*



## OCEAN ACIDIFICATION IS OCCURRING 10X FASTER THAN AT ANY POINT IN THE LAST 55 MILLION YEARS

“Ocean acidification is happening 10 times faster than that which preceded the extinction 55 million years ago during the Palaeocene Eocene Thermal Maximum, the largest ocean acidification event since the extinction of the dinosaurs”

*UK Ocean Acidification  
Research Programme, 2009*

– 6 –

## Ocean Security

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# CAUSE

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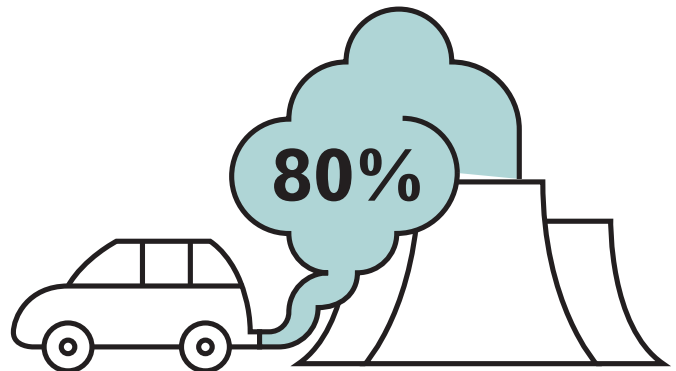




## FOSSIL FUEL BURNING CREATES 80% OF CO<sub>2</sub>

“80% of human-induced CO<sub>2</sub> emissions came from the burning of fossil fuels, while about 20% resulted from deforestation and associated agricultural practices”

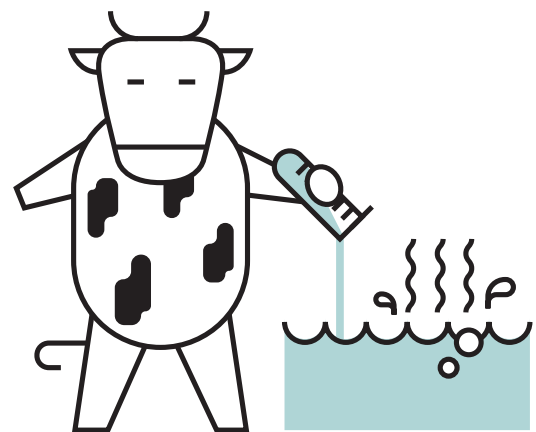
*Worldwatch Institute, 2009*



## LIVESTOCK ARE RESPONSIBLE FOR 64% OF HUMAN INDUCED AMMONIA EMISSIONS

Livestock are also responsible for almost two-thirds (64%) of anthropogenic ammonia emissions, which contribute significantly to acid rain and acidification of ecosystems”

*United Nations Environment Programme, 2012*



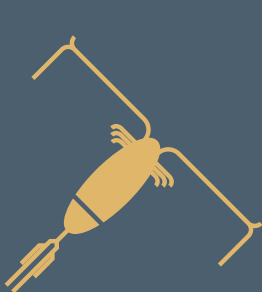
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## Ocean Security

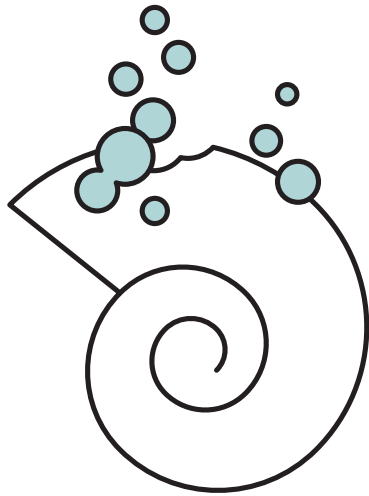
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# TIMELINE

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1

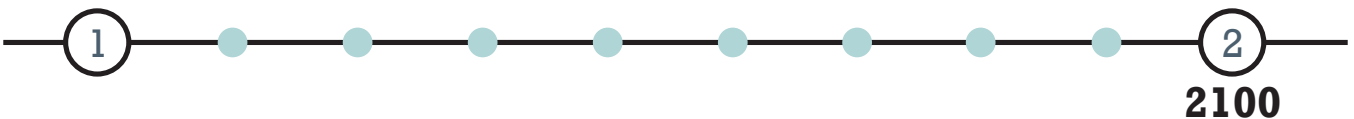


## OCEAN ACIDIFICATION RATE FASTER THAN LAST 300 MILLION YEARS

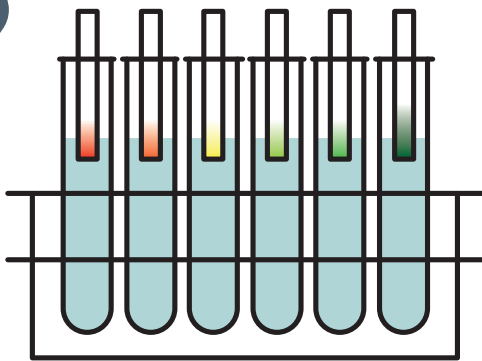
“The oceans are becoming more acidic at the fastest rate in 300m years. This [acidification] is unprecedented in the Earth's known history. We are entering an unknown territory of marine ecosystem change, and exposing organisms to intolerable evolutionary pressure. The next mass extinction may have already begun.”

*International Program on the State of the Ocean: State of the Oceans Report, 2013*

2013



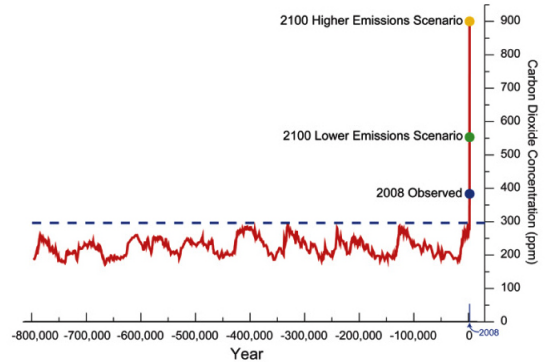
2



## BY 2100 OCEANS 150% MORE ACIDIC

“By the end of this century the surface waters of the ocean could be nearly 150% more acidic”

*National Oceanic and Atmospheric Administration*



## 800,000 YEAR RECORD OF CARBON DIOXIDE (CO<sub>2</sub>) CONCENTRATIONS

*National Oceanic and Atmospheric Administration*

– 6 –

## Ocean Security

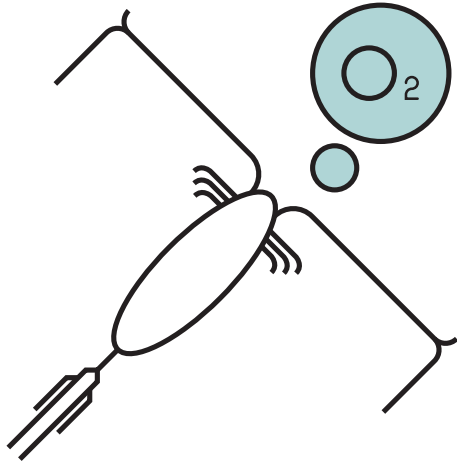
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# PROBLEM

## Phytoplankton Die Off

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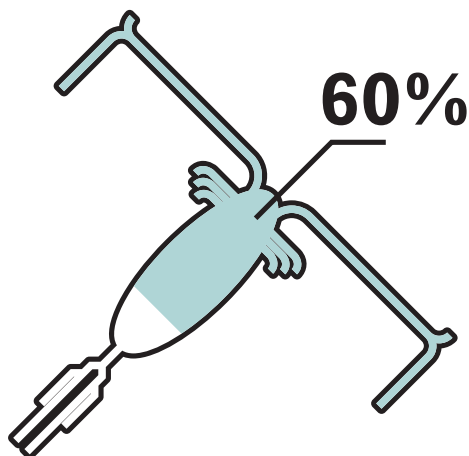




## PHYTOPLANKTON CREATE 50% OF WORLD'S OXYGEN

“Half of the world's oxygen is produced via phytoplankton photosynthesis”

*National Geographic, 2004*



## PHYTOPLANKTON DOWN 40%

“Phytoplankton numbers are down 40% since the 1950's”

*Scientific American, 2010*

– 6 –

## Ocean Security

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# CAUSE & TIMELINE

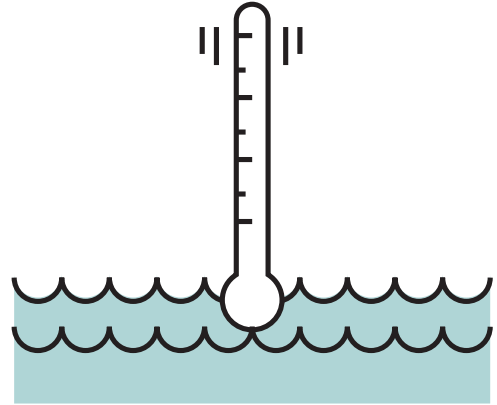
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# OCEAN TEMPERATURE RISES ARE KILLING PHYTOPLANKTON

“Rising sea surface temperatures is the main cause of phytoplankton die-off”

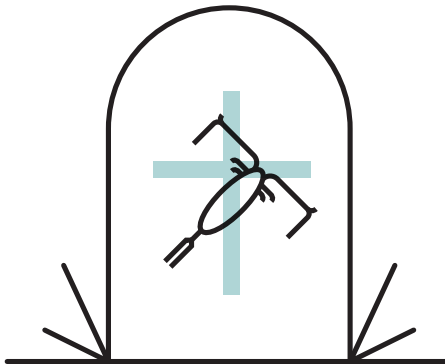
*Scientific American, 2010*



2013

3  
2100

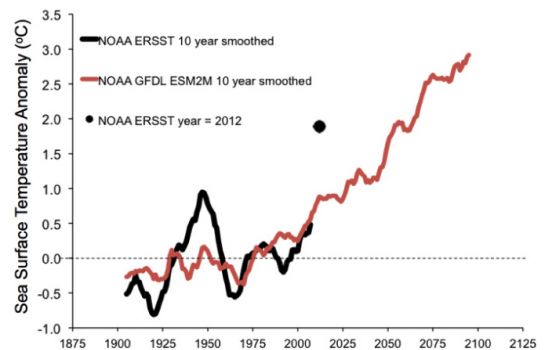
3



## PHYTOPLANKTON TO DECREASE A FURTHER 6% TO 11% BY 2100

“Phytoplankton and zooplankton biomass are expected to decrease by 6% and 11% respectively by the end of century due to climate change”

*Science Daily, 2014*



## SEA SURFACE TEMPERATURE ANOMALY (°C)

*National Oceanic and Atmospheric Administration, 2015*

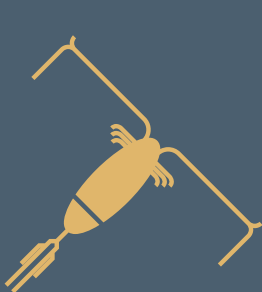
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## Ocean Security

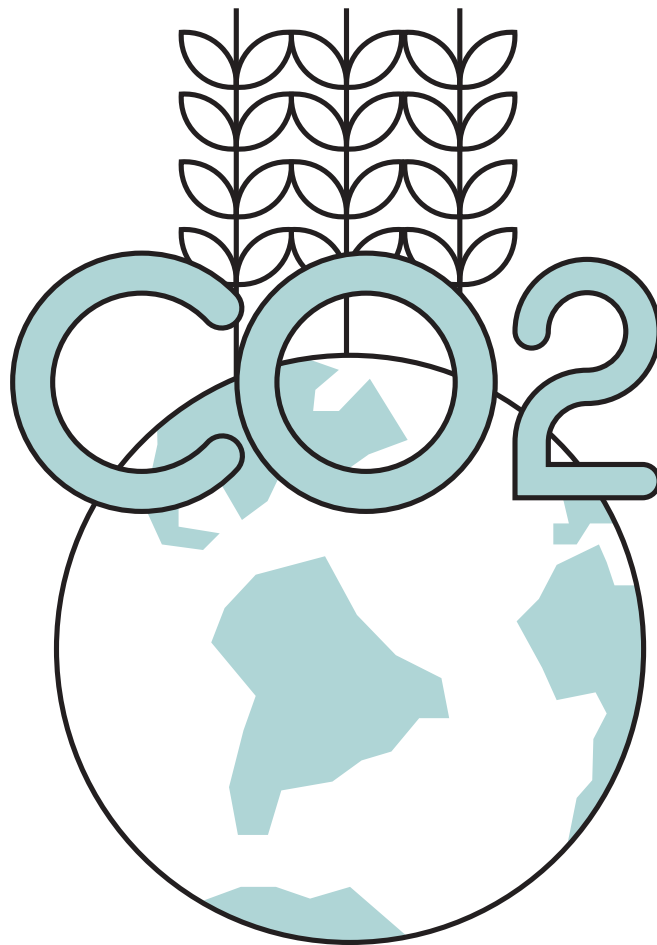
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# SOLUTION

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## **ORGANIC AGRICULTURE CAN ABSORB 100% OF ATMOSPHERIC CO<sub>2</sub>**

“We could sequester more than 100% of current annual CO<sub>2</sub> emissions with a switch to widely available and inexpensive organic management practices”

*Rodale Institute, 2014*

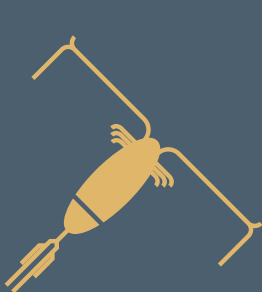
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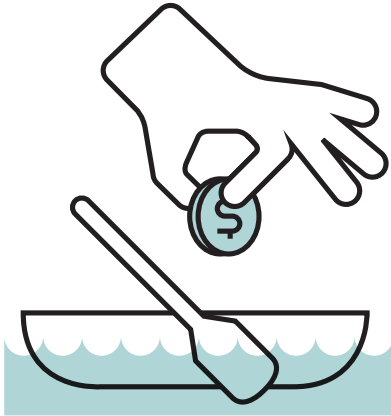
## Ocean Security

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# PROBLEM & CAUSE

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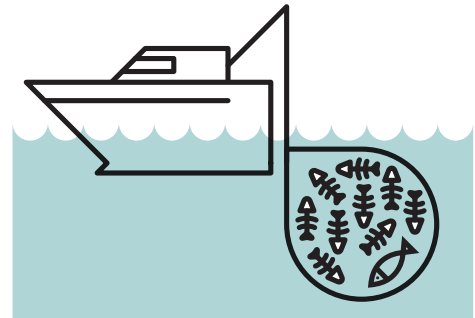




## FISHING SUBSIDIES DESTROY THE OCEANS

“Globally, fisheries subsidies amount to about \$35bn per year. Without them, many high seas fisheries would not be economically viable”

*Global Ocean Commission*



## 90% OF BIG FISH GONE

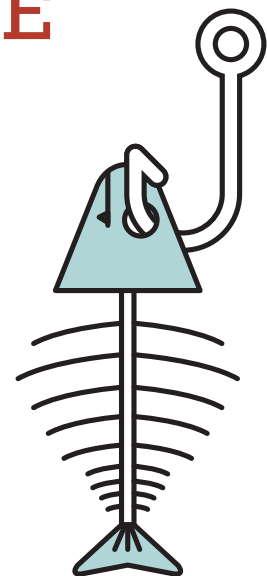
“Overfishing has wiped out 90% of big fish, since the 1950’s”

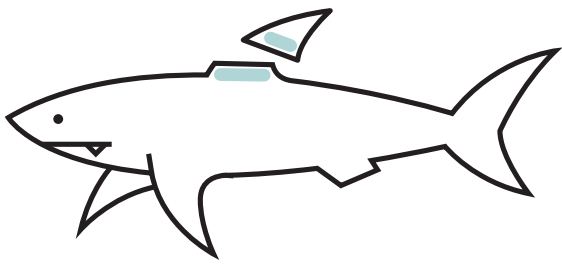
*National Geographic, 2003*

# 75% OF TUNA AND MACKEREL POPULATIONS HAVE GONE

“Tuna and mackerel populations have suffered a “catastrophic” decline of nearly three quarters in the last 40 years... [The] WWF and the Zoological Society of London found that numbers of the scombridae family of fish, which also includes bonito, fell by 74% between 1970 and 2012, outstripping a decline of 49% for 1,234 ocean species over the same period”

*The Guardian, 2015*

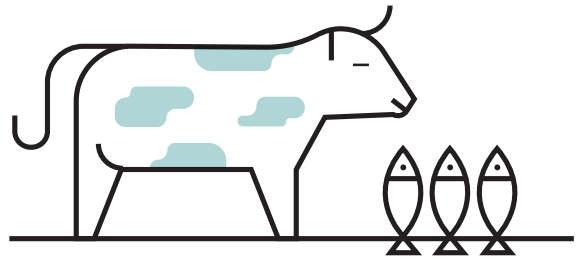




## 100 MILLION SHARKS ARE KILLED ANNUALLY

“One of the most comprehensive studies ever compiled on illegal shark killing brings new startling statistics. An estimated 100 million sharks are killed every year around the world, a number that far exceeds what many populations need to recover”

*National Geographic, 2013*



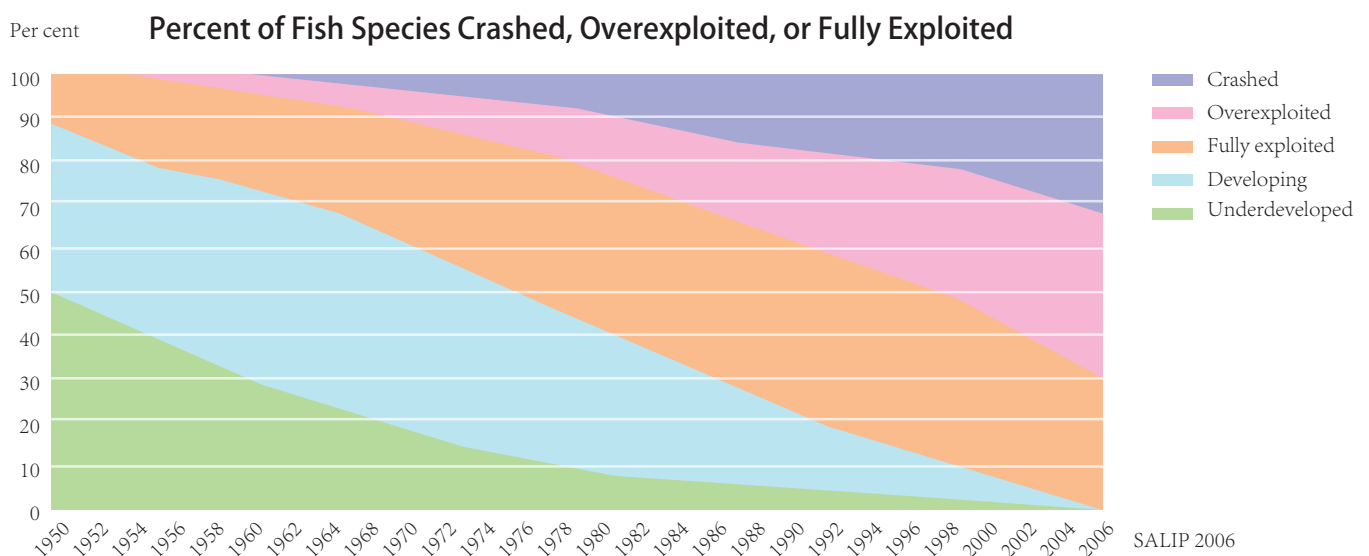
## 50% OF SEA LIFE IS FED TO LIVESTOCK

“Thirty million tons or 36%, by some accounts as much as 50%, of global fisheries’ catch each year are used to feed livestock”

*A Well Fed World, 2009*

# OCEANS AT THE BREAKING POINT

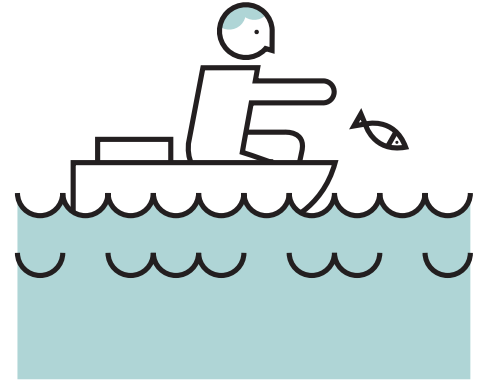
“The condition of the world’s fisheries has drastically declined as a result of overfishing”



*Scientific American, 2013*

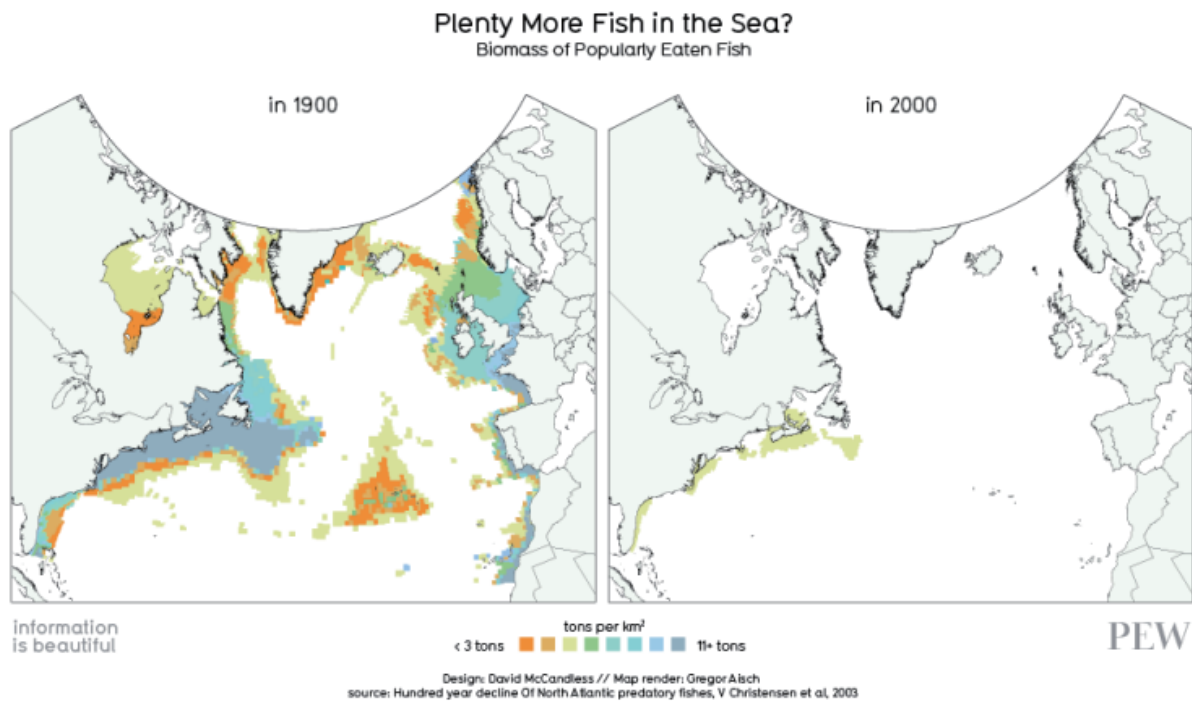
# 17% TO 22% OF CATCHES ARE THROWN BACK DEAD OR DYING

“17% to 22% of what fishermen catch every year is discarded at sea, likely already dead or dying”



*Oceana International, 2014*

# AVAILABLE FISH BIOMASS IN THE NORTH ATLANTIC



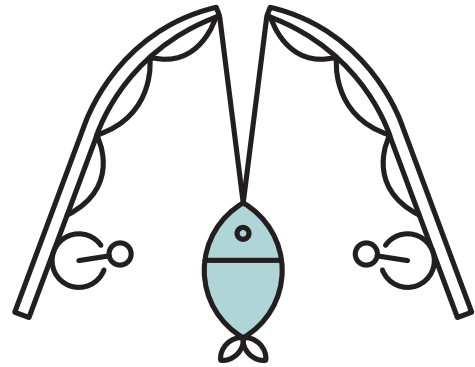
*Oxford University Smith School of Enterprise and the Environment, 2011*

# FISHING FLEETS HAVE INCREASED 10X SINCE 1950'S, BUT CATCH IS DOWN 50%

“[Fishing] fleets now fish all of the world's oceans and have increased in power by an average of 10-fold (25-fold for Asia) since the 1950s.

Significantly, for the equivalent fishing power expended, landings from global fisheries are now half what they were a half-century ago, indicating profound changes to supporting marine environments”

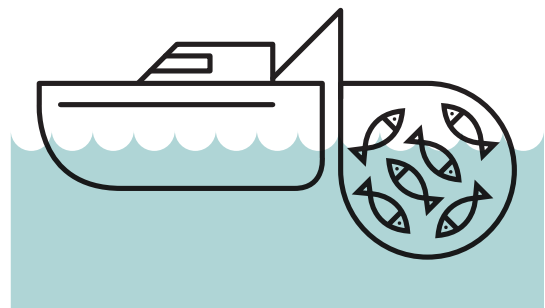
*Fish And Fisheries Journal, 2012*



# 1 TRILLION FISH CAUGHT A YEAR

“The most reliable estimates of fish numbers are likely to be those based on average weight data taken from more than one reference. These total 0.43-1.14 trillion and account for 29% of fish capture tonnage. In addition, the lower estimate for multi-species categories with an EMW is likely to be very conservative and totals a further 0.079 trillion for another 7% of fish capture tonnage. Combining these two figures brings the lower estimate for this 36% of capture tonnage to 0.51 trillion. It is concluded that the number of fish caught each year is of the order of a trillion”

*The Guardian, 2015*



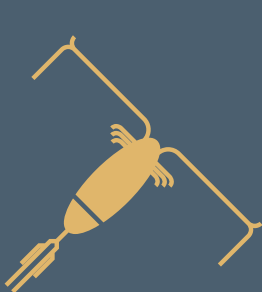
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Ocean Security

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# TIMELINE & SOLUTION

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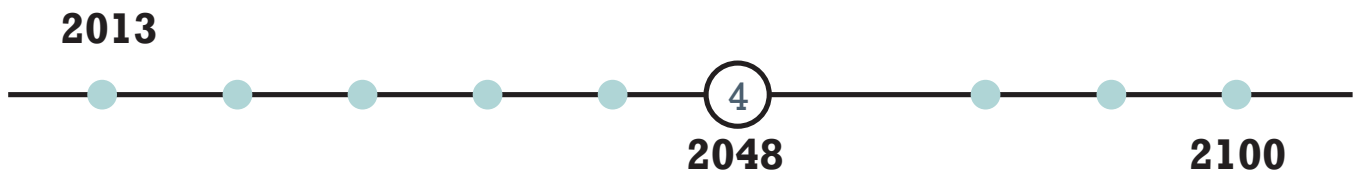
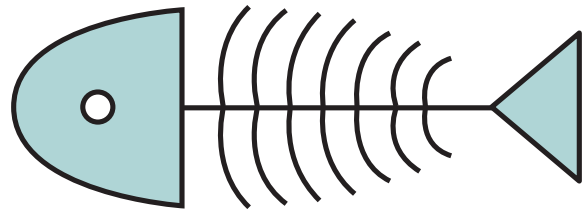


4

## FISH EXTINCTION BY 2048

“If fishing rates continue apace, all the world's fisheries will have collapsed by the year 2048”

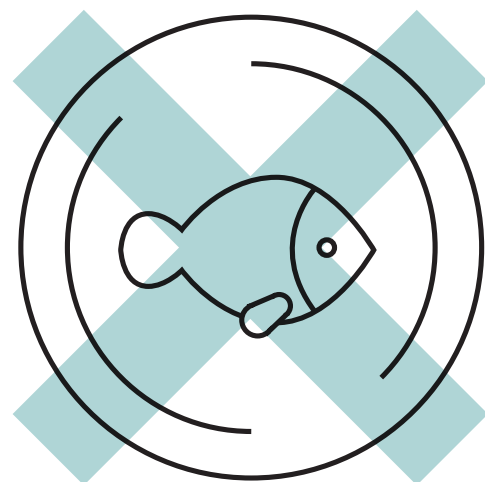
*National Geographic*



## DON'T EAT FISH!

“If you want to save the fish just don't eat them”

*James cameron, 2015*







[www.worldpreservationfoundation.com](http://www.worldpreservationfoundation.com)