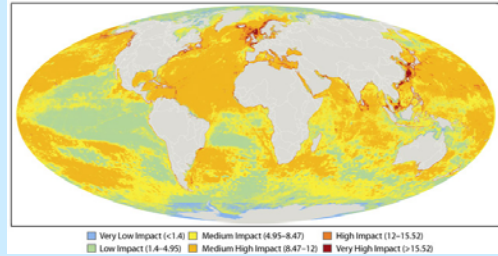


Lecture 7 : The state of our seas.



A Global Map of Human Impacts to Marine Ecosystems

Over 40% of the world's ocean is heavily impacted; only a tiny percentage is pristine...



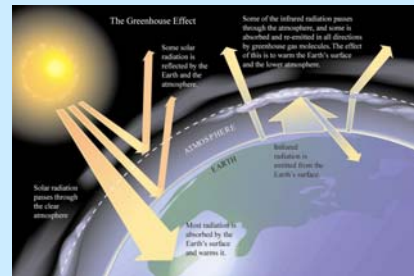
Major threats to Ocean systems worldwide



1. Global warming
2. Ocean Acidification
3. Eutrophication
4. Exploitation of resources – Mining of coral
5. Over fishing
6. Non-sustainable fishing methods

1. Global warming

The greenhouse effect.



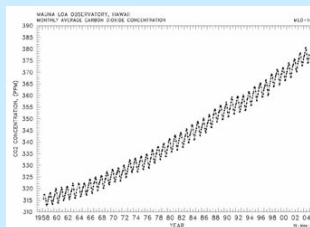
Identifying the problem .



Keeling's first measurement - 1958 - 315 ppm

Keeling also detected seasonal variations in carbon dioxide levels.

Keeling's curve

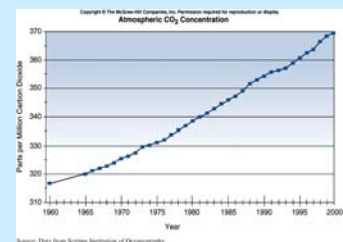


The trend in carbon dioxide levels over the last 50 years.

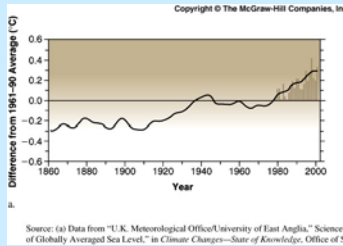
Levels of carbon dioxide in 1958 - 315 ppm

Current levels :
2007:
375 - 381 ppm

Latest IPCC estimate 385 - and up...



The trend in climate change over the last 150 years reflects the trend in carbon dioxide levels



Global Warming and Climate Change..
How bad can it be ?.....

- **IPCC - Intergovernmental Panel on Climate change-**
2000 scientists assembled by the UN and World Meteorological Organization, published their report in 2001.
- They estimated a temperature rise of between 2.5 - 10.4 F by 2100; sea levels to rise by 4 inches to 3 feet.
- (Last 10F rise was at the end of the last ice -age and took 13,000 yrs)

Global Warming and Climate Change..
How bad can it be ?.....

- The ACIA - Arctic Climate Impact Assessment
Produced by 250 scientists from 8 arctic countries, published in 2004.
- They predict that, if current trends continue, by 2100 the temperature will rise between 7 and 13° F

Global Warming and Climate Change..
How bad can it be ?.....

- The 4th report from the IPCC

2500+ Scientific reviews
800+ contributing authors
450 lead authors
130 countries
6 years
4 volumes
1 report

Global Warming and Climate Change..
How bad can it be ?.....

Warming of the climate system is unequivocal.

The probability that this is caused by natural climatic processes alone is less than 5%.

Levels of carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values , and any values seen over the last 650,000 years.

By the time carbon dioxide levels reach 550 ppm - the Arctic ice cap will melt over summer.

This may be a the tipping point...

Global Warming and Climate Change..
How bad can it be ?.....

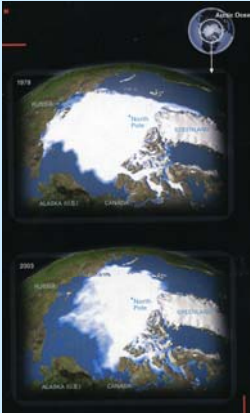
If things go unchanged, by 2100:

World temperatures could rise by between 1.1 and 6.4°C (1.98 and 11.52°F)

Sea levels will probably rise by 18 to 59 cm (7.08 to 23.22 in)

Weather effects will include frequent warm spells, heat waves heavy rainfall, an increase in droughts, tropical cyclones and extreme high tides.

Loss of ice in the Arctic
From 1979





to 2003

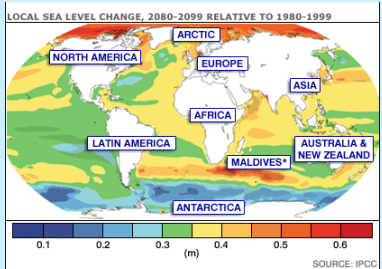
This also reduces the albedo effect of the ice.
A textbook example of positive feedback.....

Global Warming and Climate Change..
How bad can it be ?.....

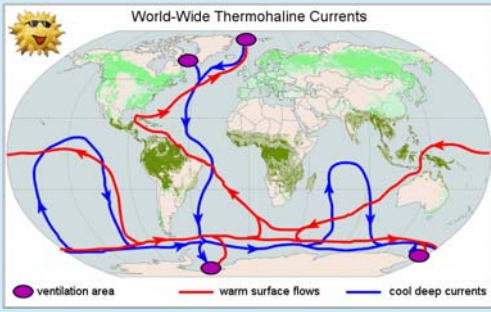
- Polar bears and many other pagophilic (ice - loving) species are imminent threat of extinction



Global Warming and Climate Change..
How bad can it be ?.....



The thermohaline circulation (THC) - distributes heat, but is dependant on changes in density, due to the salinity of the oceans.....



Coral bleaching

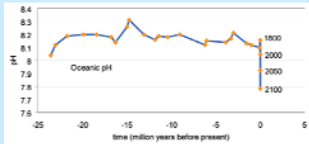
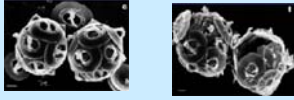



Ocean Acidification



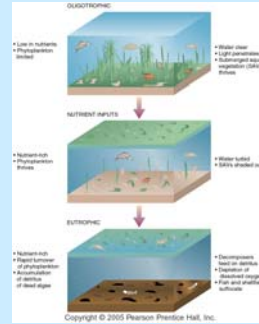



Ocean Acidification



Recent changes in ocean pH levels

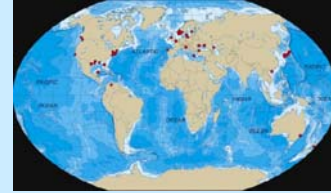
Eutrophication



150 'dead zones' counted in oceans

U.N. report warns of nitrogen runoff killing fisheries

MSNBC staff and news service reports
Updated: 10:12 a.m. PT March 29, 2004



Exploitation of resources – Mining of coral

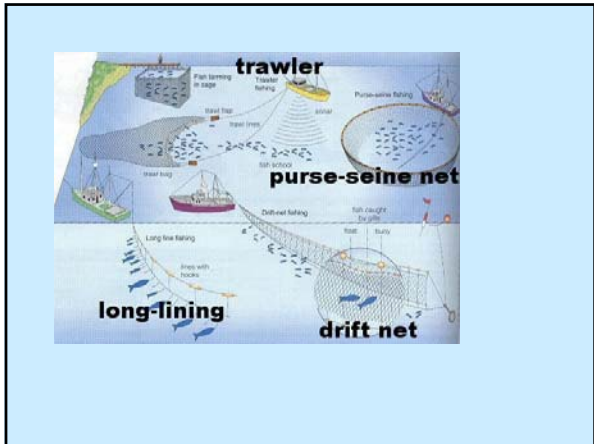


Over fishing



A total of almost 80% of the world's fisheries are fully- to over-exploited, depleted, or in a state of collapse. Worldwide about 90% of the stocks of large predatory fish stocks are already gone.



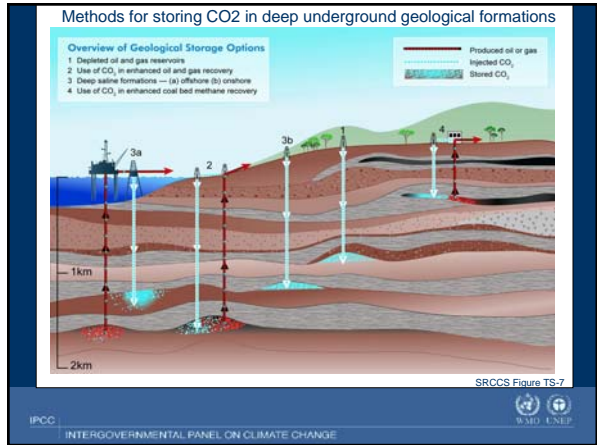



How can we best protect our oceans ?

1. Scientific research
2. Stewardship
3. Activism

Seafood Watch
West Coast Seafood Guide 2006

BEST CHOICES	GOOD ALTERNATIVES	AVOID
<ul style="list-style-type: none"> Atlantic Salmon Alaska Wild Salmon Wild Pacific Salmon Wild Pacific Halibut Wild Pacific Rockfish Wild Pacific Sole Wild Pacific Tautog Wild Pacific Yellowtail Wild Pacific Whitefish Wild Pacific Rockfish Wild Pacific Sole Wild Pacific Tautog Wild Pacific Yellowtail Wild Pacific Whitefish 	<ul style="list-style-type: none"> Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon Alaska Wild Salmon 	<ul style="list-style-type: none"> Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon Atlantic Salmon



Addressing Climate Change

The collage includes:

- Solar panels in space.
- Wind turbines in a desert landscape.
- A view of Earth from space.
- A view of a solar panel array on the ground.
- A view of the Earth from space with a red dot indicating a location.