

# “Jellyfish blooms: implications for coastal resources and human health – responses and adaptation strategies

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# Beauty or beast ?



# Forms & Colors







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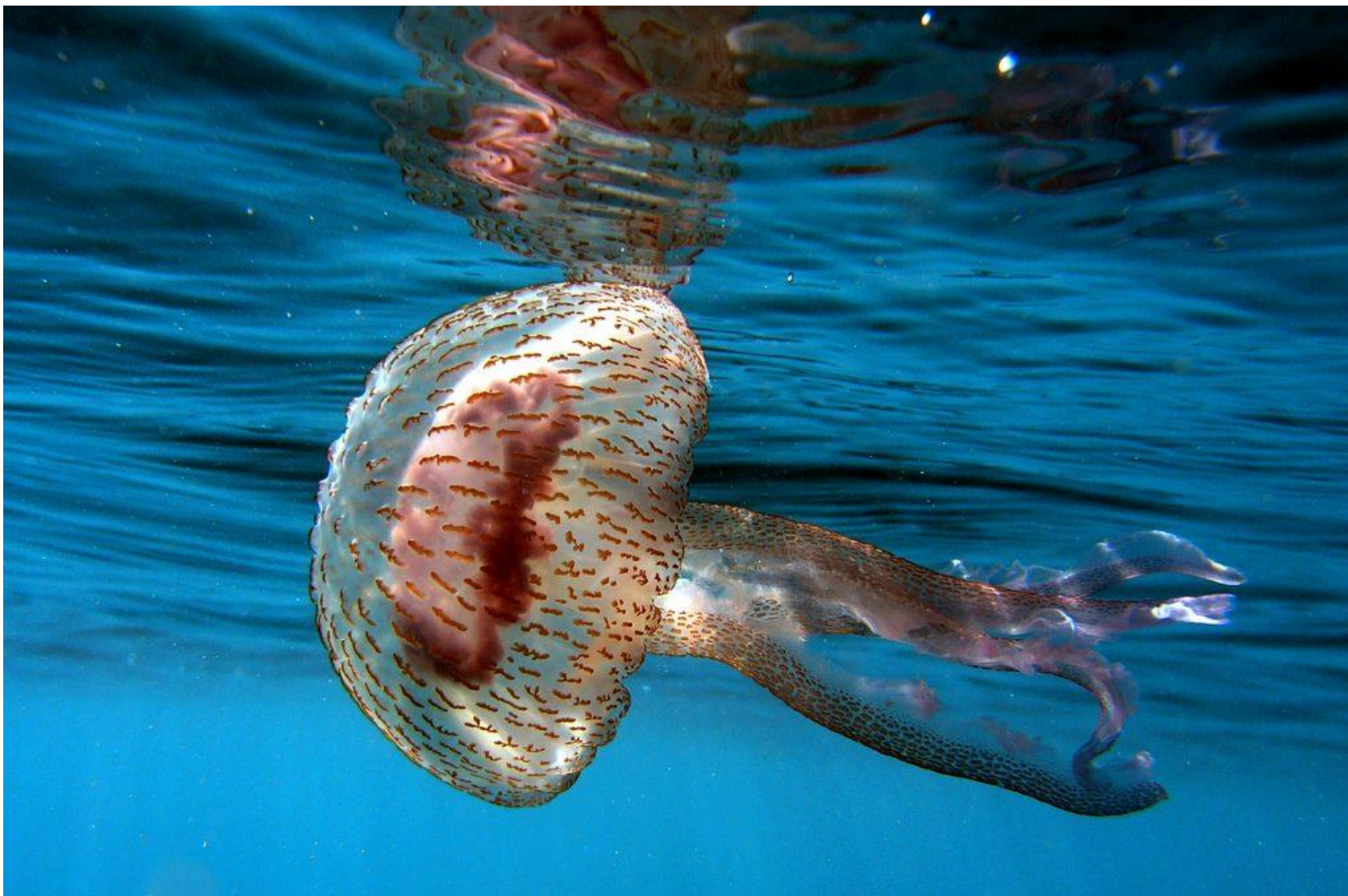






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# Does size matter?

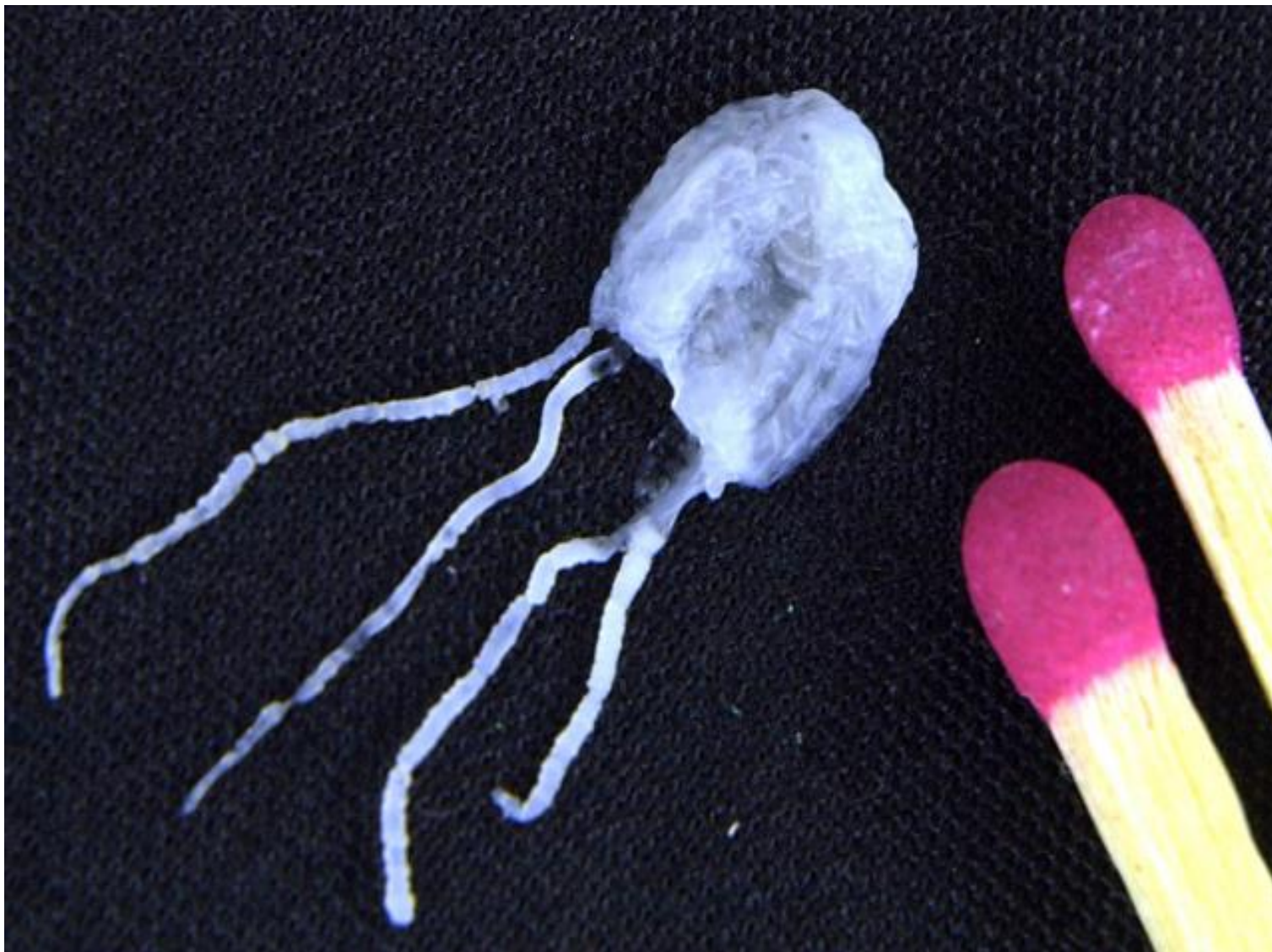






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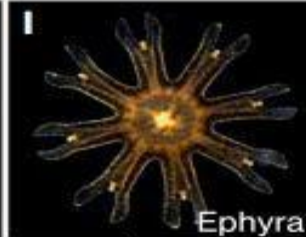
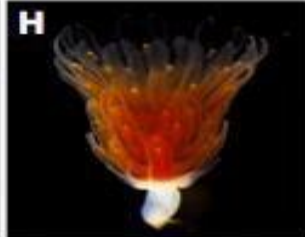
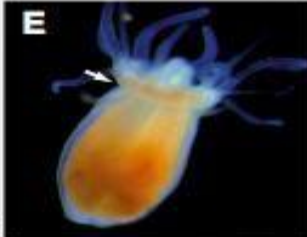
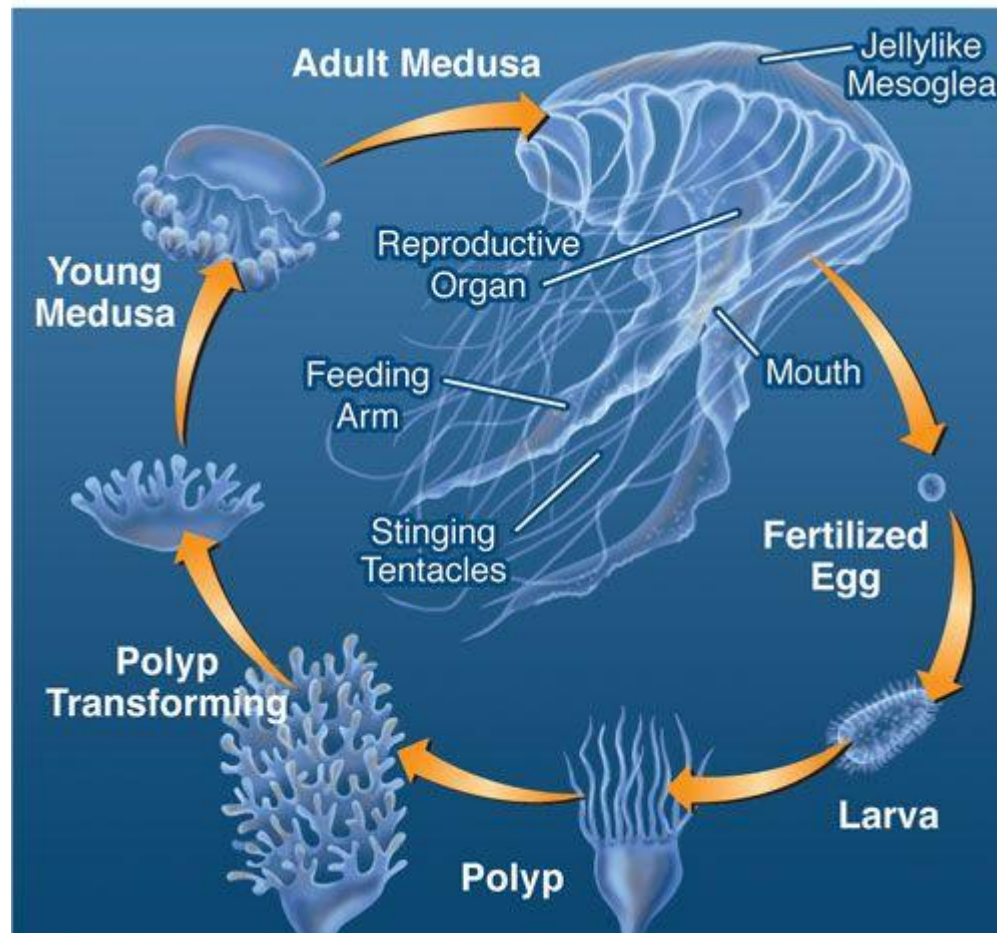




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# Life cycle

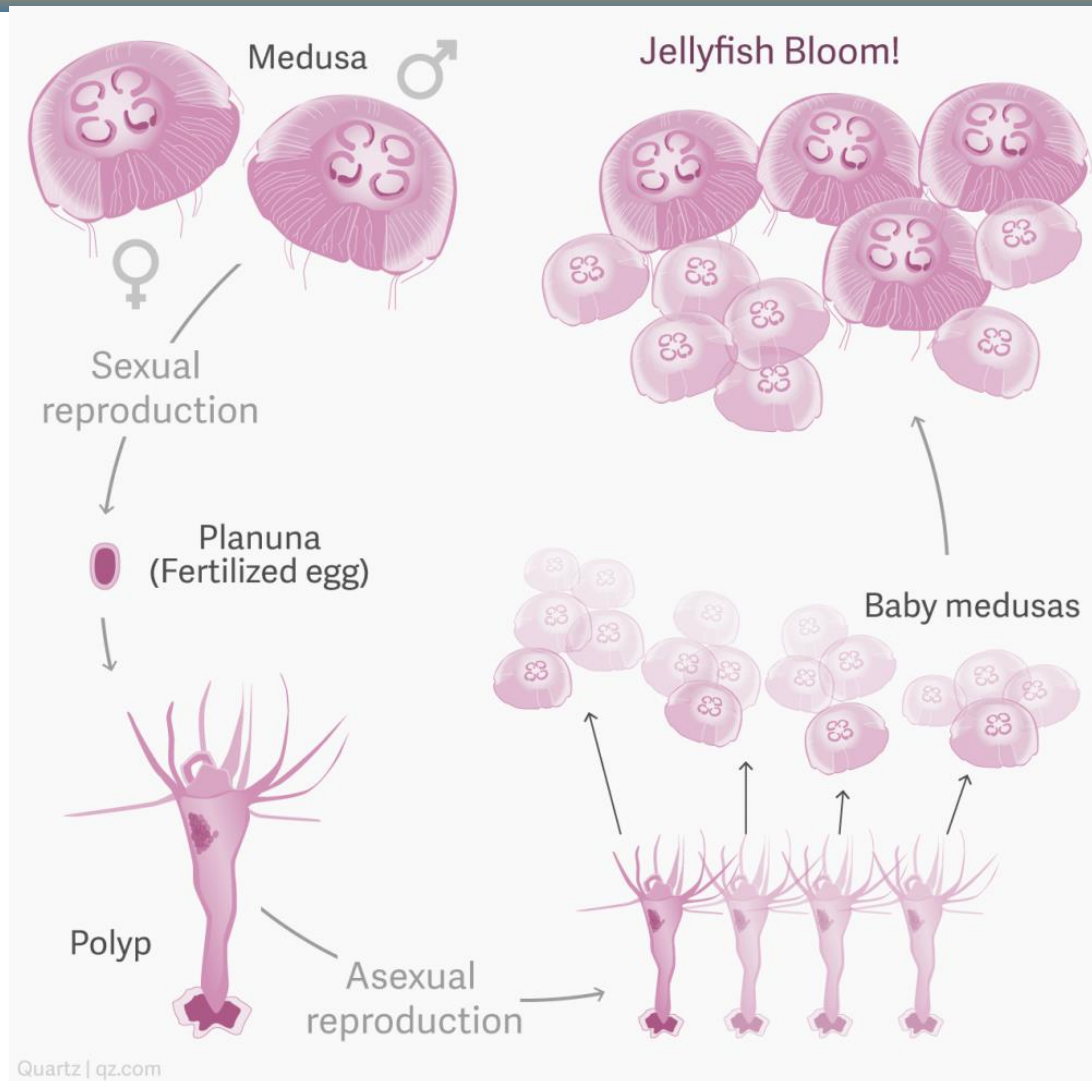






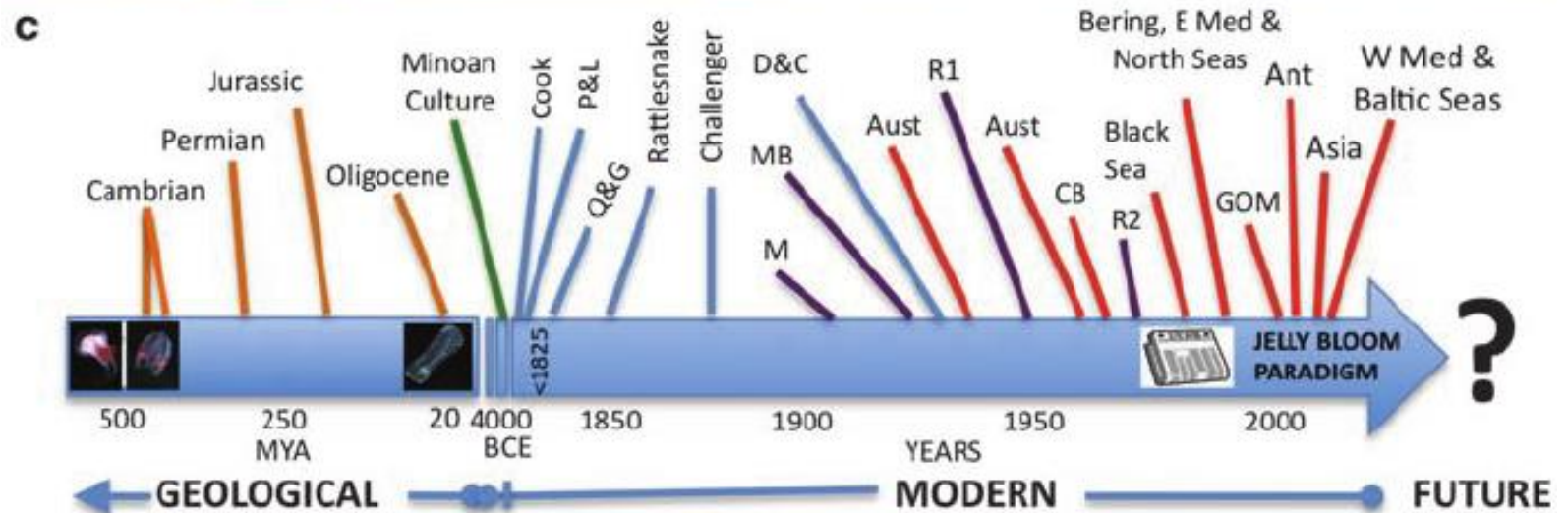
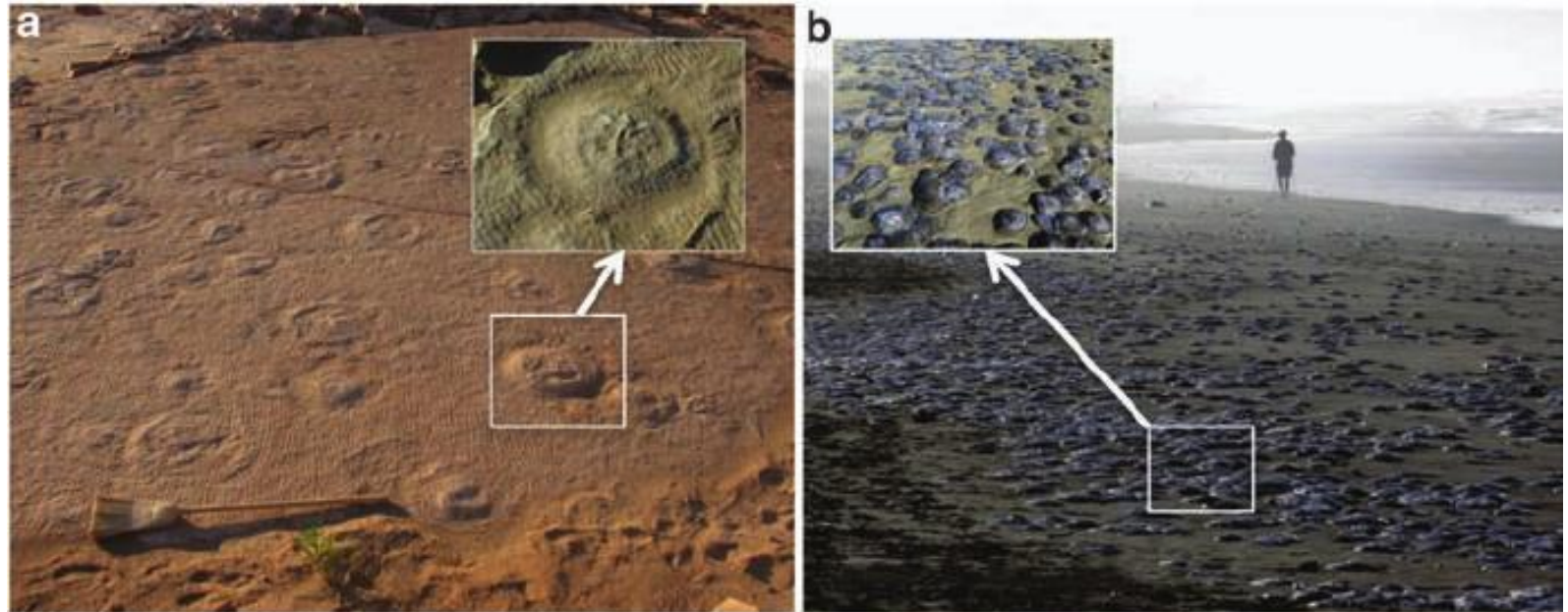
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Kawahara *et al.*, 2012

# Are Blooms recently discovered?





# Blooms places, years and species identified

Jelly fish species	Place	Year
<i>Aurelia aurita</i>	Black sea	1970
<i>Mnemiopsis leidyi</i>	Black sea	1986
<i>Pelagia noctiluca</i>	Philippines	1999
<i>Nemopilema nomurai</i>	Japan	Once every 40 year 2009-2002 2012
<i>Aurelia aurita</i>	Australia	2006
<i>Pelagia noctiluca</i>	Italy, Adriatic	2002 – till now
<i>Pelagia noctiluca</i>	Scotland, Ireland	2000,2007, 2013
<i>Pelagia noctiluca</i> , <i>Rhopelima nomadica</i> ,	Sweden, Florida, Israel	2017 ,2013
<i>Physalia physalia</i> , <i>Aurilia aurita</i> , <i>Stomolophus spp</i>	USA	2000,2010 ,2013 2017



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## The human impact of major jellyfish blooms

### United States 2006

Over two weeks, jellyfish clogged a nuclear plant's cooling water intake three times, forcing a 60% output reduction in one of the reactors.

### N. Ireland 2007

Mauve stinger jellyfish killed 100,000 salmon on the country's only salmon farm.

### Oman 2003

300 tonnes of jellyfish damaged intake screens at a desalination plant, cutting its output by 50%.

### Black Sea 1982

Invasive comb jellyfish—likely brought to the sea via a ship's ballast water—wiped out a \$350 million fishing industry.

### Japan 2009

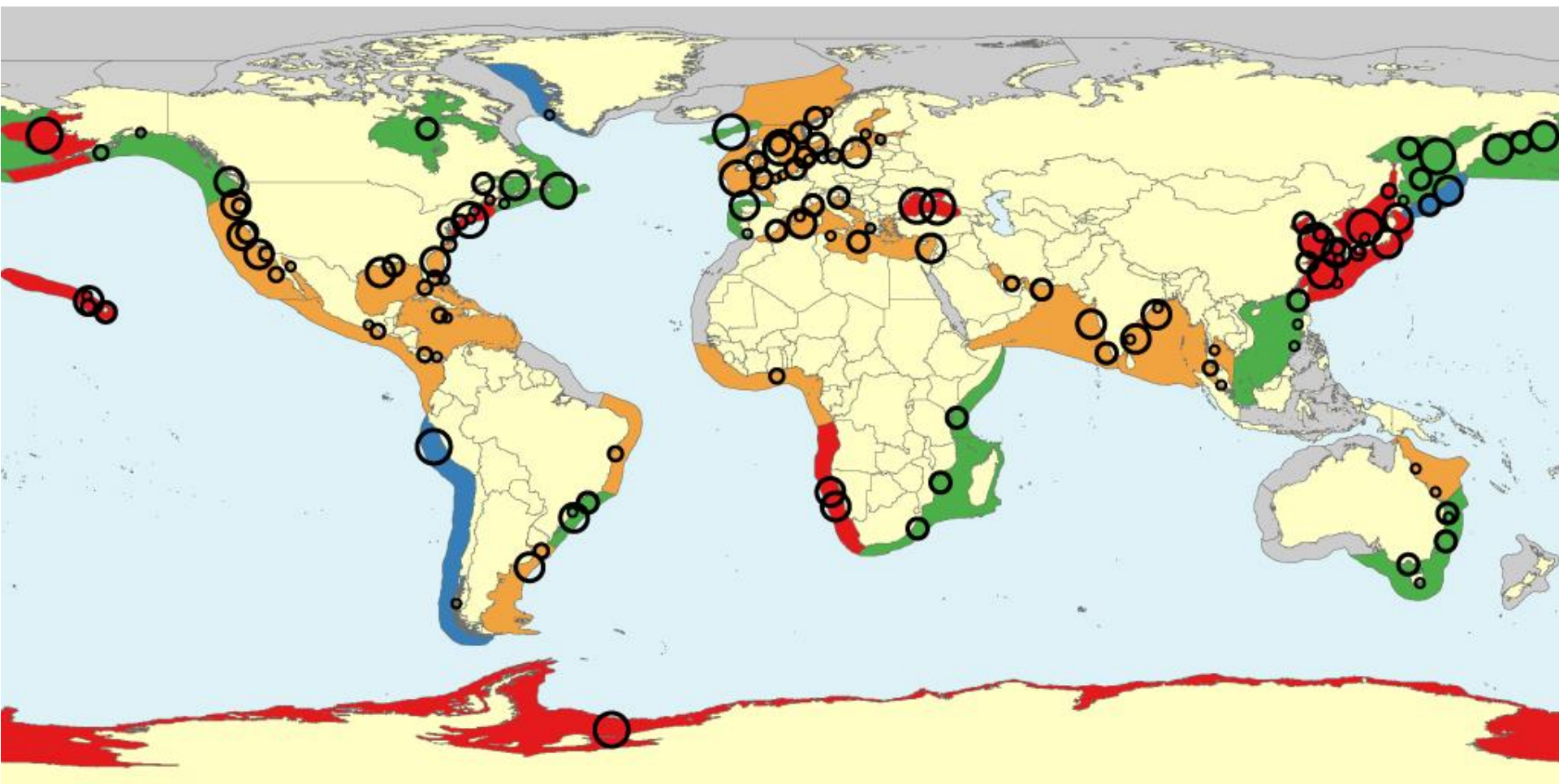
A 10-ton trawler capsized when the crew tried to haul in a net full of Nomura's jellyfish, which can weigh 440 pounds each.

Jellyfish designed by iDROBUX from The Noun Project

Ritchie King | Quartz | qz.com



# Global Distribution



Brotz *et al.*, 2009

# How blooms looks like?







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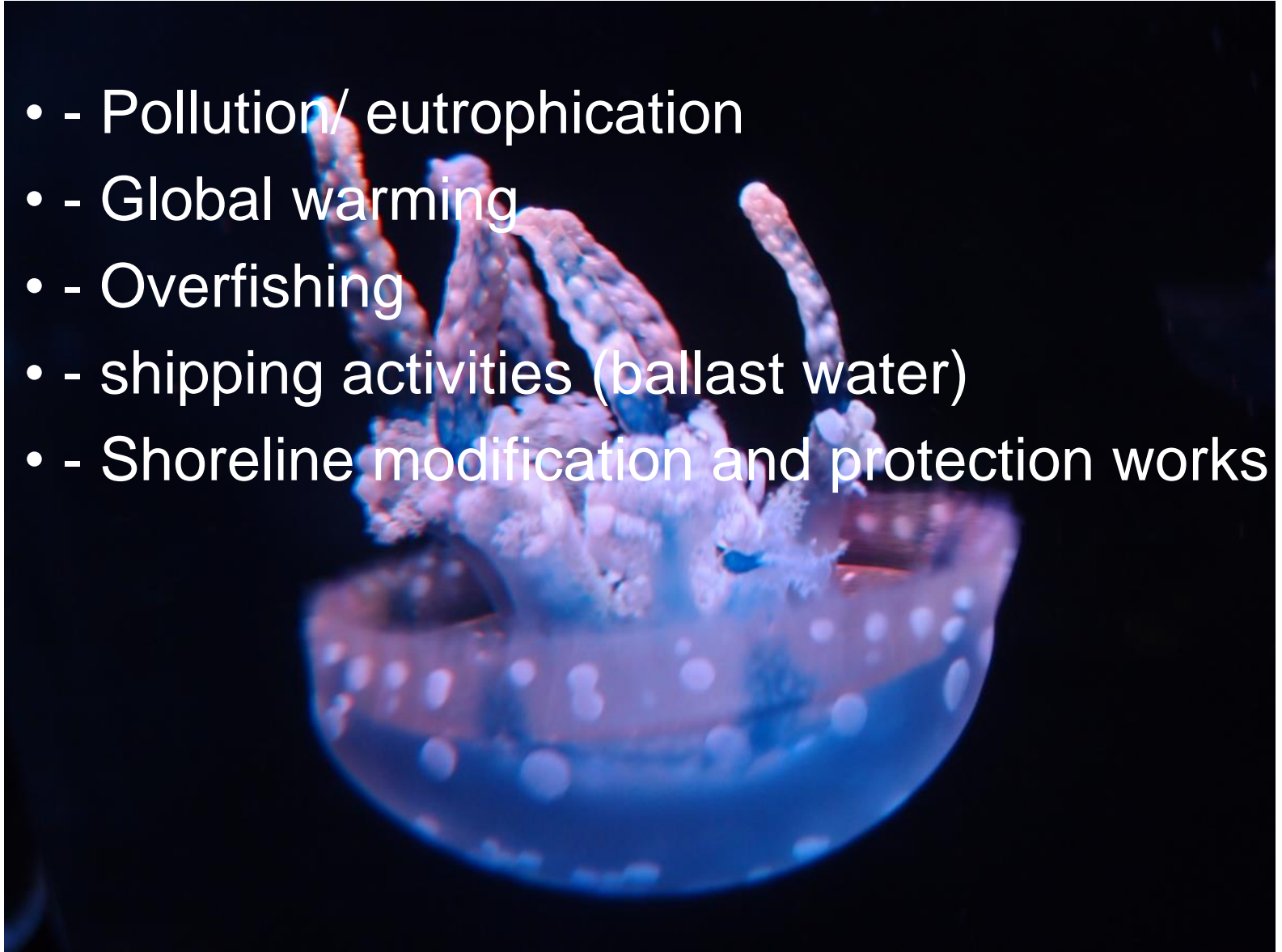
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## Reasons for Blooms increase

- - Pollution/ eutrophication
- - Global warming
- - Overfishing
- - shipping activities (ballast water)
- - Shoreline modification and protection works

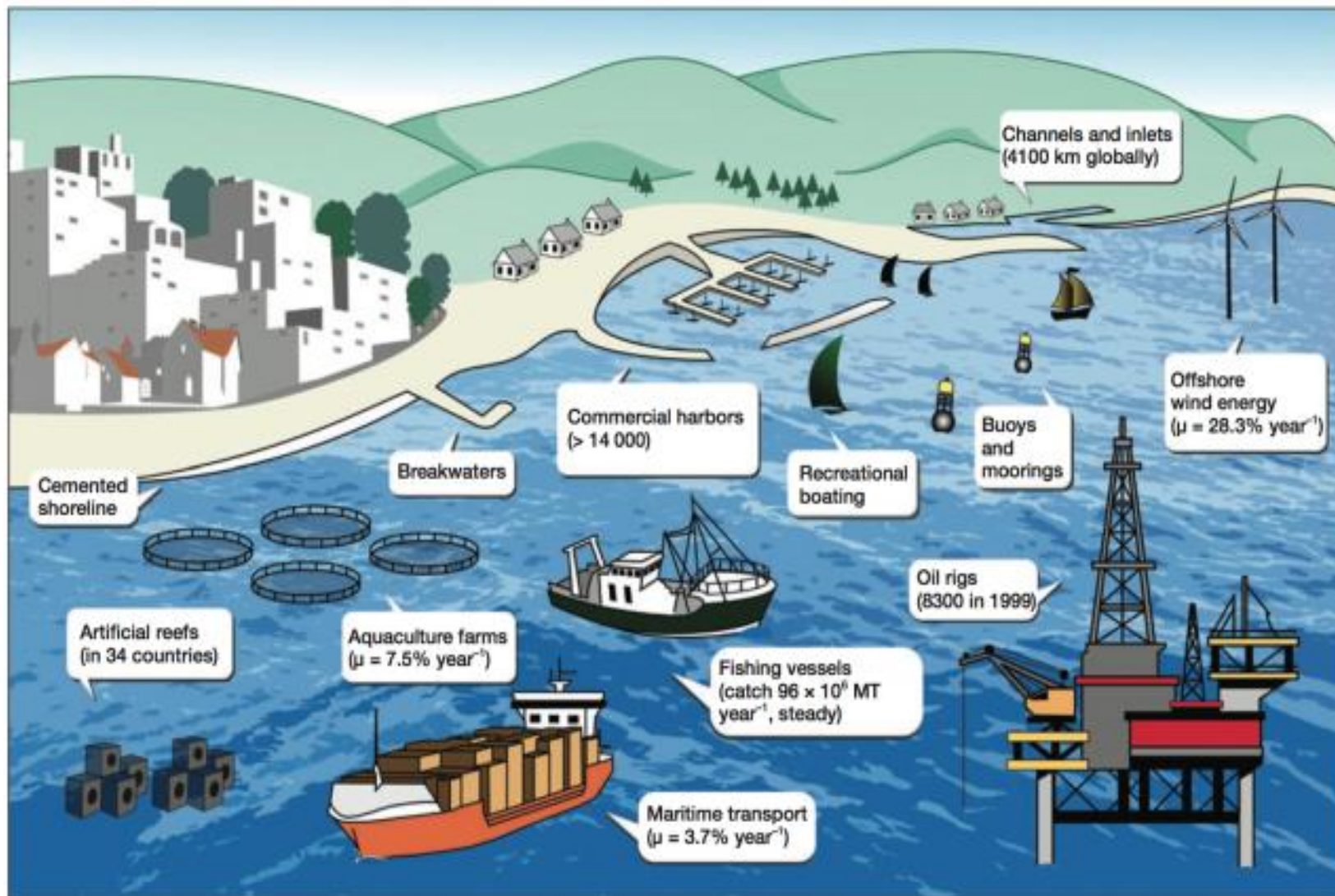






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It only needs any solid substrate to settle on

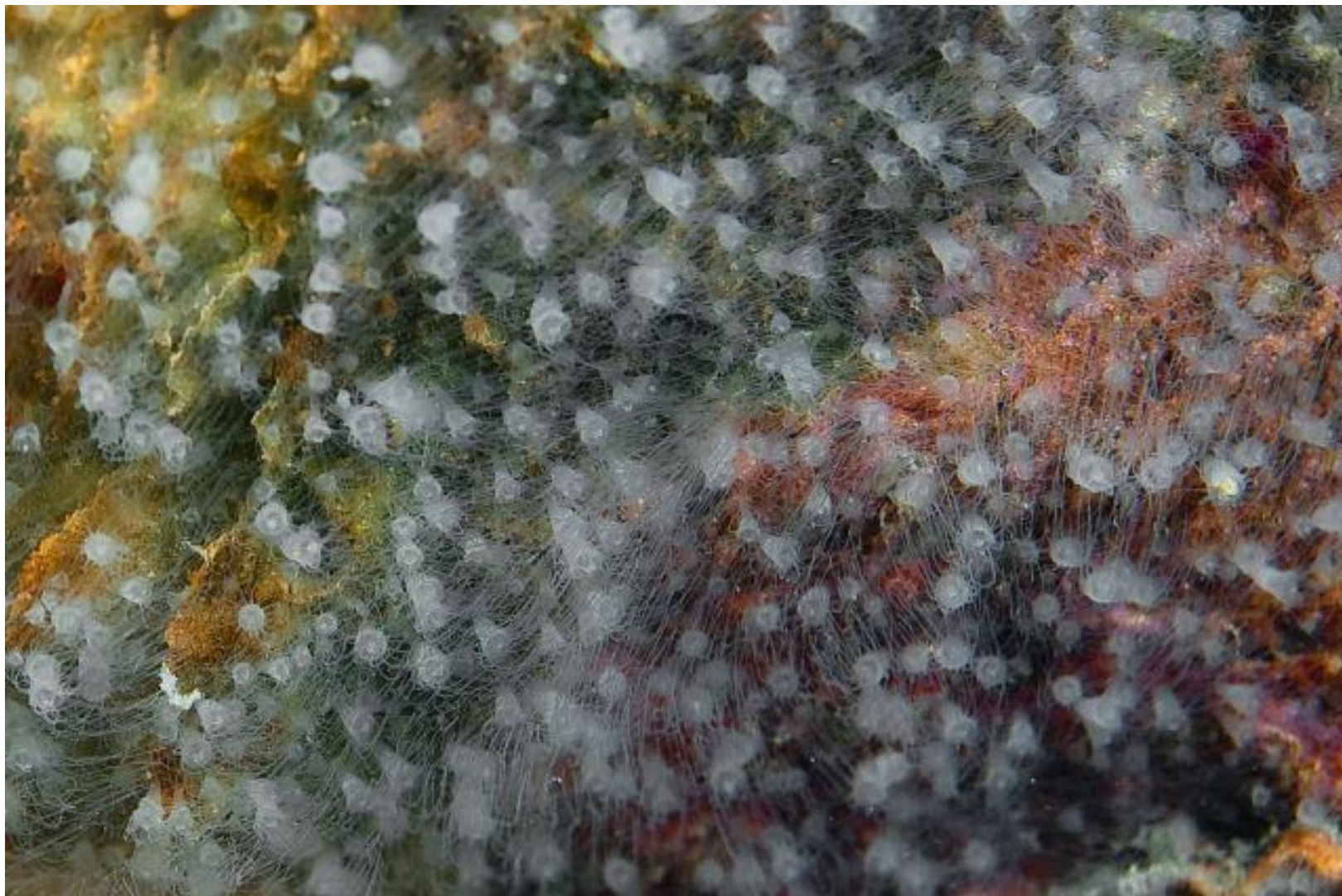






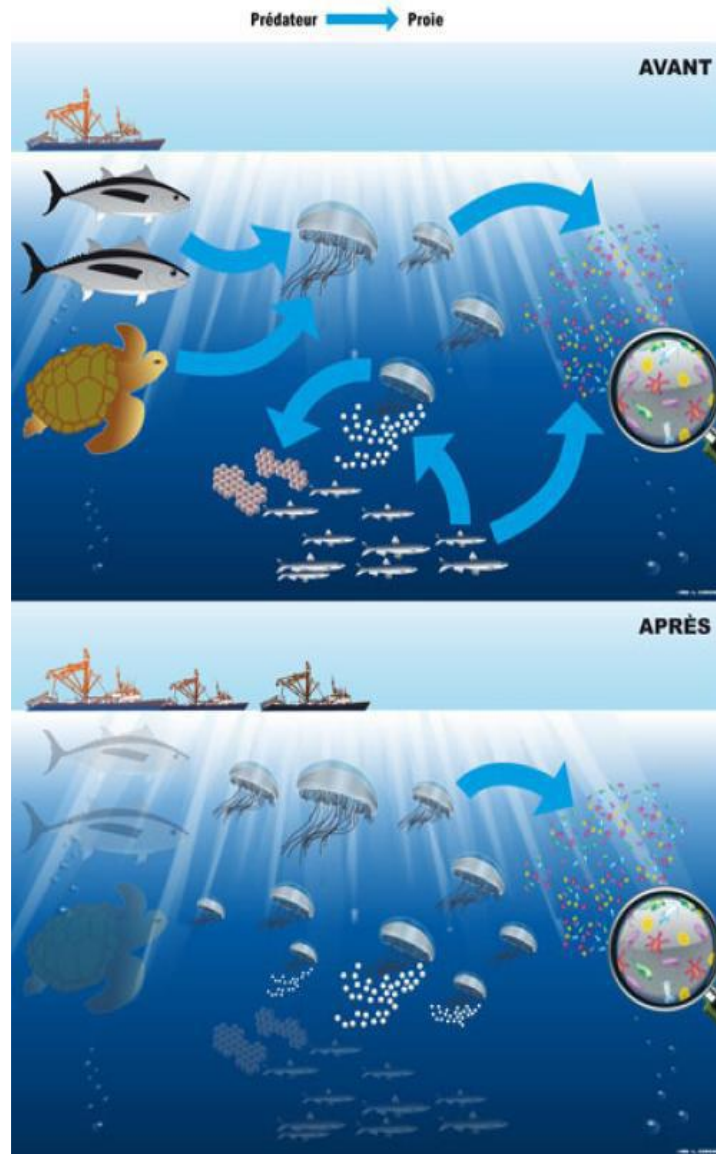
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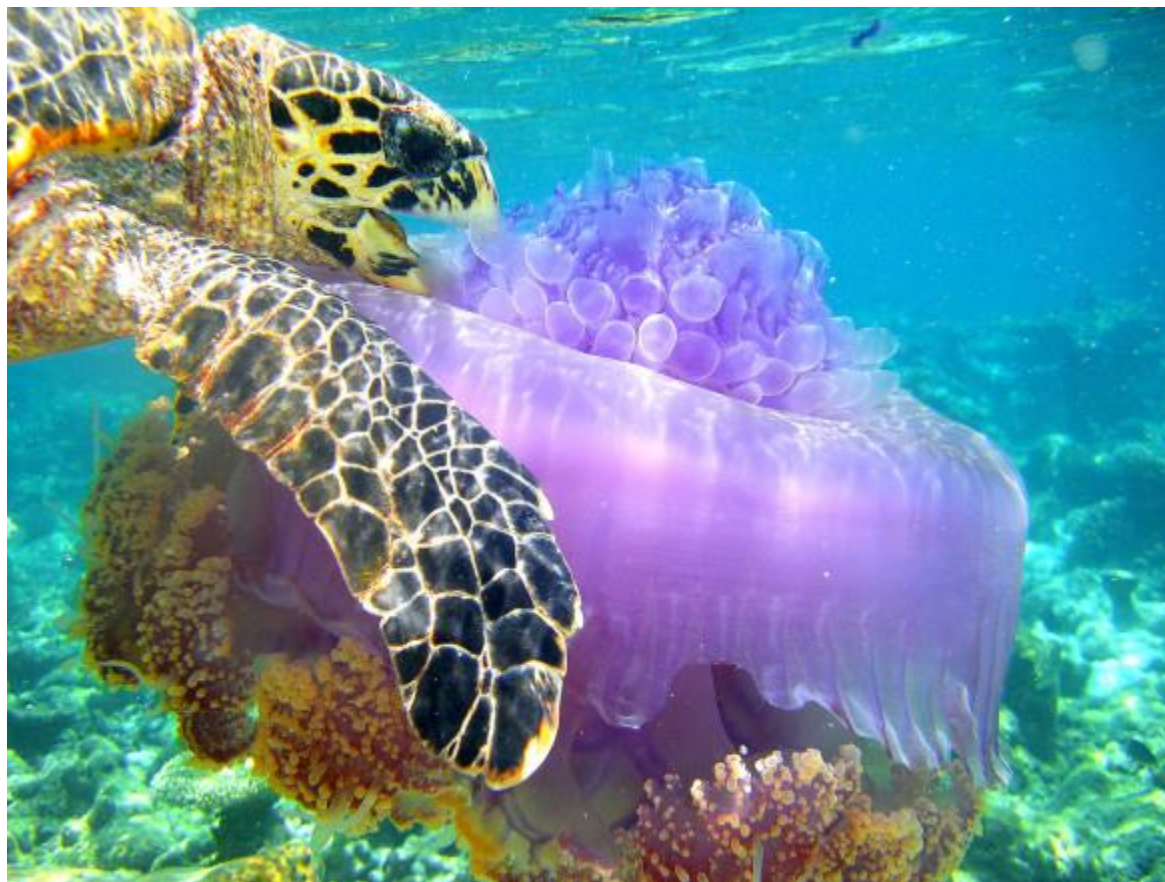
# - Over Fishing practices for predator and competitors





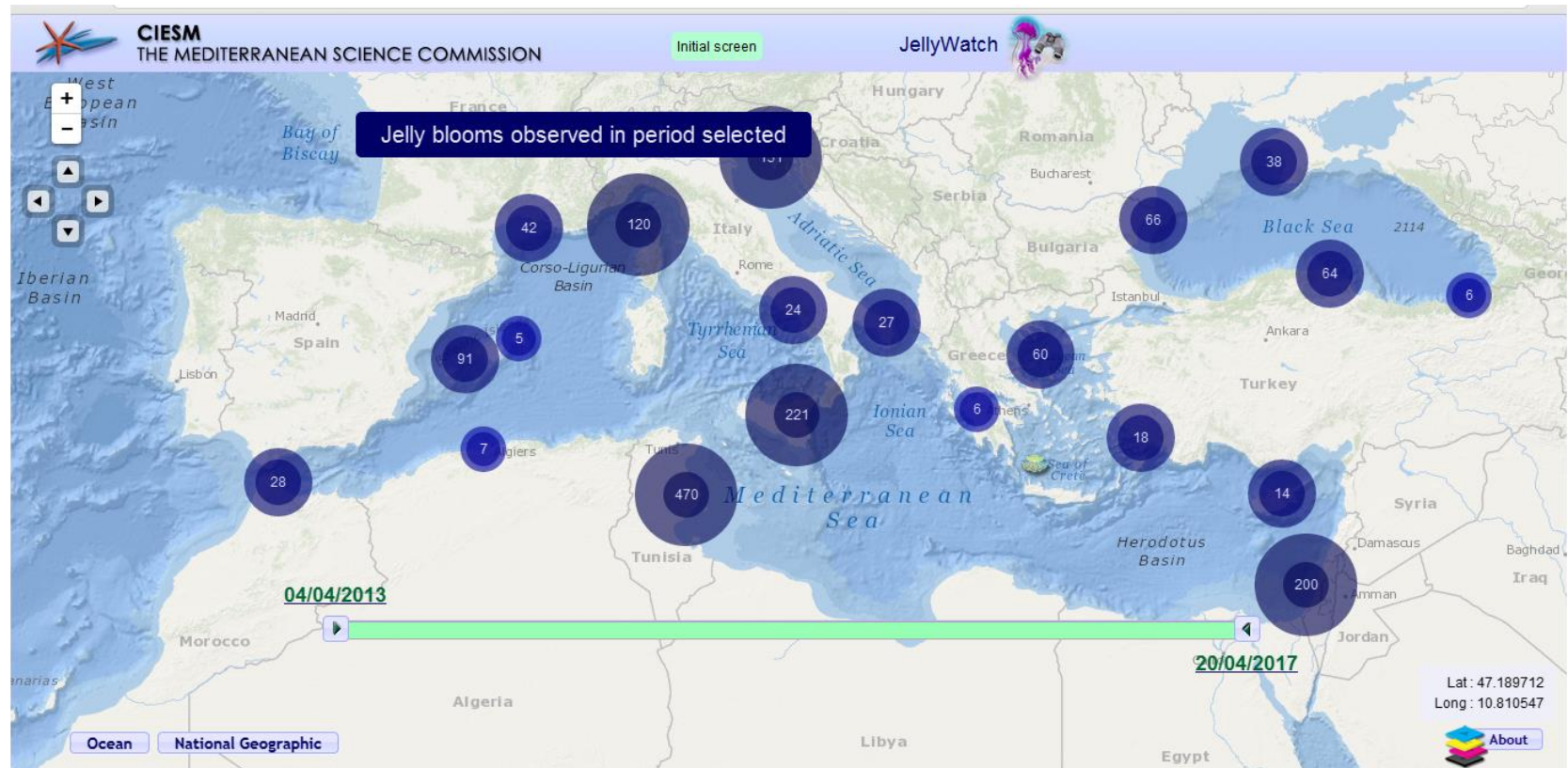
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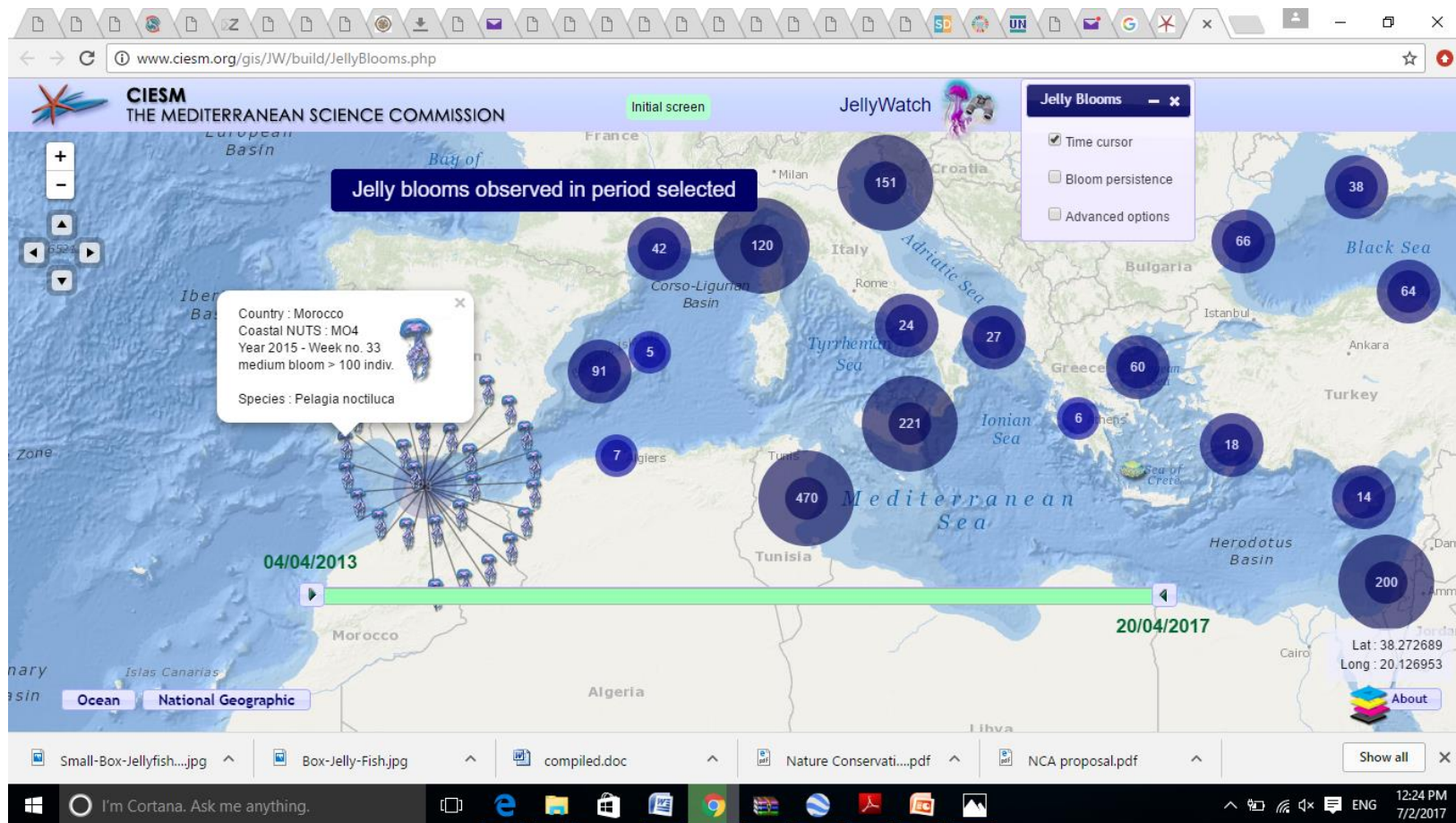
# Monitoring activities





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# Negative impacts on fisheries



# Jellyfish Dominate in fishing nets & spoil the catch





## - Clogging water intake structures in various plants



# Sting and causing fatality to human





# Mitigations:

## 1- Increasing of predators



## 2- Jellyfish Eliminating RObotics Swarm





- 1-Reduction of eutrophication.**
- 2-Introducing ecosystem based approach for fisheries management.**
- 3- Conservation of key species (predators & competitors).**
- 4- Application of anti-fouling and bio-control strategies in shipping and coastal structures**
- 5- Applying jellyfish excluding nets and screens**



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Simply change your life style & embrace jellyfish



## Selected references:

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- Richardson, Anthony J., Bakun, Andrew, Hays, Graeme c., and Gibbons, Mark J., 2009. The jellyfish joyride: causes, consequences and management responses to a more gelatinous future. *Trends in Ecology and Evolution* 24:6.