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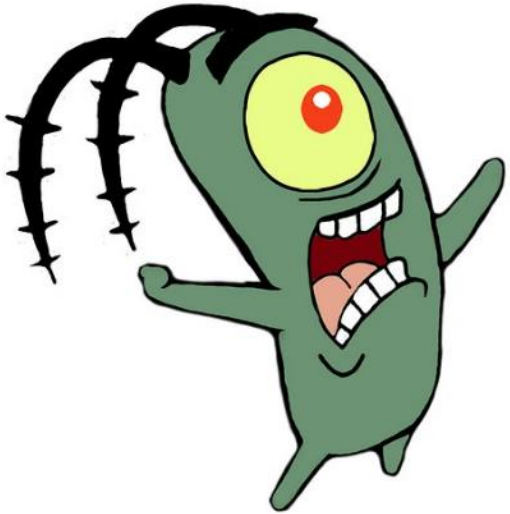
Cyanobacteria and Lough Neagh - from terraforming to terrifying.....



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Talk Outline:

- The Lough
- The cyanobacterial blooms
- Causes
- Ecological consequences
- Future

Lough Neagh

- Lough Neagh is the largest lake in Britain and Ireland
- Enriched with nutrients
- Economically important
- Drinking water, fish, fisheries, birds, cultural site, ecology

Blue-Green Algae - Confirmed Locations (2024)

208

Number of Confirmed Reports

(Displaying 208 of 208)

Lough Neagh - Kinnego Marina

Confirmed Report: 29/09/2024
Council: Armagh City, Banbridge and Craigavon
Catchment: Lough Neagh & Peripherals
Local Management Area: Lough Neagh

Lough Neagh - Kinnego Marina

Confirmed Report: 29/09/2024
Council: Armagh City, Banbridge and Craigavon
Catchment: Lough Neagh & Peripherals
Local Management Area: Lough Neagh

Castlewellan Lake

Confirmed Report: 20/09/2024
Council: Newry, Mourne and Down
Catchment: SE Down Streams
Local Management Area: South Down

Lough Neagh - Rea's Wood

Confirmed Report: 16/09/2024
Council: Antrim and Newtownabbey
Catchment: Lough Neagh & Peripherals
Local Management Area: Lough Neagh


Ballyronan
The Loup
Antrim
Aldergrove

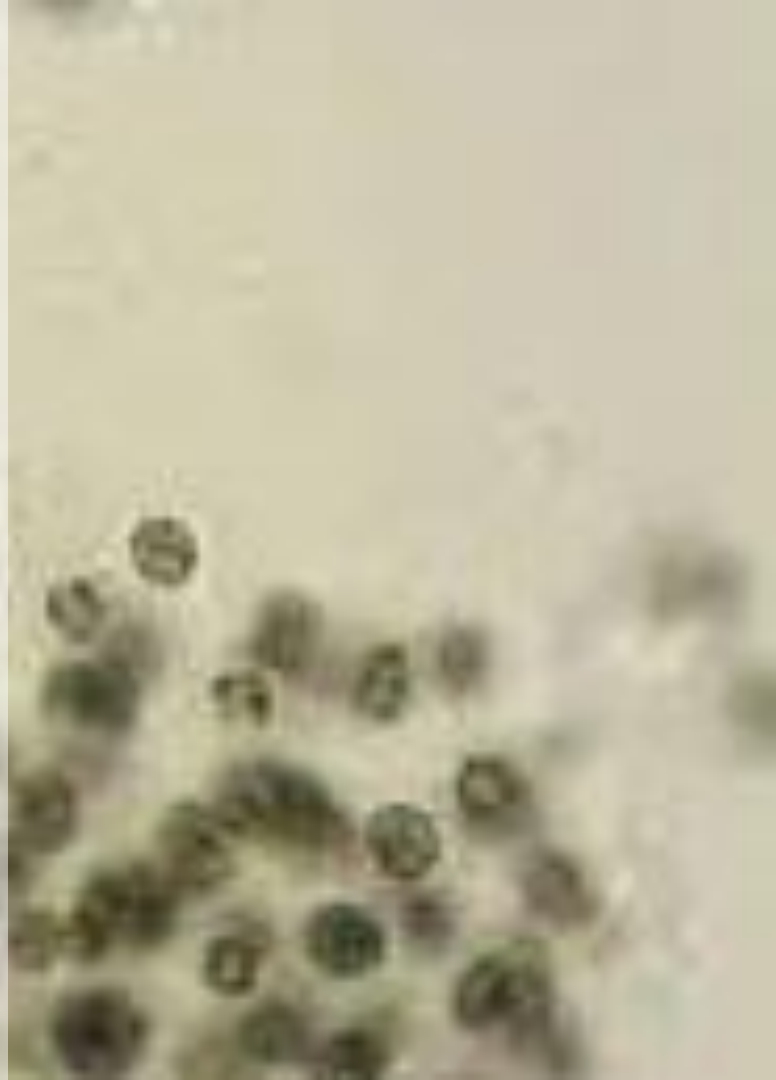
Posts Replies Highlights Articles Mec

adam mellor @Mell... · 14/09/2023

In #LoughNeagh, the stratification & bloom has broken down, the water has mixed, and there is a worrying decline in oxygen concentration (surface data only below). A real concern given the amount of organic material across the water column - I'll continue to highlight the data...

Cyanobacteria: plant or bacteria?

- Also known as Blue-Green algae, technically a bacteria
- Not the same as E. coli, usually low numbers
- 3 billion year old group of organisms, widespread & diverse
- Responsible for the oxygenation of our atmosphere and oceans (terraforming)
- Changed and still changing life on earth (terrifying)



Lough Neagh since 2020

WATER TEMPERATURE

Average water temperature...

Increased 1°C Since mid-1990s.

Increasing even more in last 2 years due to climate change. Some fish and other lake animals will struggle to survive in higher temperatures.

WATER CLARITY

Many prey species will be at higher risk from predators due to clearer waters.

Water in 2023 is almost...

3x as clear as in 2019.

PLASTICS POLLUTION

Small plastic fragments are not just a marine problem but also occur in Lough Neagh and are...

Bad for wildlife & water quality

They come from larger plastic waste, fibres from clothes washing and packaging residues.

DECREASED FISH FOOD

Zooplankton are an important food source for many fish species in Lough Neagh. In 2022 there was...

78% less Chlorophyll

compared to 2019, which means less plant material for zooplankton to feed on.

ZEBRA MUSSELS

Zebra Mussels are an invasive species which can become the dominant species in an area by outcompeting native species.

Population has greatly increased recently

For more information email: info@afbini.gov.uk

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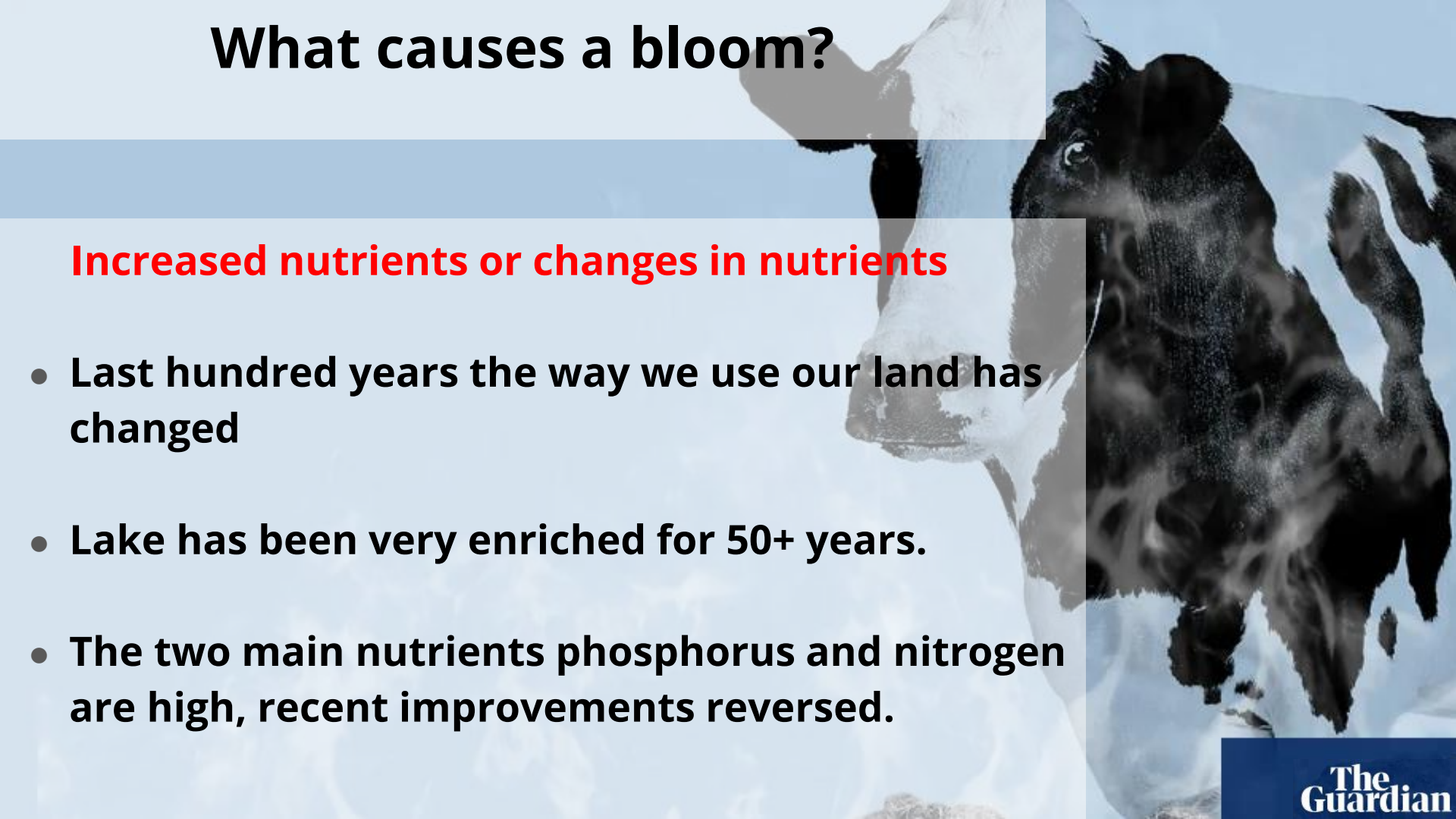
What causes a bloom?

Increased nutrients or changes in nutrients

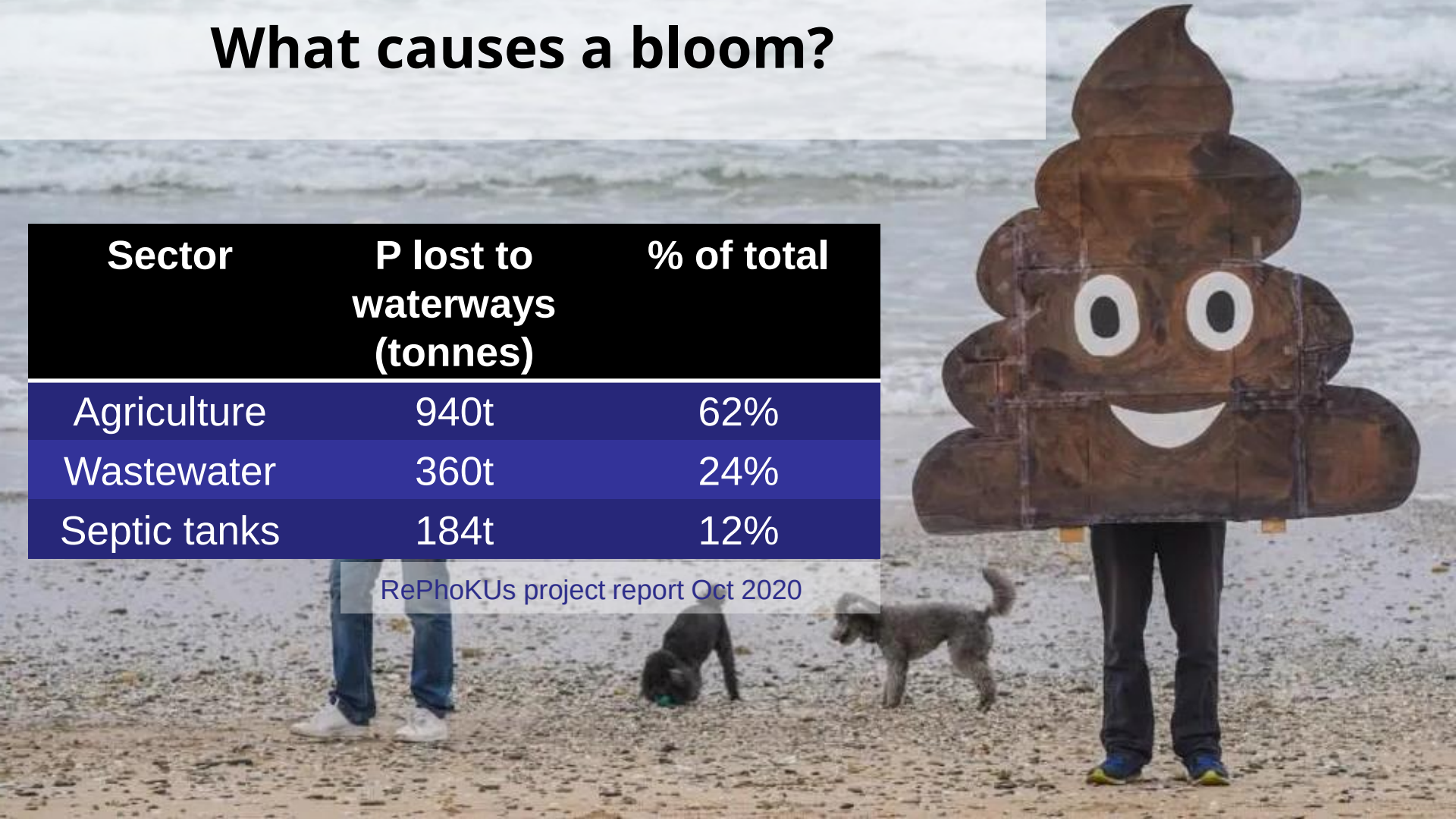
- **Last hundred years the way we use our land has changed**
- **Lake has been very enriched for 50+ years.**
- **The two main nutrients phosphorus and nitrogen are high, recent improvements reversed.**



What causes a bloom?

Sector	P lost to waterways (tonnes)	% of total
Agriculture	940t	62%
Wastewater	360t	24%
Septic tanks	184t	12%

RePhoKUs project report Oct 2020



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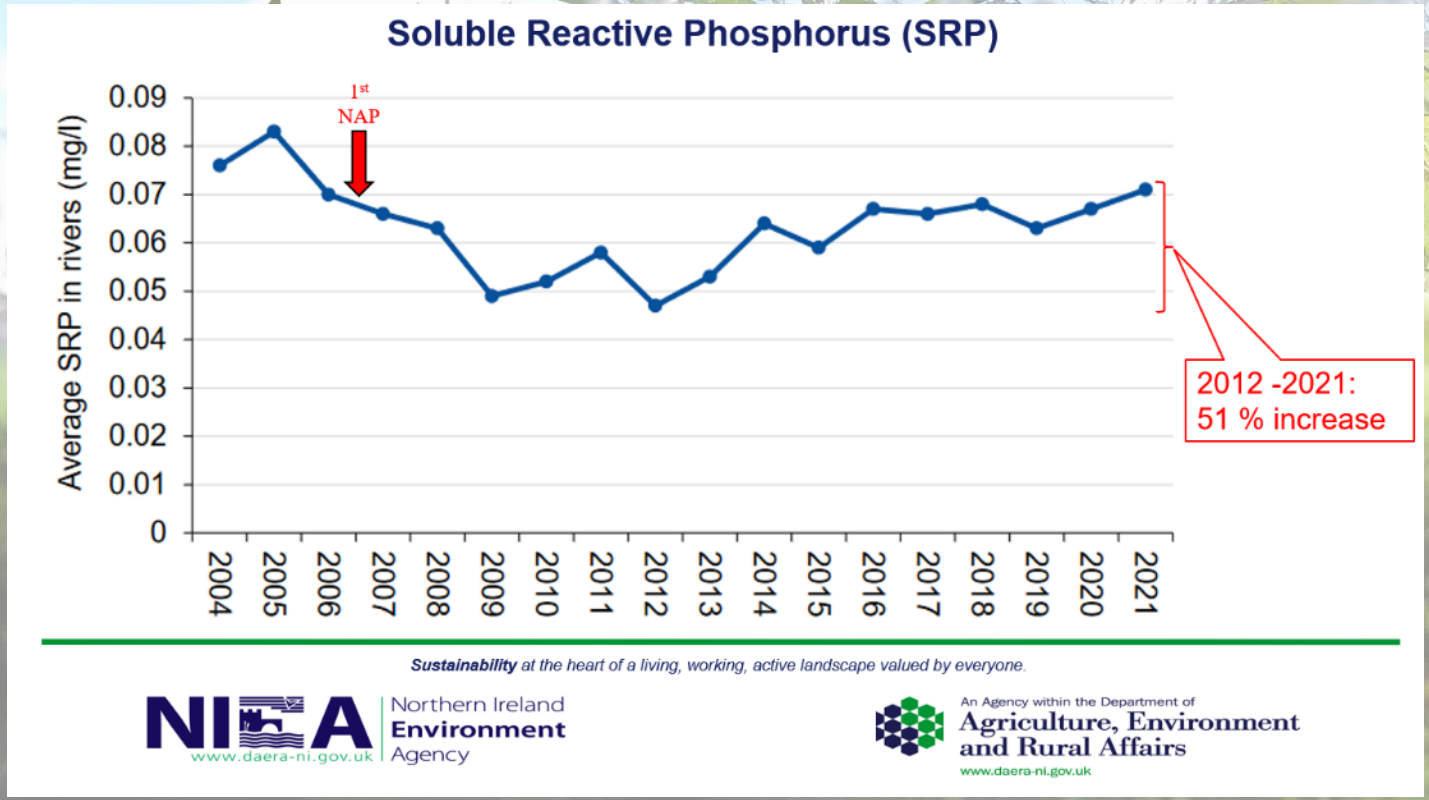

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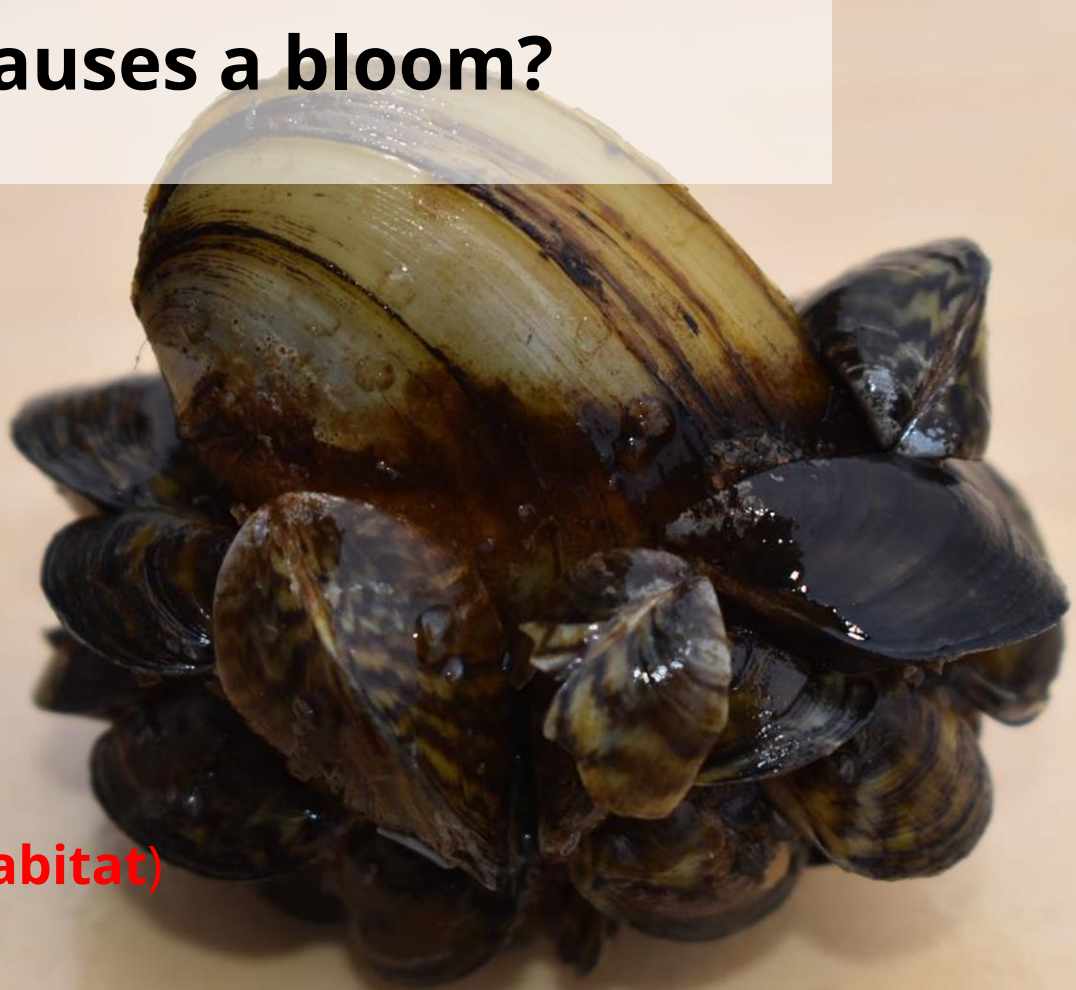

Changes in light /
Invasive species (habitat)

Zebra mussels have increased water transparency from 1m to 2.5 m

What causes a bloom?

Lough Neagh *Warming Stripes* 1974 - 2022

Departures from the time series average

…what else does temperature do….?

Information currently *in-press* to illustrate the long-term temperature trend since 1950's, and the increasing importance of P remineralization from the lakes sediment (internal load) which is driven to a significant extent, but not solely, by temperature.

This is to illustrate the diversity of effects that warming temperatures has, not just on biodiversity (ecological niche's for certain species), but also on biogeochemistry which in turn determines ecology…

…an ecological cascade

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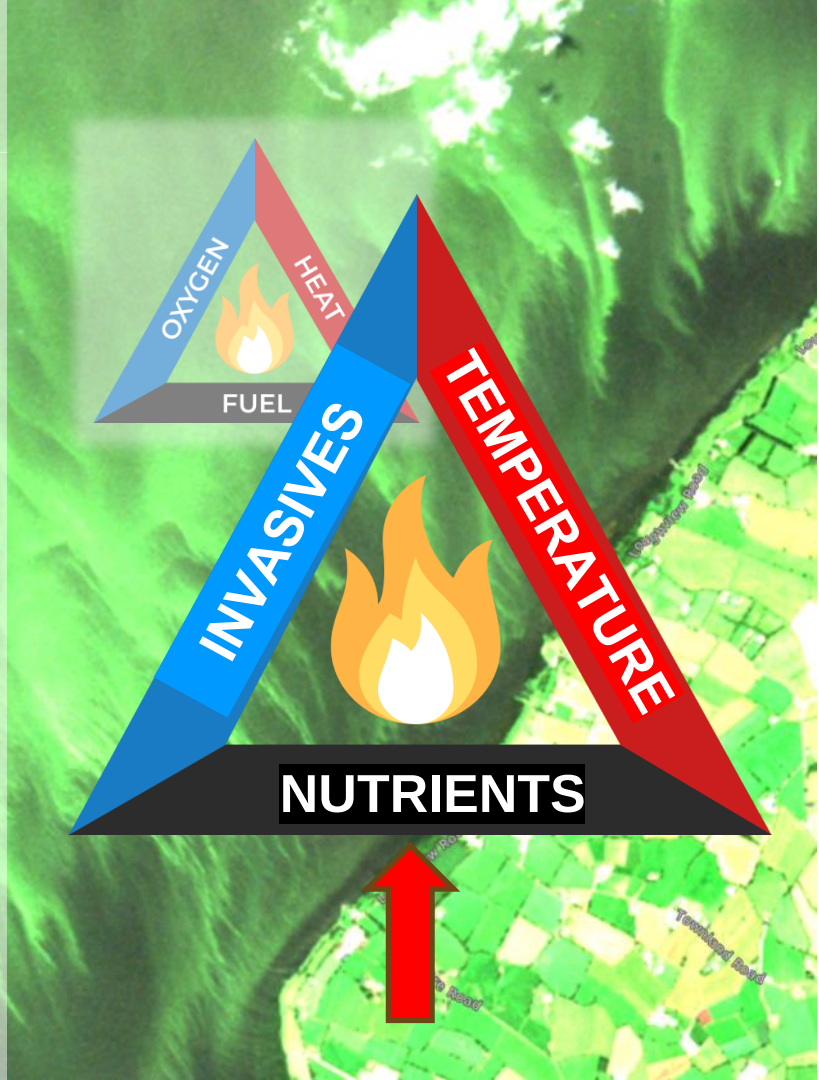
What can we do?

- Nutrient and other pollutant control is vital but societally painful to implement
- In lake measures must consider the composition of lake sediment, scale, human consumption of water, ecology
- Zebra mussels and climate are challenging to control



The international journal of science / 13 July 2023

nature

TROUBLED WATERS

Plastic pollution in reefs and freshwater ecosystems

Future - Long term changes

- Timescales of recovery, take decades (40 years for P stored in lake sediment to flush out)
- Nutrient management
- Behavioural change
- Management of expectations