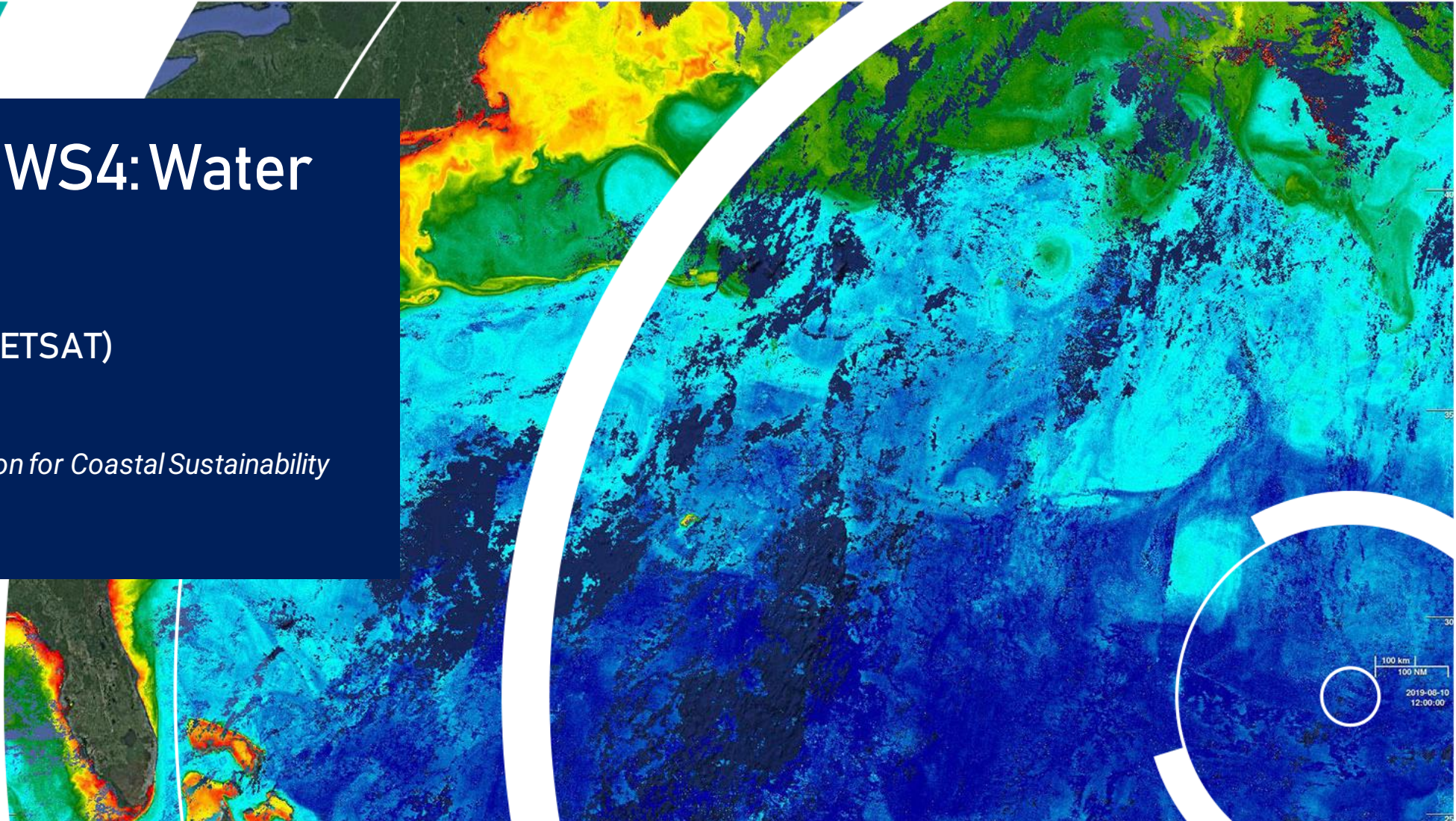


Introduction to WS4: Water Quality

Hayley Evers-King (EUMETSAT)
Ning Liu (UNEP)

*Ocean Observation and Prediction for Coastal Sustainability
in Africa, 5th March 2024*

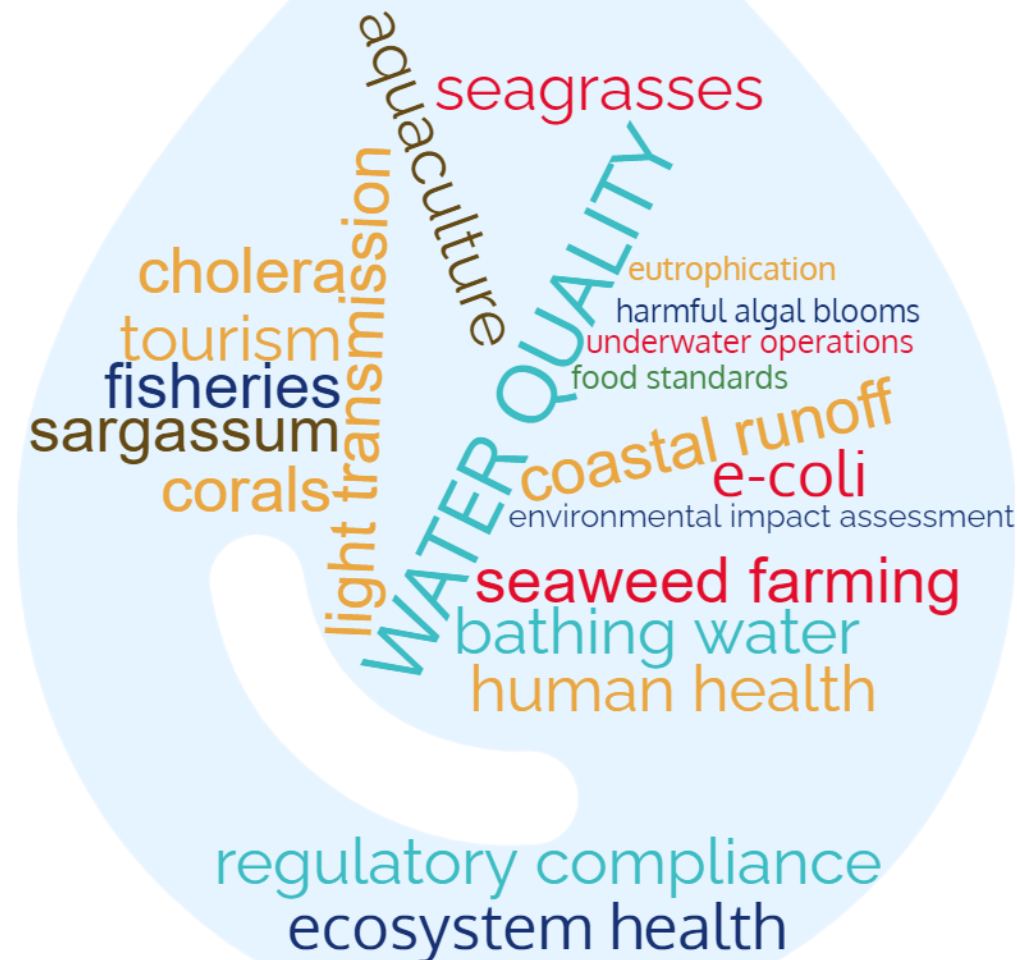




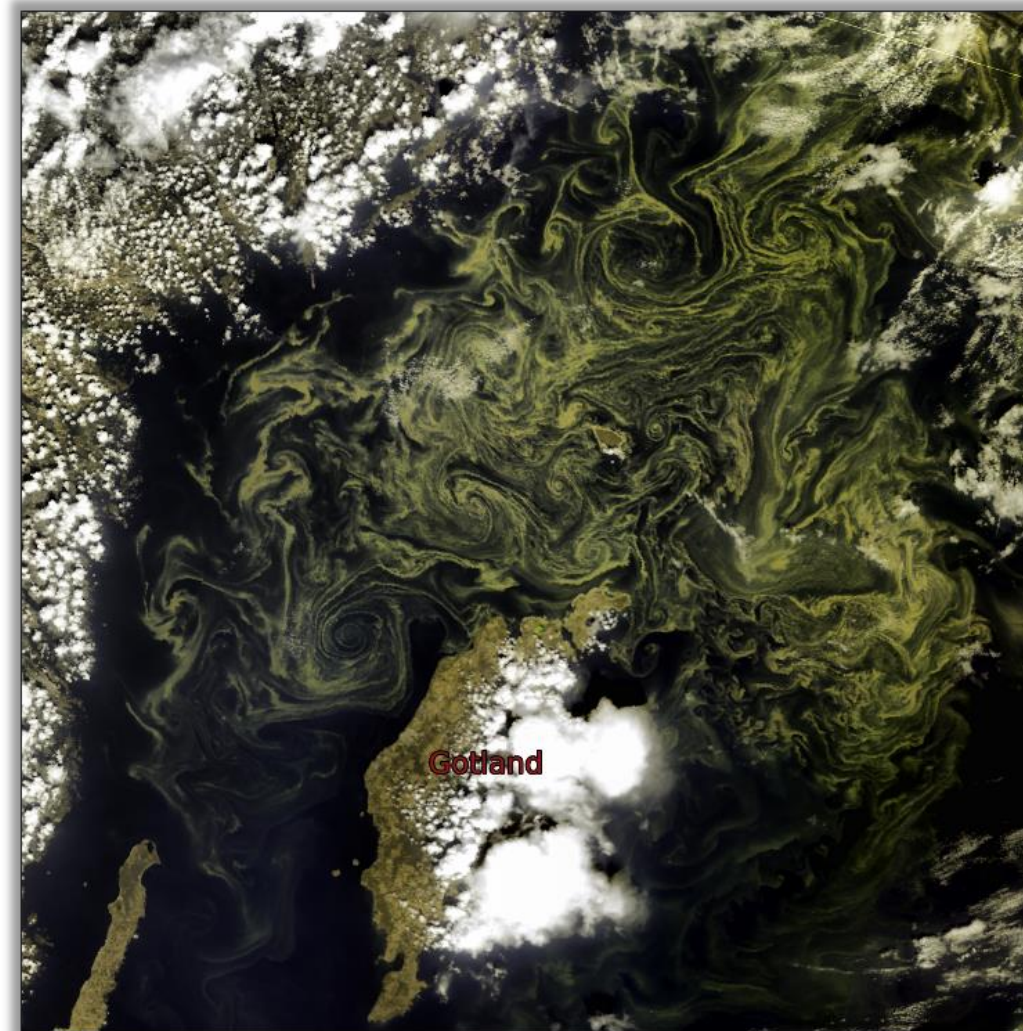
Why do we care about water quality?

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- Relevant to many topics:
 - Blue Economy
 - Human Health
 - Climate Change
 - Disaster Response
 - Environmental management
 - Policy and regulatory compliance



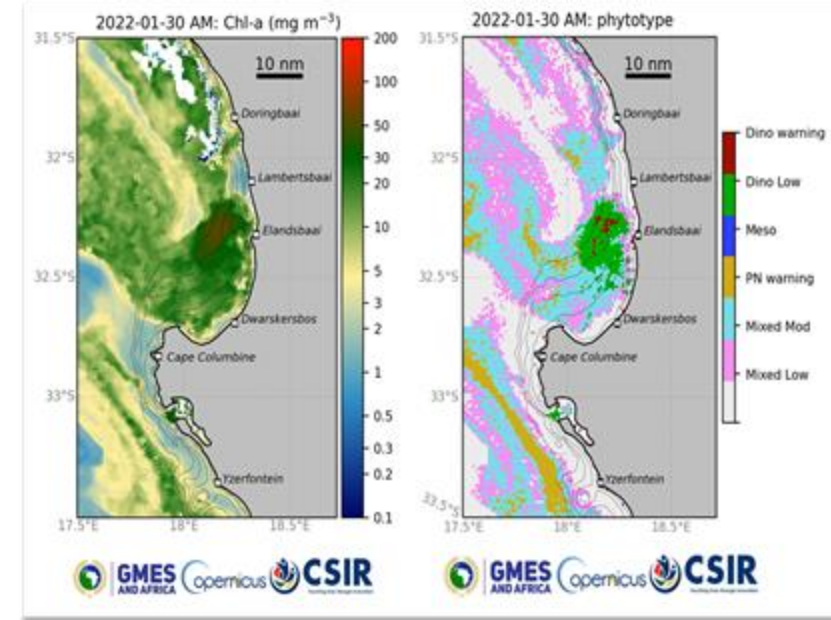
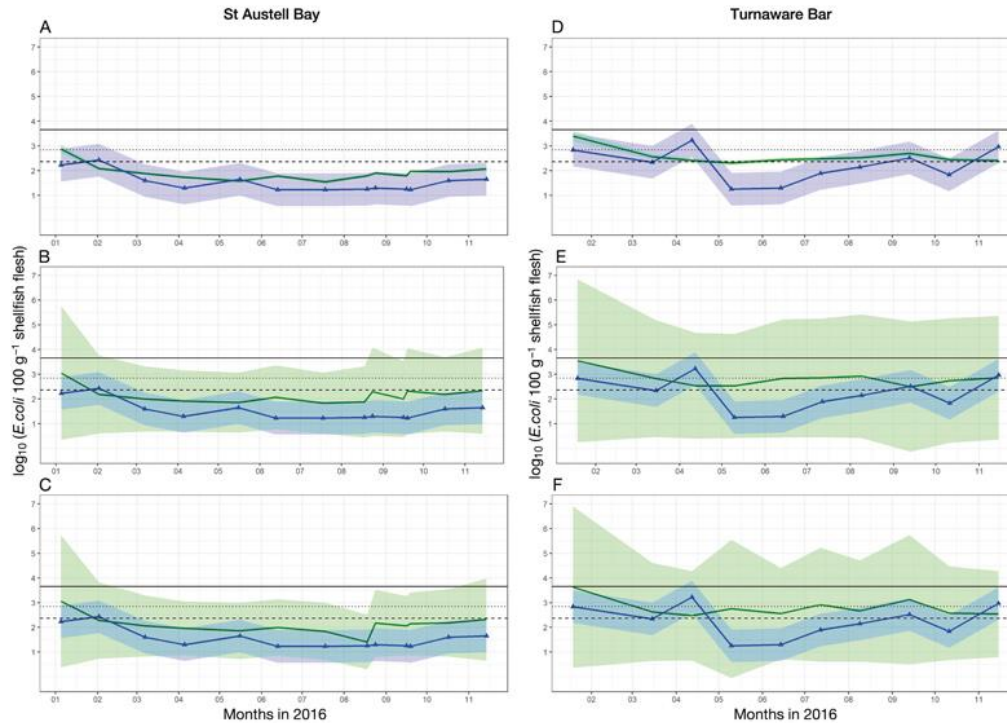
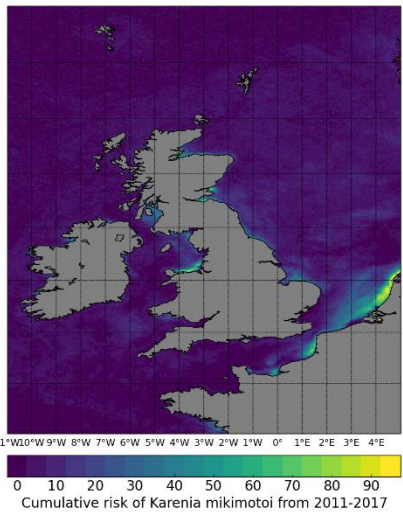
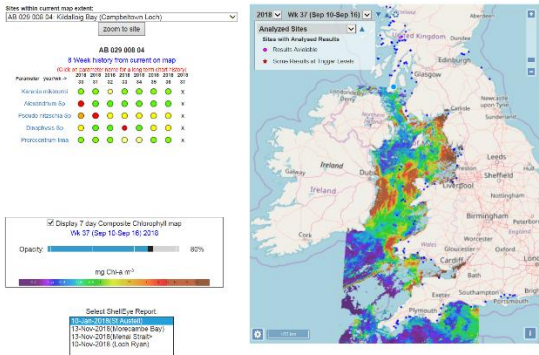
- Observing water quality (optical data)
 - Transparency/light penetration
 - Chlorophyll-a concentration
 - Presence of species (sometimes)
 - Sediments/suspended matter
 - Other things (pollution, debris etc)
- Observing influences on water quality
 - Temperature
 - Winds
 - Currents etc
 - Land use change
 - Precipitation
- **Prediction** – combining observations/drivers
- **Risk** – long term data set analysis
- **Quantifying services/planning restoration**





Examples of WQ information from EO in use...aquaculture

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GMES&Africa, HAB products for aquaculture – Marie Smith, CSIR.

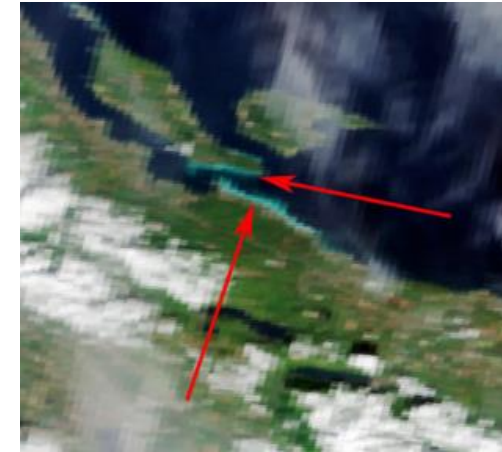
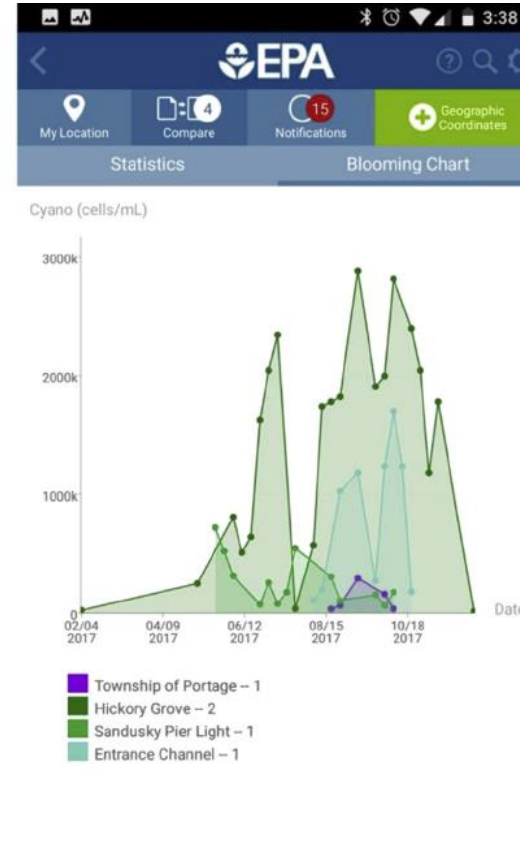
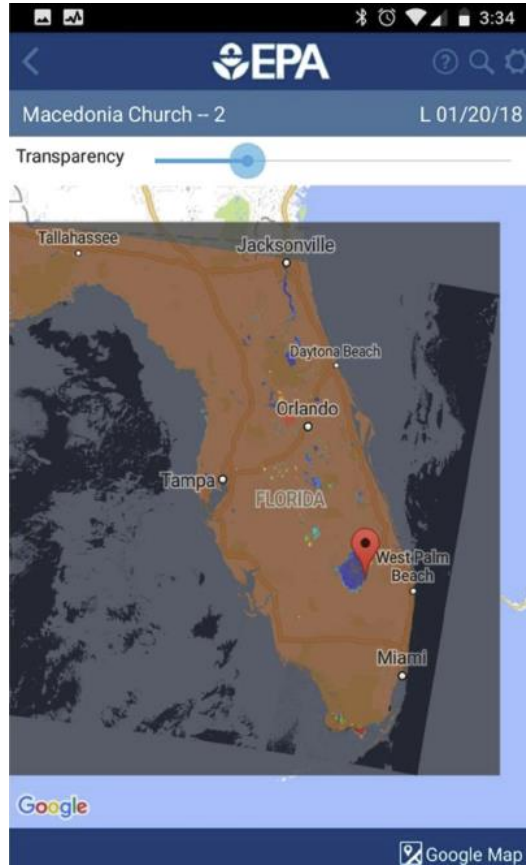
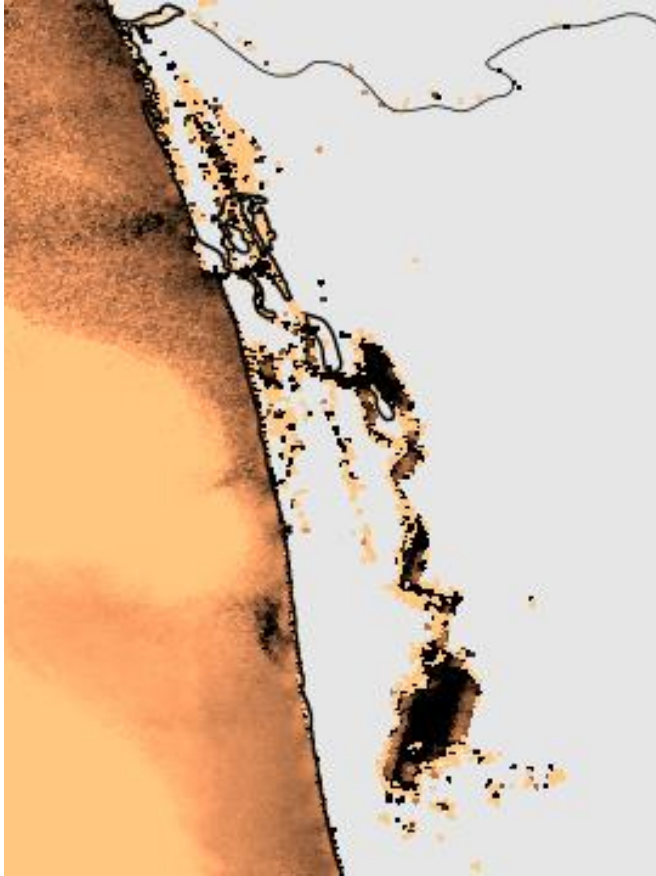
Example services for shellfish farmers and insurance providers (ShellEye project – Peter Miller, Wiebke Schmidt. Schmidt et al., 2018)



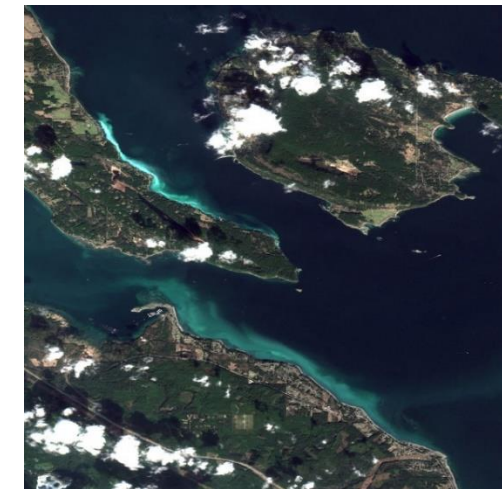
Examples of WQ information from EO in use...human health

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OLCI data used to develop cholera potential indicators, Kerala, India (Hayley Evers-King, Marie-Fanny Racault, Shubha Sathyendranath)



OLCI: Herring Spawn off Vancouver Island (Maycira Costa), synergy with Sentinel-2.

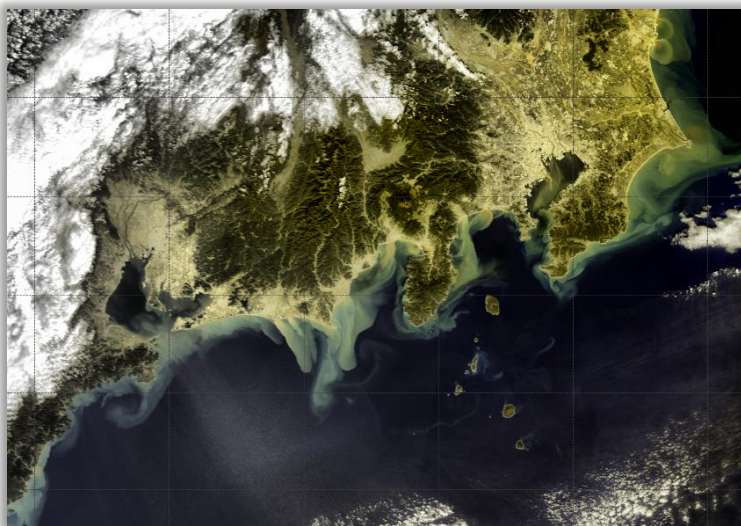


OLCI: A mobile application providing information about cyanobacterial blooms (Schaeffer et al., 2018)



Examples of WQ information from EO in use...sediments

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Post storm flooding and coastal sediment dynamics (Typhoon Hagibis)



Impact of offshore wind on turbidity
Forster et al, Crown Estate report

Feb 20 2020

Mar 11 2020

Mar 19 2020



Sediment dynamics in Venice Lagoon during COVID pandemic (Braga et al., 2020)

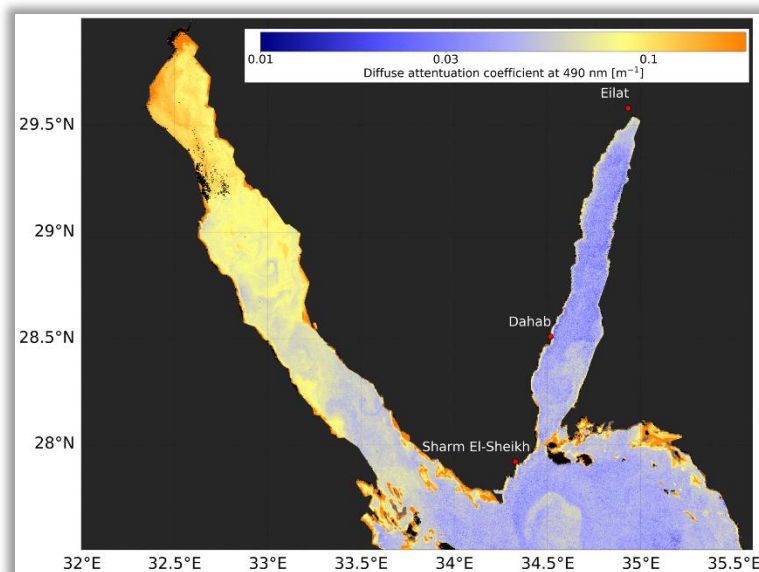
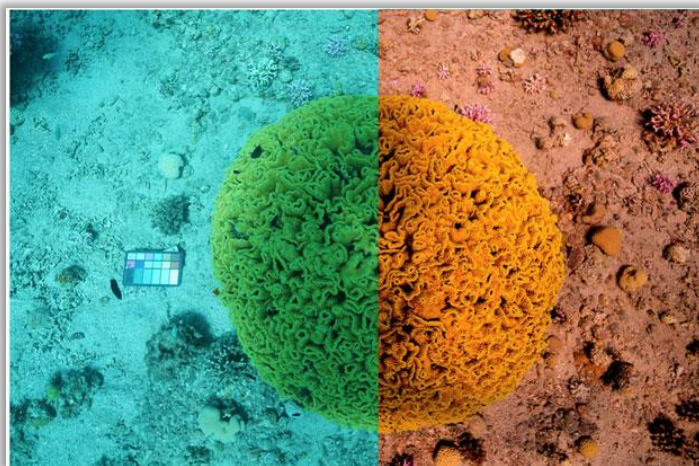
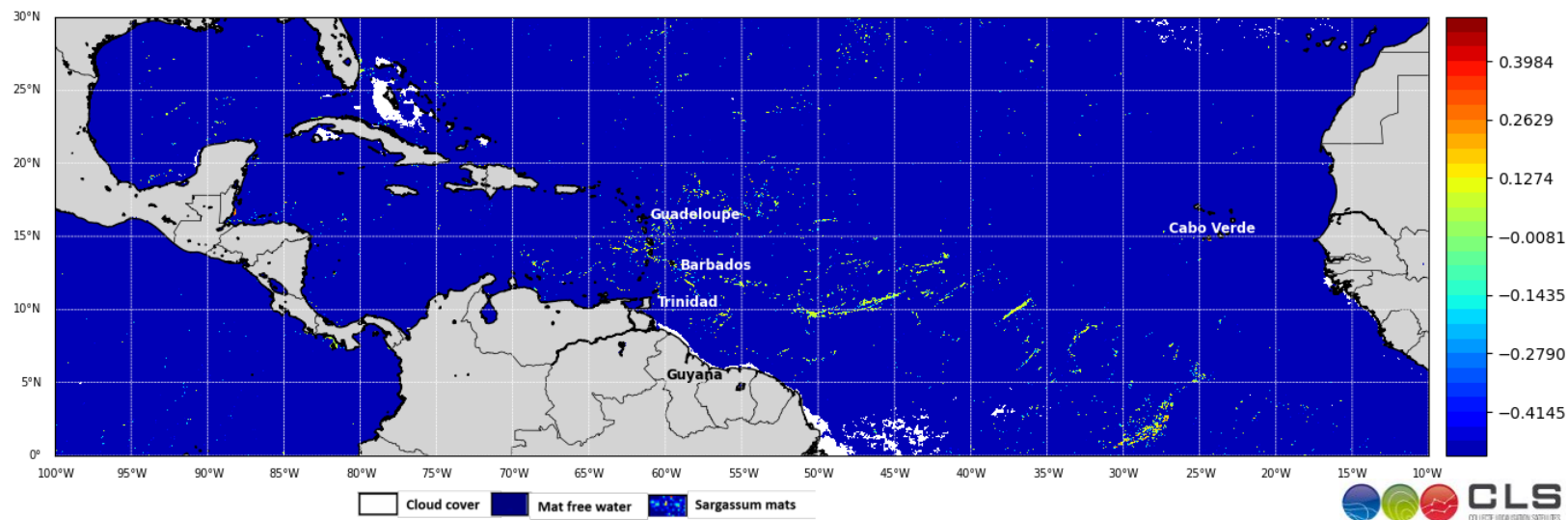


Examples of WQ information from EO in use....other!

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OLCI / MODIS NFAI CLS 7 days Mean (2024-02-28 00:00:00 UTC)

CLS sargassum detection



Light attenuation, coral reefs, and image processing (Derya Akkaynnak)

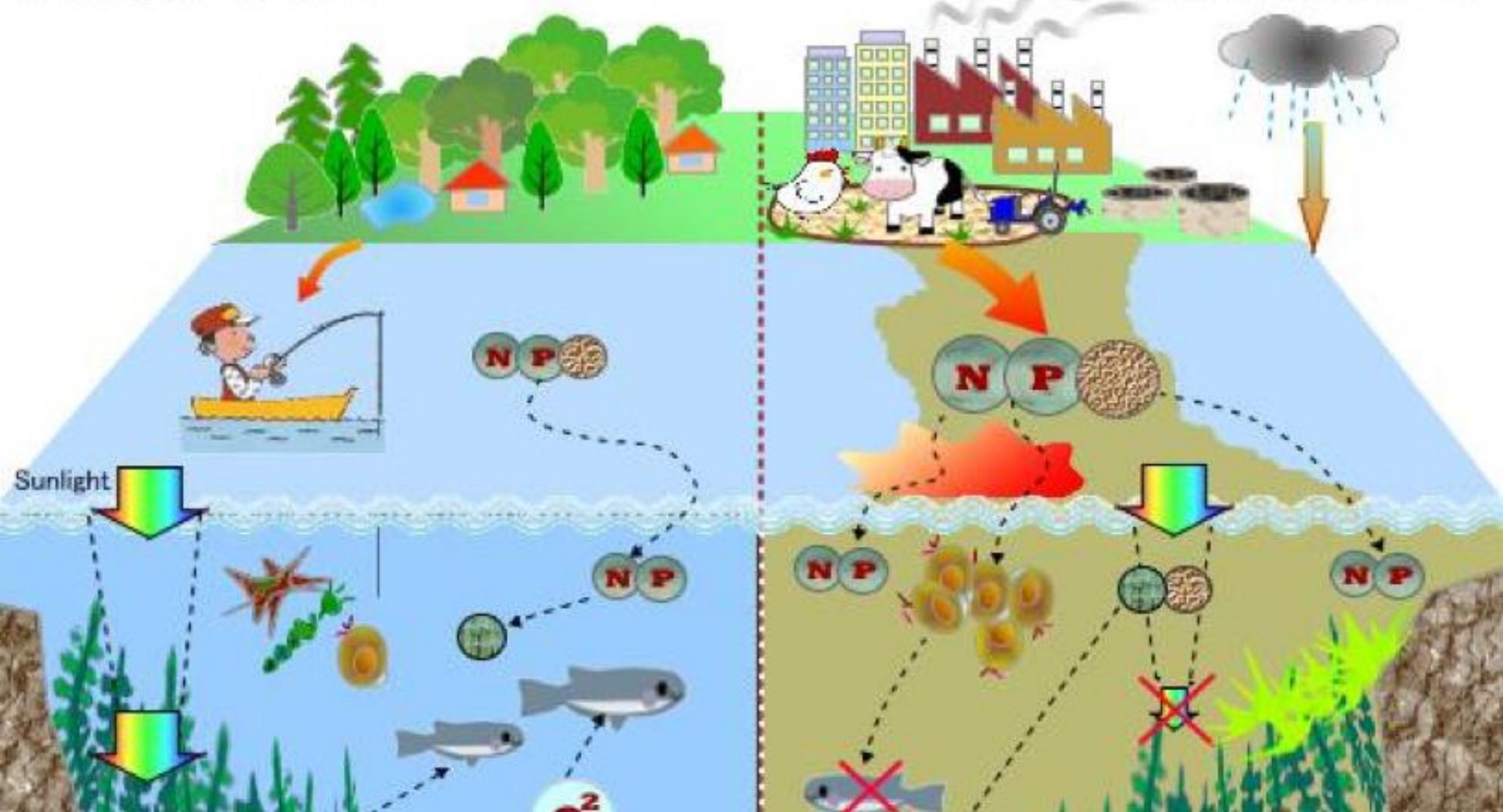


2004 5 29



Healthy ecosystem

Eutrophic ecosystem



- **Global Partnership on Plastic Pollution and Marine Litter**

<https://www.gpmarinelitter.org/>

- **Global Wastewater Initiative**

<https://www.unep.org/explore-topics/water/what-we-do/global-wastewater-initiative-gwwi>

- **Global Partnership on Nutrient Management**

<https://www.unep.org/explore-topics/oceans-seas/global-partnership-nutrient-management>

Nitrogen and phosphorus pollution

- Today, about 80 per cent of reactive nitrogen – estimated to be worth US\$200 billion – is lost to the environment every year.
- The global cost of phosphorus pollution is estimated to be US\$265 billion per year.



- 14.1 by 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution
- Kunming-Montreal Global Biodiversity Framework Target 7 requests to reduce excess nutrients lost to the environment by at least half, including through more efficient nutrient recycling and use.

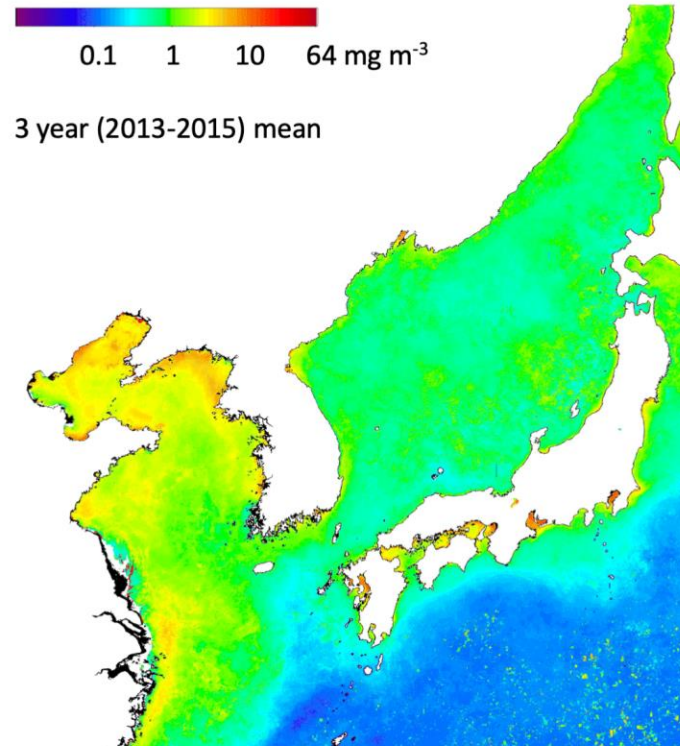


- In March 2019, the United Nations Environment Assembly adopted a resolution calling for sustainable nitrogen management (UNEA 4.14).
- In March 2022, the Environment Assembly adopted a second resolution on the topic (UNEA 5.2).



- 95 Member States nominated focal points
- 5 meetings organized
- Currently focus on the development of national action plans

Assessment of eutrophication in the Northwest Pacific Region with satellite Chl-a from 1998 to 2015 using NEAT





Thank you!
Questions are welcome.