EGU General Assembly 2020

Assessment of cumulative impacts and coastal ecosystem health in the JiaoZhou Bay

ZiYuan Hu[a], Murray LOGAN[b], XiaoXia SUN[a,c],
Richard BRINKMAN[b], Song SUN[c]

[a] Jiaozhou Bay National Marine Ecosystem Research Station, Institute of Oceanology, Chinese Academy of Sciences
[b] Australian Institute of Marine Science
[c] Laboratory of Marine Ecology and Environmental Science, Institute of Oceanology, Chinese Academy of Sciences

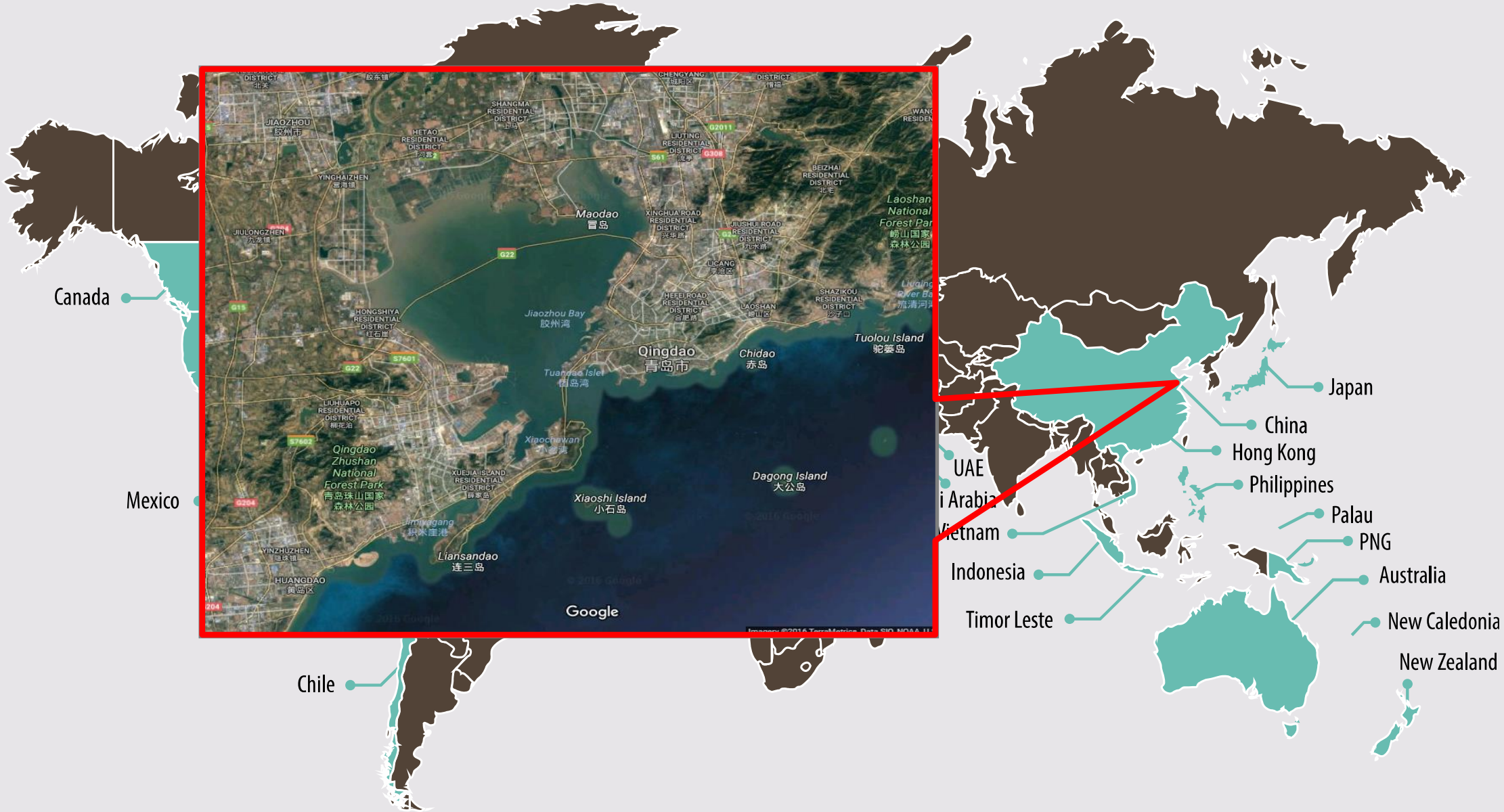
IOCAS 1950

Jiao Zhou Bay Marine Ecosystem Research Station

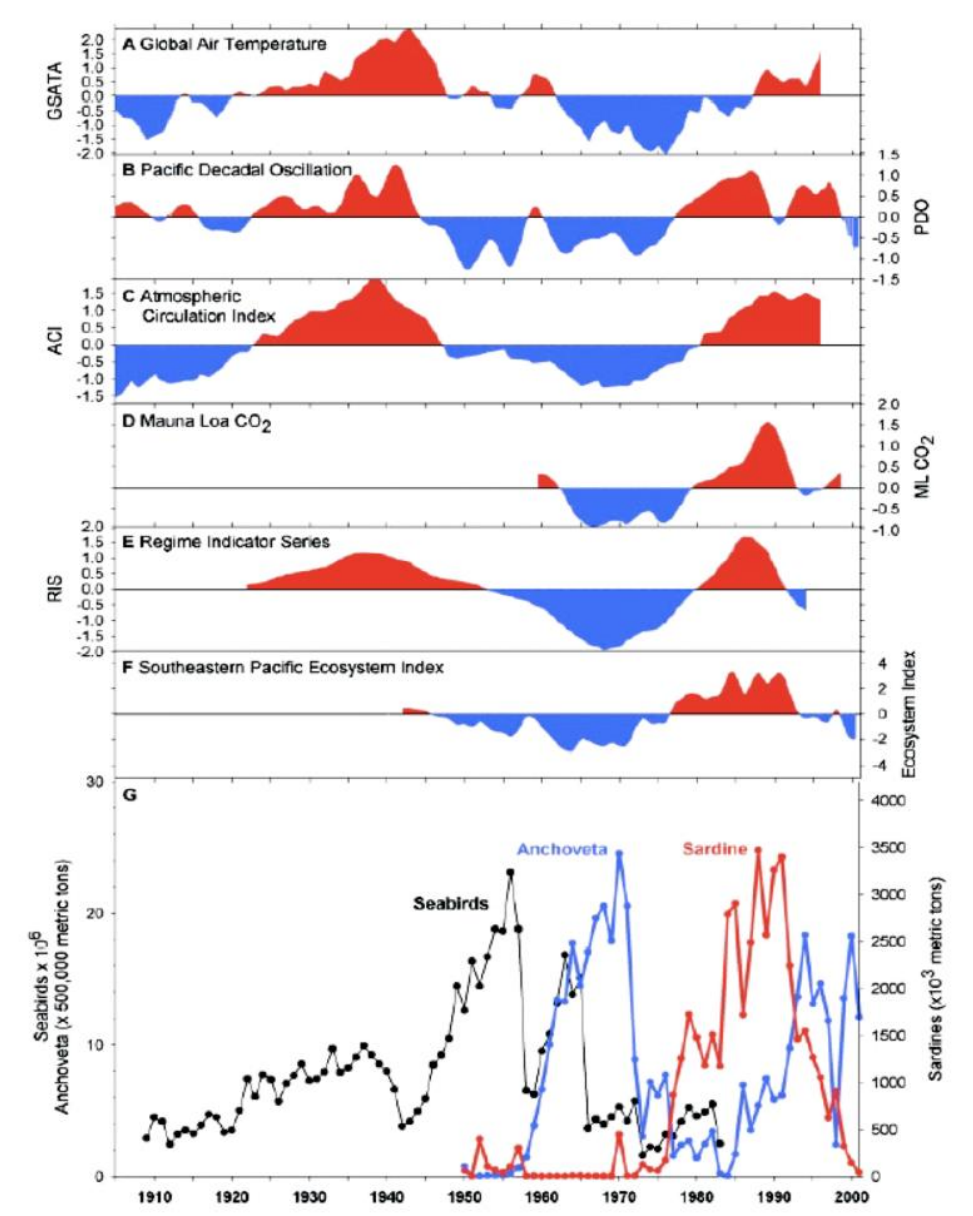
Australian Government

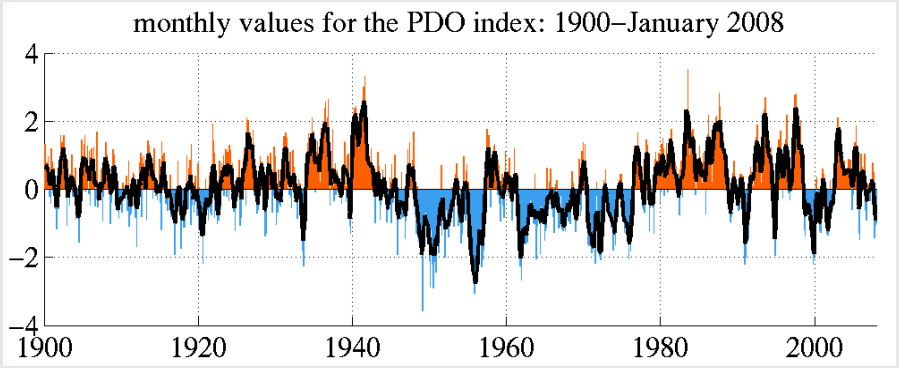
Australian Institute of Marine Science

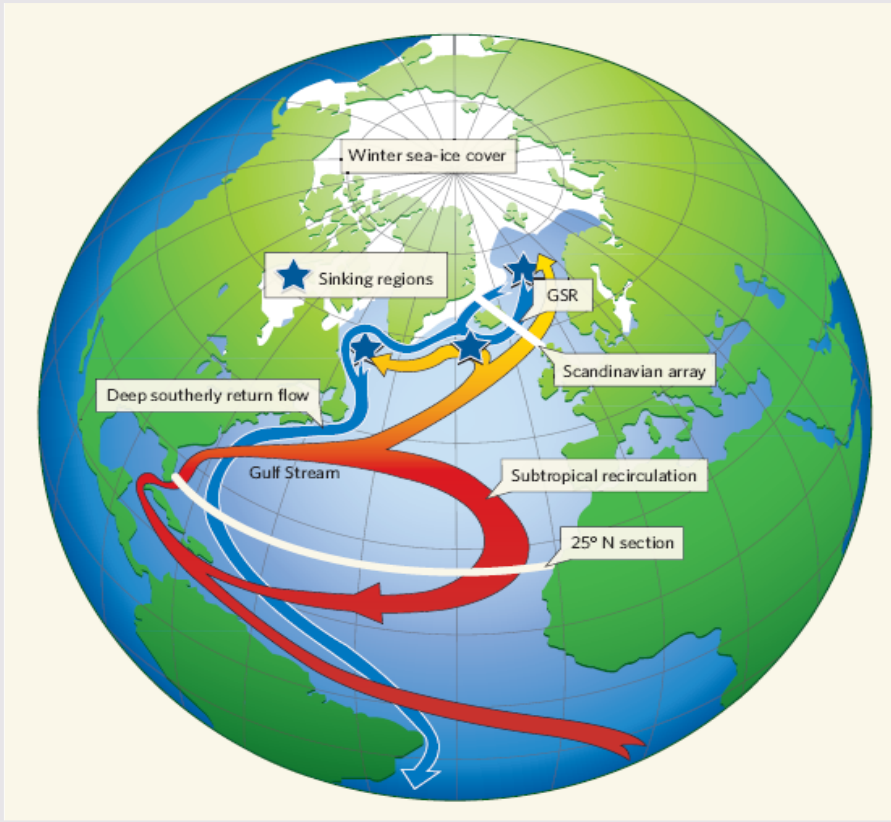
Coastal Ecosystem Health Assessment



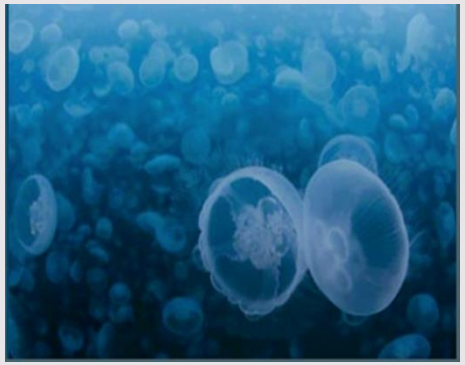
Coastal Ecosystem Health Assessment

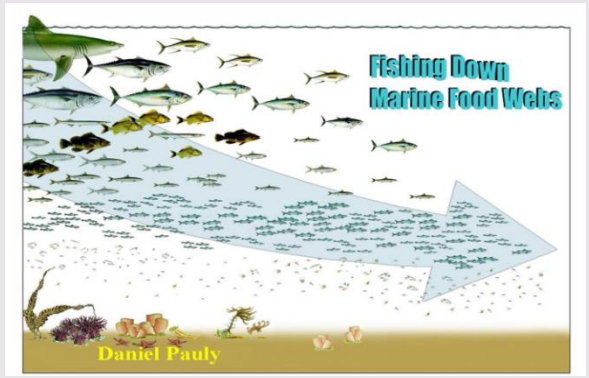


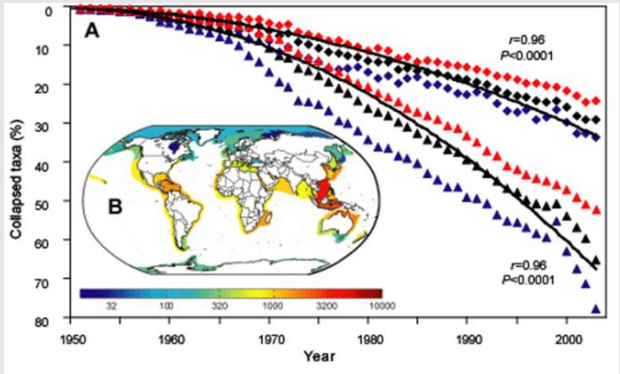


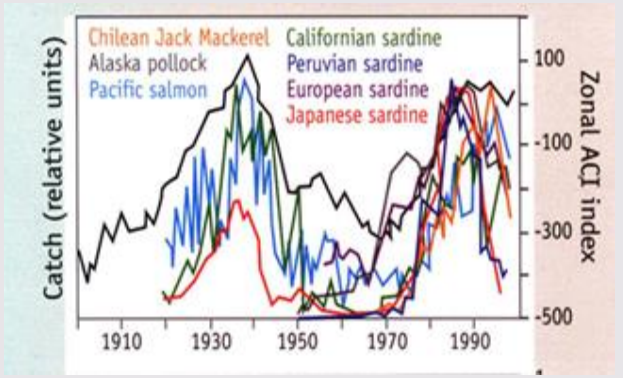


Coastal Ecosystem Health Assessment









Coastal Ecosystem Health Assessment

Policies and treaties that encourage the responsible exploitation of marine resources are critical to address these threats.

Coastal Ecosystem Health Assessment

Scientific papers
Research results

Complexity of language, limited accessibility, etc.

Restrict the usefulness

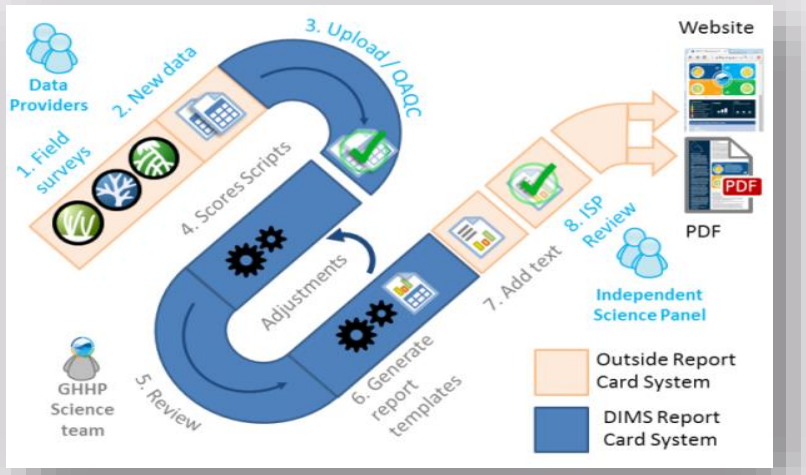
Ecosystem Health Assessment !

Managers & policy makers

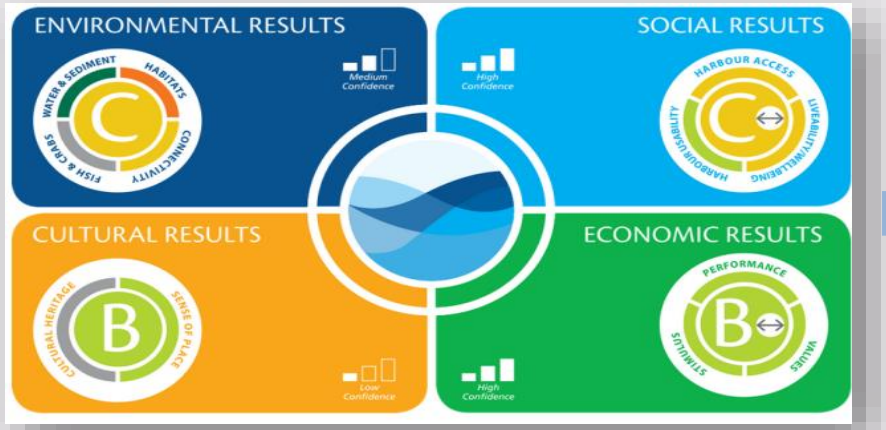
Beyond the scientific community

Coastal Ecosystem Health Assessment

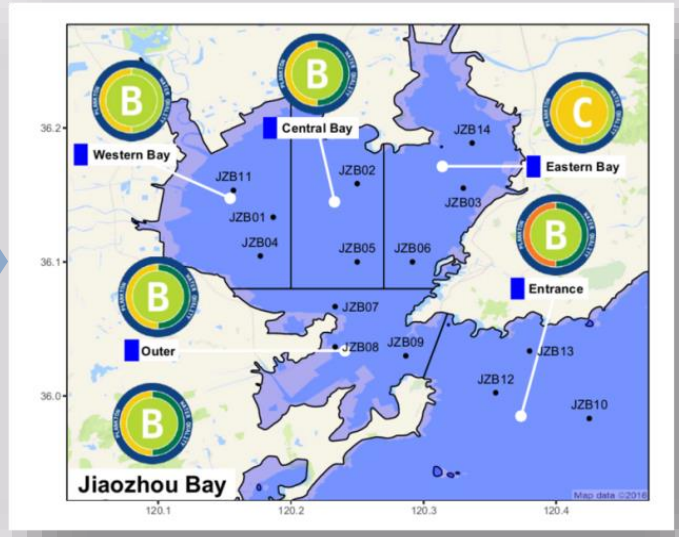
Monitoring Data



Assessment



Decision support



Coastal Ecosystem Health Assessment

WHAT?

The notion “health” was extended to ecosystems from medical science in the middle 1980s when many human-dominated ecosystems suffered from highly dysfunction (Rapport, 1995, Rapport et al., 1998).

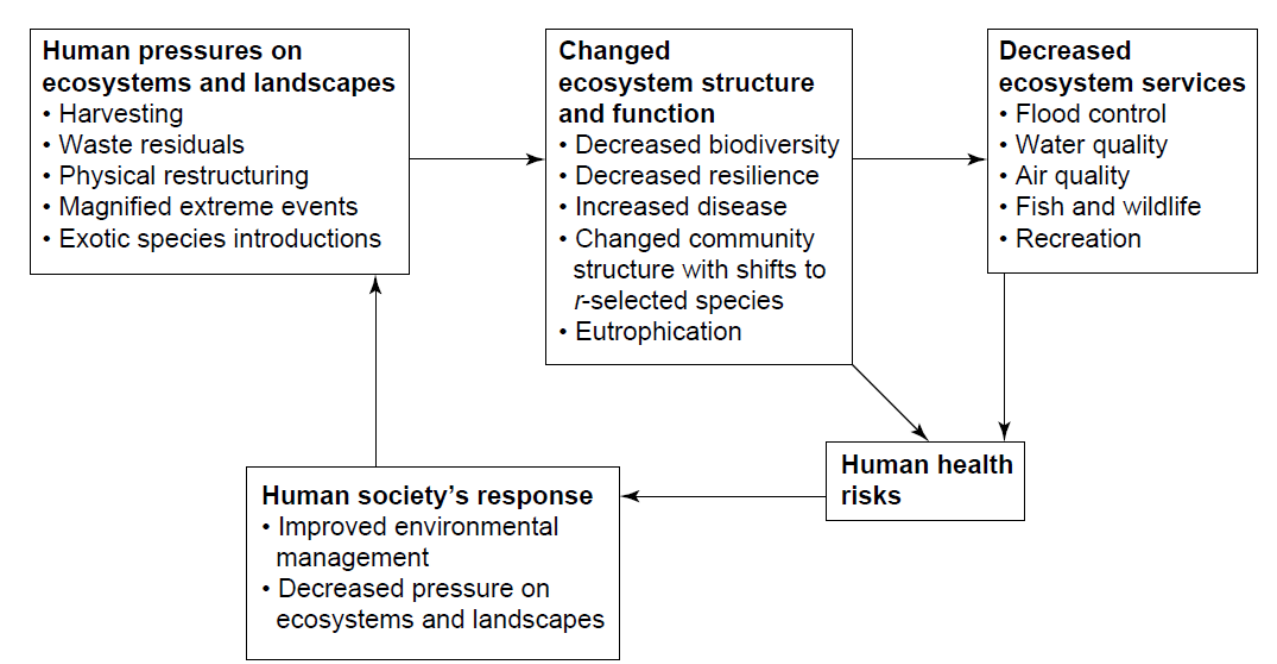


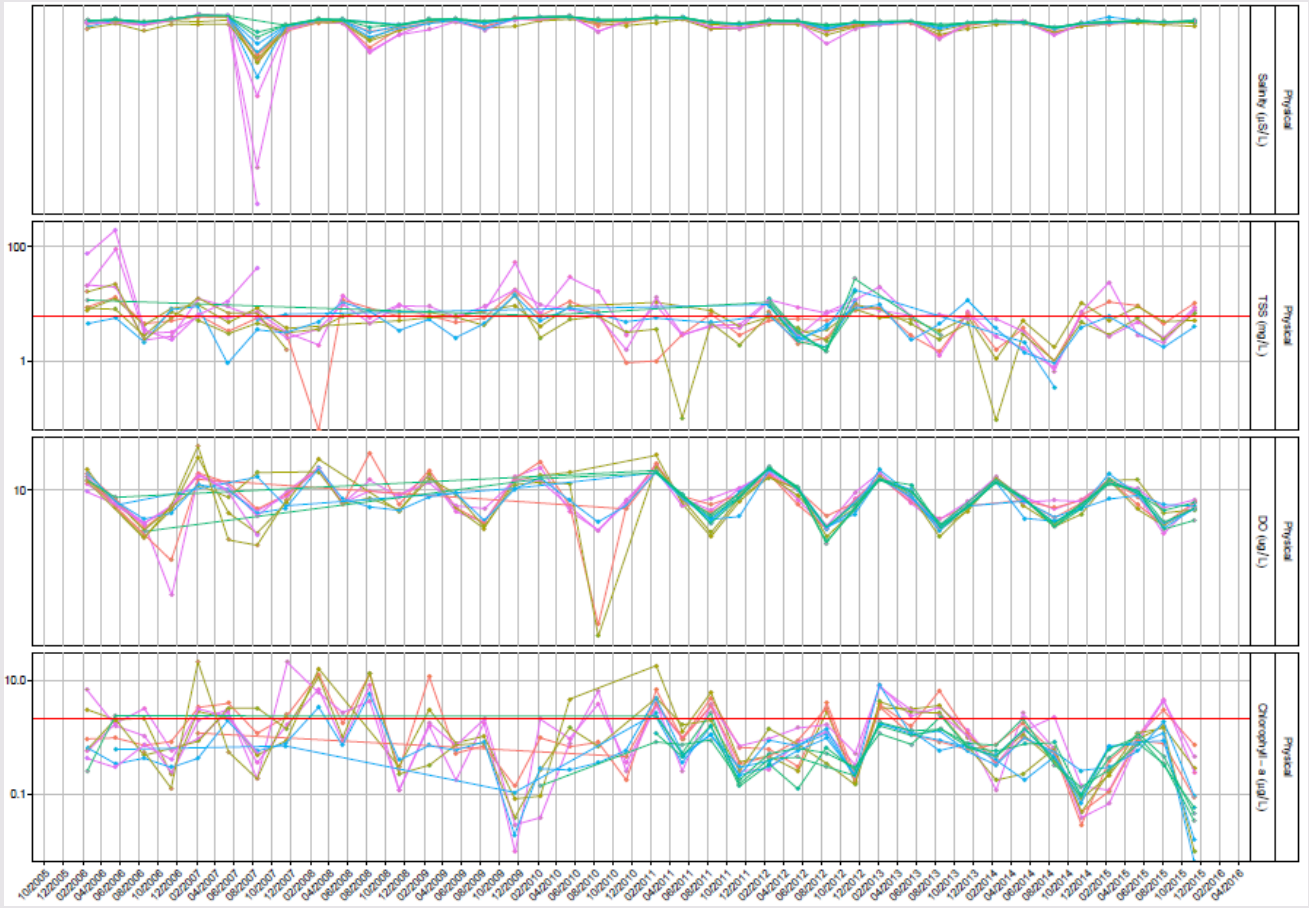
Fig. 1. Linkages between pressures from human activity, ecosystem change and degradation of ecosystem and human health.

(Rapport et al., 1998)

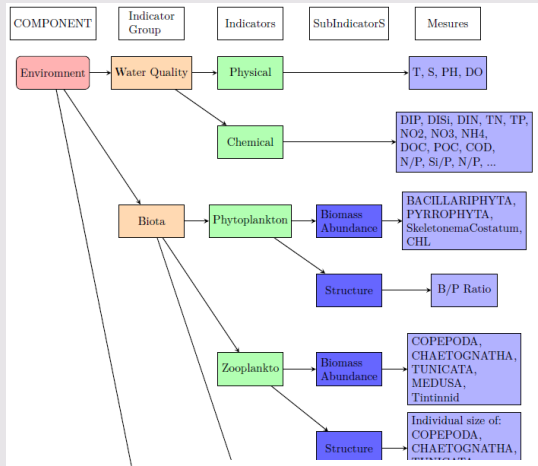
Coastal Ecosystem Health Assessment

Coastal Ecosystem Health Assessment

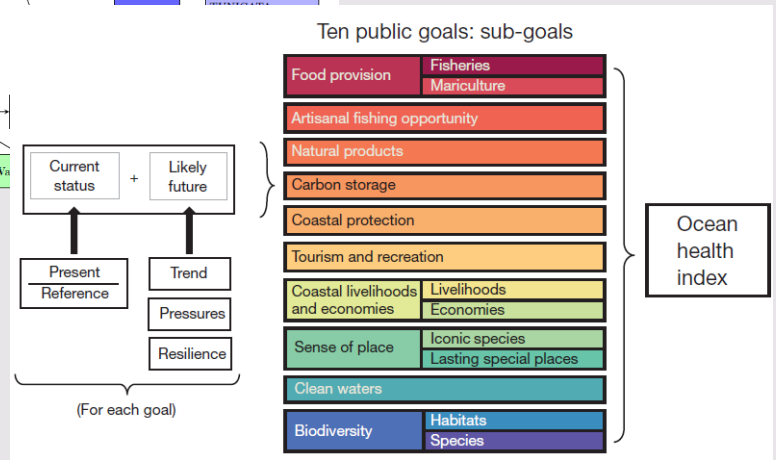
Monitoring Data



Indicator

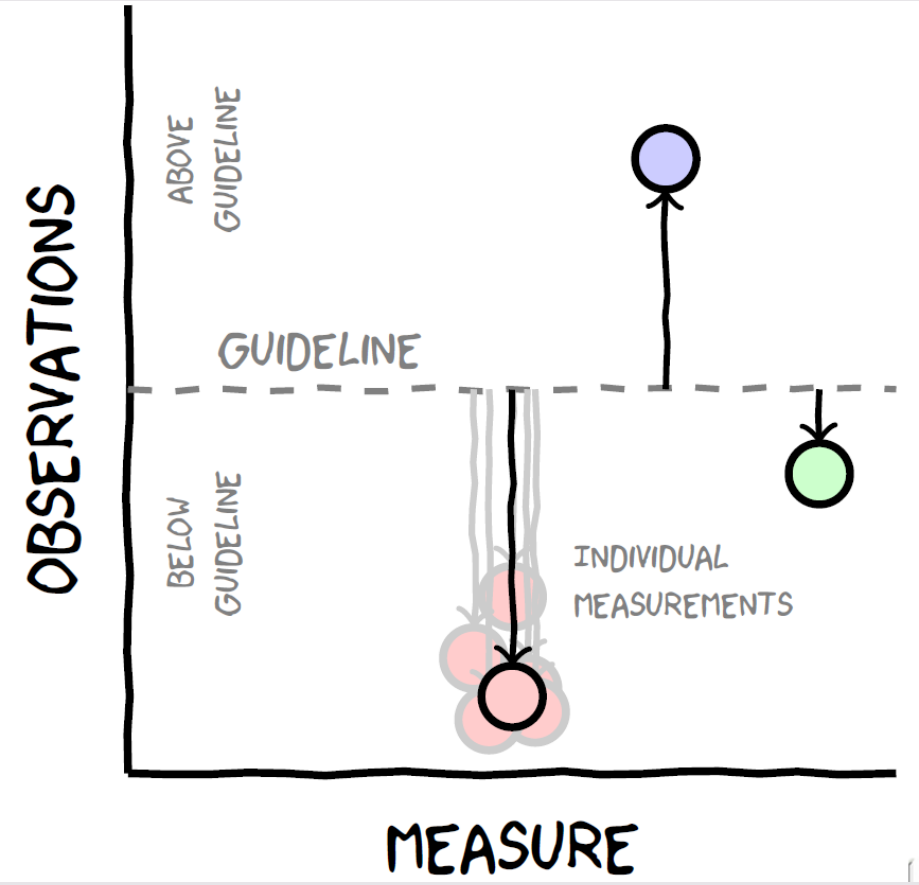


PSR
VOR ……



Coastal Ecosystem Health Assessment

Benchmark

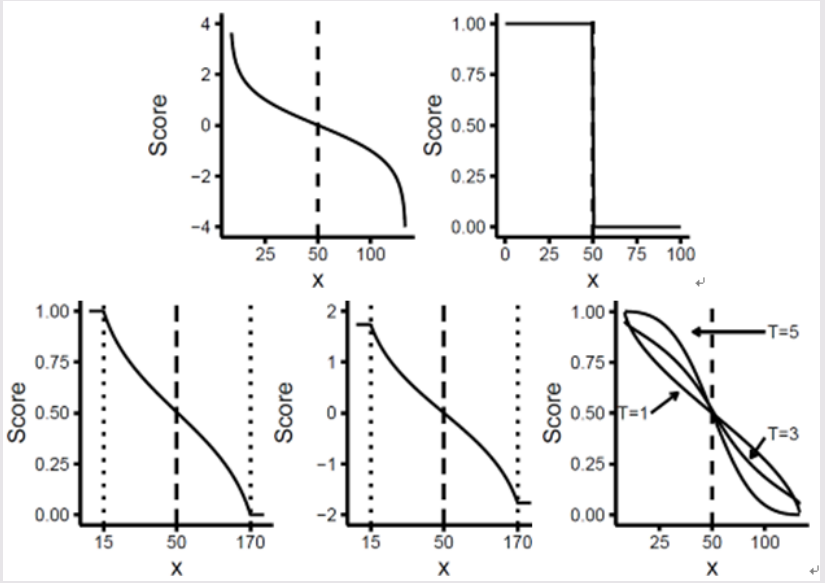


measure + ecological effect

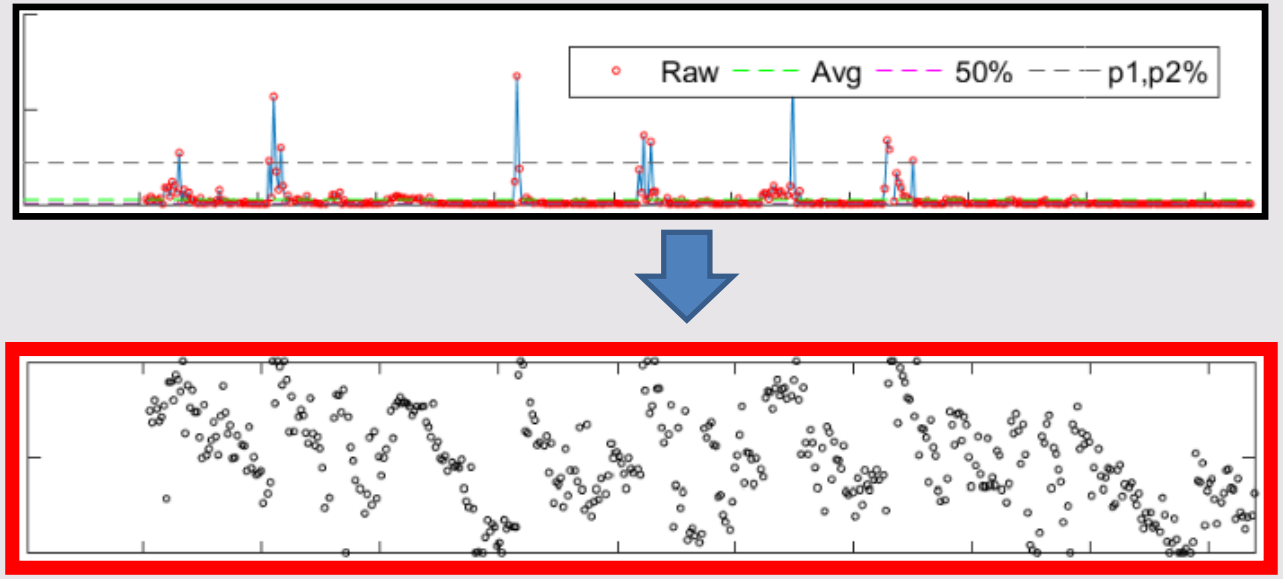
Coastal Ecosystem Health Assessment

Assessing Method

measures



scores



Report Card

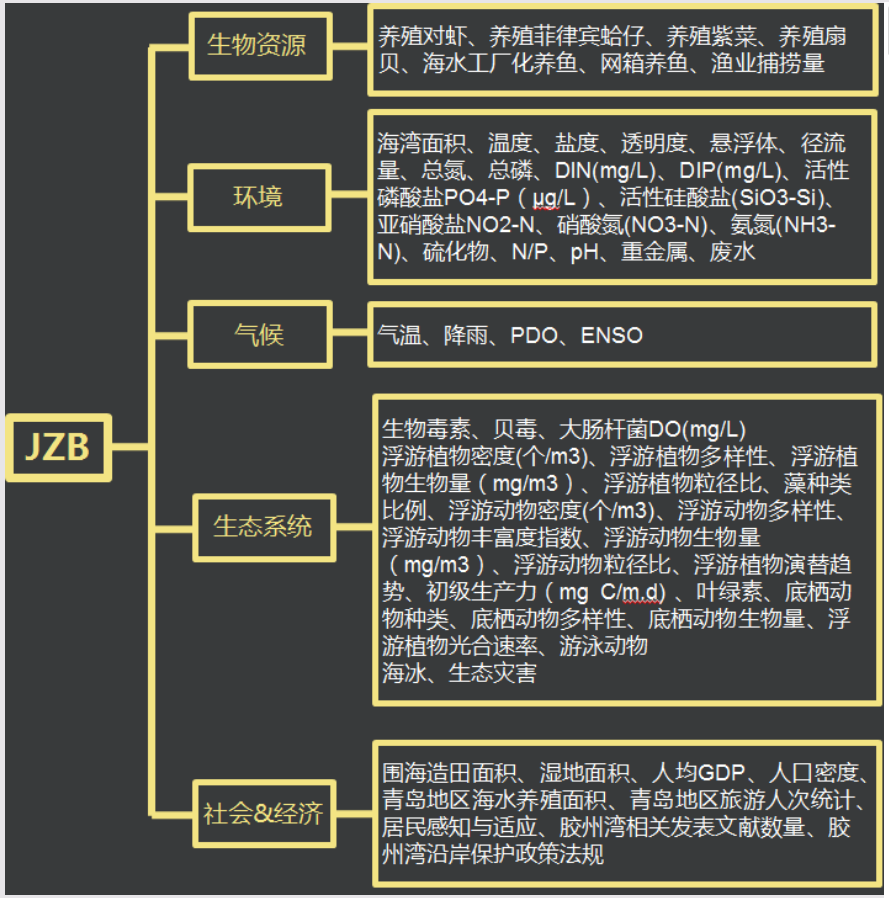
Score	Grade	Description
≥ 0.85	A	Very Good
$\geq 0.65, < 0.85$	B	Good
$\geq 0.5, < 0.65$	C	Satisfactory
$\geq 0.25, < 0.5$	D	Poor
< 0.25	E	Very Poor

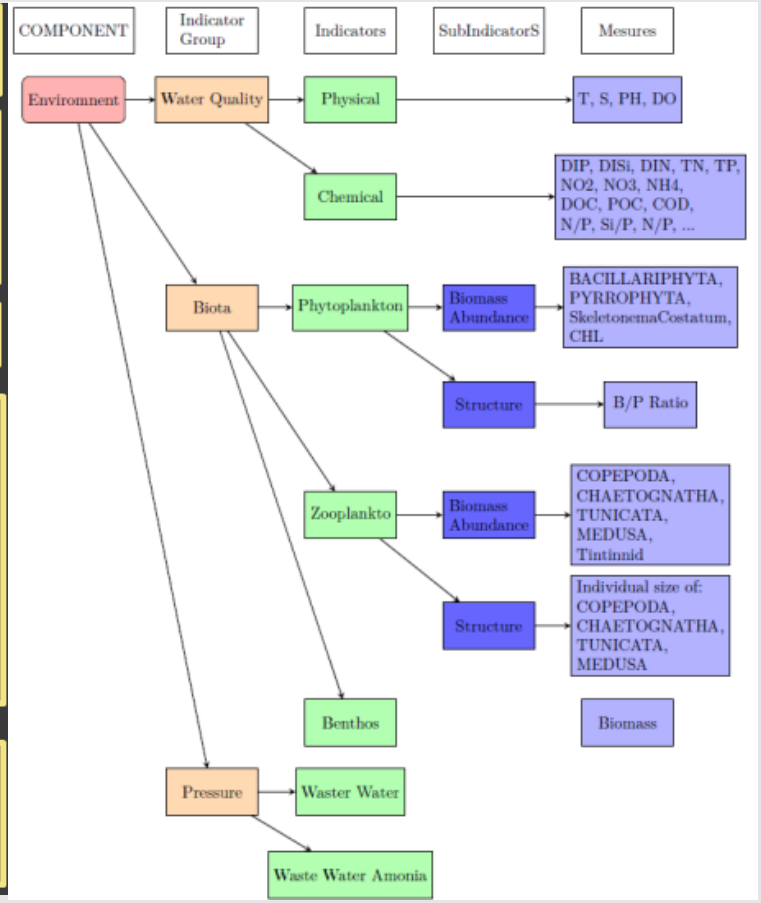
Coastal Ecosystem Health Assessment

SUSTAINABLE DEVELOPMENT GOALS

Big Earth Data Science
Engineering Program (CASEarth)

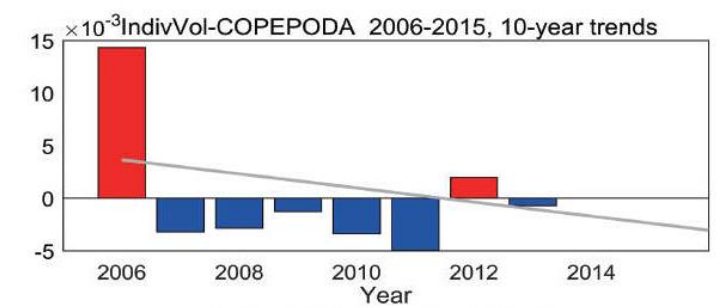
Coastal Ecosystem Health Assessment

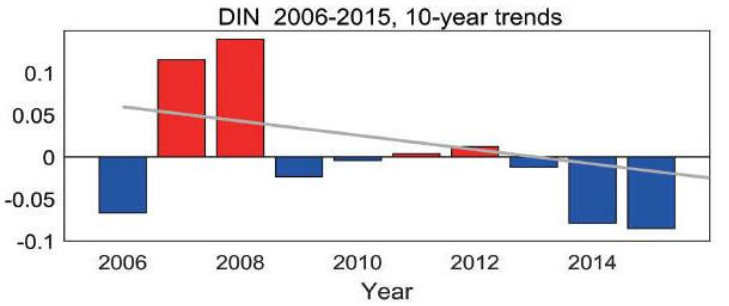


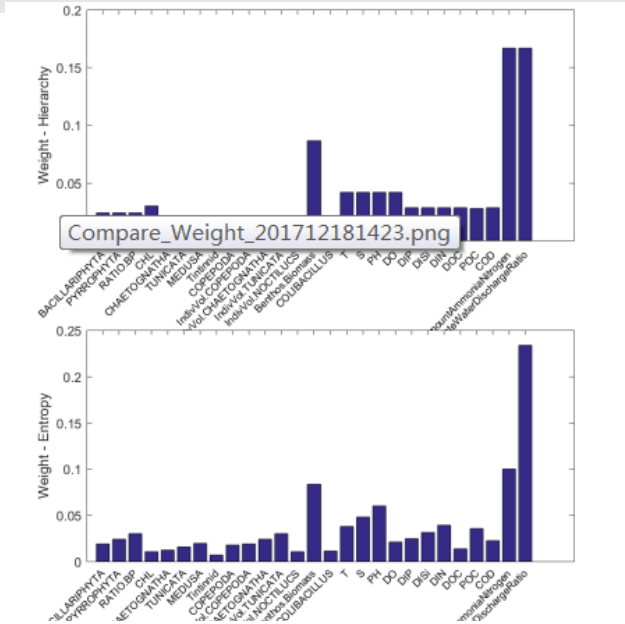


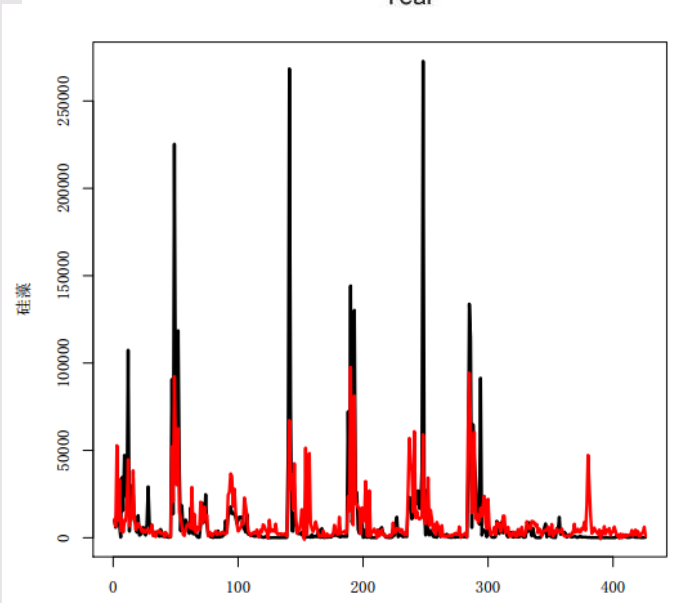
With a focus on SDG, a selection of indicators and guideline settings were reviewed to gain a better understanding of ecosystem structure, services, functions, and ecological disasters and diseases.

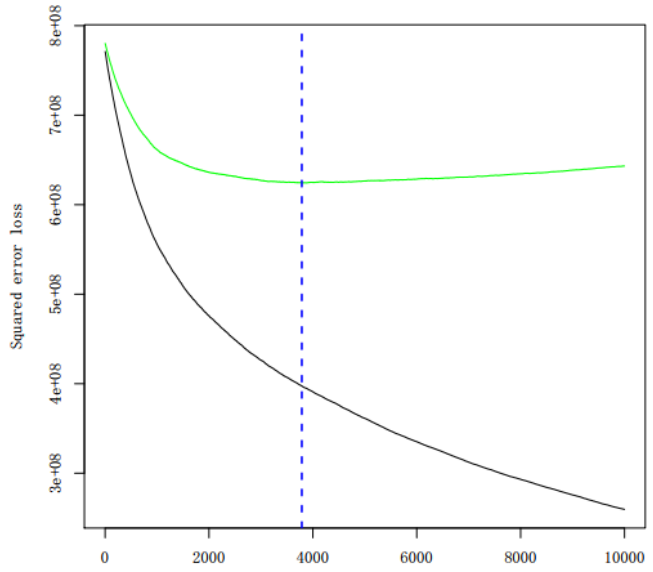
Coastal Ecosystem Health Assessment





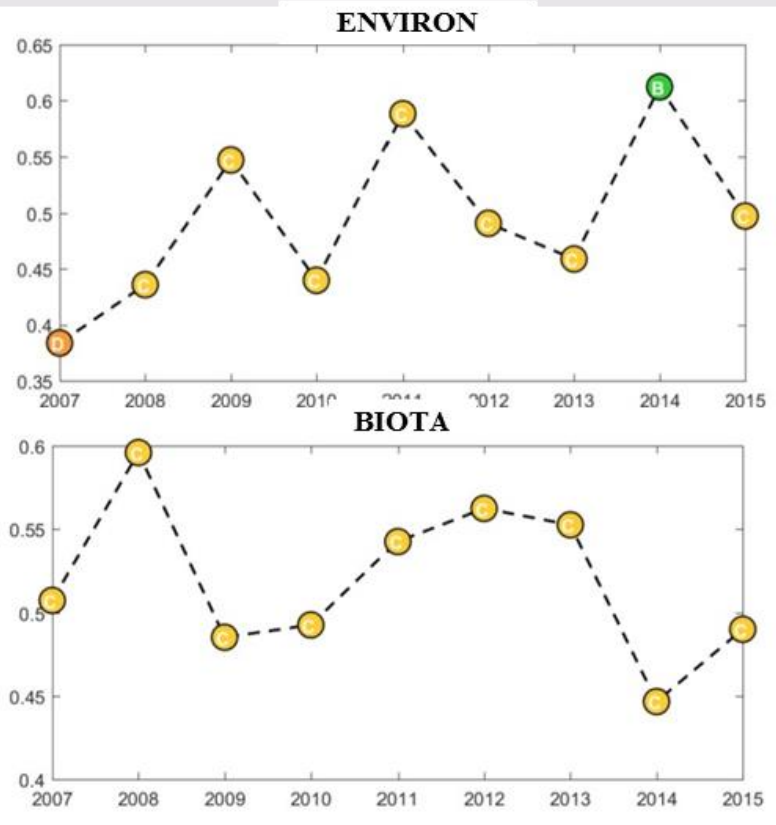


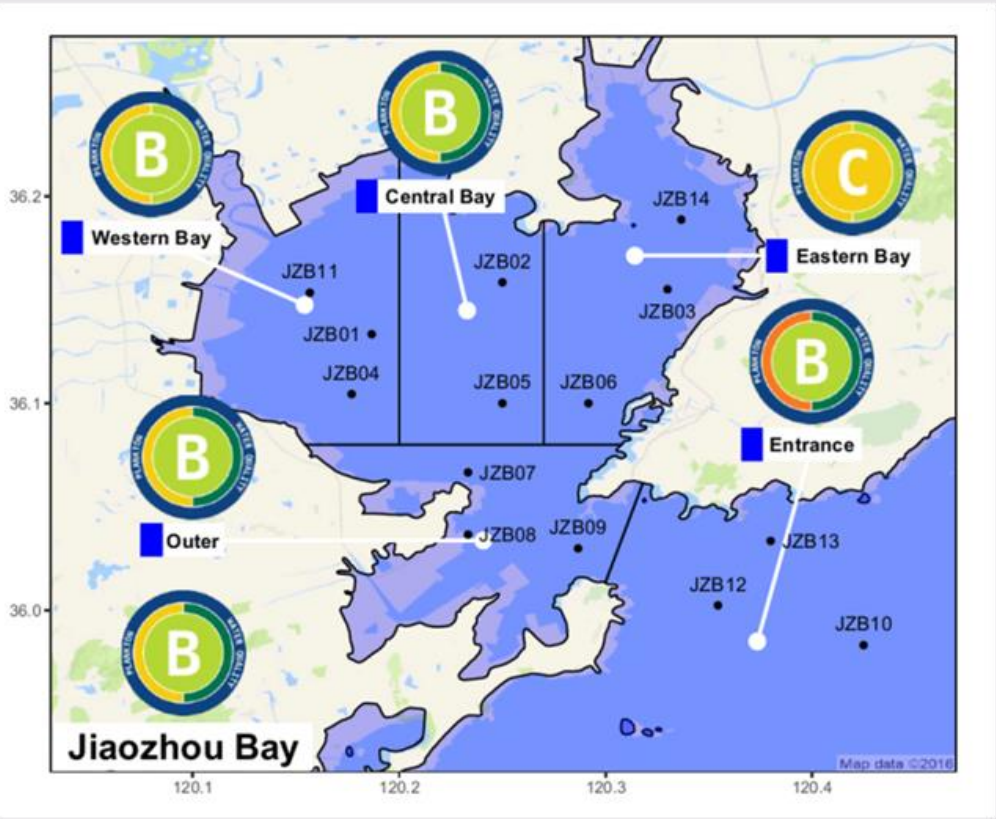




Use data mining to improve guidelines, thresholds, and reference settings in existing health assessments by implementing machine learning techniques

Coastal Ecosystem Health Assessment





Outlook

- including diagnostic models and scenario simulation models to analyze stress factors on marine health and to diagnose marine ecosystem health.

- Integrate diagnostic, water quality, ecological, and hydrodynamic modules into a model platform, enabling us to simulate different scenarios and predict possible responses of the marine ecosystem.

- Repeat the structured research methodology for other coastal regions, improve our model for a wide variety of environments.

- Develop decision support with the aim to support national strategic objectives and to facilitate targeted end-users towards restoration and protection of coastal and marine environments.

- Further international collaborations.