Introducing a New Taxonomy for Underwater Environments

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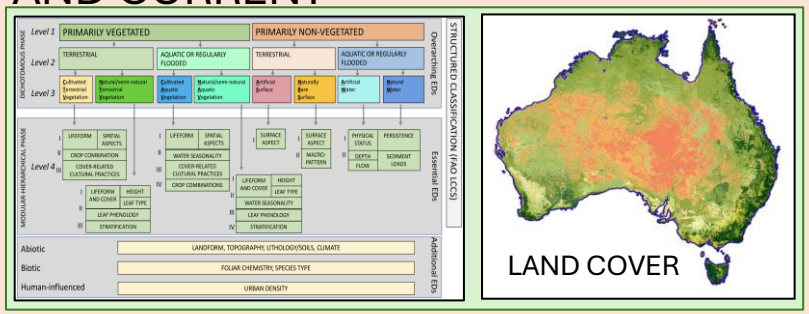
LIVING EARTH: GLOBALLY APPLICABLE AND LOCALLY RELEVANT TAXONOMIES

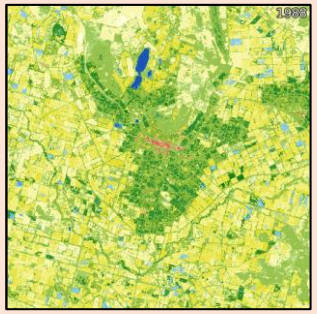
PAST AND CURRENT

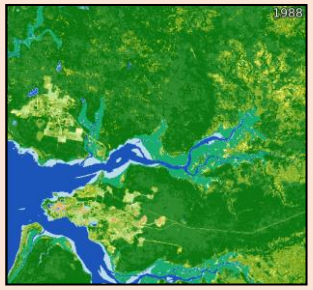
GLOBAL TAXONOMIES AND FRAMEWORKS

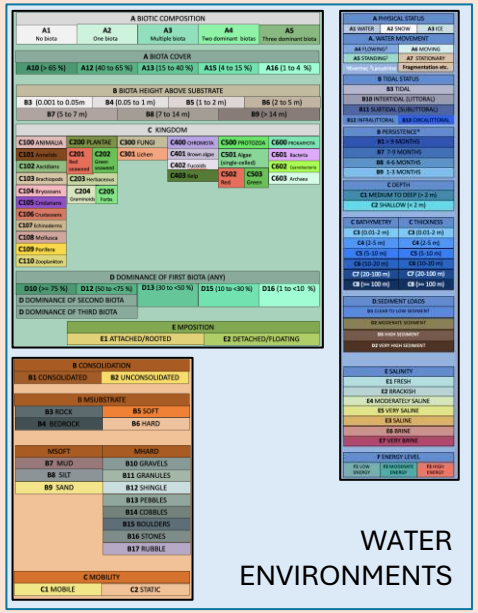


LAND COVER

LAND COVER CHANGE

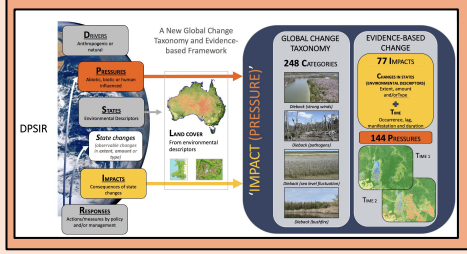


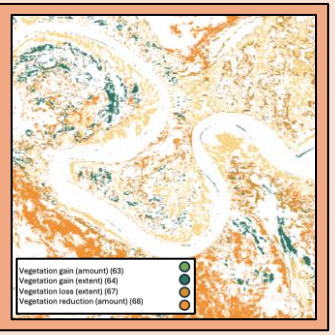




WATER ENVIRONMENTS

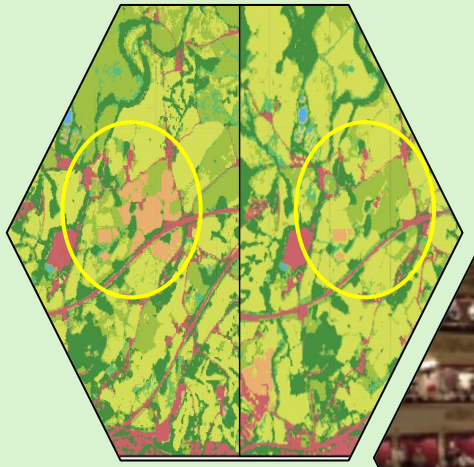
CHANGE IMPACTS AND PRESSURES





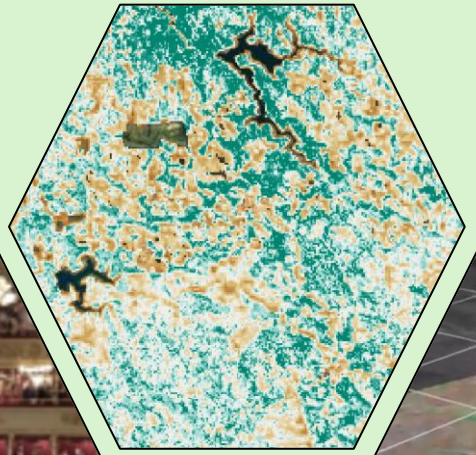
FUTURES: SUPPORTING STEPS TO ACHIEVEMENT

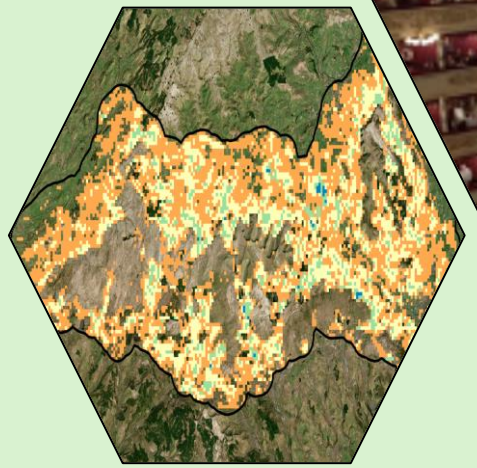
(Re-)imagining



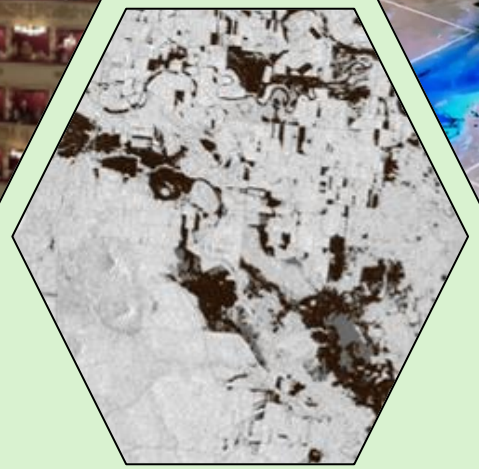
Harmonizing

Valuing

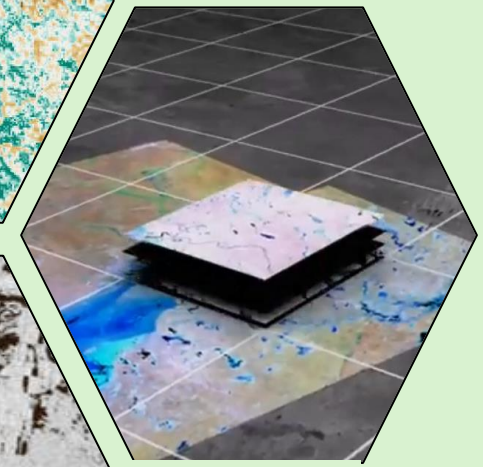




Realizing



Assessing risk



Monitoring Progress towards goals and ambitions

DATA PROVIDERS

Landsat

Sentinel-2

Sentinel-1

ASF

opernicus
Europe's eyes on Earth
sentinel open access hub >

USGS
science for a changing world

ARD

Sentinel-1 ARD

PRE-PROCESSING

DOWNLOADING Sentinel-1 L1 GRD

DOWNLOADING/REPROJECTING Sentinel-2 L2A

INDEXING

INDEXING

DOWNLOAD

EODATADOWN

User Interface & free-open access

Data Base

IMPORTING

Other Data

OPEN DATA CUBE

LIVING WALES TOOLS

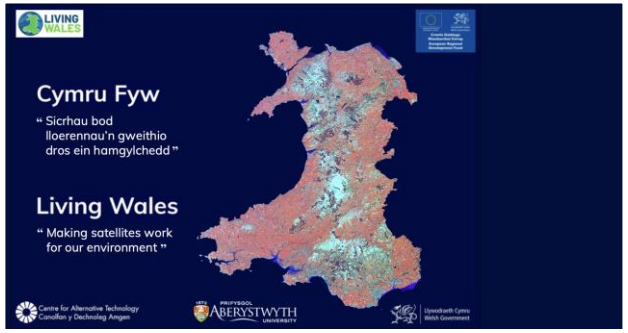
Ready to Use Products

EXPORTING

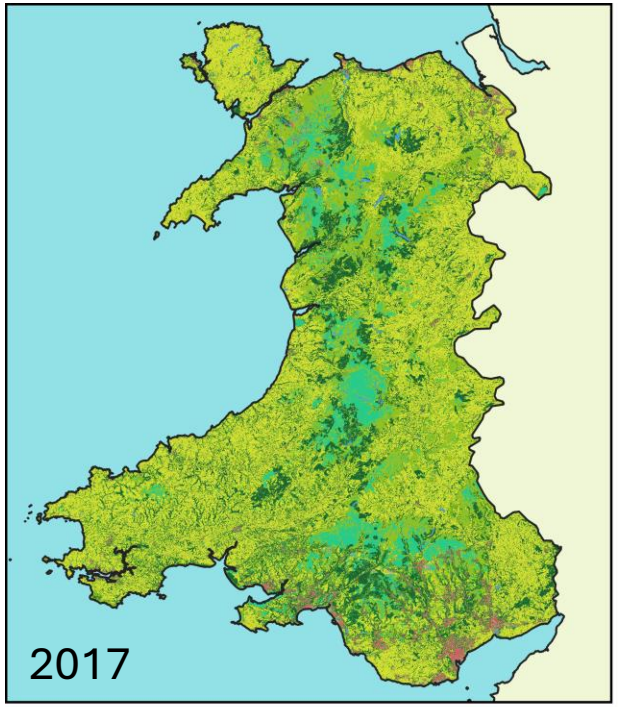
WELSH OPEN DATA CUBE

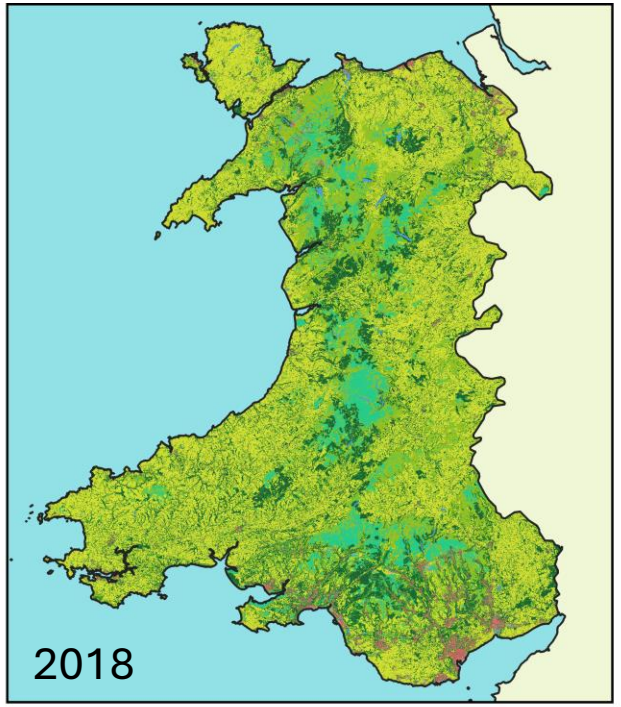
LIVING WALES

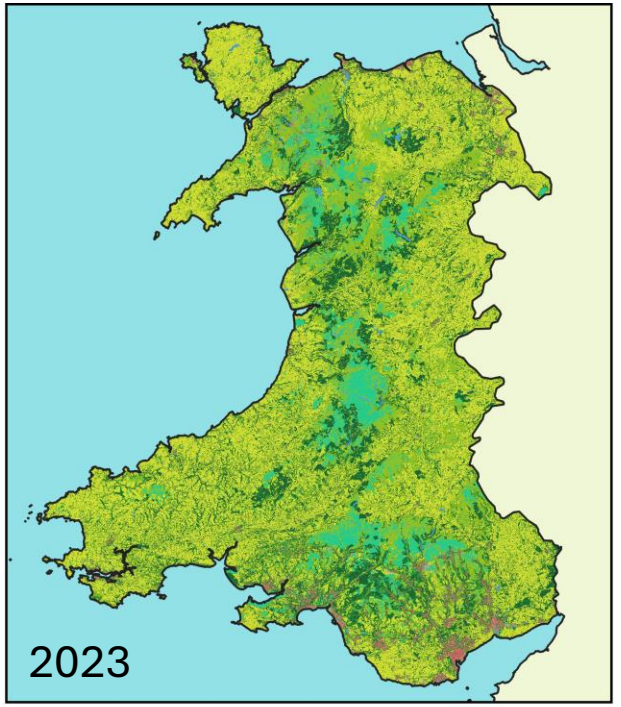
National Land Cover Maps for Wales

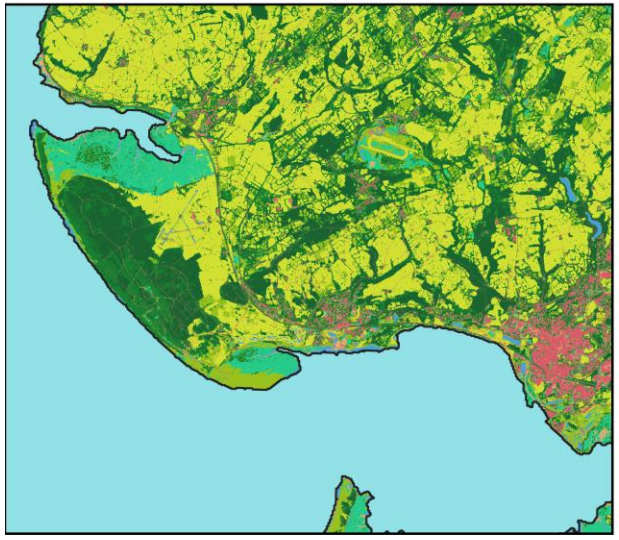


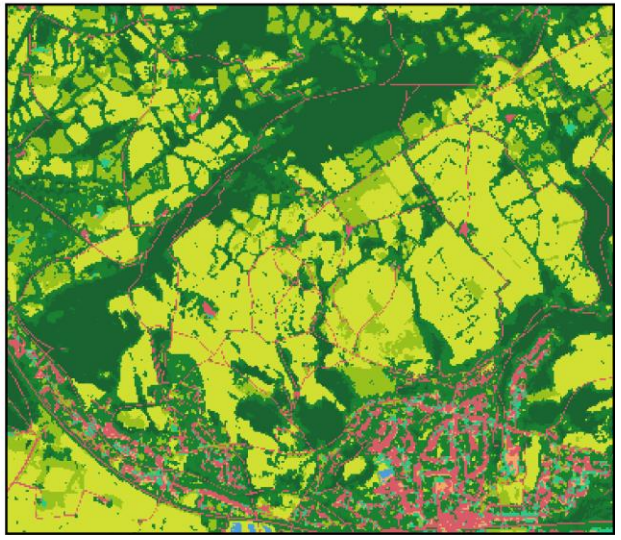
Generated according to the FAO LCCS





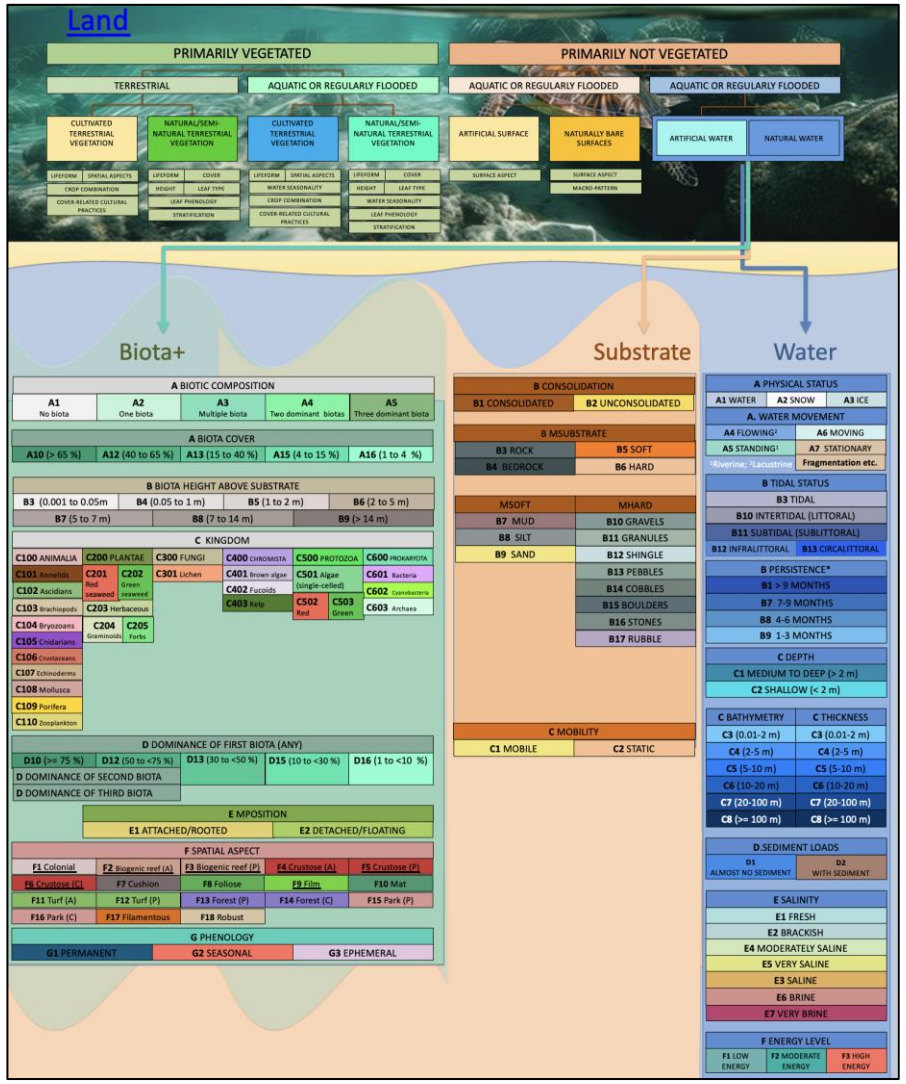


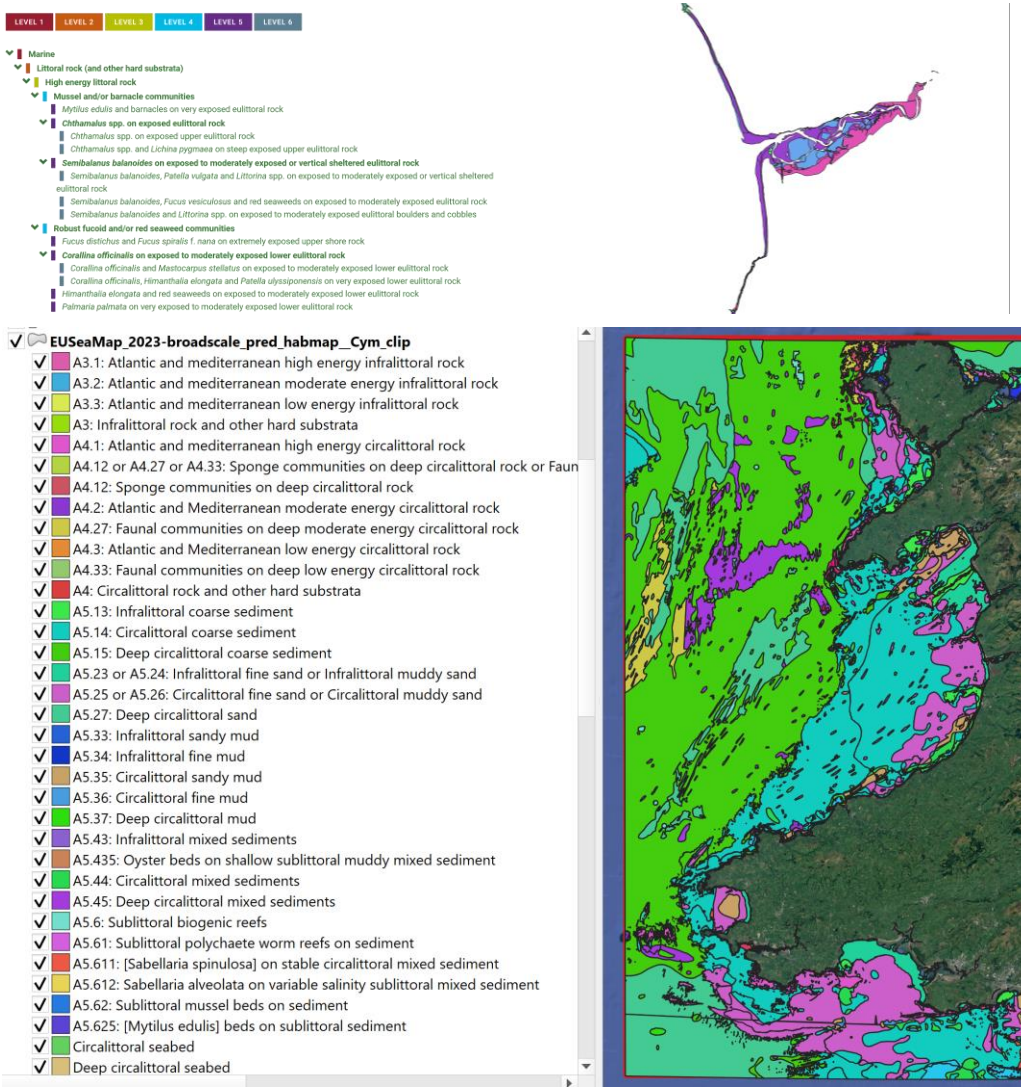


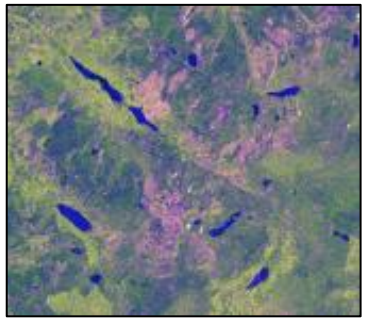


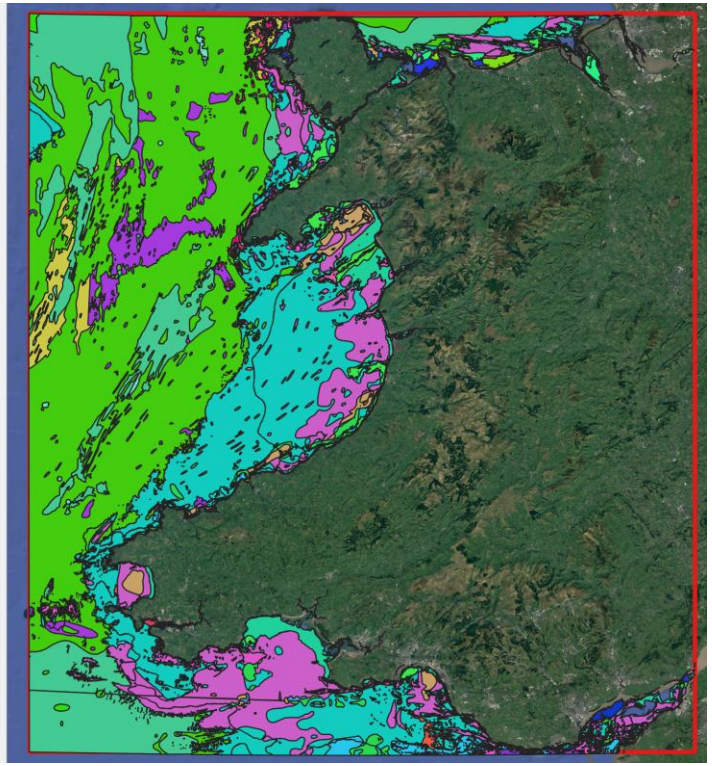
Underwater Domains

Whilst the FAO LCCS allows classification of some aquatic environments based on environmental descriptors, a new 'water-relevant' taxonomy has been developed to facilitate construction of maps of freshwater, intertidal and subtidal environments from relevant environmental descriptors retrieved primarily from Earth observation data.



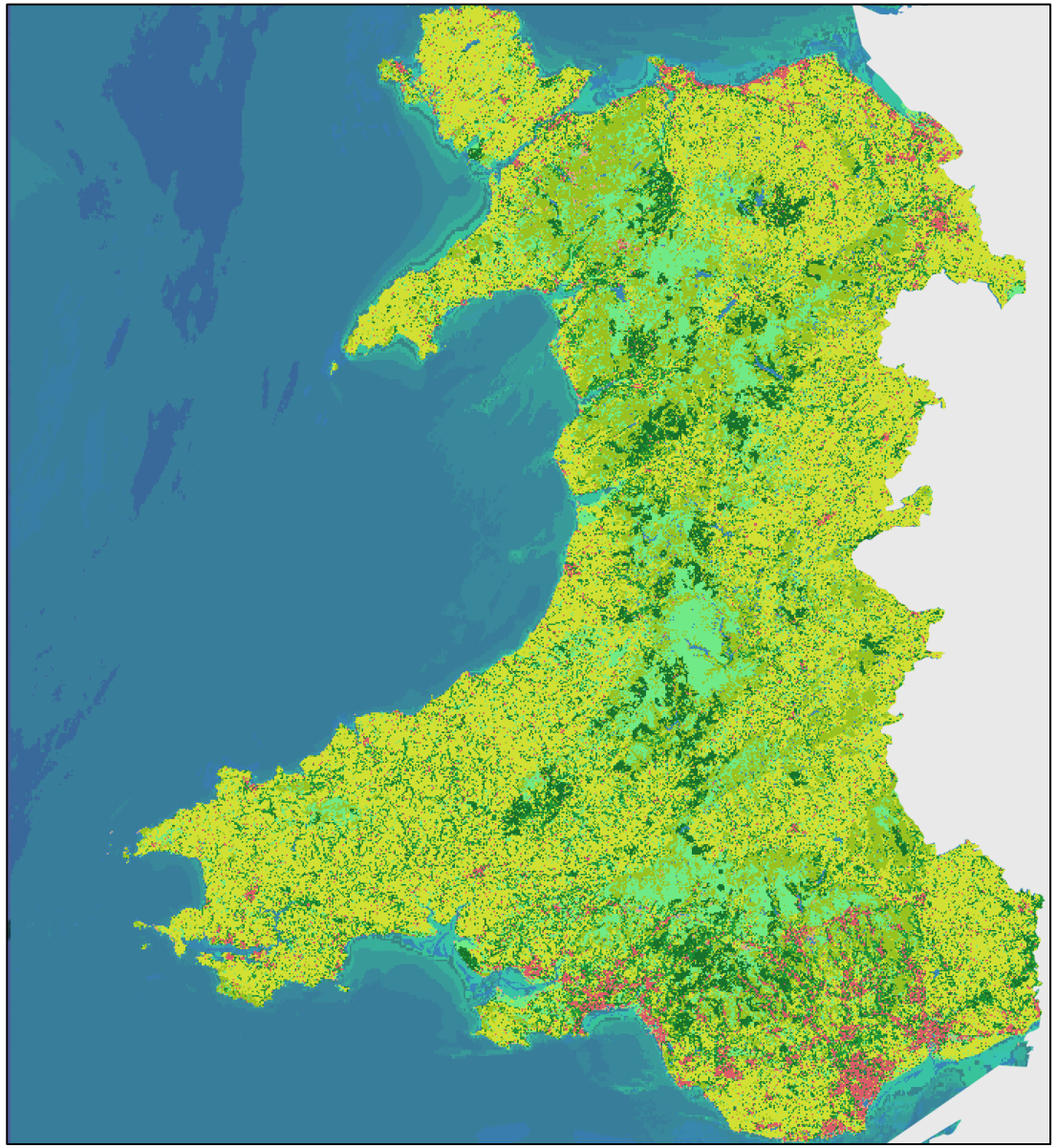




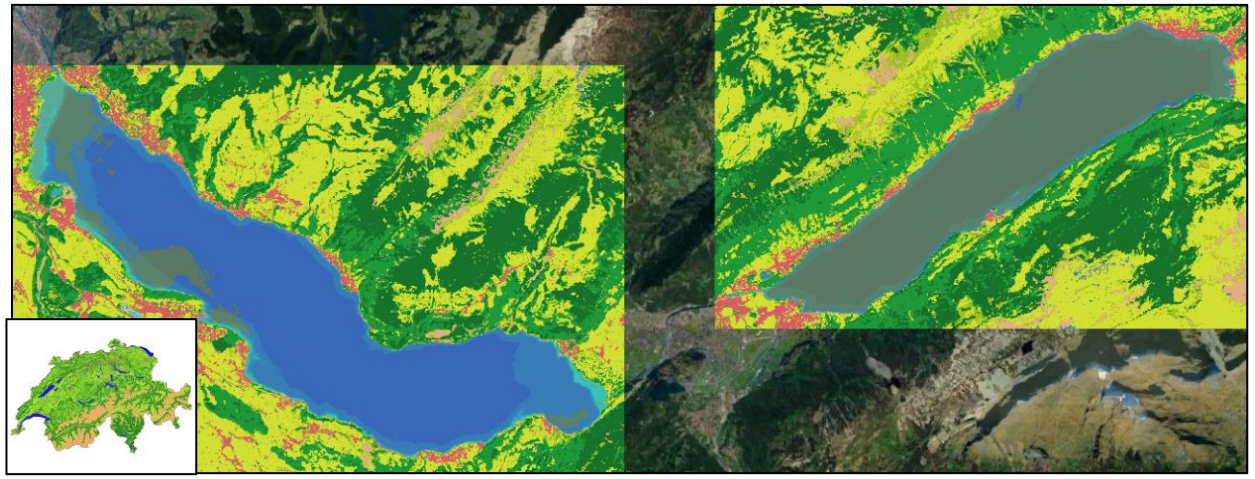


Integrated within *Living Earth* code

Case Studies: Land and Water Classifications



Living Wales – Land and Water Integration

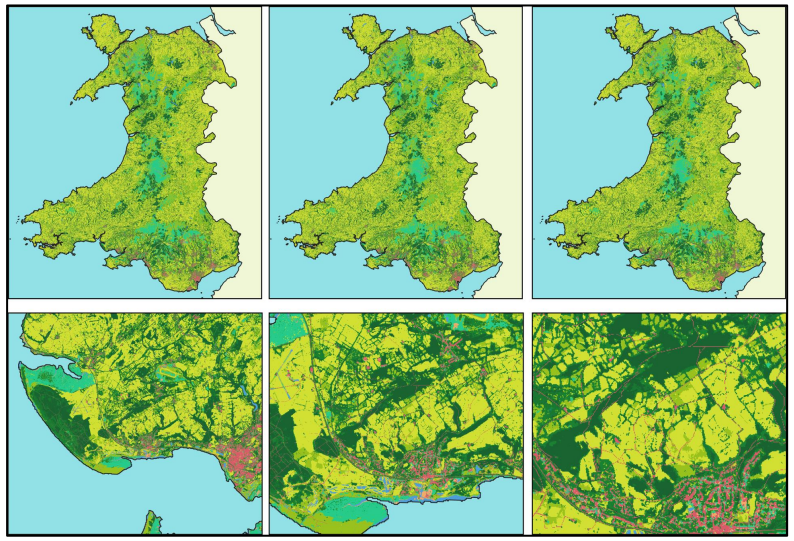


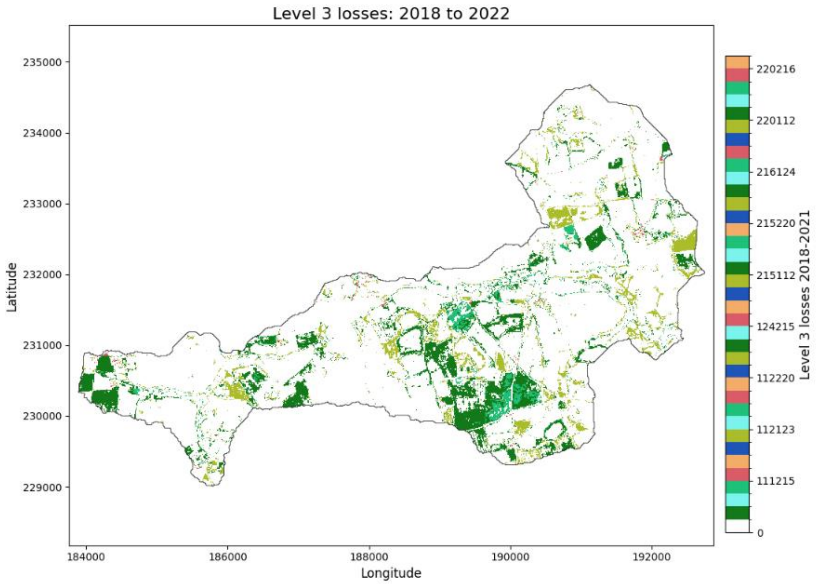
Swiss Data Cube – Lake Biota and Turbidity

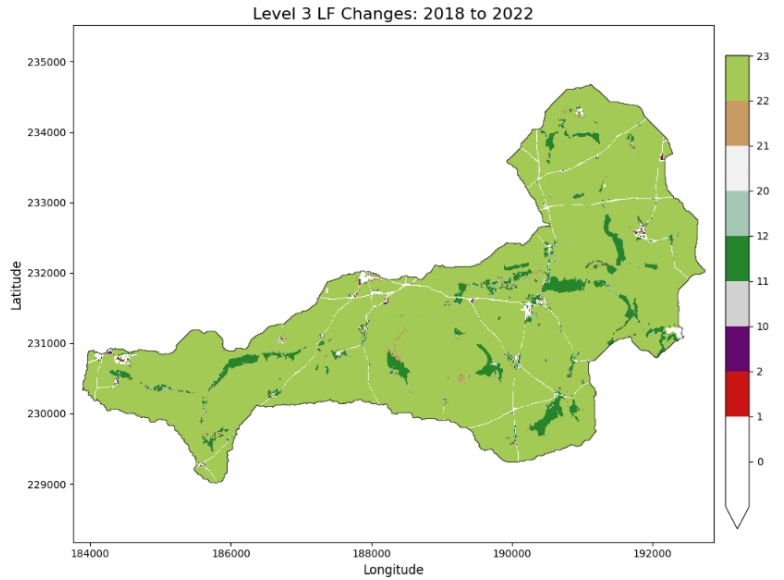
Papua New Guinea
Integration of information on corals, seagrass and turbidity

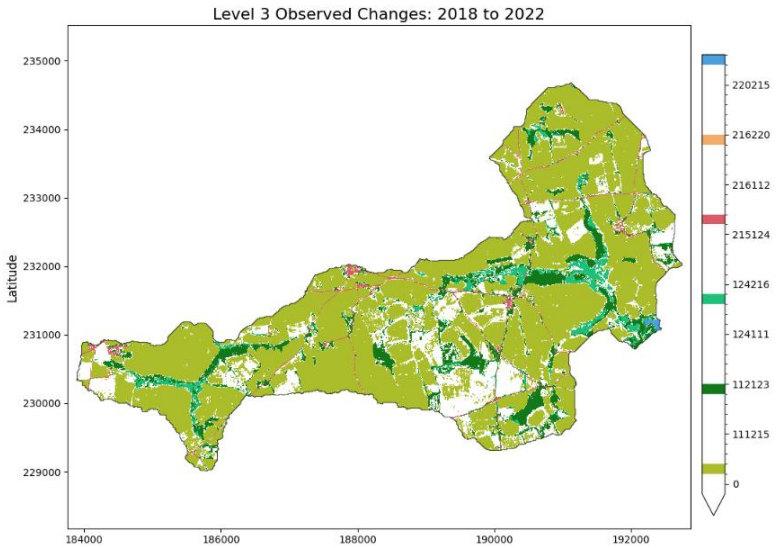
Full colourr schemes for a potential 160,000 water classes.

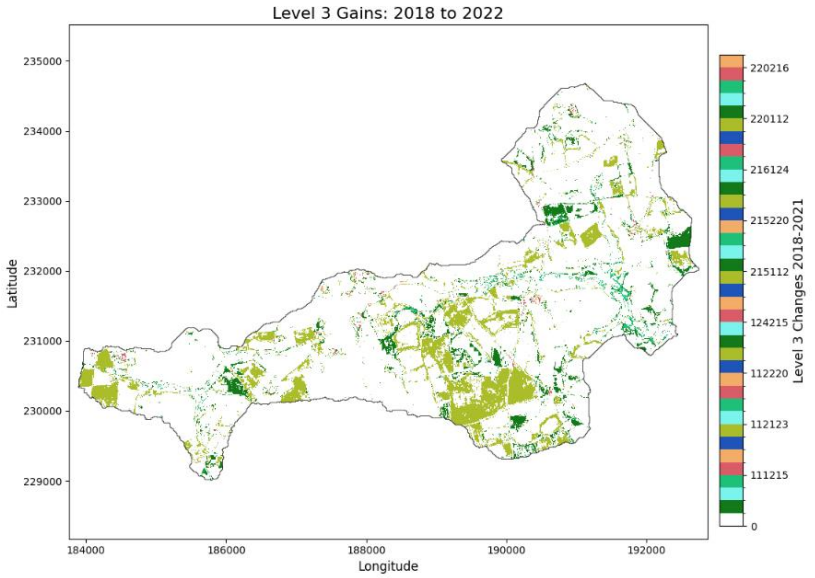
Evidence-Based Framework Used to Identify Land Cover Change

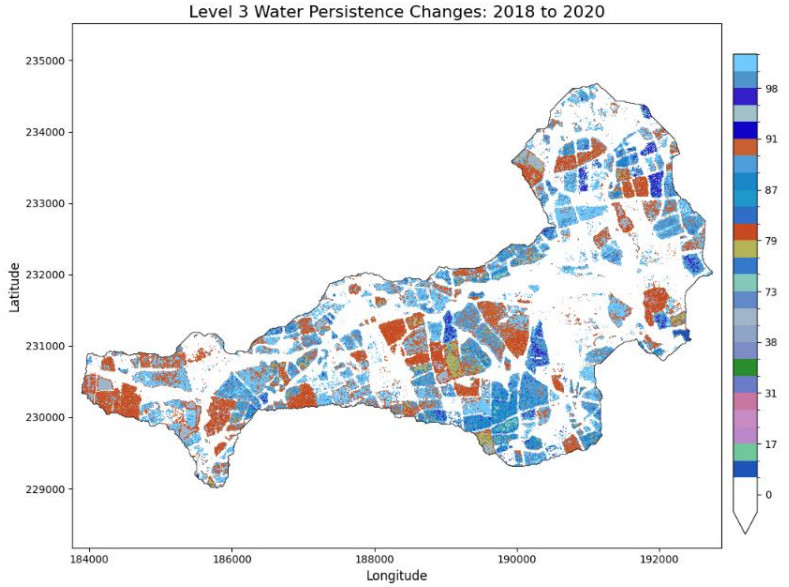






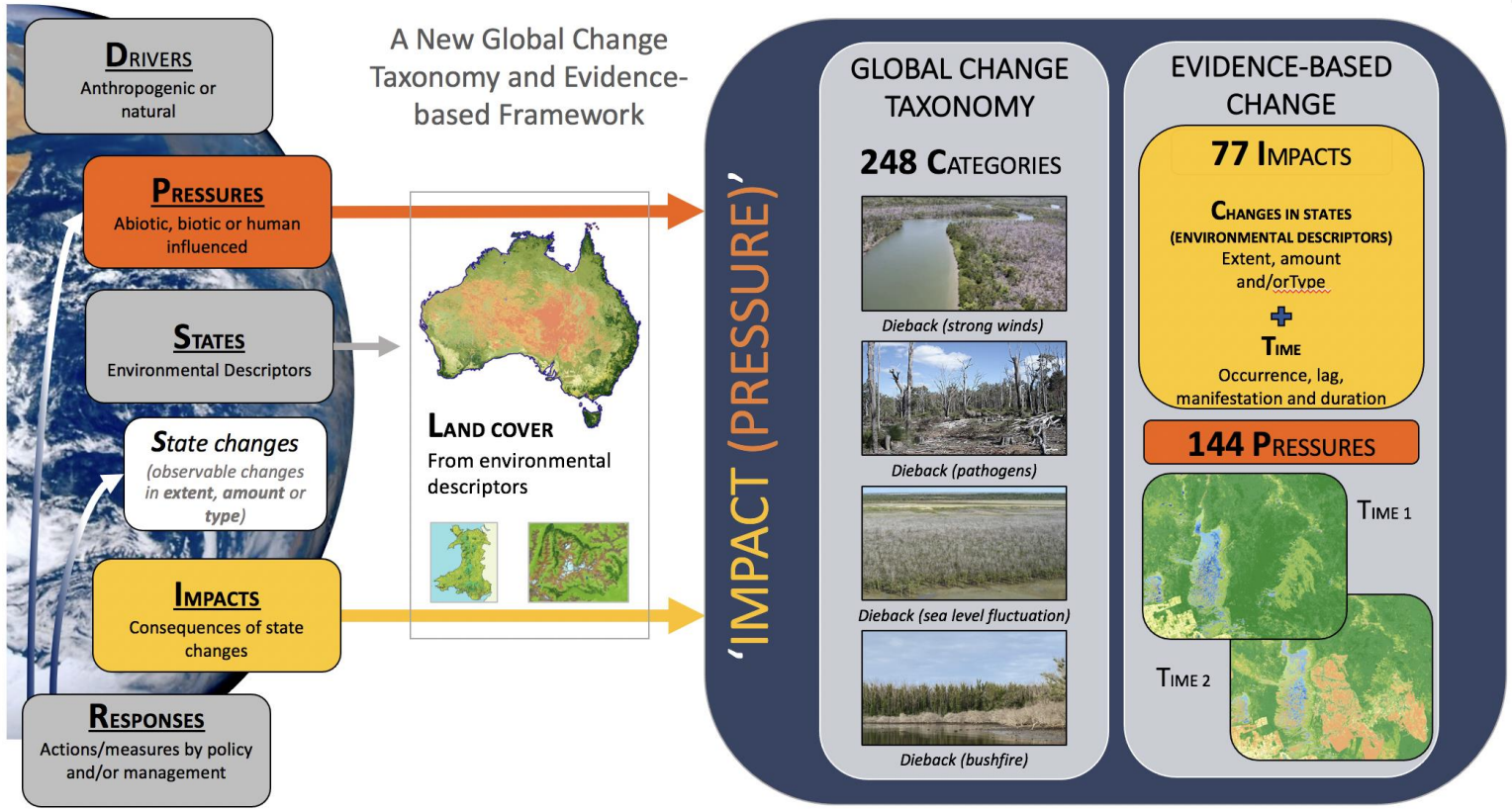






Evidence-Based Change

DPSIR



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RESEARCH ARTICLE | Open Access

A globally relevant change taxonomy and evidence-based change framework for land monitoring

Richard M. Lucas, Sophia German, Graciela Metternicht, Rebecca K. Schmidt, Christopher J. Owers, Suzanne M. Prober, Anna E. Richards, Sally Tetreault-Campbell, Kristen J. Williams ... See all authors

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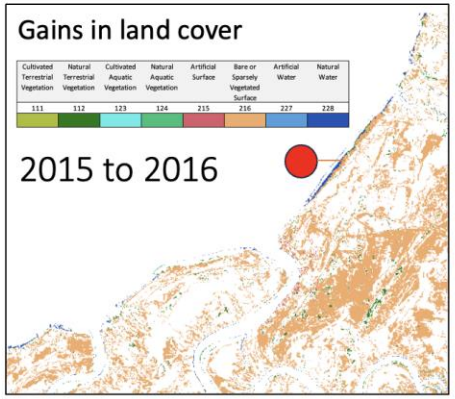
Integrates:

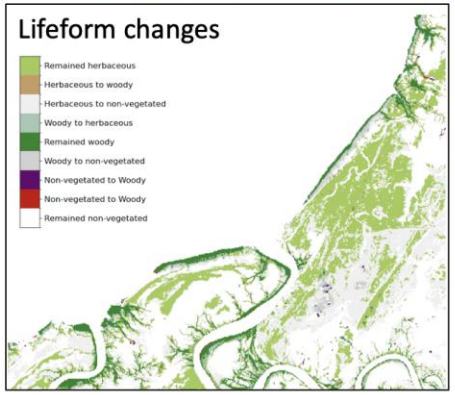
a) Observed change
b) Evidence for impacts
c) Evidence for pressures

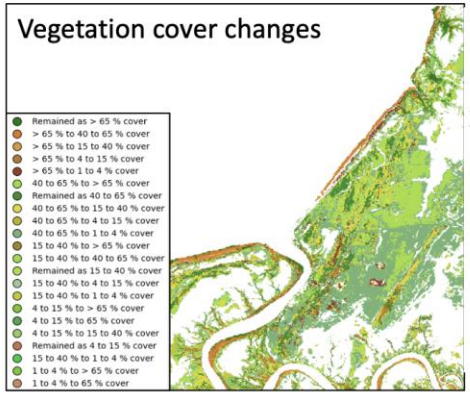
Living Earth partners developed Evidence-Based Change Framework with this building on the Driver-Pressure-State-Impacts-Response (DPSIR) framework and a Global Change Taxonomy. Currently, **77** impact and **144** pressure terms are defined, forming **246** combined 'impact(pressure)' classes. The use of EDs with pre-defined units and codes ensures scalability of the *Living Earth* approach across space and time.

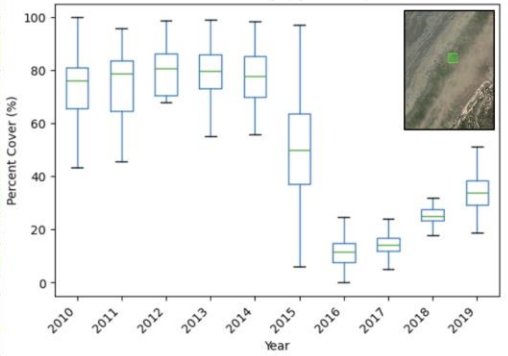
Comparisons of LCCS maps and contributing EDs between time-separated periods allows evidence for change impacts to be gathered and linked to driving pressures to ascertain causes and consequences.

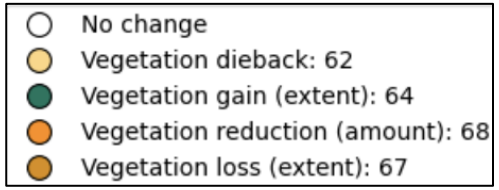
Coastal Dynamics – Gulf of Carpentaria, Queensland



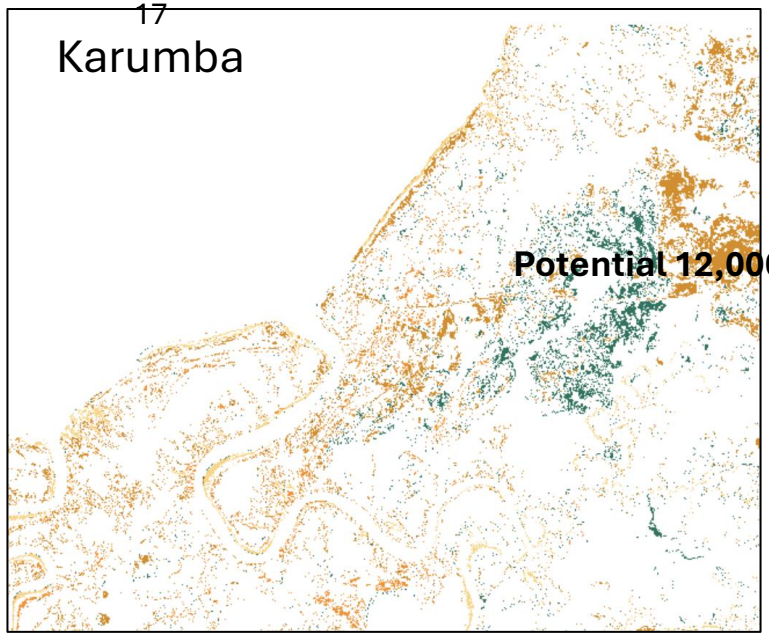


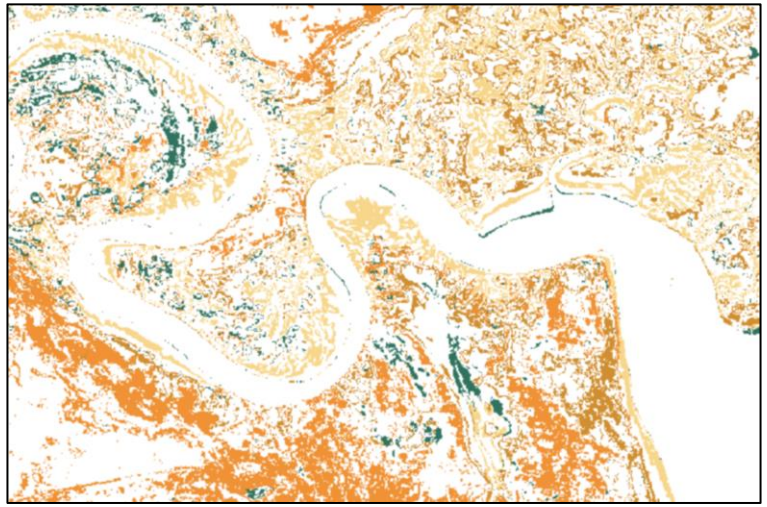






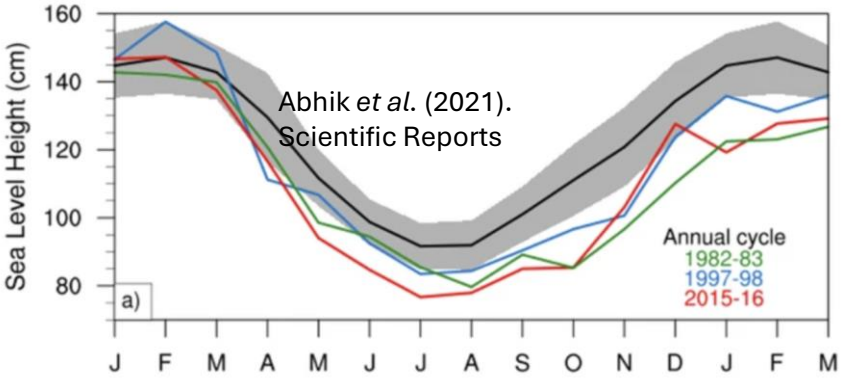
Evidence for impacts - 2014-17





Roper River

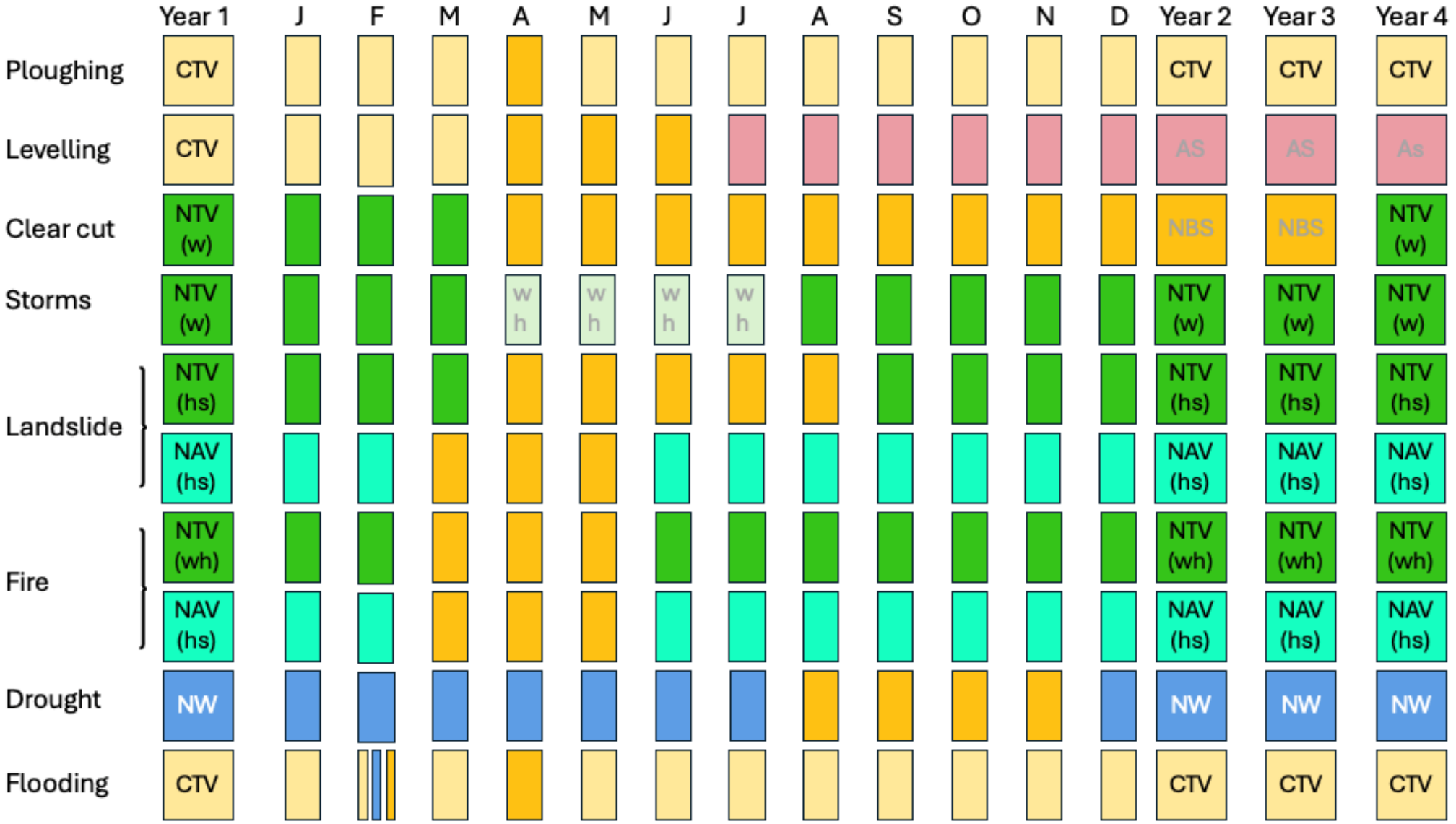
Evidence for Pressures



77 Potential Impacts discerned from evidence
144 Potential Pressures

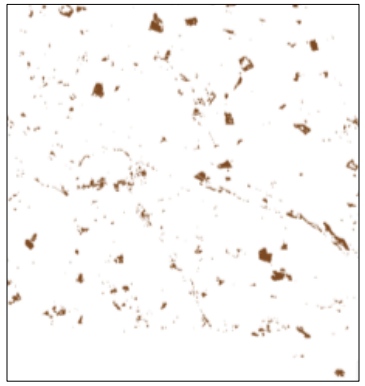
E.g., Vegetation (mangrove) dieback (sea level fluctuation)

Pressures: *Sub-annual (from Land Cover)*



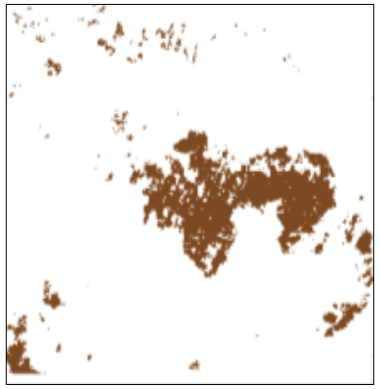
Pressures: *Sub-annual*

Ploughing



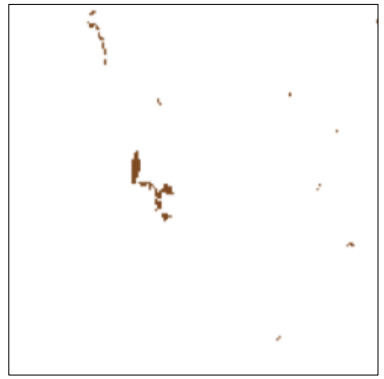
Clear Cuts

Fire

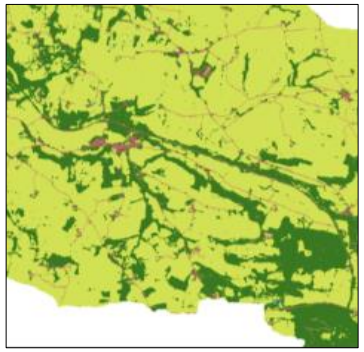


Landslide

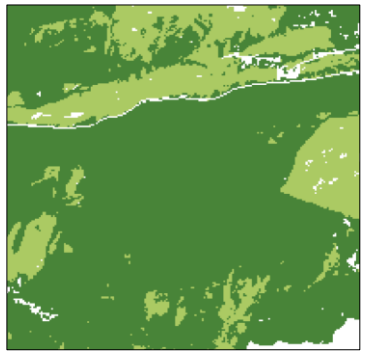
Drought



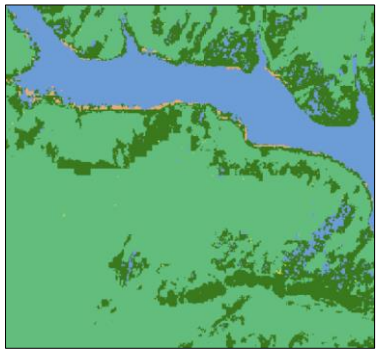
Cultivated Terrestrial Vegetation	Natural Terrestrial Vegetation	Cultivated Aquatic Vegetation	Natural Aquatic Vegetation	Artificial Surface	Bare or Sparsely Vegetated Surface	Artificial Water	Natural Water
111	112	123	124	215	216	227	228



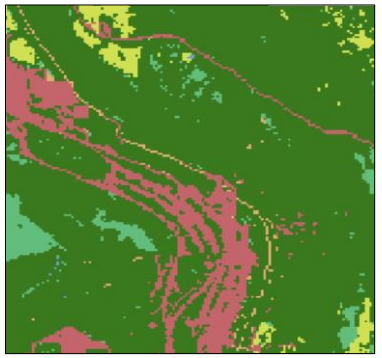
Cultivated Terrestrial Vegetation



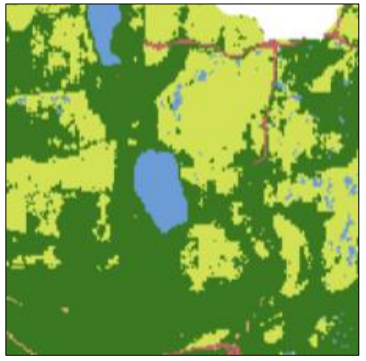
Natural Terrestrial Vegetation (Woody)



Natural Aquatic Vegetation (Herbaceous)



Natural Terrestrial Vegetation (Herbaceous)



Water

PAST OBSERVATIONS (Impacts – Pressures)

FOREST (PLANTATION)

WATERCOURSE

MARINE ENVIRONMENT

Sequential 'impacts (pressures)'

Bare surface exposure
Clear cutting (forests)

Erosion
(Excess precipitation)

Surface elevation change
(Erosion)

24th March 2025

31st March 2025

Simultaneous 'impacts (pressures)'

6th July 2025

5th August 2025

Increased sediment load
(sediment transport)

Accretion
(sediment transport)

Simultaneous 'impacts (pressures)'

7th July 2025

5th August 2025

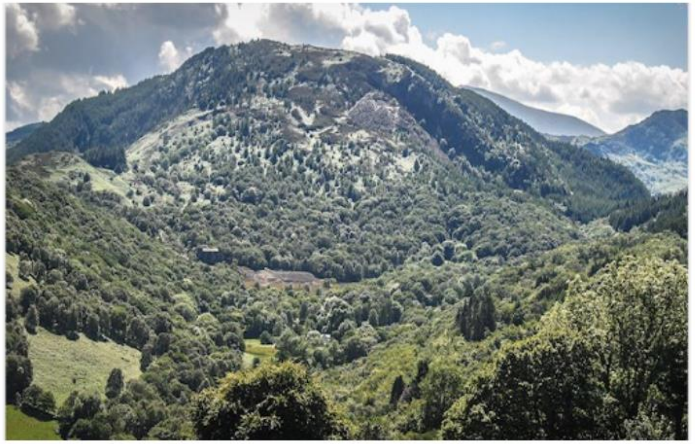
Water quality change
(Nutrification)

Accretion
(sediment transport)

Simultaneous 'impacts (pressures)'

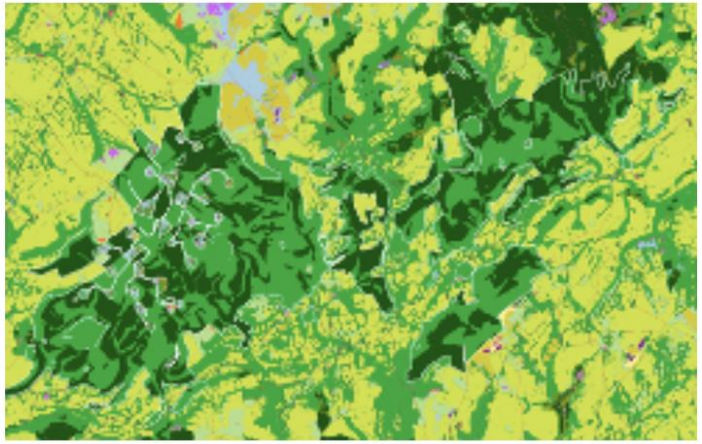
TIME

Working Towards Future Landscapes



(RE)IMAGINING

What would we like to see?

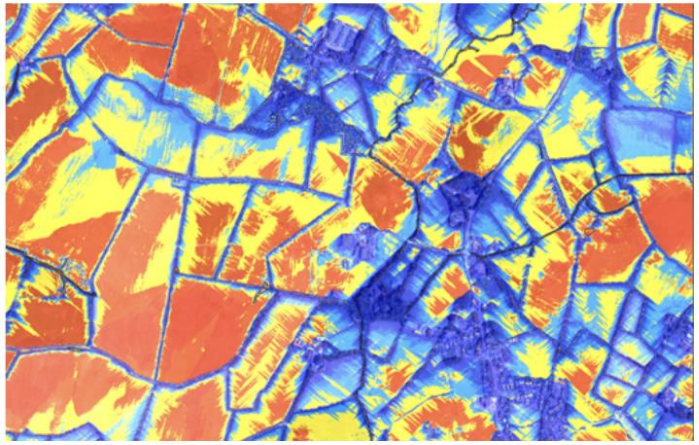


VALUING

How can we place a value on what we want?

ASSESSING RISK

How can we identify threats?

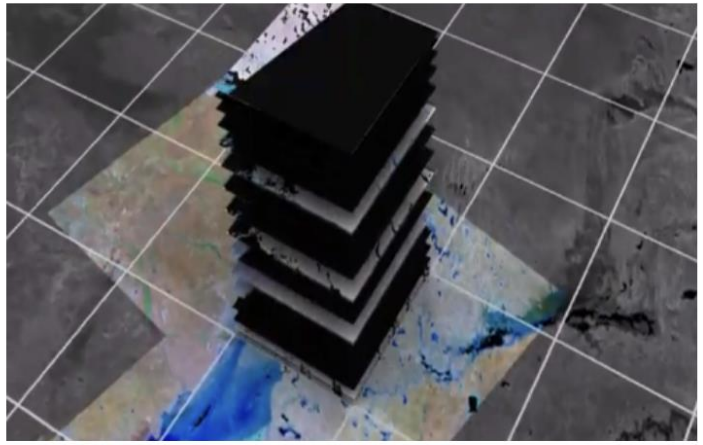


REALISING

How can we be certain?

HARMONISING

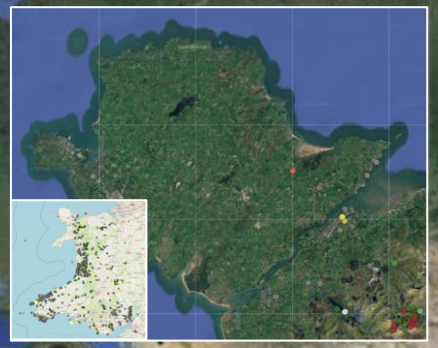
How can we agree and co-design?

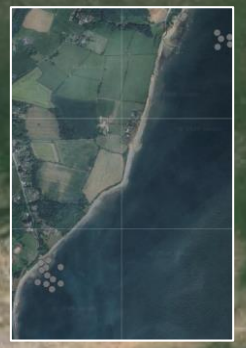


MONITORING

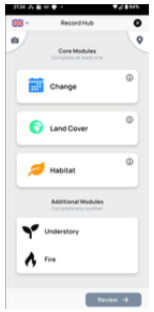
How can we track progress towards our ambitions?

Earthtrack (Land, Water and Futures)

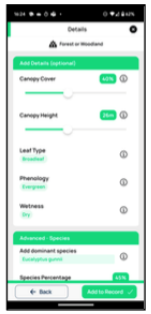




EARTHTRACK MAIN

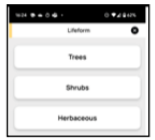


LAND COVER (FAO LCCS)

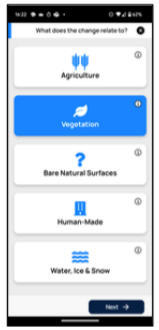


HABITATS (PHASE I)

UNDERSTOREY (FAO LCCS)

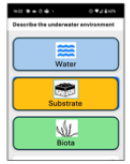


LAND COVER CHANGE

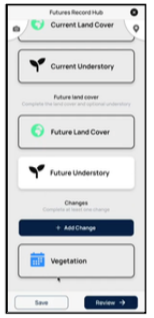


FIRE

UNDERWATER



FUTURES



Living Earth: An Expanding Resource

Thank you to all contributors and collaborators over the years

Australian Traditional owners, past and present

Land cover maps according to the FAO LCCS	The Global Change Taxonomy & Evidence-Based Change Framework	Analysis Ready Data (including EODataDown)	Environmental Descriptors	Land cover maps (e.g., Wales, Australia)	EarthTrack	Open Data Cube implementation and access