

MONITORING BIOLOGICAL RESPONSES TO CLIMATE CHANGE – THE ROLE OF CITIZEN SCIENCE



**CONSERVATION
COUNCIL**
OF WESTERN AUSTRALIA INC.

THE WESTERN AUSTRALIAN BIODIVERSITY & CLIMATE CHANGE FORUM

- The Forum called for expressions of interest from Australian scientists with published or unpublished work on biodiversity responses to climate change in this State. As anticipated very few data long term time-series were identified.

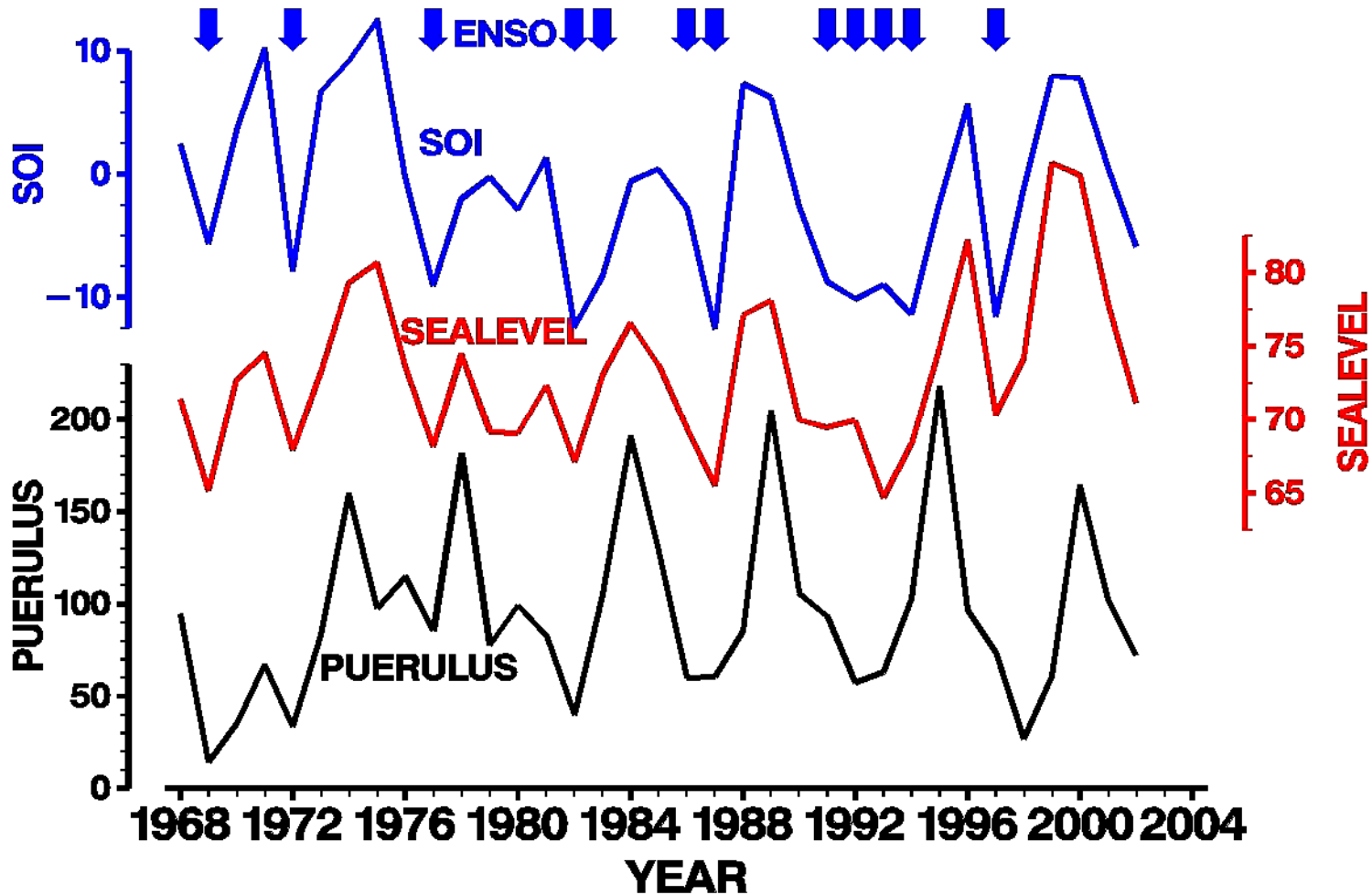
WHAT DO WE KNOW?

- The Intergovernmental Panel on Climate Change (IPCC) utilized 28671 data sets in making its assessment on the impact of the enhanced Greenhouse Effect on global biodiversity. Of these 28115 (98%) were from Europe and only 6 (0.02%) were from Australasia. It is not clear from the IPC report how many of these 6 papers relate to changes in biodiversity. Suffice to say the amount of reported research on climate change and biodiversity in the Australasian region is currently negligible.

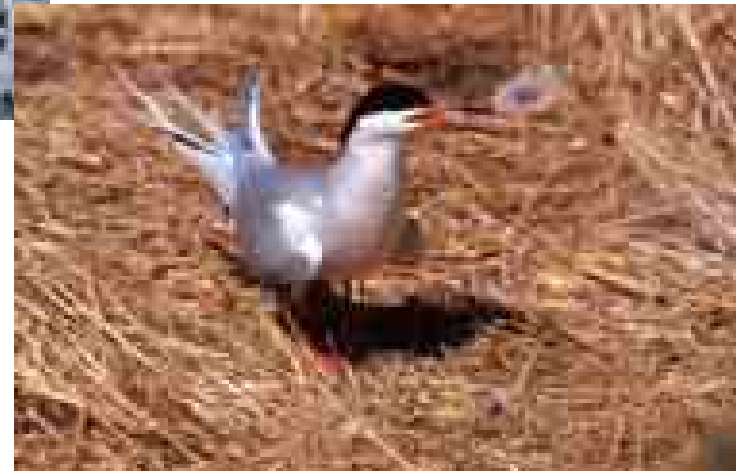
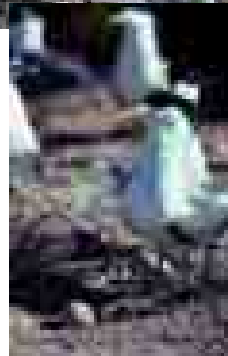
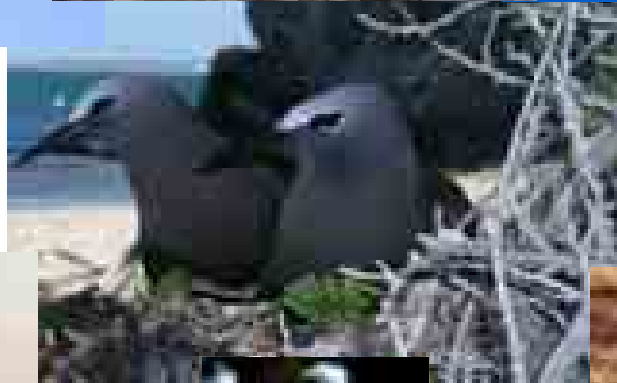
LONG TERM OR TIME SERIES DATA

- Nangara Mound – Vegetation monitoring
- Cypress Pines - Dendrochronology
- Bush-birds – Middlesex Observatory - Manjimup
- Rock Lobster puerulus settlement
- Seabird population dynamics

ENSO, Leeuwin Current & Puerulus



Seabird Population Dynamics



OTHER RELEVANT INVESTIGATIONS

- South-west tree decline
- Experimental approaches
- Genetic research
- Bio-climatic modeling

Citizen Science and monitoring biological responses to Climate Change

3c (i)

- **Establish a Citizen Science Program to collect data on indicators at an eco-regional scale (marine, aquatic, terrestrial).**
 - Develop a coordinated Citizen Science program with a suite of projects operating on eco-regional spatial scales and specifically designed to detect biodiversity responses to climate shifts.

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- **Establish some long term time series for biota in strategic (stress zone) regions (marine, terrestrial).**
 - Set up observatories on the bio-geographical boundaries of ecological stress zones (marine, terrestrial).

CITIZEN SCIENCE – WHAT IS IT?

Citizen Scientists are voluntary, unpaid members of communities who observe or monitor nature, and collect data, for the purpose of increasing knowledge.

- They are not ‘amateurs ’in the sense that citizen scientists should be regarded as untrained or inexperienced.
- The use of the term ‘citizen’ also implies that the purpose for this science is not directed by government or supported by the market.
- In order to be science it must be technically defensible and subject to peer review processes.

APPROACHES TO MONITORING BIOLOGICAL RESPONSES TO CLIMATE CHANGE

- continuous or periodic recording of plant and animal distributions (presence / absence, numbers) on a very large, ecosystem or bioregional spatial scale,
- continuous or periodic recording of the timing of biological events (phenology) on an ecosystem or bioregional scale,
- building on historical investigations, bio-chronologies, written records and biological collections to identify on-going reference sites,

CCWA Citizen Science for Ecological Monitoring Program

Handbook



Training Module (applications)

Climate Change
Monitoring

Environmental Protection
Monitoring

NRM Evaluation
Monitoring



Target Groups

NRM Councils

CCWA Affiliates

Other Community
Groups

TAFE Summer
School Courses



Projects

CDR
Terrestrial
Climate
Change
Observatory

Lancelin
Island
Marine
Climate
Change
Observatory

Penguin
Watch

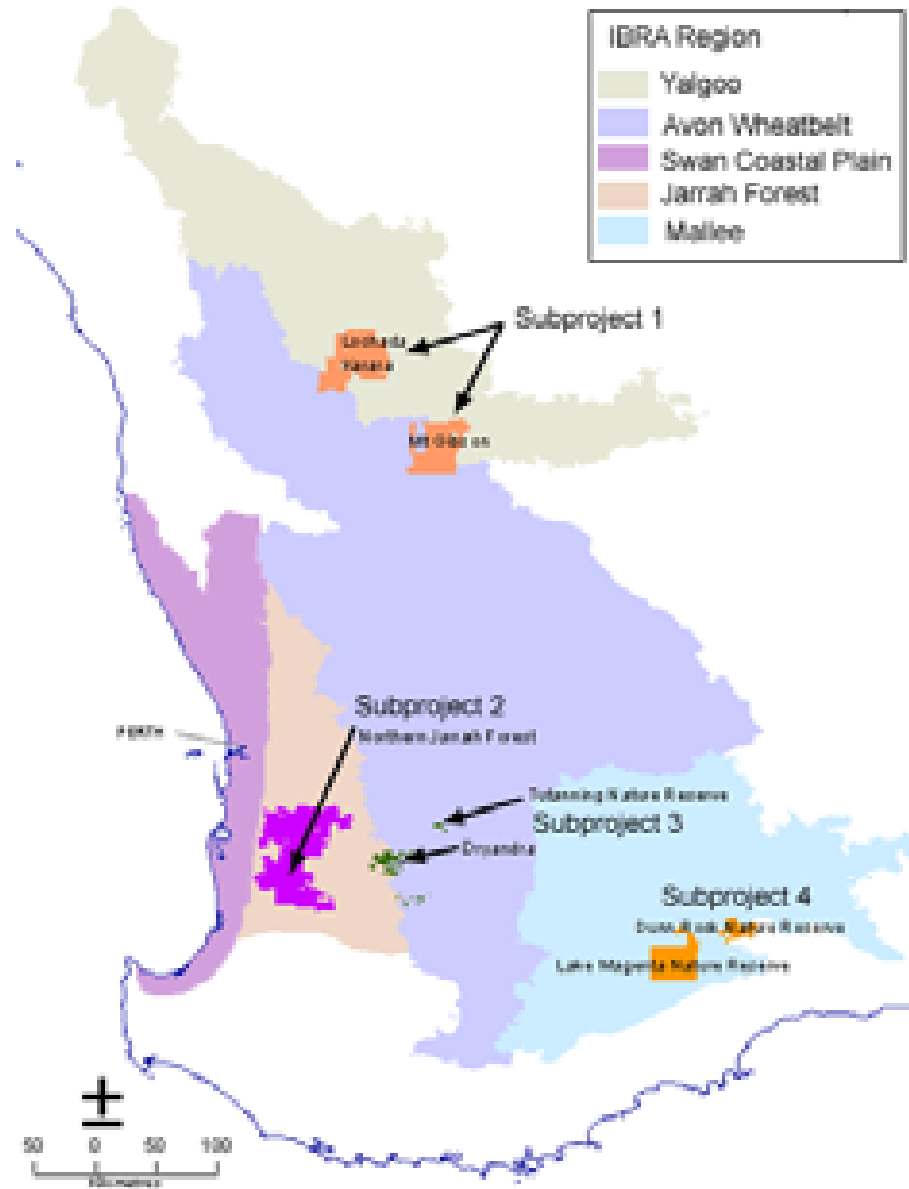
Bush
Canaries

Rat
Island
Recovery

SCPS
Bycatch

APPROACHES TO MONITORING BIOLOGICAL RESPONSES TO CLIMATE CHANGE

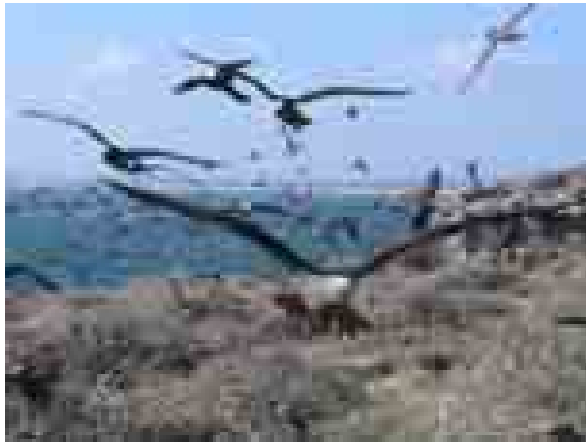
- **Establishing reference datasets for the structured long-term recording of plants or animals at specific (climatically strategic) localities, ie. Observatories,**
- Targeted sampling of biological or behavioural attributes in selected indicator taxa.



CHARLES DARWIN CLIMATE CHANGE OBSERVATORY



LANCELIN ISLAND MARINE CLIMATE CHANGE OBSERVATORY



The Establishment of the Brown Noddy (*Anous stolidus*) Colony on Lancelin Island

