IMPACTS OF *SABELLA SPALLANZANII* ON SUBTIDAL SOFT-SEDIMENT COMMUNITIES

Javier Atalah, Oliver Floerl, Xavier Pochon, Michael Townsend, Leigh Tait, Andrew Lohrer

24 July 2018

Top of the South Marine Biosecurity Workshop

CAWTHRON
The power of science®

TOP OF THE SOUTH
Marine Biosecurity Partnership

Research Aims

- Develop a standardized risk assessment framework to compare impacts from non-native species consistently
- ✓ Measure the effects of non-native species on marine biodiversity and ecosystem function
- Forecast the future range distributions of non-native marine species in NZ
- Evaluate the costs and benefits to NZ society of intervention against non-native marine species

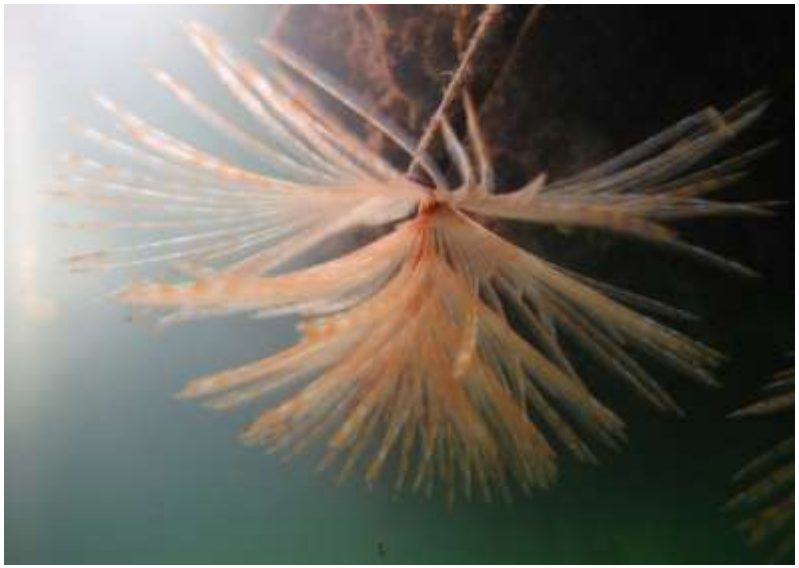
CASE STUDY – SABELLA SPALLANZANII

- Designated as an unwanted organism under the Biosecurity Act.
- First discovered in 2008, now established in several regions.
- Surveillance in major commercial ports and harbours.
- Impacts on NZ benthic biodiversity and functioning are still poorly understood.

CAWTHRON
The power of science®

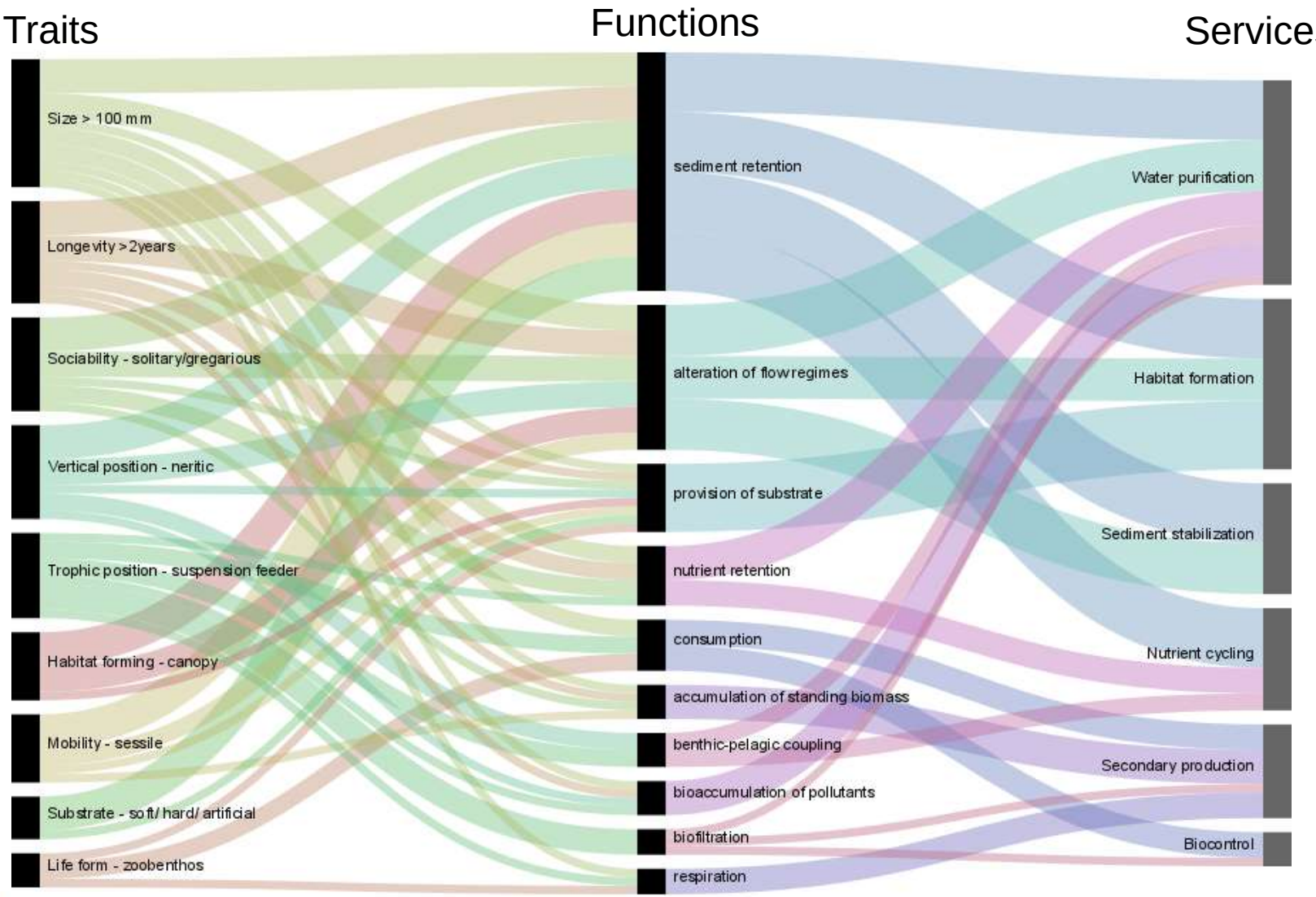
SABELLA INVASIVE TRAITS

- High reproductive output (> 50,000 eggs per spawning event).
- Extended reproductive season May – September
- Rapid growth and ability to regenerate body structures if damaged
- Wide environmental tolerances and a lack of predators
- Habitat generalist
- Extended larval duration
- High potential for natural and
- human-mediated spread



CAWTHRON
The power of science®

FUNCTIONS AND SERVICES ASSOCIATED TO SABELLA TRAITS



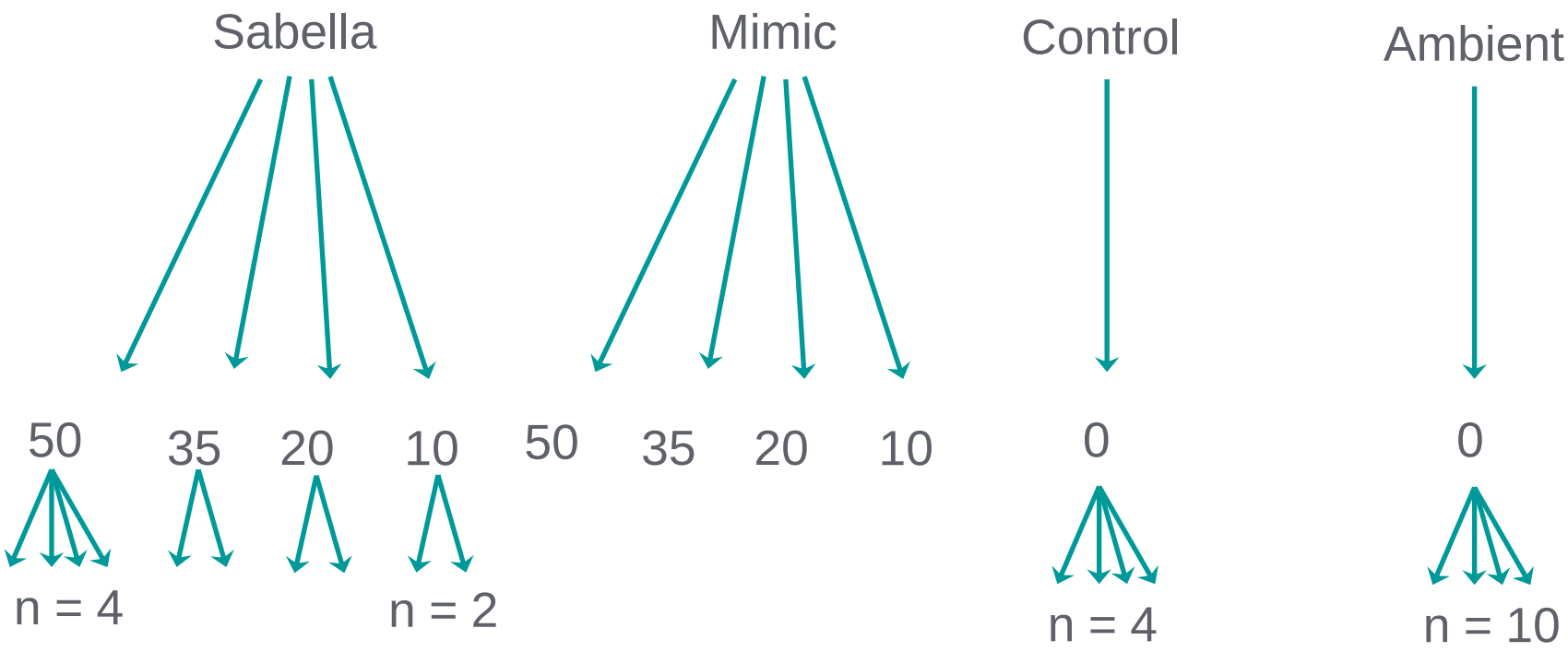
CAWTHRON
The power of science®

EXPERIMENTAL STUDY ON NIS IMPACTS

STUDY SITE

CAWTHRON
The power of science®

METHODS – EXPERIMENTAL DESIGN



CAWTHRON
The power of science®

METHODS – EXPERIMENTAL SETUP

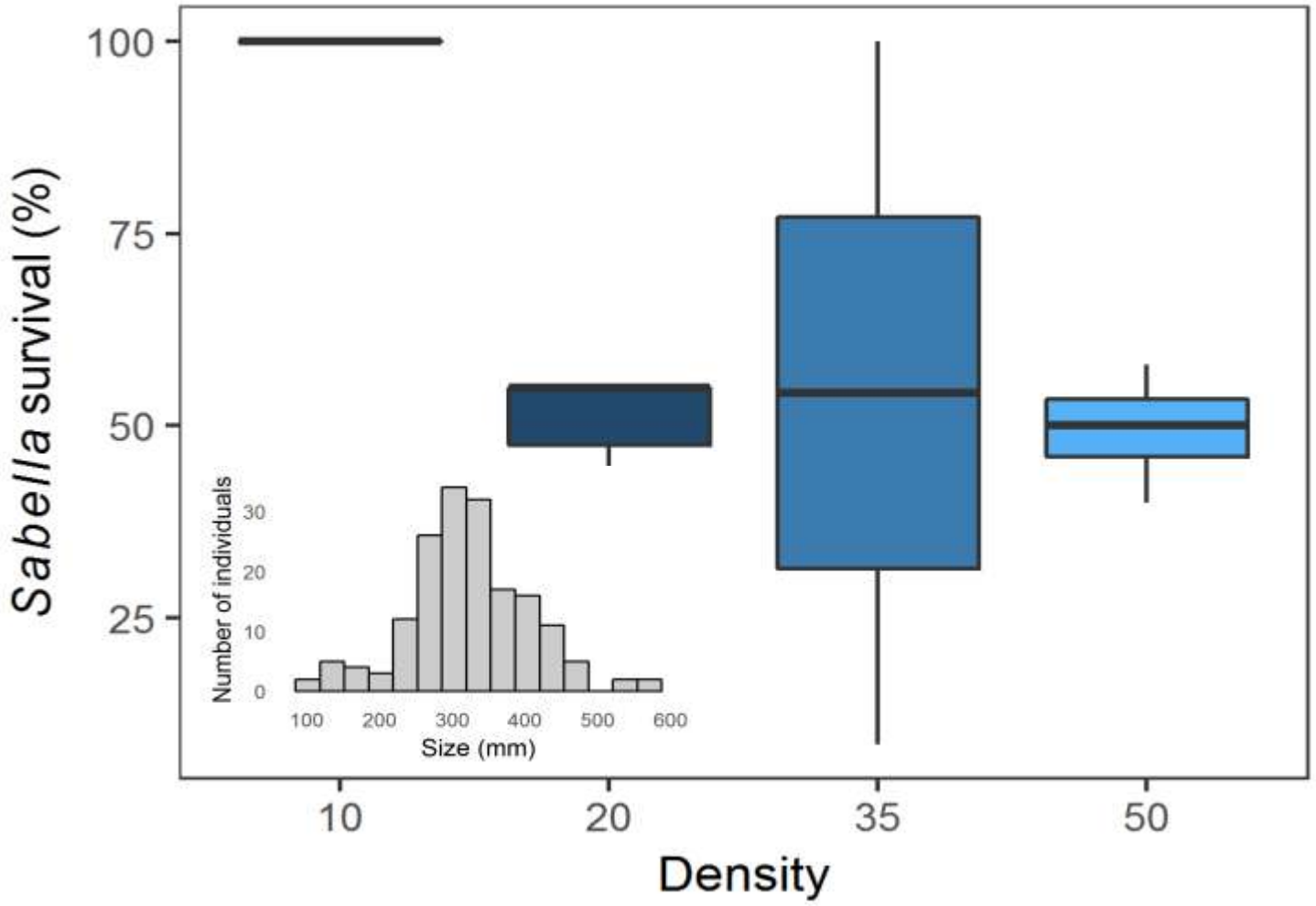
CAWTHRON
The power of science®

SAMPLING

- Core sediment sampling
- Sediment physico-chemical characteristics
- Macrofaunal community (Morphological)
- Eukaryote communities (Molecular)
- Bacterial communities (Molecular)

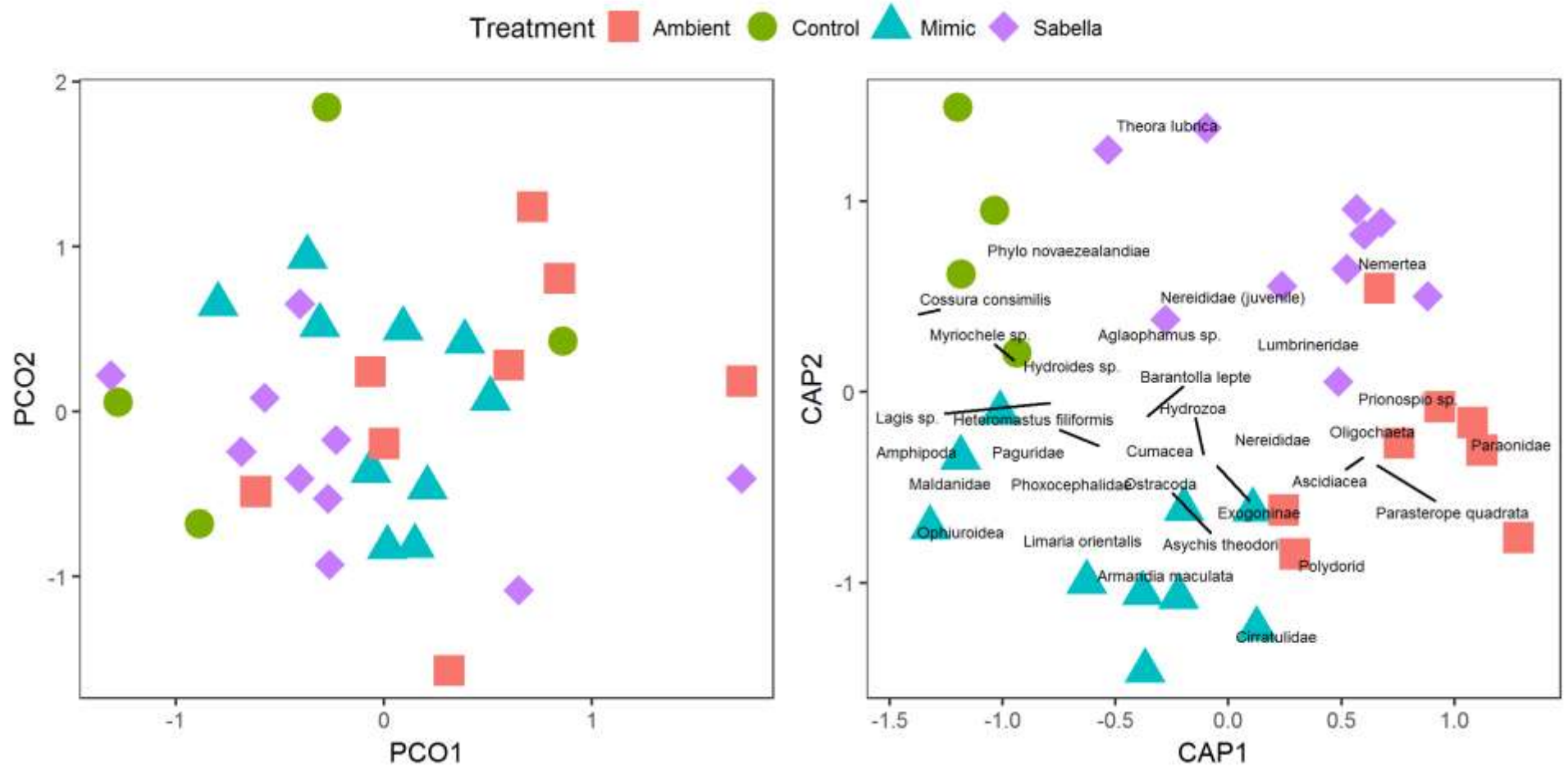
CAWTHRON
The power of science®

RESULTS: SURVIVAL AND SIZE DISTRIBUTION



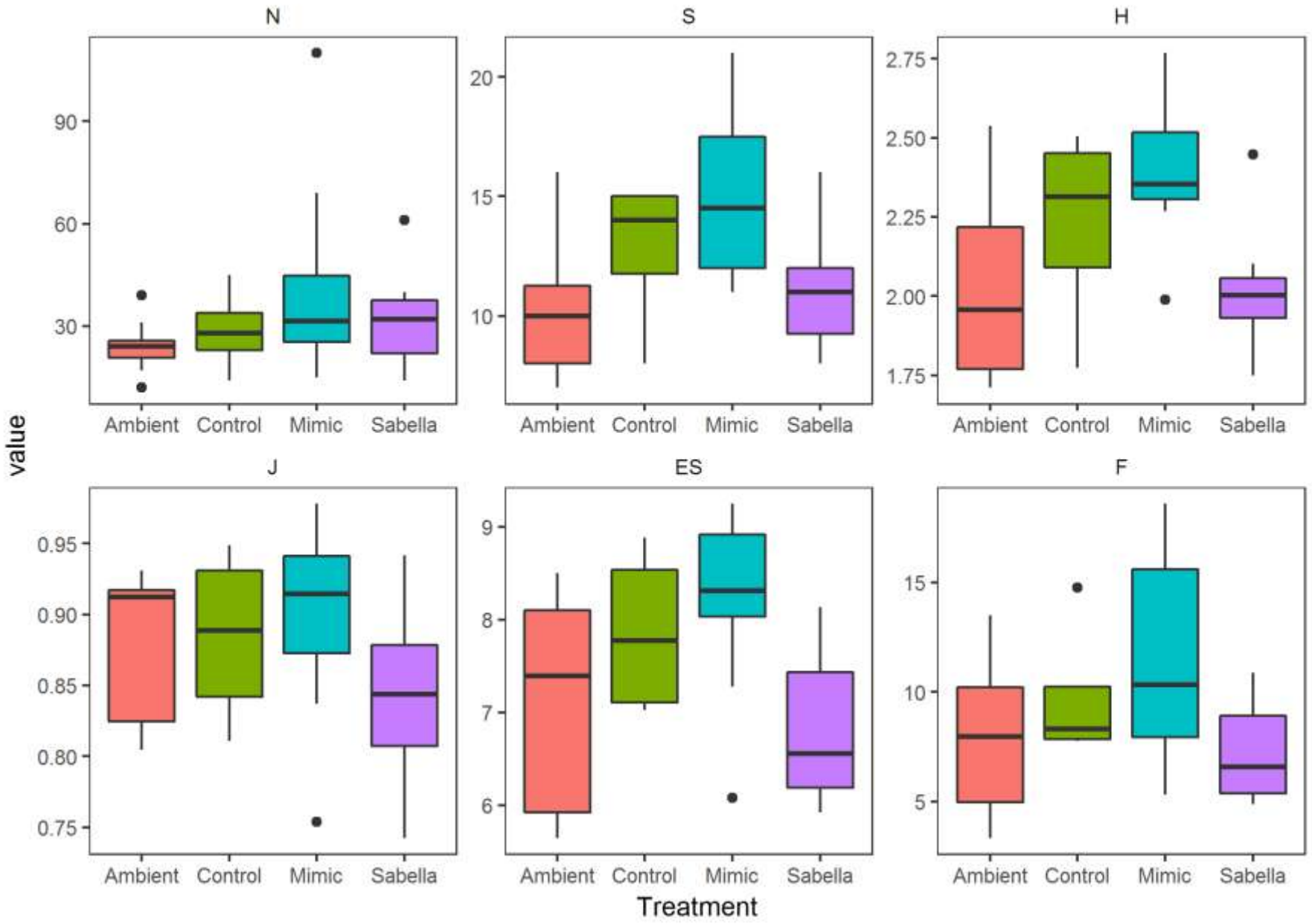
CAWTHRON
The power of science®

CHANGES IN COMMUNITY STRUCTURE

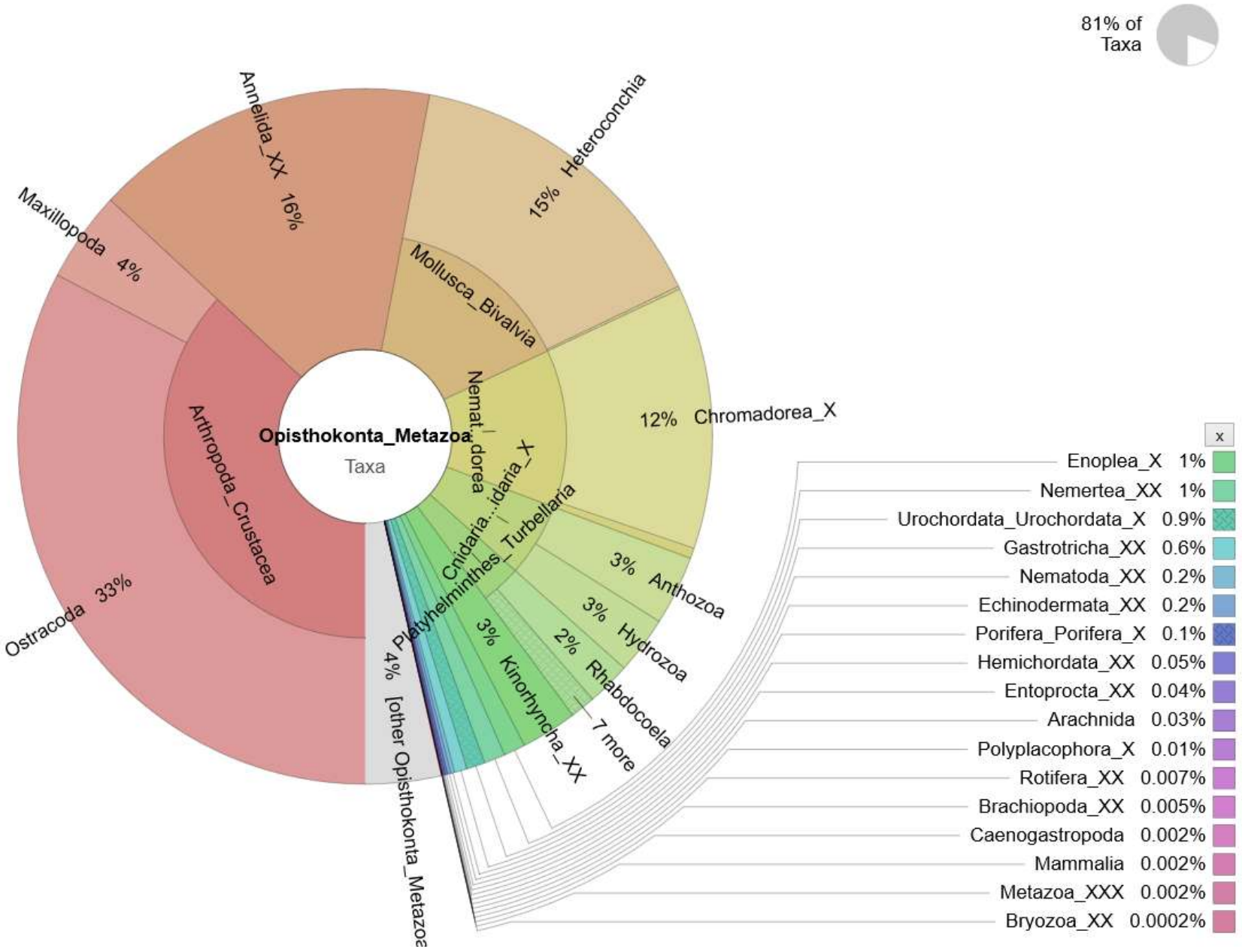


CAWTHRON
The power of science®

DIVERSITY INDICES



RESULTS – METAZOAN DIVERSITY



RELATED STUDIES IN SOUTH-EASTERN AUSTRALIA

- Holloway & Keough 2002 showed Sabella influenced wharf pile community composition in the early stages of development (<10 weeks), but effects were negligible after 6 months
- O'Brien et al. 2006 found that high Sabella density was associated with lower abundances of small (< 1 mm) mobile crustaceans.
- Ross et al. 2007 found no effect of Sabella on macrofauna, with the exception of lumbrinerid polychaetes and gammarid amphipods.
- Ross et al. 2013 detected changes in assemblage composition, with an increase in the abundance of echinoderms (largely brittle stars).

CAWTHRON
The power of science®

FUTURE WORK

- Analyse eukaryote and bacterial datasets
- Determine functional changes associated to shifts in community structure.
- Incorporate sediment physico-chemical data into the analyses.
- Analyse data on Sabella epifaunal communities.
- Integrate findings with chamber experiments on nutrient cycling.
- Integrate results into national pests spread and impacts models.

CAWTHRON
The power of science®