



STEM education and training at the CSIRO Marine National Facility

Ben Arthur & Ben Rae
Marine National Facility

RV Investigator – a new era in marine and atmospheric research for Australian scientists



Marine National Facility (MNF)

Australia's blue water research capability



- Established in 1984
- Funded by the Australian Government
- Owned and operated by CSIRO
- Overseen by an independent Steering Committee
- Comprises vessel, equipment, datasets and voyage management
- Available to Australian researchers and their international collaborators

RV Investigator

Australia's super science ship

Marine National Facility



Figures

- Built 2014, \$120 M
- 93.9m long, beam 18.5m
- 40 scientists
- Capable of 300 days/year at sea
- Range of 10,000NM, 60 days
- Ice edge to the equator



RV Investigator

Multidisciplinary research

Marine National Facility

OCEANOGRAPHIC

Unravel decadal climate variability and fisheries interactions

- Deep ocean observations
- CTD systems



ATMOSPHERIC

Quantify the ocean's role in global climate

- Advanced weather research radar
- Atmospheric sampling systems



GEOSCIENCE

Discover submarine volcanoes, minerals and slip zones

- Full ocean depth multibeam sonars
- Sediment sampling



BIOLOGICAL

Revolutionise fisheries science and management

- Advanced biomass sonar systems
- Deepwater trawling

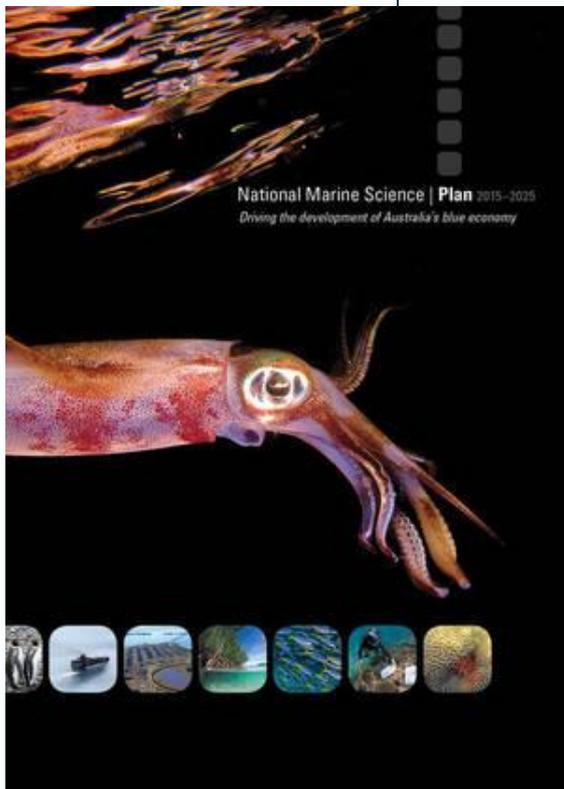


The MNF and the Blue Economy

National Marine Science Plan 2015 - 2025

Marine National Facility

Investigator has 3 years demonstrated experience delivering research.
But is supporting and enabling research enough?



Explicit focus on the
Blue Economy
throughout marine
science system

\$47.2 billion in 2012



~\$100 billion in 2025

What can the MNF do to help deliver the
marine experts who will ensure we
successfully manage the future
conservation and prosperity of our
marine and coastal environments?



STEM Education & Training

CSIRO Educator on Board

Marine National Facility

Professional development program for Australian STEM school teachers

Provides berths for primary and secondary teachers to sail on board *Investigator* for short voyages:

- Work alongside scientists to assist, learn and contribute to the national collaborative marine research effort.
- Update their own STEM content.
- Conduct educational and outreach activities including live broadcasts.
- Develop curriculum-linked resources to be shared with other Australian teachers (assisted by CSIRO Education & Outreach).

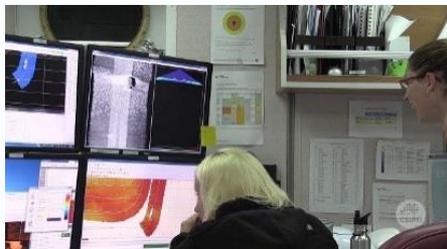
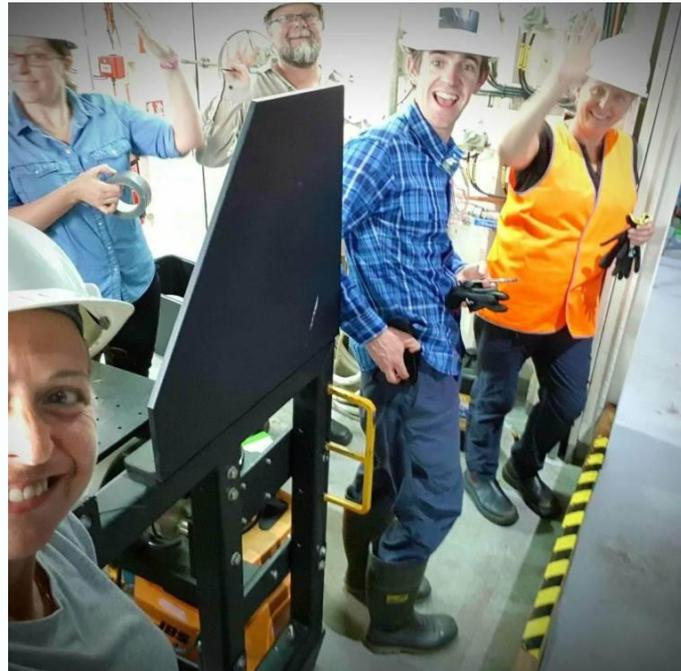


STEM Education & Training

CSIRO Educator on Board

Marine National Facility

- 2017 pilot – Totten Glacier, 1 teacher, 51 days
- 2017 – Sydney to Broome, 2 teachers, 15 days
- 2018 – Brisbane to Hobart, 3 teachers, 8 days
- 2018 – Bass Strait, 4 teachers, 11 days



STEM Education & Training

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“Working alongside scientists who are at the top of their field was priceless in my own development as a teacher.”

“I most enjoyed the interplay between the scientists – bouncing off each other. Seeing everyone swapping ideas, not putting any down, just expanding thought sequences. This is the first time, in a long time, I’ve actually seen that happen and I’m really impressed.”

“In terms of science, I’ve learned more in one week than I have in my whole life.”

STEM Education & Training

MNF Floating Classroom

Marine National Facility

When in port, run your class on board...

- Ship tour followed by STEM lesson
- Secondary, tertiary & TAFE educators

UTS - Sydney



STEM Education & Training



CAPSTAN
Collaborative Australian
Post-Graduate Sea Training
Alliance Network



MACQUARIE
University

Marine National Facility

3 pilot voyages on *Investigator* 2017-20

Up to 30 students and trainers

CAPSTAN 2017 – Fremantle to Hobart



STEM Education & Training

Ship tours

Marine National Facility

Class to ship



Or ship to class



STEM Education & Training

The future...

Marine National Facility

Educator on Board

- 2019-20 voyages
- How do we demonstrate impact?

CAPSTAN voyages

- Beyond 2020...

Indigenous student cadetship

Increased sea time?



Thank you and Questions?

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