



Science Rocks
Career Expo 2020
ONLINE
STUDY GUIDE



fisheries science and sustainability
marine ecology
science communication

Great Southern Science Council Pro Files series – connecting science professionals and our community

Paul Mackey

job title
organisation
where and contacts

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Pro File video interview
Related resource in this series

Not yet available...watch this space for a Pro File video in future
See also: Science Rocks Career Expo Online – Pro File Study Guide.marine environment.Rachael Goetze



Resource PDF: *Introduced to Marine Species in Western Australia*



Science Rocks Career Expo 2016 outreach by Southern Ports* and Dept of Fisheries^ teams: MicroEye dissecting scope samples and marine biosecurity information and monitoring. L to R Tahryn Thompson^, Rachael Goetze*, Kylie Outhwaite^ and Paul Mackey*



Environmental Officer Rachael Goetze shows annelid worm conga line on MicroEye screen of 30+ individual worms, and close up. Interesting fact: the worms are head to bum line - eeewww, but why?

EXTENSION MATERIAL – science professionals answered these questions to extend your interest and study in their topic area

<p>WE ASKED THESE QUESTIONS ABOUT THE PATHWAY AND THE WORK...</p>	<p>How did you get into the work you do now as an environmental officer?</p>	<p>I grew up in and around the Jarrah forest as boy and always enjoyed the nature, water and the outdoors. After finishing school I worked in the construction trade, mining, purchasing/logistics and also as a combat engineer in the Army Reserve. A family mentor encouraged me to undertake tertiary study and recommended environmental science as a burgeoning area. So I enrolled in a Bachelor of Science, Environmental Management as a mature age student after 8 years' post school experience. I undertook an extra year of study and achieved a first class honours, investigating seagrass responses to light limitation.</p>
	<p>Describe a typical work day, and in your project <i>The Port as a Fish Refuge – A Joint Initiative between UWA and Southern Ports Albany?</i></p>	<p>A typical workday will include meetings, providing advice in order to assist in facilitating trade and managing port operations effectively. Matters to be managed may include regulatory approvals, emissions controls and monitoring, commercial advice and community interface.</p>
	<p>Favourite part of your work?</p>	<p>Finding practical solutions and pathways to complex challenges and opportunities. It is great to have amazing science, but the science I like to pursue is practical, applicable and delivers outcomes, and often known as applied science.</p>
	<p>Best way to deal with less exciting parts of your job?</p>	<p>The administrative tasks seem to be a growth area! I try and be efficient and encourage systems and processes to be scaled appropriately for our site and resourcing. There is a balance to be had, you can have a fantastic system and be busy bees, but are you delivering the results and getting the best outcome for effort?</p>

FREQUENTLY ASKED QUESTIONS in this topic/job	FAQ 1 Is ballast water a big problem for biosecurity?	Yes and no. Ballast water can be a vector for introduced marine species. However, a ballast tank is a hostile environment and there are many species that simply cannot survive that environment to pose a translocation risk to our port. Global meta-data analysis undertaken estimate that 70% of successful IMS translocations are attributed to non-trading small craft (eg. island hopping private yachts), via hull fouling. Yet these major vectors remain largely, unregulated. That is, the regulation appears inverse and disproportionate to the risk vectors.
	FAQ 2 How is ballast water managed?	Ballast water is managed under an international convention and Australia is a signatory to the convention. The Commonwealth manages incoming international vessel visits and the ballast tanks must be pumped and flushed out in deep water prior to arrival in Australian waters.
	FAQ 3 Do you monitor for introduced marine species?	Yes, Southern Ports is part of State and National award-winning program with other Western Australian ports and the Department of Primary Industries and Regional Development. The program is known as the State-Wide Array Sampling Program (SWASP) and collects settlement plates and samples from our port waters and samples them using cutting-edge genetic analysis. The program serves as an effective sentinel for early detection for our port. If any Introduced Marine Species (IMS) are detected, this early warning allows for rapid management responses and better chances of mitigating the risks.
YOUR TURN	What question could you ask them?	See also https://www.southernports.com.au/albany/environmental-faqs
LEARN MORE	Paul recommends these <i>resources</i> about introduced marine species in Western Australia:	Introduced Marine Species In Western Australia, Department of Fisheries, 2009 (PDF downloadable) http://www.fish.wa.gov.au/Search/Results.aspx?k=introduced%20marine%20species%20pdf marine pest identification guide western Australia, 2016 (PDF downloadable) http://www.fish.wa.gov.au/Search/Results.aspx?k=have%20you%20seen%20these%20marine%20pests
	Paul says this website features excellent resources about this topic:	http://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biosecurity/Pages/default.aspx

<p>DO MORE</p>	<p>A citizen science or interactive project that community can be involved in to learn more about this topic</p>	<p>PestWatch A simple and rewarding way to get involved in sustaining our marine environments is to download the free PestWatch application from the Department of Fisheries website. You can take a photo of anything that looks weird, or doesn't seem right and upload direct. A fisheries researcher will respond to your query and get in contact if it is of concern – you could be a 'marine hero'!</p> <p>http://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biosecurity/Identifying-Pests-And-Diseases/Pages/WA-PestWatch.aspx</p>
<p>INNOVATE One, Two, Three...solved!</p>	<p>One Big Problem we are trying to understand in this topic area Two innovative ways we are already trying to solve the problem THREE ideas for the problem solving wishlist that anyone could help develop</p>	<p>1 How to convey and encourage other States and countries to uptake the State-Wide Array Sampling Program (SWASP) approach to marine pest monitoring.</p> <p>2.1 Communication of outcomes and benefits of applied science: The SWASP group have submitted and won State and National awards for the program.</p> <p>2.2 Advocating at all levels for support for effective marine pest monitoring: The teams using SWASP continue to advocate and communicate the power, efficiency and rewards of implementing the program more widely, including at national and international forums.</p> <p>3 Use your vote - ask your parents, and in a few years' time when you can vote, to ask prospective members of parliament to advocate for further funding and expansion of the SWASP program to protect the broader Australian marine environment. Learn about the program, and brainstorm with a study group ways to improve it.</p>
<p>YOUR TURN</p>	<p>Using your new insights for this topic and its issues, please add another idea for the Problem Solving Wishlist. Then think of a research question to test possible solutions.</p>	<p><i>Example idea: Southern Ports Albany offers grants to community – for marine pest monitoring, brainstorm a \$500 school project to make a communication product (on-site tour, video interview, poster, multi-media article for social media or digital e-news,) that could help all students in your port community understand the problems of introduced marine species and how the SWASP is used reduced these problems.</i></p>

<p># CURRICULUM LINKS #</p>	<p># Examining factors that affect population sizes such as seasonal changes, destruction of habitats, introduced species #</p> <p>Research 3 introduced marine species that threaten the marine and coastal environment around the South Coast regions of Western Australia from Bunbury through to Esperance.</p> <p>How were they introduced, and what is their main impact?</p> <p>How are we researching them, managing and limiting further distribution, and who (eg science professionals, agency managers, industry workers) is doing this work?</p> <p>Find 1 introduced marine species that is found in other sites in Australia, but not yet in Western Australia. How are we monitoring and managing to ensure it doesn't get into Western Australian ocean waters? Is it working? Why or why not?</p>
<p>FAMOUS MARINE ENVIRONMENTALISTS</p>	<p>Do some research to find two famous marine environmental influencers ?</p> <p>1 famous for marine environment work</p> <p>2 famous marine advocacy</p> <p>What are they famous for?</p> <p>How has their work changed how we view the marine environment?</p>
<p>KNOWLEDGE + IMAGINATION What would it be like?</p>	<p>You are environmental manager for a regional port facility and want to implement the State-Wide Array Sampling Program (SWASP) like the one used at Port of Albany.</p> <p>What will you as an environmental manager need to know and what other industry professionals or specialists might you work with along the way? HINT SWASP requires tasks and infrastructure in marine biology and sample collecting, genetic testing, data management and analysis, and communication of results.</p>
<p>OUR PATCH MARINE ENVIRONMENT IN THE GREAT SOUTHERN</p>	<p>1 List and briefly describe three introduced threats to marine life in the Southern Ocean off Western Australian coast that could occur as a result of port activities such as international shipping traffic and loading cargo such as grain, woodchip, fertiliser, iron ore or livestock. Threats could be from pollution, introduced species, changed water quality or others.</p> <p>2 For <u>each</u> threat</p> <p>2a describe two actions we currently are taking to reduce and manage those threats?</p> <p>2b brainstorm two new technologies or innovations we are using for even better ways to reduce and manage those threats</p>