CSIRO Marine Debris Newsletter

We have had an exciting year in the global plastics space! From presenting at the 7th International Marine Debris Conference to working with United Nations COBSEA (Coordinating Body on Seas of East Asia) to deliver training in Thailand involving participants from five different countries within the region, it has been an active several months! We're particularly excited to getting back to face to face training with partners as the world is opening up again after the early Covid-19 days.

Dear partners,

As we move forward from what we all hope was the worst of the pandemic, we wanted to check in and hope that you are all doing well after what were some of most challenging times. We hope that you and your loved ones have remained safe and sound.

After the prolonged period of not being able to travel internationally, we are pleased to share some of recent happenings with you about CSIRO's contributions to the global plastics research area worldwide. It is an exciting time with the 5.2 UNEA resolution, and we hope that our science, partnerships, and activities can contribute to the global conversation.

While we were not able to carry out face to face training during the heigh of the pandemic, we were able to focus on completing some of the work (including publications with many of you and your teams – see special issue in Sustainability). And, finally, we ran a first in person capacity building, training, and on-ground data collection efforts in July 2022 in Thailand, and we were excited to participate in our first international conference since 2019.

If you have any news or photos you would like to share, we welcome your contributions. Please email us at MarineDebrisAdmin@csiro.au.

Best wishes to all for a fruitful and productive 2023 from the Team at CSIRO!

It has been a pleasure to work with you over the past several years, and we are looking forward to developing further relationships and projects in 2023 and beyond!

Team News

7IMDC – International Marine Debris Conference

In September 2022, five members of our team presented at the 7th International Marine Debris Conference (7IMDC), held in Busan, South Korea. Lauren, Kathy, and Kelsey (a previous PhD student) were able to present in person, with Denise and Qamar presenting online. It was a hybrid conference with successful online presentations and fruitful Q&A sessions. It is exciting to see where research is going in this important area, with so much exciting work happening around the world!

This conference was a great opportunity to meet some of our current project partners face to face, as we were able to catch up with staff from PADI AWARE and Ocean Conservancy, in addition to forging new working relationships with upcoming partners from around the world, including throughout Asia, Africa, the Americas and Pacific.

Lauren Roman Presenting at the 7IMDC

Kathy Willis Presenting at the 7IMDC

Kathy Willis

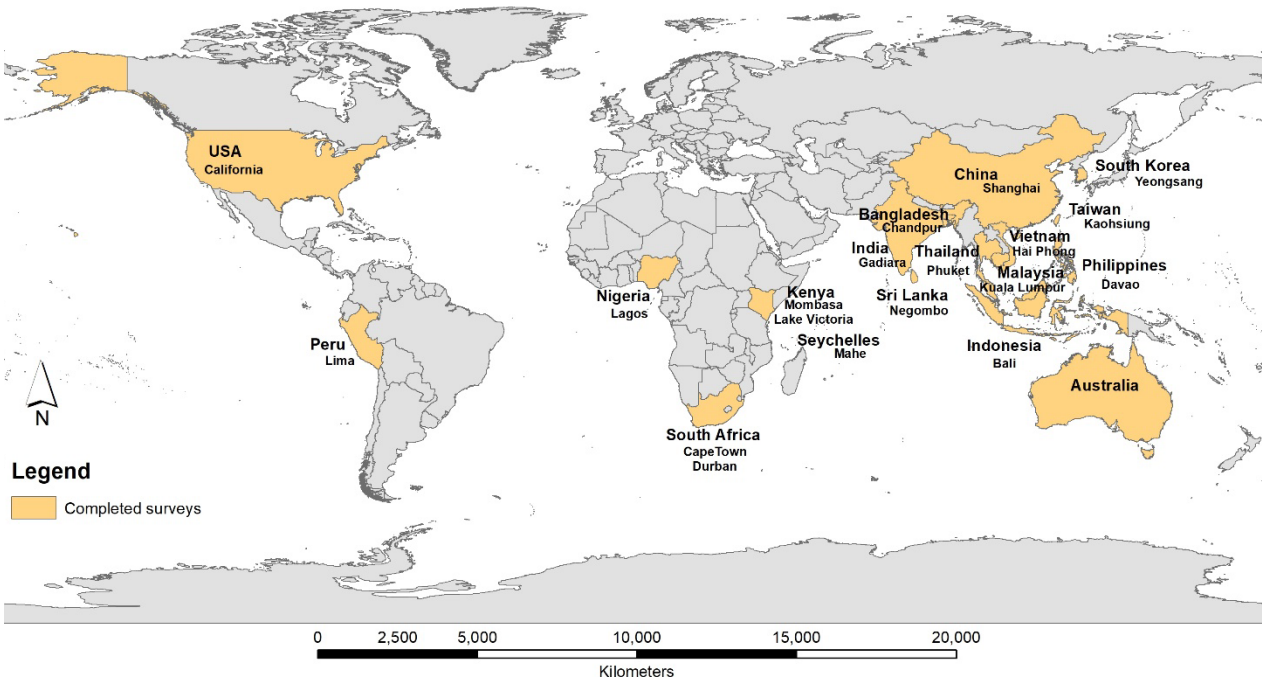
In October 2022, Kathy, a previous PhD student in our team, re-joined us as a postdoctoral research scientist at CSIRO. She has spent the last year and a half living in Seattle, USA, working with the Coastal Observation and Seabird Survey Team citizen science programme on a Fulbright Fellowship. You may see her in the coming years as she works with the team delivering training modules and working with partners on using plastic monitoring data to evaluate policy effectiveness. Welcome back Kathy! Her latest publication can be accessed here.

Training and Fieldwork

Global Plastic Leakage Project - Update

Our global plastics leakage project is going strong, and we feel very fortunate to have now partnered with organisations from around the world. Our initial goal was to carry out capacity building and baseline data collection in 5-8 countries around the world, though we have well and truly exceeded that. To date we have worked in the following countries: Australia, Bangladesh, Cambodia, mainland China, India, Indonesia, Kenya, Malaysia, Nigeria, Peru, Philippines, Seychelles, South Africa, South Korea, Sri Lanka, Taiwan, Thailand and Vietnam. This work has been supported by Oak Family Foundation, PM Angell Foundation, Schmidt Marine Technologies, UN COBSEA, the Department of Foreign Affairs and Trade and CSIRO. It could and would not happen without you!

Please let us know if you would like to learn more or to get involved! Denise.hardesty@csiro.au



Map showing countries surveyed for waste lost to the environment using the CSIRO methodology.

In July 2022, we led a two-week intensive learning workshop and field campaign in Phuket, Thailand as part of our partnership with UN COBSEA. This work was supported by the Sea Circular program and Sweden Sverige. More than 30 people from Thailand, Vietnam, Cambodia, Malaysia, and Philippines (and Australia) came together to learn skills, share stories, and collect meaningful data. In addition to our face-to-face efforts, the CSIRO team supported remote training as our country partners led the way to train even more people in their respective countries. Each participant walked away with the knowledge and skills to teach others how to conduct on-ground surveys in their respective countries. Follow up surveys have already been completed in Malaysia, Philippines, and Cambodia, with more fieldwork and training coming up in Malaysia and Vietnam. The participants were friendly and fabulous even when doing surveys in a torrential rainstorm!

Selected photos of the training and fieldwork during out trip in Thailand in July 2022.

ODK - An improved way to collect data

We are excited to share with you that the **ODK data entry portal/platform** (Link here) which works on Android devices has been launched. This is an easy-to-use app-like tool that you can use on your mobile phone or tablet. This app is free to all and means data entry takes less time and will even work if the user is offline or has no reception. Please get in touch with us if you would like to learn more about the data collection approach we are now using (denise.hardesty@csiro.au). Importantly, the app allows users to translate to local language and we will soon be uploading videos and other training materials (recorded during our latest adventures in Thailand, July 2022) directly to the platform for ease of use in the field.

Using the new ODK data entry tool to input survey data will make analysis easier.

Training Materials and Videos for Remote Learning

As everyone knows, the world has changed with Covid-19. With the global pandemic we needed to adapt how we provided training. Because of the difficulty in travel, we have started running some of our **training and capacity building courses virtually**. To better support these activities, we have also recently **updated our** handbook and we have produced some **training videos** that can assist new surveyors to learn the correct process. The training videos explain some background information, correct techniques, and go into detail about how to use our new data collection app (ODK). They are available now and we are very excited to share them! These videos were produced in partnership with the UN and COBSEA with support from Sea Circular and Sweden Sverige.

A screen grab from one of the new training videos with TJ talking about how to perform a litter survey.

Partner spotlight

CSIRO Global Plastic Leakage Project in India, Ashutosh

By Prof. (Dr) Ashutosh Mohanty

The Global Plastics Leakage Baseline Data, Ganges Delta Region, India study.

Lead by Prof (Dr.) Ashutosh Mohanty, Dean of Research and International affairs of the Madhyanchal Professional University, India, a team of 16 students and researchers had remote/virtual support from CSIRO to measure and monitor plastic waste in the environment. Over the course of 52 days, the team successfully completed 20 days inland, 18 days riverine and 14 days Coastal surveys within the Ganges Delta Region, India (the study was conducted over the 100 selected sites by CSIRO). While the study was verified with the organizations as West Bengal State Pollution Control Board and Central Pollution Control Board, New Delhi India, the industrious team learned a lot, had great success overall and look forward to upcoming publications based on this exciting project. This study was a milestone for research-based Universities/institutions in India as well as CSIRO Australia.

A few photos of fieldwork undertaken by Prof (Dr) Ashutosh Mohanty's team in the Ganges Delta Region, India.

CSIRO Global Plastic Leakage Project in Sri Lanka, Kamal

By Dr. Kamal Ranatunga

National Monitoring of Sri Lanka

After the successful completion of the first phase of the surveys in 2019 and with such a terrific baseline data set, CSIRO supported Sri Lanka to conduct a countrywide survey with 330+ sites. The countrywide survey was started while the country was badly impacted by COVID-19 and X-Press Pearl Ship incident which spilled a large amount of macro and microplastics into the coastal waters. We thought this would be a great opportunity to compare the newly acquired data with our baseline from 2019.

The surveys had to be conducted at a very difficult time with Covid-19 lockdowns and restrictions and at a time when the country was experiencing its worst economic turmoil. Also, the surveys had to be conducted in extremely challenging terrains, particularly in the highlands with very limited access by vehicles, in addition to several wildlife areas with elephants, tigers, bears, dangerous snakes, and wild buffalo. However, the very enthusiastic and dedicated team managed to keep the spirit all the way and was always prepared to overcome any challenging situations. Further, the team was testing the new CSIRO ODK collect mobile app and made several suggestions for improvements. 250 coastal, river, and inland sites have been already completed, and the team is prepared to mark the end of the island wide (Sri Lanka) survey sessions by the end of 2022.

A few photos of the fieldwork undertaken by Dr Kamal Ranatunga's team in Sri Lanka.

Project Highlights

Indo-Pacific Plastics Innovation Network (IPPIN)

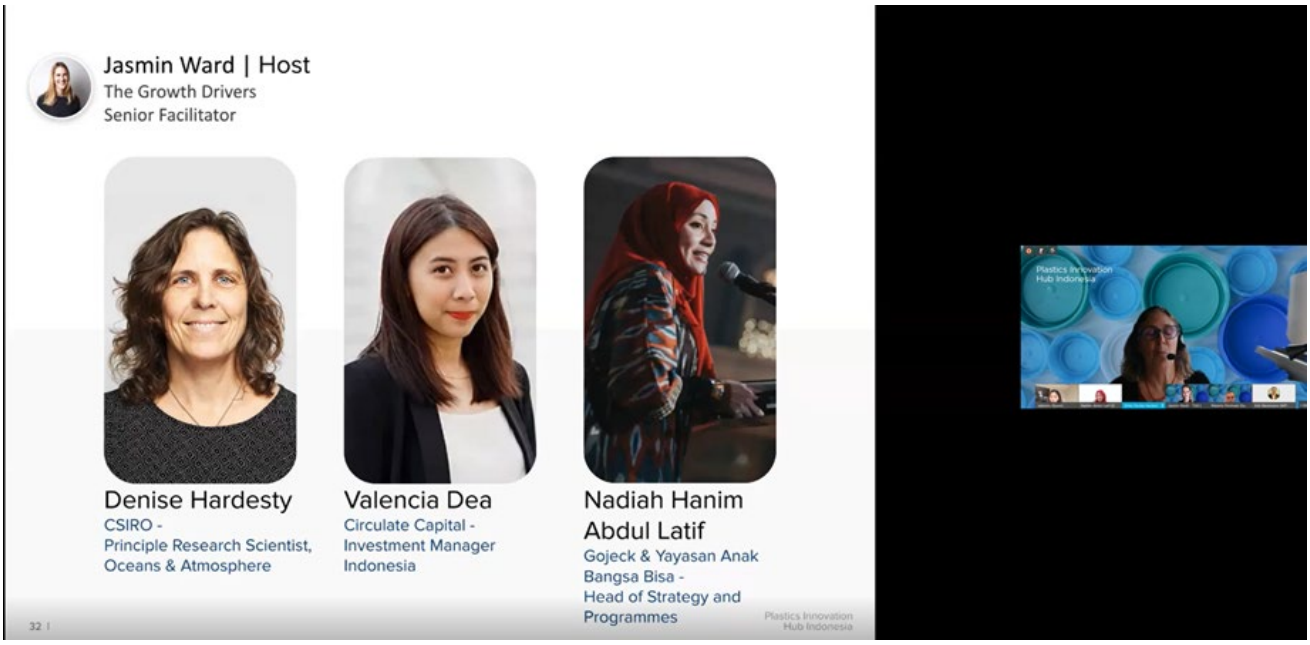
By Andrea Sosa Pintos

CSIRO's Indo-Pacific Plastics Innovation Network is partnering with Australia's Indo-Pacific partners to tackle the issue through the launch of the Plastics Innovation Hubs. The IPPIN team recently launched Hubs in Indonesia and Vietnam.

The Plastics Innovation Hub Indonesia launched in March 2022 and the Plastics Innovation Hub Vietnam (pilot) launched in June. The Hubs focuses on design and delivery of deep-tech solutions in emerging or under-resourced areas. They are initially set to target three challenge areas:

1. sustainable alternatives that outperform existing plastics
2. improving plastics and capturing value beyond first use
3. empowering decision making through reliable and accessible information.

Dr Denise Hardesty was one of the expert panellists at the Plastics Innovation Hub Indonesia launch event, sharing her views on empowering decision making through reliable and accessible information.



Denise Hardesty, panellist at the Virtual launch event for the Plastics Innovation Hub Indonesia.

Over the last few months successful teams participating in the Incubation and Accelerator programs have worked hard on designing and testing solutions to the Hub's challenge statements and presented their ideas to a live audience either at their graduation showcase and Demo Day.

Expanding on the Indonesian and Vietnam initiatives, the co-design of the Plastics Innovation Hub Mekong encompassing Thailand, Vietnam, Lao and Cambodia is currently underway. The Hub Mekong is expected to launch in March 2023, and it aims to bring together local communities and governments, researchers, business, and investors to identify, initiate, build, and grow solutions to tackle plastic waste across the region.

Some of the teams participating in programs by the Plastics Innovation Hub Indonesia.

The Indo-Pacific Plastics Innovation Network (IPPIN) has also been supporting projects led by the CSIRO Marine Debris team to conduct baselines studies of plastic leakage from land to the surrounding environment within selected core areas in Indonesia, Vietnam, Thailand Laos, and Cambodia.

This work includes capacity building workshops and completion of field surveys and data analysis for land, rivers, coastal and nearshore plastic leakage at specific localities.

Recent Papers

While we realize you can access these from our website, below are links to some of the recent peer-reviewed papers and popular articles that have been published by our team in the last several months. If for any reason you have difficulty accessing something and you would like the PDF, please send us an email and we can share a copy with you.

Popular Articles:

- Grémillet, D, BD Hardesty, HK Lotze, D Obura, D Pauly, Y-J Shin, UR Sumaila. 2021. **The oceans and COVID-19: A ten-point agenda for action**, p. 41-44. In: D. Pauly and E. Chu (eds). Marine and Freshwater Miscellanea III. Fisheries Centre Research Reports 29(1). Access here.
- Butler, R, BD Hardesty and L Roman. 17 February 2021. **Plastic in the ocean kills more threatened albatrosses than we thought.** The Conversation. Access here.

Peer Reviewed Journal Articles (2022):

- Willis, K, T Jones, R Cohen, H Burgess, J Lindsey and J Parish. 2022. **Using long-term citizen science data to distinguish zones of debris accumulation**, Mar. Poll. Bull., 182, 114028. Access here.
- Richardson, K, BD Hardesty, J Vince and C Wilcox. 2022. **Global estimates of fishing gear lost to the ocean each year**, Science Adv., 8, 41. Access here.
- Roman, L, BD Hardesty and Q Schuyler. 2022**. A systematic review and risk matrix of plastic litter impacts on aquatic wildlife: A case study of the Mekong and Ganges River Basins**, Sci. of The Tot. Env., 843. Access here.

- Velis, CA, BD Hardesty, JW Cottom and C Wilcox. 2022. **Enabling the informal sector to prevent plastic pollution and deliver an inclusive circular economy**, Env. Sci. and Pol. 138, 20-25. Access here.
- Hardesty, BD, K Willis and J Vince. 2022. **An imperative to focus the plastic pollution problem on placed-based solutions**, Front. in Sust. Access here.
- Compa, M, C Wilcox, BD Hardesty, C Alomar, D March and S Deudero. 2022. **Quantifying the risk of plastic ingestion by ichthyofauna in the Balearic Islands (western Mediterranean Sea)**, Mar. Poll. Bull., 183. Access here.
- Willis, K, BD Hardesty, J Vince and C Wilcox. 2022. **Local waste management successfully reduces coastal plastic pollution,** One Earth. Access here.
- Nguyen, TTT, NH Ha, TKL Bui, KLP Nguyen, DPT Tran, HQ Nguyen, A El-Arini, Q Schuyler and TTL Nguyen. 2022. **Baseline Marine Litter Surveys along Vietnam Coasts Using Citizen Science Approach**, *Sustainability,* 14, 9:4919, Access here.
- Schuyler, Q, BD Hardesty, TJ Lawson and C Wilcox. 2022. **Environmental context and socio-economic status drive plastic pollution in Australian cities,** Env. Res. Lett., 17, 4. Access here.
- Chen, CK, J Zhang, A Bhingarde, T Matotek, J Barrett, BD Hardesty, MM Banaszack-Holl and BL Khoon. 2022. **A portable purification system for the rapid removal of microplastics from environmental samples.** Chemical Engineering Journal, 428, 132614. Access here.

Upcoming events

The team is currently getting ready for an intense season of training and fieldwork in Cambodia, Laos, Thailand, and the Philippines expanding over the next 2 months!

We will share more details on this in our next newsletter to you and our webpage here!

CSIRO Ending Plastic Waste Symposium

Register today for CSIRO's Ending Plastic Waste Symposium, 23rd and 24th May 2023 at Rydges World Square Hotel, Sydney.

Bringing together experts across research, industry, and government, hear about cutting-edge science and technologies to end plastic waste. This includes solutions to address the entire plastic supply chain, advances in plastic design and materials, information for decision-making, global initiatives, and behaviour change.

Ending Plastic Waste Book

We are thrilled to share that our Ending Plastic Waste book (formally known as the Cookbook) is in the final stages of publication and will be launched early 2023. The book highlights grassroots efforts to end plastic pollution, creating new products from 'waste' and providing information that is critical in advocating for change at governance, Manufacturing, and end-user levels. The book can be pre-ordered here.