FIG Commission 2 - Professional Education and Commission 4 -Hydrography

FIG Working Group 4.3 Mapping the Plastic

Working Group 4.3, a joint undertaking of FIG Commission 4 and the FIG Young Surveyors Network, is the global surveying profession's response to the plastic pollution of our oceans, rivers, waterways and coastlines. Its role is to provide accurate and reliable information of the magnitude of the problem at source, thereby highlighting unsustainable practices, identifying infrastructure shortcomings and informing robust land use controls with the ultimate goal of eradicating the dumping plastic waste into rivers.

The effects of plastic pollution on the Earth's oceans are well documented, potentially catastrophic and increasing exponentially year on year. The UN Environment Programme (UNEP) has calculated that only nine per cent of the nine billion tonnes of plastic produced throughout the world has been re-cycled and each year more than 8 million tonnes of plastic come to reside in our oceans. Eighty per cent of all waste in our oceans is made of plastic. Eric Solheim, Head of UN Environment, speaking at the launch of the #CleanSeas campaign argued that it was past time to tackle the plastic problem that blights our oceans. 'We've stood by too long as the problem has gotten worse' he said, 'it must stop'. We agree.

Rivers have been identified as a significant contributor to, and enabler of, the plastic pollution problem affecting our oceans. Plastic litter is predominantly concentrated on banks, coastal beaches and in the upper limits of surface water bodies. UNEP estimates that just ten major river systems carry more than 80% of the plastic waste that ends up in the Earth's oceans. Much of the available information relating to the scale of the plastic pollution problem is based on relatively crude modelling. The lack of a means of comprehensive analysis of the spatial and temporal extent and quantum of plastic waste at a specific site, or on a regional or global level and the tools for ongoing monitoring represents a significant obstacle to addressing and eradicating plastic waste from waterways and ultimately the oceans.

Remote sensing data from satellites, airborne platforms and UAV's available in different spatial, spectral and temporal resolutions has the potential to provide long-term qualitative and quantitative assessment and monitoring of plastic pollution at hot spot areas. Assessment of the spatial extent and variability of plastic is possible due to the unique spectral signature of polymers in the near-infrared part of the electromagnetic spectrum. Research by members of Working Group 4.3 at universities in Bosnia and Hezegovina and Serbia has resulted in the development of algorithms to distinguish plastics from surrounding litter/debris classes using remote sensing techniques that enable identification of plastic debris in water down to 1 cm2 in area.

Cooperation

The (anti) plastics 'movement' world-wide is dynamic, motivated, very concerned well informed and growing rapidly. The problem is huge, if not overwhelming, and one of the things we have learned is that forming alliances with groups within the plastics movement is the most effective way of directly influencing positive outcomes. It also us to understand where and how we can contribute most effectively.

The 2019 FIG Working Week in Hanoi, Vietnam was an opportunity to form a relationship with GreenHub- a young, dynamic and green Vietnamese NGO, and Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) who are doing great work in the plastics field including a large plastic survey along the coastline near Hanoi and attendees were fortunate that these organizations were able to present the results of their survey at the Mapping the Plastic session at the Hanoi Working Week.

Unfortunately, Covid 19 has curtailed much our work this year but work to date involves

- A very well received technical session at the 2019 Working Week in Hanoi
- Chair Simon Ironside presented a paper at the KL GeoHydro 2019 conference in Kuala Lumpur in November 2019
- WG 4.3/LINZ hosted a successful Mapping the Plastic workshop in Wellington, New Zealand in December 2019 in conjunction with the Aotearoa Plastic Pollution Alliance (APPA)
- WG4.3/S+SNZ HPS involvement with the NZ Marine Geospatial Information Working Group has resulted in plastic waste being added as a database input of the national MGI inventory
- Chair Simon Ironside has published Mapping the Plastic articles in Geoconnexion and Survey & Spatial New Zealand in December 2019 and January 2020 respectively
- The peer-reviewed article *A Deep Learning Model for Automatic Plastic Mapping Using Unmanned Aerial Vehicle (UAV) Data* by WG 4.3 members Gordana Jakovljevic , Miro Govedarica and Flor Alvarez-Taboada was published in Remote Sensing magazine (2020, 12, 1515), May 2020.
- WG 4.3 was invited to submit a proposal to the World Bank in May 2020 for a pilot study of plastic pollution assessment using UAV/remote sensing techniques in Vietnam. Although unsuccessful we are discussing collaboration and data processing with the successful applicants. Covid-19 will likely affect this project.

Simon Ironside
WG 4.3 Chair

Commission 2 Professional Education

With the transfer of the FIG Working Week in June 2020 to a virtual event, there has been minimal activity for Commission 2 – Professional Education reporting. The next Working Week is scheduled for 21-25 June 2021 in Utrecht, Netherland.