Microplastics in Industrialised Catchments

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Today we will discuss ….

- Microplastics in the environment
- Barker Inlet Wetlands
- Industrialised catchment
- Citizen science approach (AUSMAP)
- Complex management response

Photo credit: AUSMAP

What are microplastics?

- Small pieces of plastic less than 5mm in length
- Sources can include:
  - Resin pellets for plastics manufacturing
  - Microbeads used in health and beauty products
  - Larger plastic pieces that have broken apart

Photo credit: AUSMAP

Why are microplastics a problem?

PORT ADELAIDE ENFIELD

- Most prevalent type of marine debris found in our oceans and waterways
- Impacts on phytoplankton, zooplankton, fish and large marine organisms
- Can be mistaken for food
- Found in marine organisms consumed by humans

Photo credit: Dan Clark/USFWS/AP

Barker Inlet Wetlands

- Constructed in 1994-98 to:
  - Improve water quality before discharge to sea
  - Habitat provision
  - Stormwater retention and flood control
- Area = 172 hectares
- Maximum water capacity = 1,200 megalitres
- More recently – wildlife regeneration

Photo credits: Port Environment Centre

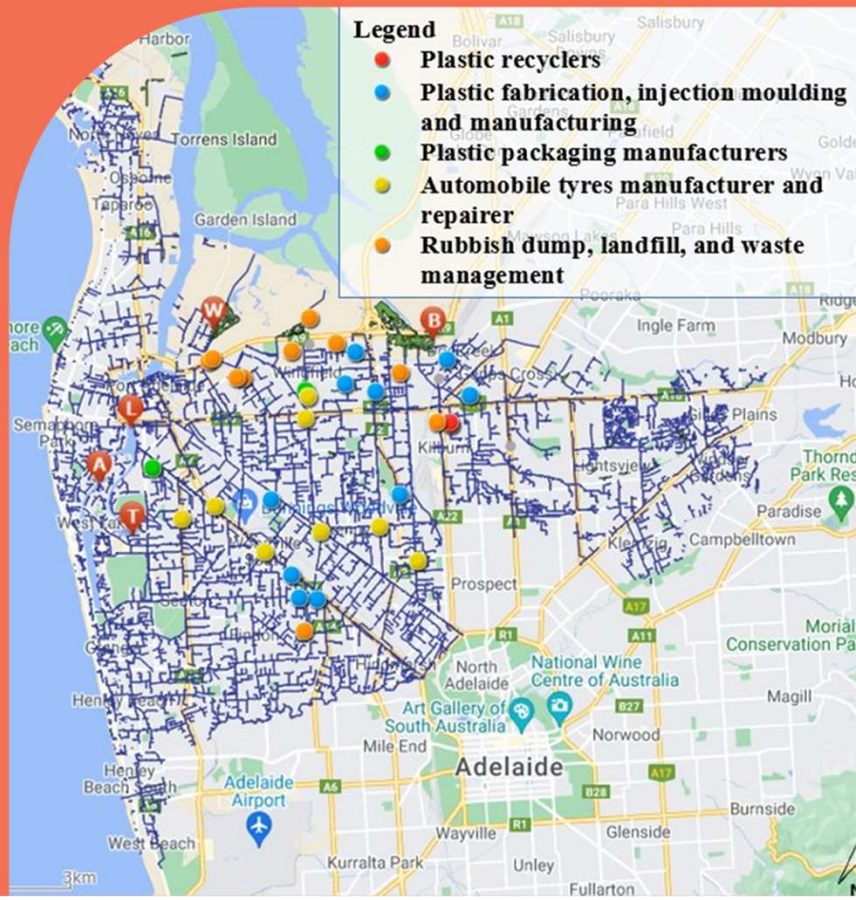
Barker Inlet Wetlands

- Largest interconnected constructed wetland system in Australia
- Part of a larger system that includes:
  - Barker Inlet – St Kilda Aquatic Reserve
  - Torrens Island Conservation Park
  - Adelaide Dolphin Sanctuary
  - Adelaide International Bird Sanctuary
  - Gulf St Vincent Important Bird Area
  - St Kilda – Chapman Creek Aquatic Reserve

Map credit: Estuary Care Foundation

Industrialised catchment

- 45 km² catchment area
- Predominant landuse is industrial
- ~30 plastic fabrication, recycling or granulating industries located in PAE
- Stormwater enters the wetlands via four stormwater drains
- Build up of microplastics at end of system



Map credit: AUSMAP

AUSMAP Citizen Science Project

- Bridge between a massive problem and solutions
- Project leaders – Total Environment Centre and Macquarie University
- Local support through Port Environment Centre
- Grant funding from City of PAE
- Citizen Science approach: 1,000s of volunteer hours sorting microplastics from wet and dry organic matter
- Source identification for collected microplastics
- Information exchange with City of Calgary (Canada)

Dr Michelle Blewitt
Program Director

Photo credits: AUSMAP

Monitoring results – Barker Inlet

- Extreme loads of microplastics found in Barker Inlet Wetlands
- Entering wetlands via stormwater system
- More than 750,000 pieces per square meter
- Visible throughout the site

Photo credit: AUSMAP

Source identification

- Monitoring at both ends of stormwater pipes and street level litter traps to identify pollutant transport pathways
- Monitoring of macro and micro debris loads in stormwater drain networks – tracking back to source
- End-of-pipe nets at stormwater outlets in key locations to capture during high-flow stormwater events (mixed results)
- Analysis of these samples showed that they were dominated by industrial pellets and hard fragments, referred to as ‘shards’ - from industrial processing of larger plastic items.
- These excessive loads indicate significant, and ongoing, mismanagement of plastics in the upper catchment areas.

Source identification

Barker Inlet South:
Blue lines = Stormwater network
Blue dots = Stormwater drains

Photo credits: AUSMAP

Stormwater drain traps

- 5 microplastic stormwater Drain Buddies
- Located in Kilburn for past 28 months
- Quarterly visual inspections
- AUSMAP education and awareness activities with adjacent industries
- EPA compliance measures undertaken to influence behaviour change

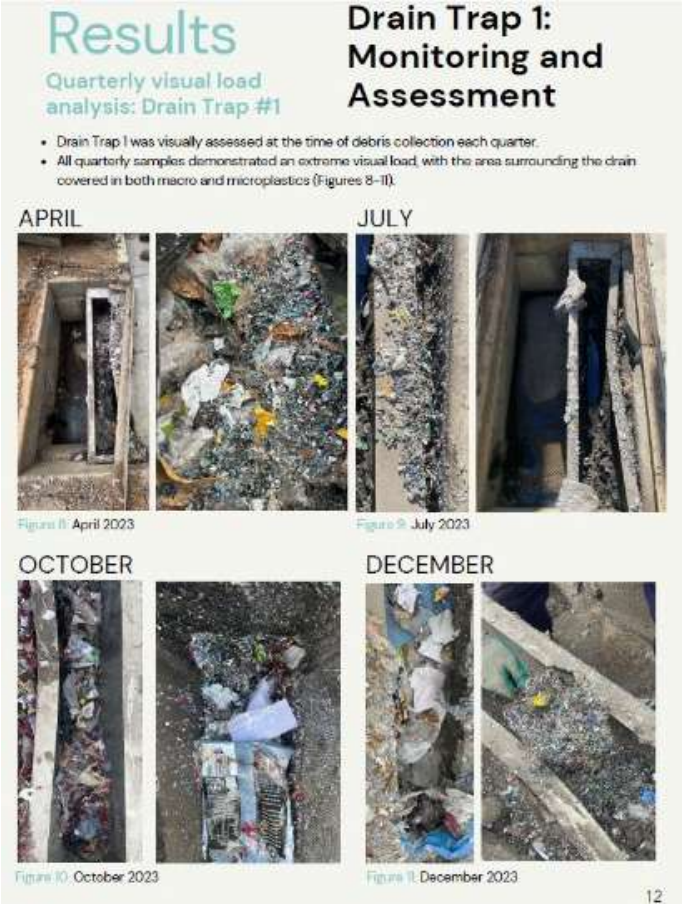
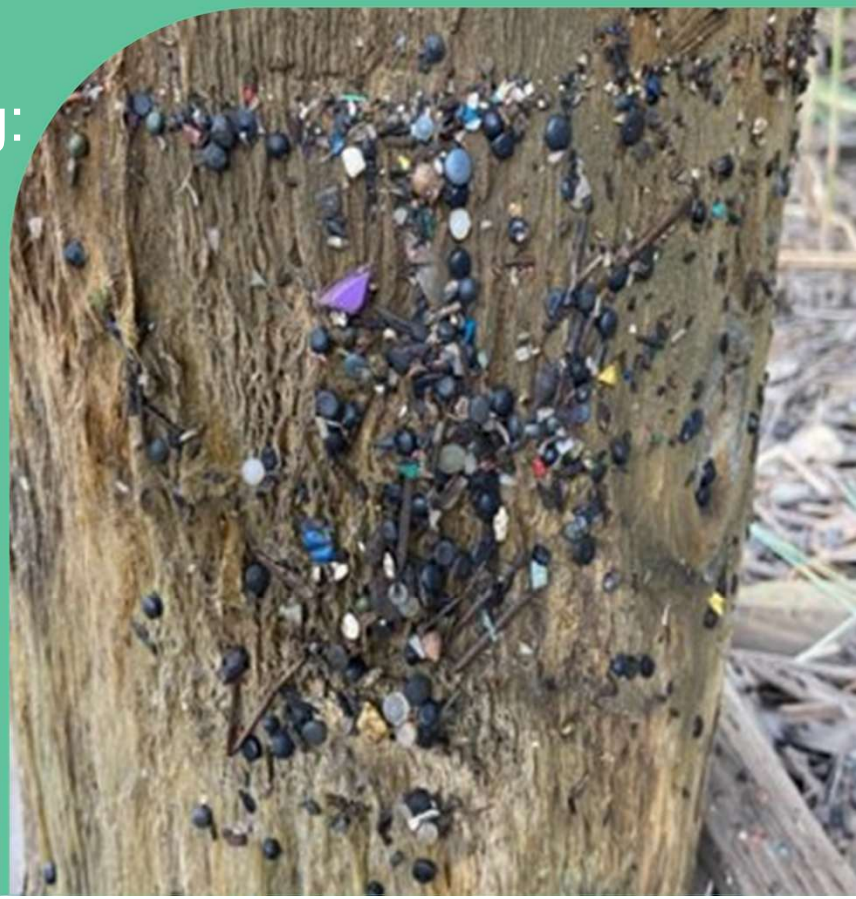


Image credit: AUSMAP

Management complexity

We need to work with many others including:

- Plastics industries
- AUSMAP volunteers
- Not-for-profit organisations
- Council staff from across the organisation
- Adjoining Councils
- State Government Agencies



Thank you

Questions?

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