



LIVING LANDS, COASTS AND SEAS

Advancing marine research and discovery at Curtin

Ecotoxicology

The Curtin Ecotoxicology group aims at measuring the impacts of urban and industrial pollution on aquatic environments. Research programs investigate a) lethal levels of anthropogenic pollutants on aquatic invertebrates and vertebrates, and b) sub-lethal impacts of pollution by the quantification of biochemical markers (biomarkers) of health on exposed organisms.

Biomarkers include detoxification systems, DNA damage, metabolite measurements, organ integrity, histopathology as well as several molecular techniques informing on the biologically relevant effects of contamination on aquatic organisms. By measuring parameters from molecular markers through to whole animal and population levels under laboratory conditions and in the field, we are able to characterise the toxic pathways and fate of contamination in aquatic environments. Issues specific to urban environments such as the impacts of used domestic water treatments or urban runoff on receiving waterways are addressed.

Of special interest to the group are the chronic impacts of oil spills on commercial fisheries. We are significantly contributing to the long-term investigations of the 2009 Montara oil spill by evaluating the impacts and subsequent recovery of fish exposed to the accidental hydrocarbon release. Such investigation is complemented by parallel projects on the environmental impacts of various oil spill remediation techniques, as well as the influence of contamination by petroleum hydrocarbon in urban waterways.

The biochemical and molecular techniques developed by the Ecotoxicology group are also applied to environmental management of mining seepages, or to accidental discharges of chemicals into aquatic environments. We recognise the importance of understanding impacts on locally and regionally relevant species and work with commercial laboratories to develop toxicity profiles in resident species likely to be impacted by particular stressors.

The group also contributes to the characterisation of the effects of ocean acidification by investigating acute (larval mortality) and chronic (reproductive, behavioural and physiological) impacts.

Equipment and support

The Ecotoxicology group conducts both field and laboratory work. Specialised field equipment such as bomb samplers, dry cryogenic dewars, sterile biopsy collection tools and stainless steel dissection table are items utilised by the group to insure high quality work free of cross-contamination. For laboratory experimentation, the group has access to world-class facilities including freshwater and saline tanks for experimental research to investigate how environmental factors, pollutants and contaminants potentially affect aquatic biota. Laboratory research is conducted in the Curtin Aquatic Research Laboratories, supported by a full-time facilities manager with extensive experience with husbandry of aquatic organisms.

Our field and laboratory set up is complemented by specialised instrumentation including:

- cryogenic long-term storage freezers
- high throughput assay systems (e.g., microwell ELISA)
- UV/Vis spectrophotometers with kinetic capabilities
- fluorescence spectrometers
- qPCR and gel imagery systems for RNA analysis.

Funding, grants and students

Since its creation, the Ecotoxicology group at Curtin has been solving environmental concerns for various industries of the resource sector, and for numerous environmental management organisations. Over \$2M has been generated in research and consultancies over the past decade, with 50+ published research articles to which a significant cohort of graduate students have contributed.

Staff

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