Environmental impact assessment and contaminants research

CSIRO provides a specialist capability and research-based solutions to industry and government on contaminant issues both within Australia and internationally.

The CSIRO Centre for Environmental Contaminants Research (CECR) is the largest contaminants research group in Australia. It has NATA-accreditation (for ultratrace dissolved metal and metal speciation analyses) and laboratories certified by the Department of Agriculture, Fisheries and Forestry, Biosecurity (DAFF Biosecurity) for its highly proficient specialist capabilities that are applied to assessing the potential impacts of contaminants in marine, aquatic and terrestrial environments.

CECR provides a specialist expertise in:

- baseline sampling and analysis for contaminants, particularly metals and metalloids at ultratrace concentrations (including methyl mercury)
- speciation and bioavailability assessments of contaminants in waters and sediments (including targeted extractions, column tests)
- water and sediment quality
- ecotoxicology and risk-based approaches for assessing contaminant impacts on ecosystems
- risk assessment of chemicals
- linking biogeochemical processes from the molecular level through to landscape-scale transformations of elements and anthropogenic compounds
- development of environmental guidelines for contaminants in waters and sediments.

CSIRO's accredited analytical laboratories

NATA
WORLD RECOGNISED ACCREDITATION

Quarantine Approved Premises (QAPs)

This expert capability has been applied in a wide range of studies both within Australia and internationally within the Asia-Pacific region, particularly in relation to baseline assessment and due-diligence monitoring for proposed or operating industries. Frequently this is to characterise the fate and transport of environmental contaminants in landscapes and water bodies, and to measure and predict ecotoxicological effects of contaminants on biota in complex aquatic and terrestrial ecosystems. When required, it mobilises its capability in response to national emergencies and urgent government and industry needs, such as assessing downstream impacts or metal mining and oil and gas production (onshore and offshore), and including characterising major chemical spills for industry, assessing produced formation waters and providing expert advice to formal inquiries.

The multidisciplinary and integrated approaches applied are underpinned by quantitative treatment of contaminant source and environmental fate as well as skills to assess effects and deliver decisions for risk mitigation and management. The CECR has a range of strengths that strongly underpin the science-based research we provide to industries, including:

- **Aquatic chemistry and ecotoxicology**: covers water and sediment quality issues in both freshwater and marine environments. We possess state of the art analytical and ecotoxicological test facilities and investigate the speciation, bioavailability and toxicity of contaminants in aquatic systems. We maintain and develop Australia's foremost capability in algal ecotoxicology, and whole-sediment ecotoxicology that encompasses toxicity tests with sub-lethal endpoints such as growth and reproduction in fresh and marine systems. Our unique capability in research underpins the development of new water and sediment quality guidelines. Much of our activities are directed towards assessing the impacts of industrial operations and coastal development activities on coastal ecosystems.
- **Molecular toxicology and environmental omics**: applies the latest biomarker, RNA and DNA based molecular techniques to conduct mechanistic studies, ecotoxicological investigations and biodiversity assessment of aquatic ecosystems. We determine how RNA and DNA signatures can be used to assess ecosystem and organism health.

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