

Research Portfolio

We have been working on the ecology of rivers, floodplains and wetlands since 1986. Some of our more recent studies include:

- Nutrient dynamics in rivers, water storages and wetlands.
- Acidification events following drying in inland wetlands and the distribution of acid sulfate soils in wetlands of the Murray-Darling Basin.
- Impact of stock grazing on floodplain soil health.
- Effects of salinisation on the ecology of wetlands including biogeochemical cycling of nutrients, and shifts in bacterial, plant and animal communities in these wetlands.
- Understanding the ways that flow affects primary production (algae, aquatic macrophytes and riparian vegetation), heterotrophic production (decomposition) and consumption of the resultant organic material function in lowland rivers.
- Effects of environmental flows on native fish recruitment in lowland rivers.
- Determining the exchange of material, energy and nutrients between lowland rivers and their floodplains.
- Modelling Carbon export from forested floodplain and wetlands predicting the likelihood of blackwater events downstream.
- Understanding the impacts of drying on biogeochemical cycling and microbial community structure in sediments.
- Effects of salinisation on plant and animal communities in wetlands.
- Development of scientifically rigorous monitoring programs for the key MDBC's "The Living Murray" Significant Ecological Asset wetlands.

- Lindsay Island Fish Larvae, where the effects of three different flow regimes on larval fish was examined and conceptual models developed.
- Effects of grazing on water quality in Lake Hume.
- Water Quality studies on Lakes Mulwala and Hume.
- Online guide to the identification and ecology of Australian Freshwater Invertebrates.
- Development of a conceptual model for the drivers responsible for blue-green algal blooms in Lake Hume.
- Impacts of managed flows on fish spawning and recruitment.
- Review of QA and QC in the Sustainable Rivers Audit (macroinvertebrate and fish themes).
- Development of a willow removal monitoring program.
- Environmental Reviews of Wyangala Dam upgrade and Lower Balonne Scoping study.
- Exchange of organic material between the Murray River Channel and Barmah Forest during the 2005 floodplain watering.
- Linking sediment dynamics, riparian vegetation and aquatic ecology in the Ovens River.

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21 Years of Research in the Murray-Darling Basin



The MDFRC is an unincorporated joint venture between CSIRO, the Murray-Darling Basin Commission and La Trobe University.

Additional investment is provided by the Australian Government through the Department of Agriculture, Fisheries and Forestry

History

The Murray-Darling Freshwater Research Centre (MDFRC) has been established for 21 years in the Albury-Wodonga region and in Mildura for 11 years. MDFRC is an unincorporated joint venture between CSIRO, the Murray-Darling Basin Commission and La Trobe University (the Centre Members). In November 2006 the Centre Members entered into an agreement and established MDFRC Pty Limited, and they have appointed the Company as their agent to carry out management functions related to MDFRC.

MDFRC employees over 30 scientific and support staff at two regional laboratories strategically located along the River Murray, at Albury-Wodonga and Mildura.

Dr David Mitchell was the inaugural Director of MDFRC from 1986 to 1993, followed by Dr Terry Hillman from 1993 to 2001. Since 2002, the MDFRC has been under the directorship of Dr Ben Gawne. Three Officers-in-Charge have operated the Lower Basin Laboratory in Mildura – Dr Ben Gawne from 1996 to 2002, Dr Shaun Meredith from 2002 to 2006 and Dr Todd Wallace since September 2006.

Vision

MDFRC's Vision Statement is: *Healthy productive aquatic ecosystems in the Murray-Darling Basin that are managed in a sustainable manner.*

Mission

The mission of the MDFRC is the delivery of knowledge to underpin sustainable adaptive management of water and associated environmental resources of the Murray-Darling Basin. We do this through the generation, synthesis and communication of excellent scientific knowledge.

Expertise

MDFRC has within its structure:

- An established NATA (National Association of Testing Authorities) accredited chemical laboratory.
- An invertebrate taxonomy voucher collection housing approximately 2,500 invertebrate species.
- An interactive guide and resources for the identification and ecology of Australian freshwater invertebrates (located on the MDFRC website).
- A microbiological laboratory (equipped for the enumeration and identification of bacteria using both traditional and molecular techniques) in aquatic ecosystems and waste treatment plants.
- MDFRC also possesses current sampling equipment for aquatic ecosystems (including an electro-fishing boat).

We are widely recognised for our ability and commitment to the provision of independent knowledge to underpin the management of our freshwater resources.

These laboratories enable MDFRC to maintain an active research presence throughout the Murray-Darling Basin and to undertake comparative research across the summer and winter rainfall systems.

The Centre has expertise in:

- Assessing and monitoring environmental flow requirements for Australian inland rivers.
- Designing and implementing long-term biological and chemical monitoring programs for rivers, wetlands and reservoirs.

- The taxonomy and identification of aquatic macro- and microinvertebrates routinely used in monitoring programs.
- Collation and interpretation of biological and water quality monitoring data.
- Assessing habitat requirements for aquatic organisms.
- Assessing water quality in freshwater ecosystems, including nutrient dynamics.
- Fish biology and ecology.
- The management of nuisance algal blooms, and algal physiology.
- Microbial ecology (including the enumeration and identification of bacteria) in aquatic ecosystems and waste treatment plants.
- Routine analysis of water quality parameters (including nutrients, carbon, metals, *E. coli* and total coliforms).

Communication and Education

The MDFC is committed to the synthesis and communication of knowledge to the community and natural resource managers in order to support sustainable management of aquatic resources.

Twenty six PhD students from seven Universities have undertaken their doctoral research through MDFRC, with an additional 22 Honours or Masters students having studied at MDFRC.

Over 380 students across the Murray-Darling Basin have participated in the *Rotary Murray-Darling School of Freshwater Research* held in Albury-Wodonga, and an additional 320 students have taken part in the *Health of the River System Youth Forum* held in Mildura. In addition, MDFRC has placed 46 work experience, practical and industry placements, and 47 summer scholarship students since 1986.