

WATR7100 - Catchment and aquatic ecosystem health

Integration module

Module description

This module provides participants with an in-depth understanding of the issues and challenges relating to the sustainable management of aquatic ecosystems. The study of aquatic ecosystem health is a relatively new field that brings together biophysical understandings of how natural systems function with societal goals and human values. A major challenge for society is to satisfy the growing demands for water without degrading aquatic ecosystems and the ecological goods and services they provide. The module focuses on three key components:

- An understanding of hydrological regimes and the basic principles relating to hydrology to aquatic ecosystems and the condition of aquatic environments.
- Theory and methodology behind the assessment of aquatic ecosystem health, including the development and validation of cost-effective techniques for the ecological assessment of river health.
- Principles and practical tools for implementing riparian restoration projects across a range of aquatic ecosystems.

Module introduction

The aim of this module is to take a whole-of-water-cycle approach to ecosystem health and catchment management. Participants gain an understanding of catchment management including hydrology, riparian restoration and ecosystem health through the lens of a real-world case study in Cairns.

Throughout the module there is an emphasis on the whole-of-water-cycle and adaptive management approaches. Participants are exposed to both the theoretical and practical components of the module content, they participate in a field trip which includes a hands-on discussion of management issues with stakeholders, along with the measurement of ecosystem health and an exploration of the outcomes of management actions like riparian restoration.

Module delivery

- **Full-time** (on-campus) students, including international students, are required to enrol in the internal offering in Semester 2. The majority of this module takes place during an intensive 10-day field trip to Cairns, Queensland at the beginning of Semester 2.
- **Part-time** (external) students are required to enrol in this module in Semester 2. They are also required to attend the 10-day field trip to Cairns, Queensland where the majority of this module is delivered.

Assumed background

The following modules are prerequisites for this module: 'New perspectives on project management' and 'Science of water'.

Learning objectives

After successfully completing this module participants are able to:

- Describe basic hydrology of catchments, and physical processes within catchments. An understanding of basic catchment hydrology is important in understanding water quality, linkages between the terrestrial and aquatic environment, the influence of land-use change on aquatic systems, reservoir function and water treatment needs and environmental flows;
- Have a basic understanding of the concepts and practices of ecosystem health;
- Have an improved understanding of stakeholder concerns in a complex, real-world setting, including understanding different perspectives and attaining balance in decision-making;
- Understand the concepts behind riparian restoration in relation to whole of catchment management;
- Have improved (1) their ability to manage their own study and (2) their ability to work effectively in teams including the ability of the student to: reflect on own learning and improve study approaches on the basis of this learning; work in a team to solve a large complex problem and communicate the solution effectively; and identify and overcome issues/problems in a team to make the team result better than the sum of the individuals;



- Participate successfully in an integrated group project exploring detailed aspects of integrated water management;
- Participate successfully in an individual project that integrates the knowledge obtained from the core classes;
- Demonstrate the use of personal reflection and social learning to improve their own ability, and their ability as part of a team, to analyse and explore integrated solutions to practical water planning and management problems exemplified in case studies presented in this module;
- Show how relevant theories, integration tools and decision support systems presented in this module can inform the analysis of case studies and help to identify practical, integrated solutions to water planning and management problems.

Teaching staff

Lead Lecturer: [Dr Wade Hadwen](#) (Australian Rivers Institute, Griffith University)

Problem-Based Learning (PBL) projects

The majority of this module takes place during an intensive 10-day field trip to Cairns, Queensland at the beginning of Semester 2.

Parallel PBL projects and field trips run through the semester, comprising roughly 50% of the assessment weight. Full-time students complete two PBL projects per semester, while part-time students complete one PBL per semester.

PBL projects for the Integration semester comprise:

- **PBL3:** Integrated catchment management – developing strategies for change (*Individual project*)
- **PBL4:** Learning lessons from integrated water management in practice (*Individual project*)

Field trips

Participants begin the Integration semester with a 10-day field trip to Cairns, Queensland. The cost of the trip is covered in module fees.

For a complete list of field trips that participants undertake during the Integration semester, please refer back to "Field trips" on page 7 of this syllabus or visit the [IWC website](#).



Photos: Gladstone region. Courtesy of Tourism Queensland