



**CHAPTER 4**

**ENVIRONMENTAL VALUES AND WATER QUALITY  
OBJECTIVES OF THE MARY RIVER AND MARINE  
RECEIVING WATERS**

## 4.1 ENVIRONMENTAL VALUES

Environmental Values (EV's) are defined in ANZECC Guidelines as “the particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and that require protection from the effects of pollution, waste discharges and deposits. Several environmental values may be designated for a specific waterbody”

The process of establishing EV's and Water Quality Objectives (WQO's) is a foundational activity for preparing a WQIP, which is done in accordance with Environmental Protection Policies (EPP Water) under the *Environmental Protection Act 1994* (section 1.4 of this report) as part of the NWQMS (section 1.2 of this report). The purpose of the EPP (water) is to provide a framework for:

- identifying EV's for Queensland Waters
- deciding and stating water quality guidelines and objectives to enhance or protect EV's
- making consistent and equitable decisions about Queensland waters that promote efficient use of resources and best practice environmental management
- involving the community through consultation and education and promoting community responsibility.

Default EV's are stated in the EPP (Water), which apply if no EV's are specified for a water body.

Under the NWQMS and the EPP (Water) **water quality** includes the broader concept of aquatic system health (not just water chemistry) and there are parallels with other planning and legislative frameworks. For example, **management goals** in the Water Quality Management (WQM) framework are equivalent to **ecological outcomes** in the WRP framework, and **water quality objectives** are equivalent to **flow objectives**. The range of Queensland legislation relevant to WQM include:

- *Environmental Protection Act (Qld) 1994* and its associated *Environmental Protection Policy (Water) 1997* and *Amendment 2006*
- *Water Resources Act (Qld) 1989* (partly repealed, licensing component only now active)
- *Water Act 2000* replaced the *Water Resources Bill 1999*
- *Integrated Planning Act (Qld) 1997*
- *Coastal Protection and Management Act (Qld) 1995*
- *Fisheries Act (Qld) 1994*

Environmental Values and WQO's for the Burrum and Mary catchments were established in 2006, by the Queensland EPA following public consultation and review. The geographical extent of waters addressed by the Mary WQIP is broadly:

- all freshwaters and tributaries of the Mary River;

- the upper, mid and lower estuary/enclosed coastal waters of the Mary River and Susan River and tidal tributaries including Tinana Creek;
- tidal canals, constructed estuaries, marinas and boat harbours and entrance buffers;
- wetlands; and
- ground waters.

The water quality objectives are intended to achieve outcomes consistent with 3 levels of aquatic ecosystem protection (ANZECC and ARMCANZ, 2000) that were nominated by the consultation process:

- **Level 1:** High ecological/conservation value ecosystems - effectively unmodified or other highly valued systems
- **Level 2:** Slightly - moderately disturbed ecosystems - ecosystems in which aquatic biological diversity may be adversely affected to a relatively small but measurable degree by human activity
- **Level 3:** Highly disturbed ecosystems - measurably degraded ecosystems of lower ecological value

The Environmental Values for the Mary, Burrum, and adjacent receiving waters are listed in Table 1 of the Mary River Environmental Values and Water Quality Objectives Report. This report is publicly available in electronic format and can be downloaded from the Queensland EPA website: [http://www.epa.qld.gov.au/publications/p01841aa.pdf/Mary\\_River\\_environmental\\_values\\_and\\_water\\_quality\\_objectives\\_Basin\\_No\\_138\\_including\\_all\\_tributaries\\_of\\_the\\_Mary\\_River.pdf](http://www.epa.qld.gov.au/publications/p01841aa.pdf/Mary_River_environmental_values_and_water_quality_objectives_Basin_No_138_including_all_tributaries_of_the_Mary_River.pdf).

## 4.2 WATER QUALITY OBJECTIVES

Table 2 in the Mary River Environmental Values and Water Quality Objectives Report (refer to the above hyperlink) identifies physico-chemical concentrations as Water Quality Objectives needed to support the aquatic ecosystem EV for waters in the Mary Catchment. Some objectives apply to specific areas or water types (such as marinas, lower estuary and Great Sandy Strait) while others apply to more than one water type. Waters of high ecological value are assigned a higher level of protection so more stringent WQO's apply. Other waters fall into the slightly-moderately disturbed level of protection, for which correspondingly lower WQO's have been derived.

For example, in the following situation there are several human use EV's with differing WQO's for faecal coliform's (measured as median number of organisms per 100mL):

- stock watering <100 organisms per 100mL
- primary recreation (e.g. swimming) <150 organisms per 100mL
- secondary recreation (e.g. boating) <1000 organisms per 100mL

The most stringent WQO is that for stock watering (<100 organisms per 100mL) and its adoption would in turn provide faecal coliform WQO's that protect all the above-identified EV's.

Table 3 in the Mary River Environmental Values and Water Quality Objectives Report (refer to the above hyperlink) identifies the general objectives of conceptual models to support riparian needs and consequent benefits to waterway type. This approach considered differing functions of riparian areas rather than the normal approach of nominating a particular width of riparian (e.g. a default value of 25 meters), which is usually difficult to achieve because of current land use. For example to achieve a shading outcome (i.e. to limit light availability to aquatic weeds), a riparian corridor of one row of trees along banks with the correct solar aspect will suffice. To achieve a barrier to intercept nutrients entering streams from groundwater seeps (i.e. to limit nitrogen availability to aquatic weeds) 10 meters is sufficient (Rassam et al., 2008). To achieve a biodiversity corridor (i.e. to maintain ecological structure in a stretch of river) a wider riparian zone is needed.

### **4.3 ECOLOGICAL CHARACTER DESCRIPTION OF THE GREAT SANDY STRAIT RAMSAR SITE**

After completion of the Environmental Values and Water Quality Objectives report, the Queensland EPA subsequently developed an Ecological Character Description of the Great Sandy Strait Ramsar site (Mike Ronan, pers comm. Based on draft Ecological Character Description for Great Sandy Strait Ramsar site).

This report is not yet publicly available, but will be referred because it is highly relevant. Like the EV/WQO's report, it collated geological and ecological knowledge about the Great Sandy Straits and lists components and processes that support ecosystem services (the five critical components and processes are listed in chapter 2).

This site supports a regionally significant area of seagrass beds, mangrove wetlands, intertidal mud and sand banks, coral reefs and sponge gardens, and other estuarine elements that contain species at, or near to, their northern or southern geographical limits. A substantial area of non-forested peat swamp referred to as 'patterned fens' occurs within the site. These fens, together with areas of 'wallum' heath swamps, support species' adapted to the prevailing acidic water and substrate.

Fauna of significance are substantial populations of nationally and/or internationally threatened species, a population of at least 20,000 shorebirds comprising at least 20 species; substantial stocks of juvenile and adult fishes, prawns and crabs (many of which are important for commercial and/or recreational harvest), and a relatively large number of species of marine mammals, including several cetaceans.

In terms of human use, Great Sandy Strait includes sites and resources of considerable cultural significance to indigenous Australians and contains natural resources that potentially may be harvested sustainably by indigenous people for traditional purposes. The site's rich diversity and abundance of natural resources also supports a range of nature-based tourism and recreational activities.

The ECD identified the following ecosystem components and processes as deserving of management attention:

*Freshwater Wetlands:*

- Habitat Extent, Condition and Diversity
- Hydrology (surface and groundwater inputs)
- Physicochemical Components

*Estuarine & Marine Wetlands*

- Habitat Extent, Condition and Diversity
- Hydrology (freshwater flow from catchments; tidal regimes)
- Physicochemical Components (water quality)