



Tamar Estuary  
and Esk Rivers

Natural Resource Management  
in Northern Tasmania

# TAMAR ESTUARY

## 2011 REPORT CARD

### ECOSYSTEM HEALTH ASSESSMENT PROGRAM

*'Working together for healthy waterways'*



# TAMAR ESTUARY

## 2011 REPORT CARD RESULTS



EHAP study area  
Tamar Estuary Tasmania

## What do the grades mean?

Ecosystem Health Report Card Grades ('A' to 'F') are generated for five (5) zones in the Tamar Estuary. Parameters are assessed against guidelines resulting in the determination of a single grade for each zone. The Ecosystem Health Index (EHI) is a numerical representation of how often the indicators meet water quality and recreational guidelines.

- A EXCELLENT** (EHI: 0.86 – 1.00)
  - conditions meet all set ecosystem health values more than 85% of the time;
- B GOOD** (EHI: 0.70 – 0.85)
  - conditions meet all set ecosystem health values in most of the reporting region;
- C FAIR** (EHI: 0.60 – 0.69)
  - conditions meet some of the set ecosystem health values in most of the reporting region;
- D POOR** (EHI: 0.50 – 0.59)
  - conditions are unlikely to meet set ecosystem health values in most of the reporting region;
- F FAIL** (EHI: <0.50)
  - conditions meet set ecosystem health values less than 50% of the time;

**+/-** '+-' grades are included to show when there has been a minor improvement or decline in the ecosystem health of a zone.

This 2011 report card has been produced using a single year of monitoring data collected by the Tamar Estuary and Esk Rivers (TEER) Ecosystem Health Assessment Program (EHAP). The 2010 report card was based on historical data from different monitoring zones. Some caution should be used in comparing grades in the 2011 report card to the 2010 report card. Variability in rainfall and climate between reporting years may also produce differences in grades as wetter periods are generally associated with higher pollutant loads and poorer water quality.

### Comparison of combined grades

	1999 - 2009 data (2010 Report Card) 10 Year Baseline	October 2009 - September 2010 data (2011 Report Card)
ZONE 5	A-	A-
ZONE 4	B+	B+
ZONE 3	B	B+
ZONE 2	B-	B-
ZONE 1	D	D+

### ZONE 5: Mouth

**A-**

Index	2011 data	% target
Water quality	B	
Recreational	A+	

Excellent ecosystem health. Good water quality with most guidelines met. Recreational water quality is excellent, with all EHAP observations within guideline levels. System is generally well flushed and able to cope with pollutants delivered to the zone.

### ZONE 4: Mid-Lower Estuary

**B+**

Index	2011 data	% target
Water quality	B-	
Recreational	A+	

Good ecosystem health and water quality. Most water quality guidelines met, but lead exceeds the guidelines. Recreational water quality is excellent, with all EHAP observations within guideline levels. Well flushed part of the system.

### ZONE 3: Mid Estuary

**B+**

Index	2011 data	% target
Water quality	B	
Recreational	A-	

Good ecosystem health with guidelines met most of the time. Good water quality but nutrients higher and more likely to exceed guidelines in winter periods. Recreational water quality is excellent, with all EHAP observations within guideline levels.

### ZONE 2: Mid-Upper Estuary

**B-**

Index	2011 data	% target
Water quality	B-	
Recreational	B	

Good ecosystem health. Good water quality, good recreational water quality, with most EHAP observations within guideline levels, except during wetter winter months.

### ZONE 1: Upper Estuary

**D+**

Index	2011 data	% target
Water quality	D+	
Recreational	D+	

Highly degraded ecosystem health. Poor water quality due to elevated nutrient levels. Copper and lead are also above guideline levels. Poor recreational water quality, with most EHAP observations exceeding guideline levels. System is poorly flushed and impacted by the proximity to the major urban centre of Launceston, tributary inflows and nearby wastewater treatment facilities.

### TARGET KEY:



> 1.5 times target



> 1.0 - 1.5 times target



> 0.5 - 1.0 times target



< 0.5 times target



# Environmental Goals

In Tasmania, the maintenance or enhancement of waterway health is driven by environmental goals which are derived from Protected Environmental Values (PEVs). These goals were developed through a process of community consultation and identification of social, cultural/heritage, environmental and economic values. The environmental goals for the Tamar estuary are:

- Maintain/restore recreational water quality and aesthetics for primary contact (e.g. swimming, diving, surfing, water skiing).
- Protection of modified (not pristine) aquatic ecosystems: seagrass, rocky reefs, sponge gardens.
- Protection of edible fish and crustaceans for harvesting excluding shellfish except where permitted to be harvested under the *Living Marine Resources Act 1995*.



## Recreational Messages:



It is not safe to harvest and consume wild shellfish from the Tamar estuary



Check for current warnings, signs and information from councils and the Department of Health and Human Services (DHHS) regarding swimming at local swimming sites

### MAP LEGEND:



Urban areas



Monitoring sites



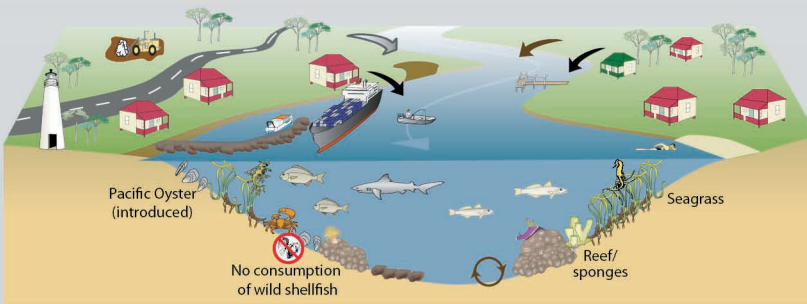
Tamar Estuary catchment boundary

# Conceptual models of the Tamar Estuary

Conceptual models are developed to illustrate key processes, habitats and management challenges in a specific environment. The conceptual models of the Tamar estuary shown below were developed to capture

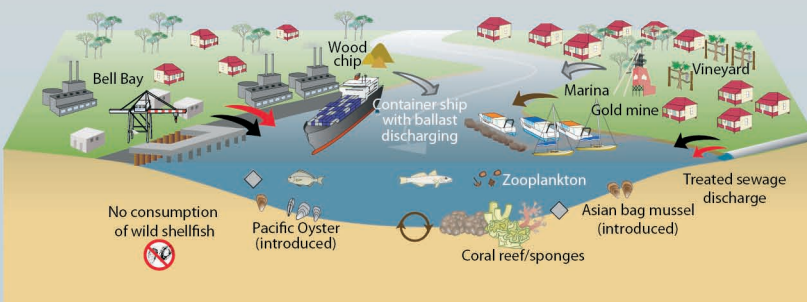
our understanding of the way in which the ecosystem functions and are designed to be updated as our understanding improves over time.

INCREASING SALINITY



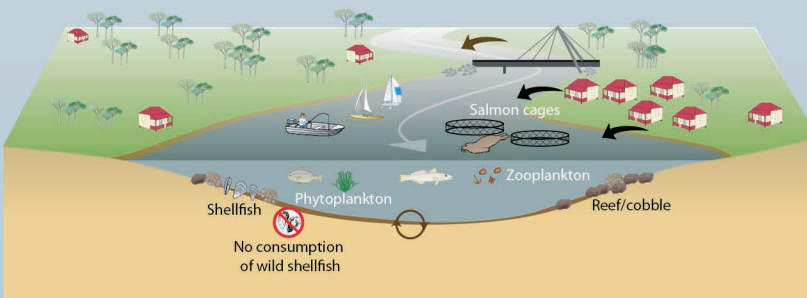
## ZONE 5: Mouth

- Catchment runoff
- Sediment/water cycling
- Stormwater discharge
- Metals input



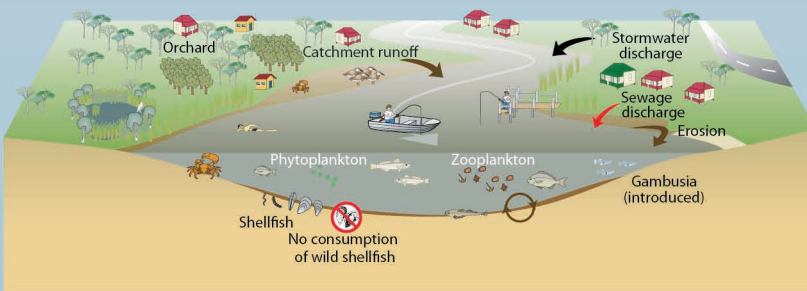
## ZONE 4: Mid-Lower Estuary

- Metals input
- Elevated metals (sediment and water)
- Sediment/water cycling
- Stormwater discharge
- Treated sewage discharge
- Catchment runoff



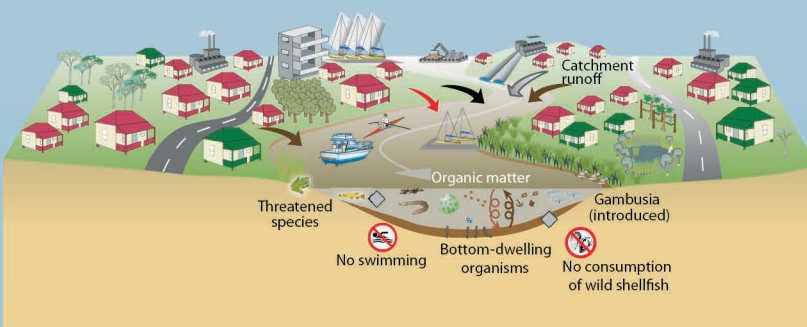
## ZONE 3: Mid Estuary

- Catchment runoff
- Sediment/water cycling
- Stormwater discharge



## ZONE 2: Mid-Upper Estuary

- Catchment runoff
- Erosion
- Sediment/water cycling
- Treated sewage discharge
- Stormwater discharge



## ZONE 1: Upper Estuary

- Elevated metals (sediment and water)
- Sediment deposition
- Sediment resuspension
- Stormwater discharge
- Treated sewage discharge
- Catchment runoff
- Metals input

# Vision for the Tamar Estuary AND ESK RIVERS SYSTEMS 2030

*‘Healthy, productive, valued and enjoyed – Our Rivers Of Life’*

## Key Messages

- The 2011 Tamar estuary report card is the first report card produced for the Tamar estuary which relies on data collected as part of the TEER Ecosystem Health Assessment Program (EHAP).
- Water quality improves as you travel along the Tamar estuary towards the ocean. This is partially due to the well flushed nature of the lower estuary and the concentration of pollutants entering the system in the more urbanised upper estuary (Zone 1) area.
- The 2011 report card grades are comparable to the 10 year base line. Results suggest that there has been no significant change in the health of the estuary.
- Wetter periods, occurring during winter months, generally correspond to poorer water quality as pollutant loads to the estuary increase during these times.
- Observations of recreational water quality were within guidelines in the lower estuary (Zones 3, 4 and 5), however exceeded guidelines on some occasions in the upper estuary (Zones 1 and 2).
- Elevated nutrient and bacteria levels are key drivers of poor grades in the upper estuary. These grades correspond to highly urbanised, high tributary input and poorly flushed areas of the estuary.
- Elevated copper and lead levels in Zone 1 and lead levels in Zone 4 are primarily due to historic mining and industrial activities, as well as urban runoff.



## Report Card

The 2011 report card uses an easy to understand grading system of ‘A’ through ‘F’ for five zones within the estuary. The grades represent the overall health of the Tamar estuary from 20 monitoring sites using data collected from October 2009 to September 2010. This has been compared to grades produced in the 2010 report card, for a baseline 10-year period from 1999 to 2009.

An EHAP Monitoring Report has also been produced to complement this report card, providing more detail on the data and methods used to produce the letter grades in the 2011 report card. The EHAP Monitoring Report will be available from the TEER website.

## Why Monitor?

It is important to monitor and understand the health of the Tamar estuary so that natural resource managers can better evaluate the condition of our waterways and target investment and on-ground works to improve waterway health.

The Ecosystem Health Assessment Program (EHAP) will also enable managers to better evaluate the effectiveness of future activities undertaken to improve waterway health such as sewage treatment plant upgrades, stormwater controls, and wastewater treatment.

## Ecosystem Health Assessment Program

The TEER Ecosystem Health Assessment Program (EHAP) for the Tamar estuary covers an area extending 70 kilometres from the Tamar yacht basin at the confluence of the North and South Esk Rivers to the mouth of the Tamar estuary at Low Head. The EHAP is a joint partnership between NRM North and monitoring partners including the Tasmanian Government, Launceston City Council, West Tamar Council, George Town Council, Meander Valley Council, University of Tasmania, Hydro Tasmania, Ben Lomond Water, BCD Resources, BHP Billiton TEMCO, Rio Tinto, Van Diemen Aquaculture, Northern Midlands Council, Environment Protection Authority and Australian Maritime College.

## Tamar Estuary and Esk Rivers (TEER) Program

The EHAP is an initiative of the Tamar Estuary and Esk Rivers (TEER) Program. The TEER was established in 2008 and is a regional partnership between the agencies responsible for management of the Tamar Estuary and Esk Rivers waterways.

The TEER Program aims to provide a coordinated management approach and guide for solutions and investment to protect, maintain and enhance the Tamar Estuary and Esk Rivers systems from ‘catchment to coast’.

A key goal is to improve our scientific understanding of the issues impacting upon the health of the TEER waterways so that we can better identify and target priority areas requiring investment in on-ground works.

The TEER Program fosters collaborative partnerships and works closely with a range of industry, community, government, research and business partners to monitor and report on waterway health as well as coordinating activities to reduce pollutants entering waterways.

## What is Ecosystem Health?

Ecosystem health is determined by the response of the environment to natural and human inputs and is defined as the degree to which the actual state of an ecosystem diverges from an ideal state as defined in management objectives. A healthy estuarine and marine ecosystem will have the following characteristics: key processes operating to maintain stable and sustainable ecosystems, zones of human impacts that do not expand or deteriorate, and aquatic ecosystems (critical habitats) which remain intact. As these characteristics are complex and difficult to measure, there are more easily measured parameters that are used to infer ecological health which have been used in the EHAP. These parameters include water quality (nutrients, pH, chlorophyll a, metals), and recreational water quality (bacteriological counts).





## Tamar Estuary and Esk Rivers

Natural Resource Management  
in Northern Tasmania

## Further Information

### TEER Program

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## Tamar Estuary and Esk Rivers Program Partners



# Methods

More details on these methods can be found in the EHAP report which is available from the TEER website.

1

Five functional zones were identified based on differences in critical habitats (e.g. seagrass, rocky reefs, wetlands), key processes (phytoplankton abundance; Chl a), human impacts (nutrient levels, e.g. total nitrogen [TN]; and metals, e.g. Zinc) and salinity within the estuary.



2

The indicators used in the 2011 report card are the same as the 2010 report card. These were determined using historical monitoring data and indicators used in other ecosystem health monitoring programs around Australia. Indicators were grouped into two categories: water quality (including metals in Zones 1 and 4 only); and recreational.

TN	Chl a
TP	DO
pH	Metals
Turb	Enterococci

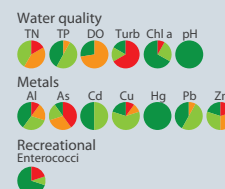
3

Data was spatially analysed and assessed against ANZECC (Australian and New Zealand Environment Conservation Council) Guidelines for Fresh and Marine Water Quality, the Tasmanian Surface Water Quality Guidelines and the Tasmanian Public Health Act Recreational Water Quality Guidelines.



4

Exceedence scores were calculated for each indicator for each category, for each of the five zones (metals only in Zones 1 and 4).



5

Ecosystem Health Index (EHI) calculated for each category in each zone by averaging indicator exceedence scores. EHI is then converted to a letter grade for each category in each zone.



6

Average of the EHIs used to generate a report card Grade for each zone. The letter grade represents the overall health of that zone.

