NRM North

Tamar Estuary and Esk Rivers

Natural Resource Management in Northern Tasmania

TAMAR ESTUARY 2012 REPORT CARD

ECOSYSTEM HEALTH ASSESSMENT PROGRAM

MONITORING PERIOD OCTOBER 2010 –SEPTEMBER 2011

'Working together for healthy waterways'

Vision for the Tamar Estuary
AND ESK RIVERS SYSTEMS 2030

'Healthy, productive, valued and enjoyed – Our Rivers Of Life'

Key Messages

- There has been no significant change in the overall ecosystem health of the Tamar estuary. Changes in grades between 2011 and 2012 are attributed to natural variation and climate influence. There has been no major land use change in the catchment during the monitoring period.
- Grades improve as you travel along the estuary towards the ocean. This is partly due to the well flushed nature of the lower estuary (Zone 5) and the higher concentration of pollutants entering the more urbanised upper estuary around the city of Launceston (Zone 1).
- The monitoring period for the 2012 report card recorded higher than average rainfall and catchment flows. Wetter periods generally correspond to poorer water quality in estuaries as pollutant loads increase during these high flow periods.

Report Card

The 2012 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 2010 to September 2011.

An EHAP Monitoring Report has also been produced to complement this report card, providing more detail on the data and methods used. The EHAP Monitoring Report is 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, Bell Bay Aluminium, 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.

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.

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
2012 REPORT CARD RESULTS

This 2012 report card has been produced using 12 months of Tamar River estuary monitoring data collected by the Tamar Estuary and Esk Rivers (TEER) Ecosystem Health Assessment Program (EHAP). Variability in climate and rainfall between reporting years may produce differences in grades as wetter periods are generally associated with higher pollutant loads and poorer water quality.

EHAP study area
Tamar Estuary Tasmania

Comparison of combined grades

	2011 Report Card (October 2009 - September 2010 data)	2012 Report Card (October 2010 - September 2011 data)
ZONE 5	A-	B+
ZONE 4	B+	B
ZONE 3	B+	B
ZONE 2	B-	B-
ZONE 1	D+	C-

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;

+/– **'+' and '–'** signs are included to indicate movement within the bands of the grade scores.

ZONE 5: Mouth — B+

Index	2010/11 data	% target
Water quality	C+	
Recreational	A+	

Good ecosystem health. Fair water quality which has been impacted by high chlorophyll-a levels, the majority of guidelines are met most of the time. Recreational water quality is excellent. This area of the estuary is very well flushed and generally able to cope with pollutants delivered to the zone.

ZONE 4: Mid-Lower Estuary — B

Index	2010/11 data	% target
Water quality	C	
Recreational	A	

Good ecosystem health but water quality has declined compared to the previous year from good to fair. High nutrients levels with nitrogen exceeding guidelines all of the time and phosphorous exceeding guidelines in wetter winter months. Copper also exceeds guidelines. Recreational water quality is excellent and is similar to the previous year.

ZONE 3: Mid Estuary — B

Index	2010/11 data	% target
Water quality	B	
Recreational	A-	

Good ecosystem health with guidelines met most of the time. Good water quality but nutrients exceed guidelines most of the time. Recreational water quality is excellent. Grades for this zone are similar to the previous year.

ZONE 2: Mid-Upper Estuary — B–

Index	2010/11 data	% target
Water quality	D	
Recreational	B+	

Good ecosystem health. Water quality has declined from the previous year from good to poor; this has been driven by higher chlorophyll-a and turbidity levels. Good recreational water quality similar to the previous year.

ZONE 1: Upper Estuary — C-

Index	2010/11 data	% target
Water quality	D	
Recreational	C	

Fair ecosystem health. Poor water quality due to elevated nutrient levels, high turbidity and increased chlorophyll-a. Lead and aluminium were above guideline levels. Although recreational water quality has improved from the previous year from poor to fair, possibly due to higher catchment inflows, zone 1 is still not suitable for primary contact. This reporting region is impacted by the proximity to the major urban centre of Launceston, tributary inflows and nearby waste water treatment facilities.

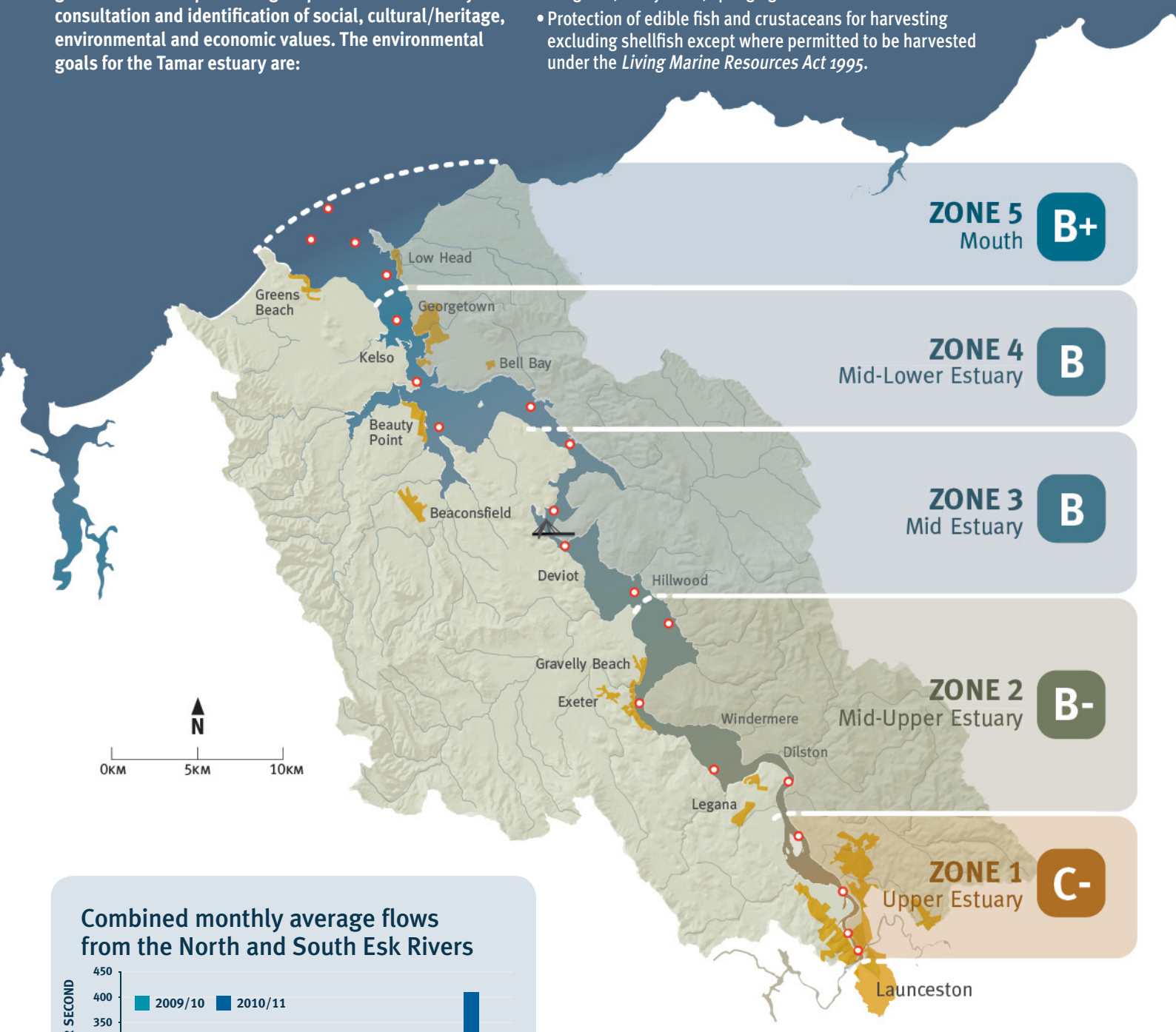
TARGET KEY:

> 1.5 times target | 1.0 - 1.5 times target | 0.5 - 1.0 times target | < 0.5 times target

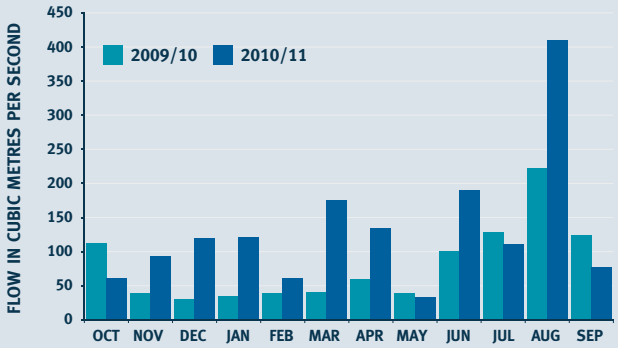
Environmental Goals

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*.



Combined monthly average flows from the North and South Esk Rivers



The above graph displays that catchment flows were significantly higher during 2010/11 compared to the previous monitoring year of 2009/10. High flows can be associated with increases in pollutant concentrations to the estuary through increased transport of available materials.

The Tamar catchment area is 10,000km² and drains 15% of Tasmania into the receiving waters of the Tamar estuary.

MAP LEGEND:

Urban areas | Monitoring sites

Recreational Messages:

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

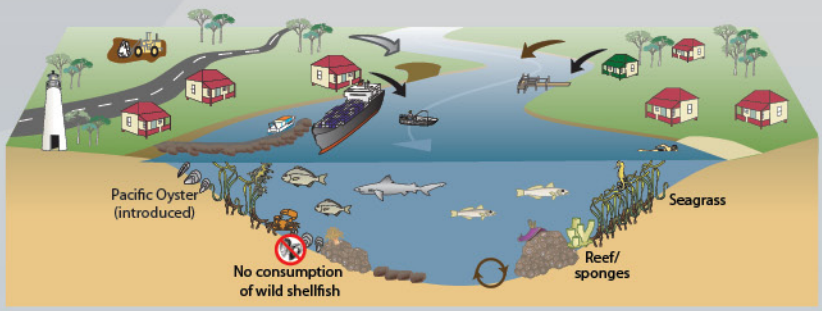
Check for current warnings, signs and information from councils and the Department of Health and Human Services (DHHS) regarding swimming at local swimming sites

It is recommended that servings of fish caught from the Tamar estuary are limited to 2-3 serves per week

Conceptual models of the Tamar Estuary

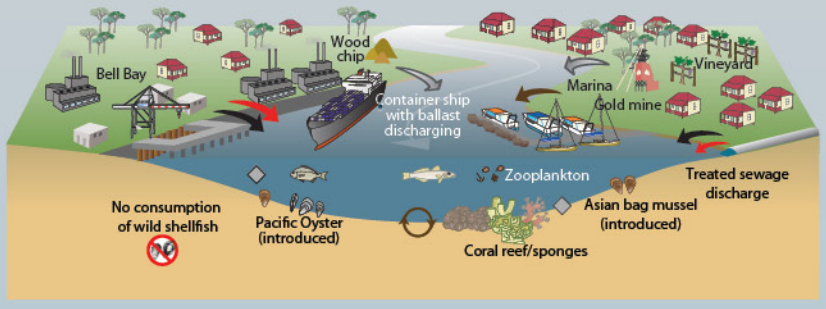
Conceptual models are developed to illustrate key processes, habitats and management challenges in a specific environment. The conceptual models of the Tamar estuary shown below were developed to capture our understanding of the way in which the ecosystem functions and are designed to be updated as our understanding improves over time.

INCREASING SALINITY



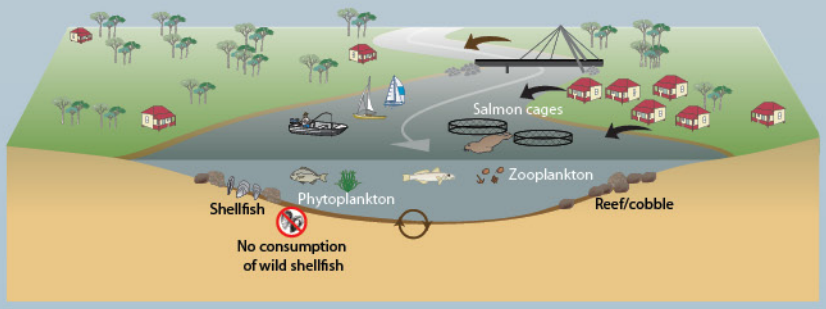
ZONE 5: Mouth

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



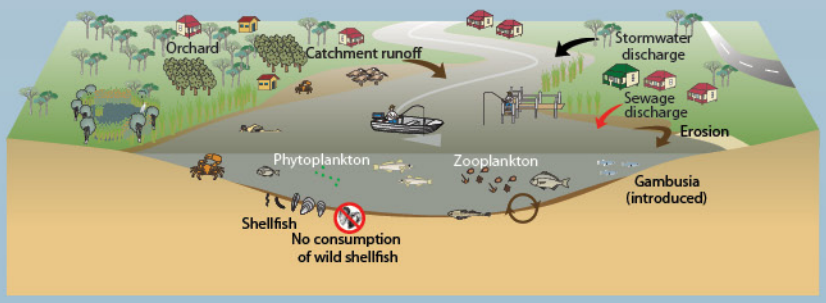
ZONE 4: Mid-Lower Estuary

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



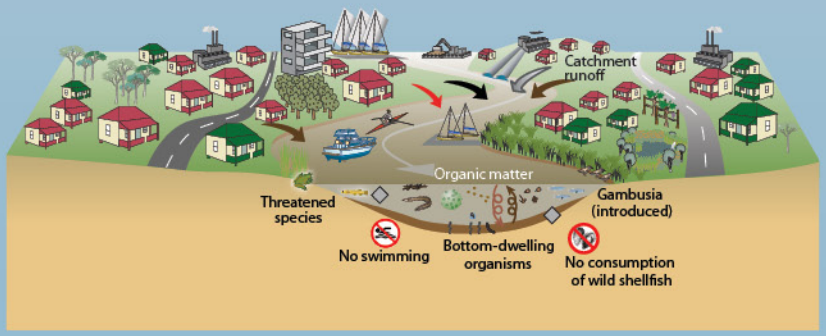
ZONE 3: Mid Estuary

- 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

NRM North

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Natural Resource Management in Northern Tasmania

Further Information

TEER Program

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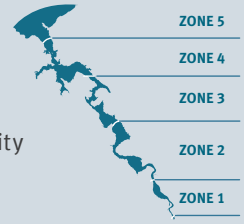
Tamar Estuary and Esk Rivers Program Partners

Methods

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

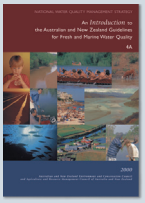
1 Five functional zones were identified based on differences in critical habitats (e.g. seagrass, rocky reefs, wetlands), key processes (phytoplankton abundance; Chl a), human impacts (nutrient levels, e.g. total nitrogen [TN]; and metals, e.g. Zinc) and salinity within the estuary.



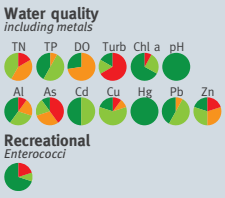
2 The indicators used in the report card were selected based on historical monitoring data and indicators used in other ecosystem health monitoring programs around Australia. Indicators were grouped into two categories: water quality (including metals in Zones 1 and 4 only); and recreational.

TN	Chl a
TP	DO
pH	Metals
Turb	Enterococci

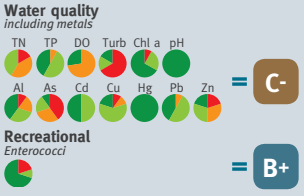
3 Data is spatially analysed and assessed against ANZECC (Australian and New Zealand Environment Conservation Council) Guidelines for Fresh and Marine Water Quality, the Tasmanian Surface Water Quality Guidelines and the Tasmanian Public Health Act Recreational Water Quality Guidelines.



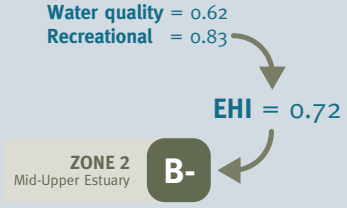
4 Exceedence scores are calculated for each indicator for each category, for each of the five zones (metals only in Zones 1 and 4).



5 An Ecosystem Health Index (EHI) is 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 The average of the EHIs are used to generate a report card Grade for each zone. The letter grade represents the overall health of that zone.



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