Extent/distribution of key habitat types

This document forms part of the Tasmanian Indicator Compendium and includes: the NRM ECM Indicator AND two Tasmanian Extensions, one for the subtidal areas and one for the intertidal and supratidal areas.

Please note that both the Indicator and the Extension need to be read in the context of the Coastal CRC Users’ Guide to estuarine, coastal and marine indicators for regional NRM monitoring (Scheltinga et al., 2004).

The Coastal CRC Users’ Guide provides both the context and the required methods for selecting and applying the Indicator, including the identification of environmental Issues and Stressors. The Indicator itself is also sourced from the Users’ Guide.

Acknowledgements: Tasmanian Indicators Working Group (Chris Rees, Eloise Carr, Greg Dowson, Ian Houshold, Stewart Blackhall, Stephen Harris, Stephen Gallagher, Tania Raymond, Rosemary Gales, Alice Morris, Alasdair Wells and Colin Shepherd, DPIWE; Nicole Middleton, Tasmanian Coastcare Facilitator; Christine Crawford, Vanessa Lucieer and Alastair Hirst, TAFI; Stephen Weight and Fiona Wells, SoE Unit; John Harkin and Chris Cleary, Monitoring and Evaluation, NRM Tasmania; Ed Butler and Peter A. Thompson, CSIRO; Derek Shields, Aquenal; John Hunter, Werner Hennecke and Richard Mount, UTAS; Brian Leahy, Tasmanian Shellfish Executive Council; Brian Smith, Queen Victoria Museum; Ray Murphy, RPDC; Christian Bell, MCCN; Christine Coughanowr and Ruth Eriksen, Derwent Estuary Program. Apologies to those missed form this list.

The Tasmanian Indicators Compendium, including the Tasmanian Extensions, was produced through the “Trialing resource condition indicator for the coastal zone” project run by Richard Mount, UTAS with funding support by the NLWRA (Rob Thorman) and other forms of assistance by many others, particularly Eloise Carr, Fiona Wells and Nicole Middleton.


The Coastal CRC Indicators Users’ Guide is available from:

The individual NRM Indicator documents are available from:

Tasmanian Indicator Compendium (i.e. the NRM Indicators plus Extensions) are available from the DPIWE Coastal Management website. Follow the links through from the home page (look for “The Estuarine, Coastal and Marine Indicators for the National Monitoring and Evaluation Framework”):
Extent/distribution of key habitat types

Indicator status: for advice

Why do we need to monitor the extent/distribution of key habitats in estuarine, coastal and marine ecosystems

Habitat loss and its effects on biodiversity is a major cause of the decline of coastal species. These habitats provide shelter, food, breeding grounds, nursery areas and migratory corridors for marine life. Many habitats also help to protect or buffer water quality and prevent storm-related erosion. They support key communities within estuarine, coastal and/or marine subsystems and have high biodiversity, tourism, human use and conservation values.

The health of coastal waterways depends on the maintenance of a diverse range of coastal habitat types and their loss is a growing global concern.

Habitat can be lost or disturbed through:

- trawling, tourism and uncontrolled coastal access (especially off-road vehicles);
- buildings and construction, foreshore development, roads and bridges, marine facilities and infrastructure, and urbanisation;
- aquaculture;
- dredging and extractive operations (sand and gravel mining); and
- reclamation.

Key habitat types identified as habitat extent indicators in the national State of the Environment reporting (see Ward et al. 1998) are algal beds, beaches and dunes, coral reefs, dune vegetation, intertidal reefs, intertidal sand and mudflats, mangroves, saltmarsh, and seagrasses. These are being reviewed by the National State of the Environment (SoE) Program.

Other habitat types may also be defined by regional communities as key for their natural resource management plans and may also be assessed for extent change.
How will monitoring the extent/distribution of key habitats in estuarine, coastal and marine ecosystems help

Monitoring of key habitat types will provide an indication of the extent habitat disturbance, and to other stressors such as changing nutrients, toxicants, aquatic sediments, water temperature, freshwater flow regimes, hydrodynamics and pest species.

Extent and distribution of key habitat types is associated:

- beach and foreshore sediment erosion and accumulation;
- biodiversity decreased;
- episodic and large scale events (drought, floods, storms, cyclones, bushfires);
- human use and clearing;
- plants or animals disturbed/lost;
- poor water quality such as turbidity and nutrients; and
- decrease in visual amenity.

Critical habitat loss was used as one determinant of ecosystem integrity in the National Estuary Assessment (Stage 2: modified estuaries) completed for the National Land and Water Resources Audit (NLWRA 2002).

How can we monitor the extent/distribution of key habitats in estuarine, coastal and marine ecosystems

In general, mapping changes in the extent/distribution of habitat is relatively straightforward and can often be undertaken by community groups such as Seagrass-Watch. Aerial photography and satellite imagery can be used, although ground-truthing by local groups is advised (see information provided in OzEstuaries). Certain aspects of some methods used to monitor habitat extent/distribution will require expert knowledge (e.g. plant identification, satellite imagery and sonar interpretation).

Monitoring methods depend on the region and particular aspects of the study. Whenever possible, the methods used should be consistent with national (Ward et al. 1998) protocols to maintain consistency between regions and allow for comparison. Expert local advice should be obtained to ensure that monitoring is conducted at an appropriate spatial and temporal scale to allow data to be statistically assessed so that demonstrated changes are verifiable.

Not all habitat types will be present in a natural resource management region—reporting only needs to be undertaken for those habitats present and where the stressor ‘habitat removal/disturbance’ is present. Although other stressors may result in loss of key habitat, other indicators are more suitable for monitoring against those stressors because extent (area – hectares or km²) is a gross level indicator (e.g. although increased aquatic sediments, toxicants or nutrients may result in a change in seagrass extent, other indicators are more directly linked to each stressor than is a change in seagrass extent).
Information on protocols for determining a change in habitat extent can be found in the guidelines for State of the Environment reporting (Ward et al. 1998), scientific publications and OzEstuaries (<www.ozestuaries.org/indicators/indicators.html>).

Differing levels of complexity will be required for data collection and analysis and interpretation (see Table 1).

### Table 1. Level of complexity needed to collect, analyse and interpret data. ‘Easy’ complexity would mean that a person with little experience could easily learn how to collect/interpret the data. ‘Moderate’ would require a person with a couple years experience and ‘hard’ would require an expert with several years of experience.

<table>
<thead>
<tr>
<th>Applicable stressors</th>
<th>Cost(^\d) per sample</th>
<th>Complexity (data collection)</th>
<th>Complexity (data interpretation and analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat removal/ disturbance</td>
<td>&gt;$100</td>
<td>Easy</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Sources of monitoring information\(^\d\)**

- NSW: Department of Environment and Conservation, Department of Infrastructure, Planning and Natural Resources; Department of Primary Industries
- NT: Department of Infrastructure, Planning and Natural Resources
- QLD: Department of Primary Industries
- SA: Environment Protection Agency; South Australian Research and Development Institute
- TAS: Tasmanian Aquaculture and Fisheries Institute
- VIC: Parks Victoria, Department of Sustainability and Environment
- WA: Water and Rivers Commission
- Geoscience Australia
- Waterwatch

\(^\d\) Costs provided are for comparison against other potential indicators and are approximate and only for the collection and analysis of samples. They do not include costs relating to personal salary/travel, maintenance/calibration of equipment, or the purchase of other equipment such as boats, trailers, scuba gear, etc. which may be needed for monitoring the indicator. The major cost for any monitoring study is usually personal salary costs. Costs given will change over time and by location, and should be thoroughly investigated and scrutinised before being used in any financial planning.

\(^\d\) This list of organisations that can supply monitoring information is for guidance only. Roles (and names) of agencies regularly change. Agencies listed should be the first point of contact, though many of the indicators are measured by others, particularly university researchers and community monitoring groups, from around Australia.

**Monitoring locations**

The extent of each habitat type should be monitored for the whole region using remote sensing tools (satellite platforms, aerial photography) with ground-truthing. More information on monitoring design and strategies for different habitats can be found in Ward et al. (1998) and OzEstuaries (2001).

**Monitoring frequency**

Where key habitats are in areas with relatively high pressures/threats, their extent should be assessed annually. In other areas, where pressures are thought to be less, they should be assessed every three to five years.
**Data measurement methods**

Depending on the habitat type being measured, aerial photography, satellite imagery, sonar, line transect or quadrats, and/or systematic towed video surveys can be used to estimate the area of habitat. With recent technological improvements, remote sensing has become a cost-effective tool for monitoring and mapping the diversity, distribution and abundance of habitat, at a range of spatial and temporal scales.

Hyperspectral data provide many more opportunities than multispectral imagery although at a greater cost. They have been used to successfully map rock platform vegetation, seagrass species, mangroves, saltflats and water quality parameters such as total suspended sediment (TSS), chlorophyll and coloured dissolved organic matter (CDOM) concentrations (Dekker et al. 2001; Brando & Dekker 2003).

Remote sensing technology is of limited value in tide-dominated coastal systems (e.g. deltas, estuaries and tidal creeks) because of poor water transparency (OzEstuaries 2001).

The area of cover should be mapped to between 10 and 100 m of true position. This is readily achievable with modern equipment.

**Data analysis and interpretation**

The causes of habitat expansion or contraction should be defined as habitats are subject to natural forces including storm damage and changes in rainfall and sea level as well as human-induced impacts. It is therefore essential to try and determine whether change in habitat extent is natural. Information on seagrass, mangrove, saltmarsh, and beach and dune habitat is given in OzEstuaries (2001).

The area of each habitat type, with an estimate of uncertainty (e.g. 95% confidence limits), should be recorded for each subregion, and for the region as a whole. Differences between this estimate and any previous (or baseline) estimate should be expressed as an estimate of change. An estimate of the size of change that could be statistically detected with the methods used, should also be recorded (Ward et al. 1998).

It is beneficial for data interpretation, if the monitoring is associated with the monitoring of nutrients, toxicants, aquatic sediments, water temperature, freshwater flow regimes, hydrodynamics and pest species; and an appropriate biological condition indicator associated with the stressor habitat removal/disturbance (i.e. animal or plant species abundance).

**Data storage**

Data should be stored by state/territory agencies and by the data collectors (if different). If possible, the public should have access to the data (and report summaries) through a websites hosted by state/territory governments.
Monitoring and reporting products

Reporting products should be as maps and/or tables of area of habitat type by subregion and region, together with tables summarising the percentage of significant change. Graphs showing significant change over time should also be produced for each habitat type by subregion and region.

Proposed responsibilities

Special-purpose studies have been undertaken over much of Australia and have created a baseline of historical data of area covered by various habitat types.

The National Land and Water Resources Audit compiled information on the coverage of several habitat types (habitat condition index) and critical habitat loss as part of its condition assessment of Australian estuaries. These data are available in the OzEstuaries website (<www.ozestuaries.org/frame1.html>) and the Australian Natural Resources Atlas <audit.ea.gov.au/ANRA/>.

Data on habitat extent and distribution for most habitat types occurring in, or next to, estuarine, coastal and marine waters around Australia have been collected and stored by state/territory agencies, major research institutions and universities. Existing information and data on seagrass, mangrove, saltmarsh and, beach and dune habitat extent is provided in OzEstuaries.

Regional bodies who choose to monitor species abundance should incorporate their data into existing surveys to assist in determining regional baseline data and later comparison to detect real change.

While consideration should be given to who is responsible for data collection, collation, analysis and interpretation, storage and management, and the generation of reporting products, it is most likely that where existing monitoring by state/territory/Australian Government agencies occurs, then it should be used by regional bodies as it is the most cost-effective and efficient option, and has been subject to quality assurance.

Links to other indicators and matters for targets

Extent/distribution of key habitat types is linked to:

- animal or plant species abundance (indicator);
- extent/distribution of subtidal macroalgae (indicator);
- native vegetation communities’ integrity (matters for targets); and
- significant native species and ecological communities (matters for targets).
Further information and references


OzEstuaries 2001, General information on estuaries, Query database. Available at <www.ozestuaries.org/frame1.html>. To query data for a specific estuary: enter the estuary name (press enter key); selected required estuary from list; select ‘condition assessment (pdf)’.


Glossary

Baseline data
Information collected to comprise a reference set for comparison with data collected at a later time; used to interpret changes over time usually after some condition has been changed.

Ground-truthed
To confirm remotely obtained data by physically visiting a site.

Line transect
A straight line placed on the ground along which ecological measurements are taken.

Quadrats
An ecological sampling unit that consists of a square frame of a known area.

Spatial
Pertaining to space or distance.

Temporal
Pertaining to time.
1. Indicator Name

Extent/distribution of key habitat types (subtidal)

TasExtension Status: version 1.0 (draft)

2. Summary

Précis of the Tasmanian approach to this indicator

The indicator is applicable in Tasmania at statewide, regional and local scales, though, while there is a clear target for coverage of the whole state with marine habitat maps, that target remains to be achieved. There are issues with supporting the indicator at the national scale concerning the lack of a nationally consistent classification scheme for marine habitats. The SEAMAP Tasmania mapping program is the preferred custodian and data source and the source of the preferred methodology.

3. Tasmanian Perspective

Environmental Context

An explanation of the environmental and ecological context, if any, that requires a unique application of this indicator in Tasmania.

Tasmania is the southern most state of Australia and is surrounded by cool temperate marine waters. Nutrient-rich waters from the southern ocean periodically influence the southern end in particular, while nutrient poor waters circulate down the east coast with the Eastern Australian Current (EAC). The coastline is exposed to strong oceanic swells and wind waves, particularly in the west and south. The north coast experiences large tidal cycles (up to 4 m) and, statewide, there are many estuaries (111) and coastal embayments providing extensive sheltered environments. Many of the estuaries are long, deep and tannin (CDOM) stained.

Monitoring Requirements and Effort

A description of the current drivers for monitoring this indicator at a statewide level and/or at the regional level, including legislative requirements and existing monitoring efforts.

- The Tasmanian coastline is about 5,000 km long, which is longer than NSW and Victoria’s combined. The area of the State Coastal Waters (i.e. High Water Mark to the 3 nautical mile limit) is one quarter of the total area of the Tasmania.

- There are no known requirements to monitor any particular marine habitats extents. The State Coastal Policy 1996 sets out a statutory requirement for monitoring but, other than a requirement to report on the coastal zone in the Tasmanian State of the Environment 2003 report (RPDC, 2003), there is no requirement to report any particular matters to any specific timetable.
Indicator Critique

A critique of the national indicator, if required.

The key subtidal habitats types could be extended to include habitats dominated by filter feeding animals such as sponges, cunjevoi and oysters. Habitats types that are unvegetated, such as silt, silty sand, sand and hard sand, are also important components of the marine and estuarine environment and should be mapped if possible. Their extent and distribution are strongly linked to ecosystem functioning. Note that comparisons between data sets collected with differing methods are compromised when they are collected with inconsistent classification schemes. There is currently no nationally agreed marine habitat classification scheme.

The proposed indicator asserts that “mapping changes in extent/distribution of habitat is relatively straightforward and can often be undertaken by community groups”. Extensive experience and research in marine habitat mapping gained by TAFI (Tasmanian Aquaculture and Fisheries Institute) has shown that accurately mapping such habitats to the standard needed for monitoring is complex and subject to considerable uncertainties and errors. Remote sensing techniques require expert advice and the selection of sampling methods (transect spacing) is not inconsequential. Community groups are more likely to be able to contribute to condition monitoring using, for example, Seagrass Watch protocols (e.g. Parks Victoria Technical Series No.16 Seagrass Monitoring Manual (Koss et al., 2005)).

There are also misleading statements in the proposed indicator under the “Monitoring Locations” and “Data Measurement Methods” headings. They tend to suggest that remote sensing (with ground truthing) is the preferred methodology, however, while significant advances have been made in recent years, for a very large proportion of locations that methodology is not suitable and acoustics must be used.

Interpretation of changes in the mapped extent of habitats is also challenging, particularly if attempting to identify the proportion of change that is due to human activity. For example, while some changes in seagrass extent may be clearly linked to dredging or anchor chain scour, other losses may be due to natural variability in climate and nutrient availability. The seagrass species *Heterozostera tasmanica* is the dominant species in southern Tasmania and it can have variable distributions, while *Posidonia australis*, a species forming large beds in the northern Tasmanian waters, is much more stable.

Linkages with other Indicators

Noted here are, firstly, whether this indicator is dependent on other indicators and, secondly, any overlaps with other NRM Matters for Target and Indicators.

1. None identified.
2. None identified.

Discussion

A brief discussion that synthesises how the current resources and data availability interacts with the environmental context, the monitoring requirements and criticisms of the proposed NRM Indicator (i.e. the CRC proposal).

The SEAMAP Tasmania program sets the standard for marine habitat mapping in Tasmania and there is a commitment to obtain statewide baseline coverage.
4. Recommendations

Note that the major Tasmanian data sources (i.e. data sets and reports) relevant to this Indicator are documented in Appendix 1 of this document to assist with locating data and data custodians.

**Preferred Methodology/s**

Identifies the methods (or methods) that have “preferred” status. Ideally, these are the methods with which all new data are collected, analysed and interpreted OR which are implemented in addition to any other methods.

A brief explanation of the reasons for using each method is presented (e.g. “This is the internationally recognised methodology.” OR “Even though this methodology is relatively simplistic and there is currently no central data repository, it will be possible in the future to combine data collected with the preferred method.”).

Generally, the preferred methodology is that documented by the SEAMAP Tasmania program, as follows:

**Habitat classification methods:** In lieu of nationally agreed habitat classification systems the SEAMAP classification method should be used wherever possible.

**Habitat data collection methods:** The methods used for the collection of habitat extent data are constantly evolving and it is therefore not useful to identify “preferred” data collection methods. Rather, it is recommended that any method used is fully documented (including positional and thematic error estimates produced via accuracy assessments) and is, ideally, “backwards” compatible with the existing data sets, even if the new data set is more detailed or complex. This is to enable trends to be monitored through time. Positional accuracy for a well-defined point should be at least between 10 – 100 m and, preferably, less than 25 m. Typical data collection methods include: optical remote sensing with aerial photography and satellite data; acoustic surveys with single beam and side scan sonar; and videography. Generally, any methodologies should include a field component as methods relying exclusively on optical remote sensing are usually inadequate.

**Preferred Dataset/s**

Identifies the data set (or data sets) that have “preferred” status. Ideally, these are the data sets to which new data are appended.

A brief explanation of the reasons for contributing to each data set is presented (e.g. “Even though these data are collected with simple technology, this is a long term data set that would be useful to extend.” OR “This is a well organised and resourced data set that is expected to be maintained by the custodian well into the foreseeable future and has excellent access arrangements in place.” OR “This data set is likely to become the new standard in this field.”).

The preferred data sets are those managed by the SEAMAP Tasmania mapping program. The SEAMAP map series is well organised, well documented, well maintained and is publicly accessible on the internet, either via The LIST or from TAFI directly. The original GIS layers are also available from TAFI on request.

**Data management**

For each “preferred” data set, the protocols required for managing the actual data set are identified. This includes:

- The identification of the “preferred” custodian.
• The identification of suitable access, licensing, intellectual property and quality standards and agreements.
• A description of the standards defined by the data custodian of the “preferred” dataset including the structuring and formatting required of the data itself (e.g. standard coordinate systems, projections, datum, scale, accuracy, file format).
• How to achieve completion of ANZLIC compliant metadata, if required.

The preferred custodian for any new marine habitat mapping is the SEAMAP Tasmania program, Tasmanian Aquaculture and Fisheries Institute (TAFI). Any new marine habitat maps should also be available through the Coastal Atlas category of The LIST.

5. Information Product/s

Generally, IPs need to be specific to the level of reporting (i.e. regional, statewide or national) and therefore need to be defined in the context of the question to be answered. It is at this stage that the quality, or “fitness-for-use”, of the data sources is evaluated.

This section provides a description of each of the Information Product/s (IP/s) that are available, if any, to support the Indicator. These can include Indices generated from single or multiple data sets. They may consist of text, maps, tables or charts. Note that it may also include proto-IPs, that is, potential or incipient IPs that can be reasonably anticipated to be useful in the future.

Ideally, the information products will consist of maps showing change in habitat distribution through time (e.g. Rees 1993) and tables showing change in area (Ha). Note that to date in Tasmania, the current “standard” for marine habitat mapping (as defined by SEAMAP Tasmania) has been applied only once and therefore trend information is generally not available. As areas are mapped again with the same methodology, trends will be able to be established.

6. References


Appendix 1: Data source/s (includes Methods and “Preferred” Status potential for each)

This is a listing of each of the individual data sources available to support the Indicator (via the Information Products). It includes the following:

- A means of identifying the data source including a document/report citation OR the name and location of the data set or data custodian (e.g. via an ANZLIC metadata ID number with a link to the Tasmanian Spatial Data Directory – TSDD e.g. [http://www.thelist.tas.gov.au/asdd/ANZTA0025000002.html](http://www.thelist.tas.gov.au/asdd/ANZTA0025000002.html)).
- The current methodology used to collect the data, or a reference to the documented method/s.
- Information about the data source that will assist in identifying whether it should qualify as a “preferred” data source (please see Recommendations section above for more). It may also list any proto-data sources, that is, potential or incipient data sources that can be reasonably anticipated to be useful in the future.

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Ideally, the official name…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier/Citation</td>
<td>ANZLIC ID number (ideally presented as hyperlink to Tasmanian Spatial Data Directory) OR other identifier ID code OR citation/reference</td>
</tr>
<tr>
<td>Custodian</td>
<td>Custodian organisation (plus contact name)</td>
</tr>
<tr>
<td>Abstract</td>
<td>Brief abstract describing the data source</td>
</tr>
<tr>
<td>Method</td>
<td>The current methodology used to collect the data, or a reference to the documented method/s.</td>
</tr>
<tr>
<td>Comment</td>
<td>Information about the data source that will assist in identifying whether it should qualify as a “preferred” data source</td>
</tr>
</tbody>
</table>

The SEAMAP Tasmania program is currently the primary source of marine habitat extent mapping data in Tasmania. The program has operated since 2000 and has set the standard for both habitat mapping methods and the definition of habitat categories for mapping purposes (see the [SEAMAP web site](http://www.seamap.org) for details). Previous studies include the work by Rees (1993) and Edyvane et al (2000).

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Derwent Estuary Marine Habitat Map - 1:25 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custodian</td>
<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
<tr>
<td>Abstract</td>
<td>The Derwent Estuary habitat project 1:25000 depicts marine habitats from Piersons Point [147 02, -43 03] to New Norfolk [147 02, -42 42] from the coastline to the 40metre depth contour. The habitat types depicted in the dataset include reef, sand, seagrass, silt, silty sand and aquatic macrophytes. The data was collected through intensive field sampling from June to December 2000 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The use of underwater camera equipment, echo sounder data and a Differential GPS unit allowed for the extensive area to be surveyed. The dataset is intended to be used to fulfill coastal management objectives</td>
</tr>
</tbody>
</table>
Method

Depth and positional point data was captured using a Garmin 135 GPS unit coupled with a RACAL differential correction unit. A FURUNO 600L colour sounder was used to discriminate habitat type. Employing a specially designed program, Seabed Mapping Tool Version 1.3, point data was attributed with one of six habitat classifications. The point dataset was checked for extraneous data, cleaned and converted to a point coverage using ESRI ARCVIEW Version 3.2. The point data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ARCINFO Version 7.2.1 to the Tasmanian Coastline coverage in AGD66. The point data was overlayed on the aerial photographs to check for continuity especially in generating the reef habitat polygons. The generated polygon coverage was edge matched to the 1:25000 coastline shape. The 1:25000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania.

Comment

Last updated: 1600 10/3/2006 (standard)

<table>
<thead>
<tr>
<th>Data source name</th>
<th>South Eastern Tasmania Marine Habitat Map 1:25 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custodian</td>
<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
<tr>
<td>Abstract</td>
<td>The southeastern Tasmania marine habitat project 1:25000 depicts marine habitats from Marion Bay [147 57, -42 44] to Second Lookout Point [146 52, -43 40] from the coastline to the 40metre depth contour. The habitat types depicted in the dataset include High profile reef, Medium profile reef, Low profile Reef, Patchy Reef, Sand, Hard Sand, Silty Sand, Silt, Seagrass, Patchy Seagrass, Sparse Seagrass and Caulerpa. The data was collected through intensive field sampling from June to December 2000 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The use of underwater camera equipment, echo sounder data and a Differential GPS unit allowed for the extensive area to be surveyed. The dataset is intended to be used to fulfil coastal management objectives according to The Living Marine Resources Act 1995.</td>
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</tbody>
</table>

Data source name: South Eastern Tasmania Marine Habitat Map 1:25 000
Custodian: Tasmanian Aquaculture and Fisheries Institute (TAFI)
Abstract: The southeastern Tasmania marine habitat project 1:25000 depicts marine habitats from Marion Bay [147 57, -42 44] to Second Lookout Point [146 52, -43 40] from the coastline to the 40metre depth contour. The habitat types depicted in the dataset include High profile reef, Medium profile reef, Low profile Reef, Patchy Reef, Sand, Hard Sand, Silty Sand, Silt, Seagrass, Patchy Seagrass, Sparse Seagrass and Caulerpa. The data was collected through intensive field sampling from June to December 2000 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The use of underwater camera equipment, echo sounder data and a Differential GPS unit allowed for the extensive area to be surveyed. The dataset is intended to be used to fulfil coastal management objectives according to The Living Marine Resources Act 1995.

Method

Depth and positional point data was captured using a Garmin 135 GPS unit coupled with a RACAL differential correction unit. A FURUNO 600L colour sounder was used to discriminate habitat type. Employing a specially designed program, Seabed Mapping Tool Version 1.3, point data was attributed with one of eleven habitat classifications. The point dataset was checked for extraneous data, cleaned and converted to a point coverage using ESRI ARCVIEW Version 3.2. The point data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ARCINFO Version 7.2.1 to the Tasmanian Coastline coverage in AGD66. The point data was overlayed on the aerial photographs to check for continuity especially in generating the reef habitat polygons. The generated polygon coverage was edge matched to the 1:25000 coastline shape. The 1:25000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania.
to the 1:25000 coastline shape. The 1:25000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania. Equipment employed to record and measure the data included [Furuno 600L colour sounder, Garmin 135 GPS map unit with a RACAL differential correction unit, Benthos Model 4208 8x zoom colour camera unit] Habitats identified: [High profile reef, Medium profile reef, Low profile Reef, Patchy Reef, Sand, Hard Sand, Silty Sand, Silt, Seagrass, Patchy Seagrass, Sparse Seagrass and Caulerpa]. Areas were sampled following transects in from the 40metre contour line to the coastline. The sampling method resembled a zigzag pattern at 200m intervals. The GPS recorded depth and position regularly at 5second intervals to generate a point dataset of 200 000 points. Sampling effort was increased in areas that demonstrated complex habitat composition.

Comment

Last updated: 1600 10/3/2006 (standard)

<table>
<thead>
<tr>
<th>Data source name</th>
<th>North Eastern Tasmania Marine Habitats–1:25000</th>
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<tbody>
<tr>
<td>Identifier/Citation</td>
<td><a href="http://www.thelist.tas.gov.au/asdd/ANZTA0025000006.html">http://www.thelist.tas.gov.au/asdd/ANZTA0025000006.html</a></td>
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<tr>
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<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
<tr>
<td>Abstract</td>
<td>The North Eastern Tasmania marine habitat layer 1: 25,000 depicts marine habitats from Swan Island [148° 20', -40° 40'] to St Helens Point [148° 20', -41° 20']. The habitat types depicted in the dataset include rocky reef, sand, hard sand and seagrass. The data was collected from November 2003 to October 2004 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The use of underwater camera equipment, echo sounder data, side scan sonar and a Differential GPS unit allowed for the extensive area to be surveyed. The dataset is intended to be used to fulfil coastal management objectives according to The Living Marine Resources Act 1995.</td>
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<tr>
<td>Method</td>
<td>The point dataset was checked for extraneous data, cleaned and converted to a point coverage using ESRI ARCVIEW Version 3.2. The point data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ARCINFO Version 9 to the Tasmanian Coastline coverage in AGD66. The point data was overlayed on the aerial photographs to check for continuity especially in generating the reef habitat polygons. The generated polygon coverage was edge matched to the 1:25000 coastline shape. The 1:25000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania. Equipment: Equipment employed to record and measure the data included ES 60 Scientific sounder, Sony digital colour camera unit (with sled) and an Omnistar 132 Light Differential GPS unit. Habitat Description: Habitats identified: [Low profile Reef, Patchy Reef, Sand, Hard Sand, and Seagrass]. Sample Method: Areas were sampled following transects in from the 40metre contour line to the coastline. The sampling method resembled a “zigzag” pattern at 100m intervals.</td>
</tr>
</tbody>
</table>
Sample Intensity: The GPS recorded depth and position regularly at 2 second intervals to generate a point dataset of 1,000,000 points. Sampling effort was increased in areas that demonstrated complex habitat composition.

Comment

Last updated: 1600 10/3/2006 (standard)

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Tasmanian Estuaries (South East) Marine Habitats – 1:25000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier/Citation</td>
<td><a href="http://www.thelist.tas.gov.au/asdd/ANZTA0025000009.html">http://www.thelist.tas.gov.au/asdd/ANZTA0025000009.html</a></td>
</tr>
<tr>
<td>Custodian</td>
<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
</tbody>
</table>

Abstract

The Tasmanian Estuaries (South East) Marine Habitats 1:25,000 layer depicts marine habitats of nine estuaries (Bryans lagoon, Catamaran River, Cloudy Bay Lagoon, D’Entrecasteaux River, Great Swanport, Little Swanport, Pipeclay Lagoon, Pitt Water and Southport Lagoon) in the south east of Tasmania. The habitat types depicted in the dataset include rocky reef, sand, hard sand and seagrass. The data was collected from November 2004 to September 2005 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The shallow waters of the estuaries enabled the use of aerial photography, including purpose flown aerial surveys, and satellite imagery as the primary data source. The habitats defined in the imagery were ground truthed in the field with underwater camera equipment, echo sounder data, and a Differential GPS unit. The dataset is intended for the use of fulfilling the coastal management objectives according to The Living Marine Resources Act 1995 and to support Natural Resource management priorities in the Southern NRM region of Tasmania.

Method

Archival aerial photography data in the ILS, DPIWE library was assessed for currency and seafloor visibility. The most current images were selected, ranging from 2003 to 2004. No recent imagery was suitable for Cloudy Bay Lagoon and Southport Lagoon, so purpose-flown imagery was collected on 26th November 2004 by TAFI. Quickbird imagery from the Greater Hobart Project (copyright DigitalGlobe, courtesy of Sinclair Knight Merz) was used for Pitt Water. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ArcGIS Version 9.0 to the Tasmanian Coastline coverage in GDA94 and mosaics created where required. The imagery data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. The point datasets that were collected in the field were checked for extraneous data, cleaned and converted to a point coverage using ESRI ArcGIS Version 9.0. The point data was overlaid on the aerial photographs to check for agreement. The generated polygon coverage was clipped to the 1:25,000 coastline shape. The 1:25,000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania.

Comment

Last updated: 1600 10/3/2006 (standard)
<table>
<thead>
<tr>
<th>Data source name</th>
<th>Tasmanian Estuaries (Georges Bay) Marine Habitats – 1:25000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier/Citation</td>
<td><a href="http://www.thelist.tas.gov.au/asdd/ANZTA0025000008.html">http://www.thelist.tas.gov.au/asdd/ANZTA0025000008.html</a></td>
</tr>
<tr>
<td>Custodian</td>
<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
<tr>
<td>Abstract</td>
<td>The Tasmanian Estuaries (Georges Bay) Marine Habitats 1:25,000 layer depicts marine habitats of one estuary (Georges Bay) near St Helens. The habitat types depicted in the dataset include rocky reef, sand, hard sand and seagrass. The data was collected from November 2004 to March 2005 by marine researchers at the Tasmanian Aquaculture and Fisheries Institute. The shallow waters of the estuaries enabled the use of aerial photography and satellite imagery as one of the primary data sources, with habitats below the depth range that imagery could detect determined with underwater camera equipment, echo sounder data, and a Differential GPS unit. This equipment was also used to field check the habitats determined from image interpretation. The dataset is intended to be used to fulfil coastal management objectives according to The Living Marine Resources Act 1995 and to support Natural Resource management priorities in the Northern NRM region of Tasmania.</td>
</tr>
<tr>
<td>Method</td>
<td>Archival aerial photography data in the ILS, DPIWE library was assessed for currency and seafloor visibility. Quickbird imagery was licensed for the whole bay, consisting of 4 band multispectral data (2.4 m pixels) and pan-sharpened natural colour data (0.6 m pixels) (copyright DigitalGlobe, courtesy of Sinclair Knight Merz). Image capture date was 2/5/2002. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ArcGIS Version 9.0 to the Tasmanian Coastline coverage in GDA94 and mosaics created where required. The imagery data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. The point datasets that were collected in the field were checked for extraneous data, cleaned and converted to a point coverage using ESRI ArcGIS Version 9.0. The point data was overlaid on the aerial photographs to check for agreement. The generated polygon coverage was clipped to the 1:25,000 coastline shape. The 1:25,000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania.</td>
</tr>
<tr>
<td>Comment</td>
<td>Last updated: 1600 10/3/2006 (standard)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Mercury Passage Marine Habitat Layer – 1:25000</th>
</tr>
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<tbody>
<tr>
<td>Identifier/Citation</td>
<td><a href="http://www.thelist.tas.gov.au/asdd/ANZTA0025000004.html">http://www.thelist.tas.gov.au/asdd/ANZTA0025000004.html</a></td>
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<tr>
<td>Custodian</td>
<td>Tasmanian Aquaculture and Fisheries Institute (TAFI)</td>
</tr>
<tr>
<td>Abstract</td>
<td>The Mercury Passage marine habitat layer1: 25,000 depicts marine habitats from Marion Bay [147 57’-42 44’] to Lords Bluff [148 00’ -42 30’] from the coastline to the 40 metre depth contour including the complete coastline of Maria Island. The habitat types depicted in the dataset include High profile reef, Medium profile reef, Low profile Reef, Patchy Reef, Sand, Hard Sand, Silty Sand, Silt, Seagrass, Patchy Seagrass, and Sparse Seagrass. The data was collected through intensive field sampling from June 2001 to February 2002 by marine</td>
</tr>
</tbody>
</table>
Researchers at the Tasmanian Aquaculture and Fisheries Institute. The use of underwater camera equipment, echo sounder data and a Differential GPS unit allowed for the extensive area to be surveyed. The dataset is intended to be used to fulfil coastal management objectives according to The Living Marine Resources Act 1995.

**Method**

Depth and positional point data was captured using a Garmin 135 GPS unit coupled with a RACAL differential correction unit. A FURUNO 600L colour sounder was used to discriminate habitat type. Employing a specially designed program, Seabed Mapping Tool Version 1.3, point data was attributed with one of eleven habitat classifications. The point dataset was checked for extraneous data, cleaned and converted to a point coverage using ESRI ARCVIEW Version 3.2. The point data was used to interpret boundaries and formed the basis of a polygon coverage that was generated from the data. Selected aerial photographs were scanned at 600dpi and stored as 24bit colour TIFF images. Each was georeferenced using ESRI ARCINFO Version 7.2.1 to the Tasmanian Coastline coverage in AGD66. The point data was overlayed on the aerial photographs to check for continuity especially in generating the reef habitat polygons. The generated polygon coverage was edge matched to the 1:25000 coastline shape. The 1:25000 coastline was supplied by the Land Information Services Division of the Department of Primary Industry, Water and Environment Tasmania.

**Comment**

Last updated: 1600 10/3/2006 (standard)

**Data source name**

Regional Classification of Tasmanian Coastal Waters (Stage 3): Marine Habitats Mapping

**Identifier/Citation**


**Custodian**

Parks GIS unit

**Abstract**

The project mapped the inshore coastal and marine habitats of Tasmania (and Bass Strait) at the broad scale (i.e. 1:100,000), to assist with the identification and selection of potential Marine Protected Area, and also, to facilitate improved coastal management.

**Method**

The methodology utilised was that developed by CSIRO (Dr Hugh Kirkman) for mapping shallow subtidal habitats in Victoria, South Australia and Western Australia. The inshore habitat categories were divided into dense seagrass, medium seagrass, bare sand, low platform reef and high profile reef. All underwater inshore habitats of Tasmania have been mapped from Landsat imagery and aerial photography.

**Comment**

This data set is of very low accuracy for most uses other than very broad statewide assessments. It should be used with caution.

Last updated: 1600 10/3/2006 (standard)
<table>
<thead>
<tr>
<th>Data source name</th>
<th>Tasmanian seagrass communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custodian</td>
<td>Chris Rees</td>
</tr>
<tr>
<td>Abstract</td>
<td>Mapped seagrass extent for selected estuaries around Tasmania to measure seagrass extent change.</td>
</tr>
<tr>
<td>Method</td>
<td>Mapped seagrass extent for selected estuaries around Tasmania with aerial photography from the circa 1950s, 1970s and 1990s. The 1990 data was complemented with field work.</td>
</tr>
<tr>
<td>Comment</td>
<td>A useful data set available in GIS format, though some methodological issues place limitations on the capacity to make comparisons with more recent SEAMAP data. Last updated: 1600 10/3/2006 (standard)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Giant Kelp (Macrocystis pyrifera)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custodian</td>
<td>Parks GIS unit</td>
</tr>
<tr>
<td>Abstract</td>
<td>The project mapped all the known sources of information about Giant Kelp in Tasmania</td>
</tr>
<tr>
<td>Method</td>
<td>Most mapped polygons were derived from aerial photography.</td>
</tr>
<tr>
<td>Comment</td>
<td>Last updated: 1600 10/3/2006 (standard)</td>
</tr>
</tbody>
</table>
**Tasmanian Extension**
(Note: This document MUST be read with the base Estuarine Coastal and Marine NRM Indicator document with the same name. The base documents can be obtained from: http://www.nrm.gov.au/monitoring/indicators/index.html)

1. **Indicator Name**

Extent/distribution of key habitat types (intertidal/supratidal)

TasExtension Status: version 1.0 (draft)

2. **Summary**

Précis of the Tasmanian approach to this indicator

This Extension document covers the intertidal and supratidal parts of the coastal zone, that is, everything above the low water mark that is not covered by other Matters for Target. Key habitat types identified include dunes, saltmarshes, sandy shores, rocky shores, intertidal mudflats and offshore islands (Ward, et al. 1998; RPDC, 2003). These habitat types include both a vegetation and geomorphological component.

Consideration should be given to identifying core data sets and standardised methodologies in relation to other Matters for Target (MfT). In Tasmania, the Coastal Values projects in the North and South NRM regions together with coastal values mapping undertaken through the South East Tasmania Integrated Coastal Management Strategy provide a substantial impetus to establishing a standard methodology, though consideration should also be given to the TASVEG mapping and vegetation condition assessment methods. Note that the LIST provides a solid basis for mapped extent of the intertidal zone, though tends to underestimate saltmarsh extents.

3. **Tasmanian Perspective**

**Environmental Context**

An explanation of the environmental and ecological context, if any, that requires a unique application of this indicator in Tasmania.

None identified.

**Monitoring Requirements**

A description of the current drivers for monitoring this indicator at a statewide level and/or at the regional level.

- The *State Coastal Policy 1996* (Outcome 4.4) sets out a statutory requirement for monitoring the effectiveness of implementation of the Policy but, other than a report on the coastal zone in the SoE report, there is no requirement to report any particular matters to any specific timetable.

- The Land Information System Tasmania (LIST) standard 1:25,000 and 1:5,000 digital map series maps a number of broad coastal habitat classes including rocky shores, sandy shores, mudflats and saltmarsh. It does not map dunes or sand sheets above the mean high water mark.)
• Statewide intertidal zone habitat studies are very limited in number, although Richardson et al. (1996, 1997) provide valuable information about the biodiversity of intertidal rock platforms and beaches.

**Indicator Critique**
A critique of the national indicator, if required.

Comparisons between data sets are compromised when they are collected with differing methods and inconsistent classification schemes. There is currently no nationally agreed coastal habitat classification scheme.

**Linkages with other Indicators**
Noted here are, firstly, whether this indicator is dependent on other indicators and, secondly, any overlaps with other NRM Matters for Target and Indicators.

1. None identified
2. This indicator is strongly linked to the indicators for both the Native Vegetation Communities' Integrity Matter for Target (MfT), and the Significant Native Species and Ecological Communities MfT. Consideration should be given to identifying common core data and standardising preferred methodologies. The MfT 'Ecologically significant invasive species' is also linked to this indicator with its own two indicators 'The area and density of weeds under active management' and 'New incursions of significant weeds'.

**Discussion**
A brief discussion that synthesises how the current resources and data availability interacts with the environmental context, the monitoring requirements and criticisms of the proposed NRM Indicator (i.e. the CRC proposal).

In Tasmania, there is yet to be established a standardised methodology or classification scheme for key coastal (intertidal and supratidal) habitats. It is noteworthy that the habitats cannot be described with vegetation type alone as they have a clear geomorphological component as well – for example, beaches, dunes and intertidal vegetation communities. The South East Tasmania Integrated Coastal Management Strategy 2002 (Blake at al., 2002) and the two (North and South) Regional NRM Coastal Values projects (in progress) are providing a lead in establishing these methods and also creating a substantial basis for a preferred data set.

4. **Recommendations**
Note that the major Tasmanian data sources (i.e. data sets and reports) relevant to this Indicator are documented in Appendix 1 of this document to assist with locating data and data custodians.

**Preferred Methodology/s**
Identifies the methods (or methods) that have “preferred” status. Ideally, these are the methods with which all new data are collected, analysed and interpreted OR which are implemented in addition to any other methods.

A brief explanation of the reasons for using each method is presented (e.g. “This is the internationally recognised methodology.” OR “Even though this methodology is
relatively simplistic and there is currently no central data repository, it will be possible in the future to combine data collected with the preferred method.

The Coastal Values projects present a methodology that has direct application to the monitoring and evaluation of key supratidal habitat types. The projects involve three main stages; assessing habitat condition, habitat viability, and assigning values or priorities.

An analogous methodology is recommended in the Flora and Fauna Habitat Identification and Assessment Process for the Hobart City Council (North, Barker and Associates - Ecosystem Services, 2004). This report identifies significant areas of native vegetation with respect to flora and fauna habitat and develops a prioritised classification system for the condition and long-term viability of areas of native vegetation on both public and private land (North, Barker and Associates - Ecosystem Services, 2004).

A further project in the Southern NRM Region will map intertidal and foreshore habitat. The intent is to determine baseline condition benchmarks and establish reference sites for key foreshore habitat types across the region. The methodology will be compatible if not consistent with those described above.

Where possible the data should be collected from orthorectified aerial photographs and high definition satellite imagery and then ground-truthed. This data should be produced in GIS digital layers.

Further details are available from the following preferred sources.

1. Coastal Values of Southern Tasmania and the Coastal Values of North East Tasmania projects.

2. Integrated South East Tasmania Coastal Management Strategy (Blake et al., 2002).

3. TASVEG mapping methods and the TASVEG vegetation condition manual (Vegetation Section, DPIWE, 2005).

4. DPIWE Technical manual for vegetation monitoring (Barker, 2001)

**Preferred Dataset/s**

Identifies the data set (or data sets) that have “preferred” status. Ideally, these are the data sets to which new data are appended.

A brief explanation of the reasons for contributing to each data set is presented (e.g. “Even though these data are collected with simple technology, this is a long term data set that would be useful to extend.” OR “This is a well organised and resourced data set that is expected to be maintained by the custodian well into the foreseeable future and has excellent access arrangements in place.” OR “This data set is likely to become the new standard in this field.”).

The preferred data sets are the Coastal Values of Tasmania Project and TASVEG, managed through the The Tasmanian Vegetation Mapping Program (TVMP), the ongoing State Government program mapping Tasmania's vegetation at high resolution.
Data management

For each “preferred” data set, the protocols required for managing the actual data set are identified. This includes:

2. The identification of the “preferred” custodian.
3. The identification of suitable access, licensing, intellectual property and quality standards and agreements.
4. A description of the standards defined by the data custodian of the “preferred” dataset including the structuring and formatting required of the data itself (e.g. standard coordinate systems, projections, datum, scale, accuracy, file format).
5. How to achieve completion of ANZLIC compliant metadata, if required.

The preferred custodian for any new coastal habitat mapping data is TASVEG, the product of the Tasmanian vegetation mapping program, Department of Primary Industries, Water & Environment (DPIWE), also available via The LIST.

5. Information Product/s

Generally, IPs need to be specific to the level of reporting (i.e. regional, statewide or national) and therefore need to be defined in the context of the question to be answered. It is at this stage that the quality, or “fitness-for-use”, of the data sources is evaluated.

This section provides a description of each of the Information Product/s (IP/s) that are available, if any, to support the Indicator. These can include Indices generated from single or multiple data sets. They may consist of text, maps, tables or charts. Note that it may also include proto-IPs, that is, potential or incipient IPs that can be reasonably anticipated to be useful in the future.

None identified.

6. References


McCarthy, M.A., Parris, K.M., van der Ree, R., McDonnell, M.J., Burgman, M.A.,
(2004). The habitat hectares approach to vegetation assessment: an evaluation
and suggestions for improvement. *Ecological Management and Restoration* 5:
24-27.

North, Barker and Associates - Ecosystem Services, 2004. *Flora and Fauna Habitat
Identification and Assessment Process for the Hobart City Council*. North,
Barker and Associates - Ecosystem Services, Hobart.

vegetation: The ‘habitat hectares’ approach. *Ecological Management and
Restoration* 4: S29-S38.

'habitat hectares': A response to McCarthy et al. (2004). *Ecological Management
and Restoration* 5: 28-29.

beaches on the east coast of Tasmania*, Zoology Department, University of
Tasmania, Hobart.

the east coast of Tasmania and Flinders Island*, Zoology Department,
University of Tasmania, Hobart.

Development Commission, Hobart, last modified < 2/5/2005>,

for assessing vegetation condition in Tasmania*. Vegetation Section, Department
of Primary Industries, Water and Environment (DPIWE), Hobart.

Ward T, Butler E & Hill B 1998, *Environmental indicators for national state of the
environment reporting – Estuaries and the sea*, Australia: State of the
Environment (Environmental Indicator Reports), Department of the
Environment, Canberra.
Appendix 1: Data source/s (includes Methods and “Preferred” Status potential for each)

This is a listing of each of the individual data sources available to support the Indicator (via the Information Products). It includes the following:

6. A means of identifying the data source including a document/report citation OR the name and location of the data set or data custodian (e.g. via an ANZLIC metadata ID number with a link to the Tasmanian Spatial Data Directory - TSDD e.g. [http://www.thelist.tas.gov.au/asdd/ANZTA0025000002.html](http://www.thelist.tas.gov.au/asdd/ANZTA0025000002.html)).

7. The current methodology used to collect the data, or a reference to the documented method/s.

8. Information about the data source that will assist in identifying whether it should qualify as a “preferred” data source (please see Recommendations section above for more). It may also list any proto-data sources, that is, potential or incipient data sources that can be reasonably anticipated to be useful in the future.

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Ideally, the official name…</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identifier/Citation</strong></td>
<td>ANZLIC ID number (ideally presented as hyperlink to Tasmanian Spatial Data Directory) OR other identifier ID code OR citation/reference</td>
</tr>
<tr>
<td><strong>Custodian</strong></td>
<td>Custodian organisation (plus contact name)</td>
</tr>
<tr>
<td><strong>Abstract</strong></td>
<td>Brief abstract describing the data source</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>The current methodology used to collect the data, or a reference to the documented method/s.</td>
</tr>
<tr>
<td><strong>Comment</strong></td>
<td>Information about the data source that will assist in identifying whether it should qualify as a “preferred” data source</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Data source name</th>
<th>Land Information System Tasmania (The LIST)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Custodian</strong></td>
<td>Information and Land Services Division of the Department of Primary Industries, Water and Environment, on behalf of the Land Information Coordination Committee.</td>
</tr>
<tr>
<td><strong>Abstract</strong></td>
<td>See metadata.</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>See metadata.</td>
</tr>
<tr>
<td><strong>Comment</strong></td>
<td>Includes intertidal habitat mapping based on State-wide Topographic Digital map layers. The data includes for intertidal habitats: Rocky Shore, Sand, Mudflat, Unknown, and for on-shore coastal habitats: Saltmarsh. Note that the LIST map layers apparently underestimate the amount of saltmarsh, reporting less than half that shown by TasVeg2000. Last updated: 1600 14/3/2006 (standard)</td>
</tr>
<tr>
<td>Data source name</td>
<td>Coastal Values of Southern Tasmania project</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Identifier</td>
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</tr>
<tr>
<td>Custodian</td>
<td>Vegetation - DPIWE/ North Barker Ecosystem Services</td>
</tr>
<tr>
<td></td>
<td>Geomorphology - DPIWE/ Chris Sharples &amp; Frances Mowling</td>
</tr>
<tr>
<td>Abstract</td>
<td>The project is about the collection and integration of coastal management data for</td>
</tr>
<tr>
<td></td>
<td>the Southern Natural Resource Management Region, so that the whole region has a</td>
</tr>
<tr>
<td></td>
<td>consistent level of data on coastal vegetation, fauna habitat, land use and</td>
</tr>
<tr>
<td></td>
<td>geomorphology. It includes assessment of habitat condition, viability, and priorities</td>
</tr>
<tr>
<td></td>
<td>for the region.</td>
</tr>
<tr>
<td>Method</td>
<td>Data is to be collected from existing sources such as aerial photographs and then</td>
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<tr>
<td></td>
<td>ground-truthed and assessed as to its condition. Vegetation and geomorphological</td>
</tr>
<tr>
<td></td>
<td>data will intersect to achieve a priority data layer.</td>
</tr>
<tr>
<td>Comment</td>
<td>Mean High Water to 100m inland. NOT YET PUBLISHED. Due for publication in 2006.</td>
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<td></td>
<td>Last updated: 1300 17/3/2006 (standard)</td>
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<table>
<thead>
<tr>
<th>Data source name</th>
<th>Coastal Values of North East Tasmania project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
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<tr>
<td>Custodian</td>
<td>Vegetation - DPIWE</td>
</tr>
<tr>
<td></td>
<td>Geomorphology - DPIWE/ Chris Sharples &amp; Frances Mowling</td>
</tr>
<tr>
<td>Abstract</td>
<td>This project is about collecting coastal management data so that the whole Northern</td>
</tr>
<tr>
<td></td>
<td>NRM Region has a consistent level of data on coastal vegetation and fauna habitat.</td>
</tr>
<tr>
<td></td>
<td>Coastal data will provide State and Local Government and Northern NRM Committee</td>
</tr>
<tr>
<td></td>
<td>planners, managers and decision makers with a better understanding of the existing</td>
</tr>
<tr>
<td></td>
<td>coastal environment. This will enable better decisions on the sustainable use and</td>
</tr>
<tr>
<td></td>
<td>development of our coastline.</td>
</tr>
<tr>
<td>Method</td>
<td>Data is to be collected from existing sources such as aerial photographs and then</td>
</tr>
<tr>
<td></td>
<td>ground-truthed and assessed as to its condition.</td>
</tr>
<tr>
<td>Comment</td>
<td>Mean High Water to 100m inland. NOT YET PUBLISHED. Due for publication in 2006.</td>
</tr>
<tr>
<td></td>
<td>Last updated: 1300 17/3/2006 (standard)</td>
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</table>

<table>
<thead>
<tr>
<th>Data source name</th>
<th>TASVEG – The Tasmanian Vegetation Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>ANZTA00150000012</td>
</tr>
<tr>
<td>Custodian</td>
<td>Coordinator, Tasmanian Vegetation Mapping Program, DPIWE.</td>
</tr>
<tr>
<td></td>
<td>Phone: 03 6233 4501 Email: <a href="mailto:TASVEG@dpiwe.tas.gov.au">TASVEG@dpiwe.tas.gov.au</a></td>
</tr>
<tr>
<td>Abstract</td>
<td>TASVEG is a Tasmania-wide vegetation map, produced by the Tasmanian Vegetation</td>
</tr>
<tr>
<td></td>
<td>Mapping Program (TVMP). The TVMP use 154 distinct vegetation communities to produce</td>
</tr>
<tr>
<td></td>
<td>TASVEG at</td>
</tr>
</tbody>
</table>
a scale of 1:25,000. The TASVEG mapping builds on and incorporates the Regional Forest Agreement (RFA) mapping of forest vegetation communities as well as the World Heritage Area (WHA) mapping that was carried out at 1:25,000 scale. Non-forest community types include grasslands, heathlands, scrub, wetlands and saltmarshes as well as riparian and coastal vegetation, woodlands and forest remnants.

**Method**
The principal techniques used are aerial photographic interpretation, transformation of that data into digital form and incorporation of external data resources, such as the RFA, WHA and plantation mapping, followed by field verification. The photographic interpretation has been digitised and joined using custom software (PhotoFactory) and attributed with Genamap, a GIS system with a custom-made interface. This data is currently stored in an ArcSDE database.

**Comment**
TASVEG is based on 158 vegetation communities. It is not a habitat map, but a map of the extent and distribution of vegetation types. The mapping has been used in the past as the base for habitat mapping (eg. Hobart City Council). It has statewide coverage, including coastal and estuarine macro-vegetation. Coverage is complete, with on-going improvement and revision.

Last updated: 1600 14/3/2006 (standard)

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<th>Data source name</th>
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<td>Internal report NOT YET PUBLISHED. Due for publication in 2006. Will be available from DPIWE Library. Contact for Project is Felicity Faulkner, Biodiversity Conservation Branch.</td>
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<th>Salt marshes in Tasmania: Distribution, community composition and conservation</th>
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<td>J.B. Kirkpatrick</td>
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<td>Abstract</td>
<td>The maps of Kirkpatrick and Glasby (1981) showing the distribution of vegetation species in saltmarshes across Tasmania could act a basis for change analysis. The authors present a relationship between the various vegetation communities and the environmental variables of salinity and waterlogging. The report is a potential basis for studying trends in condition of saltmarshes in Tasmania.</td>
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