



Weed Assessment and Vegetation Prioritisation Project

For the Derwent Estuary Program

22nd April 2010
NRM007

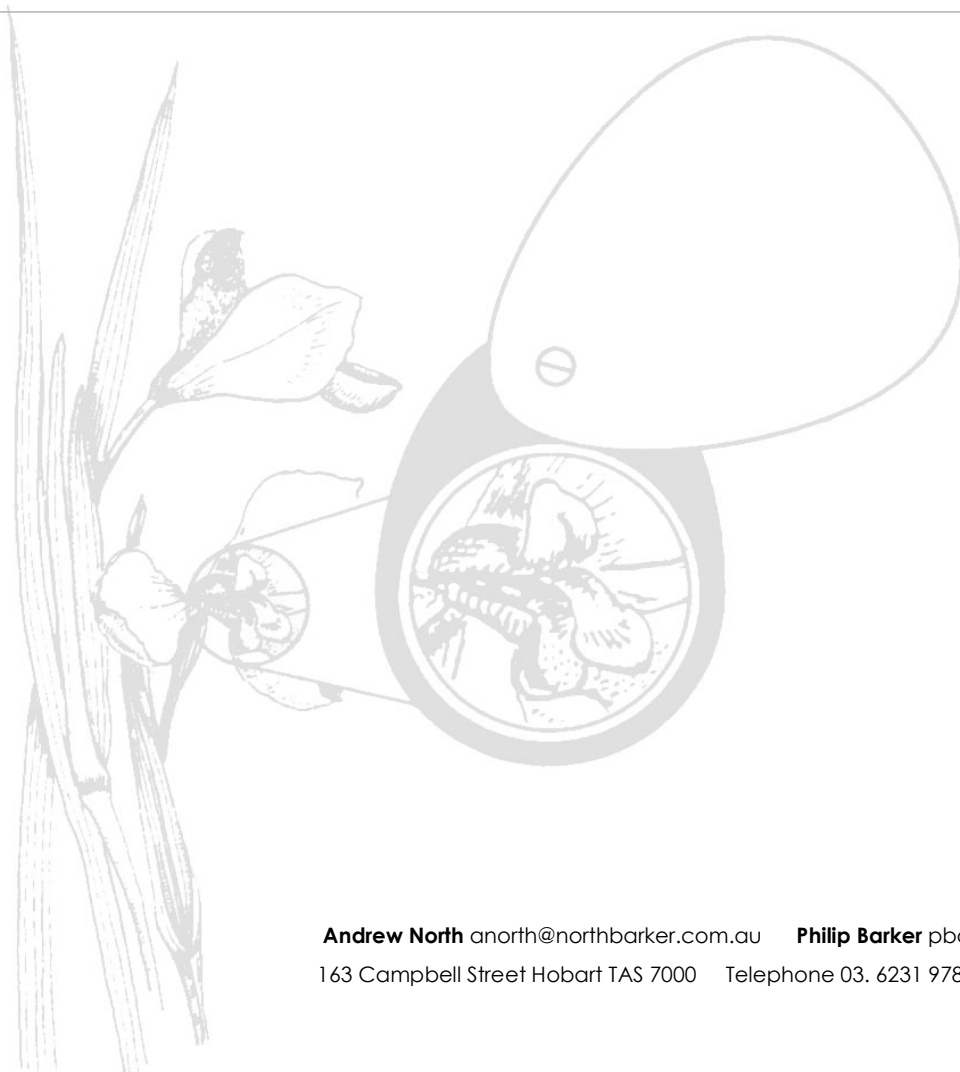


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1. BACKGROUND

The Derwent Estuary Program (DEP) has engaged North Barker Ecosystem Services to undertake the DEP Weed Assessment and Vegetation Prioritisation Project. This project is part of a larger project that has been funded by Australian Government Community Coastcare.

The study area for this project is defined as the Tasmanian coastal strip (between mean high water mark and 100 metres inland) for the DEP area. The DEP area runs from Tinderbox, following the coast north to the bridge in New Norfolk, crossing the river to the northern side, and then following the coast east and south to Cape Direction and the Iron Pot lighthouse. Within this study area an approximately one hectare grid running along the coast was defined.

The aim of this project is to compile into one data set weed records from various sources that fall within the DEP study area. Following on from this, vegetation communities within the study area were prioritised based on assessed scores for condition, viability, and significance. Deliverables for this project include a data set of weed records and information on priority vegetation areas, along with suggested and scoped weed control projects at several nominated priority sites.

2. VEGETATION PRIORITISATION

2.1 Methodology

Data for this part of the project has been brought forward from previous DEP funded NRM South Coastal Values projects covering the same region. The grid for that project has been used as the study area for this project and the corresponding condition and viability data has also been used.

In addition to the original 1 ha grid, more grid cells have been added for this project to cover several key aquatic habitats for which information has been more recently developed. Vegetation condition and viability information has been added to these cells to form a complete data set. As field work was not carried out for this part of the project the condition and viability values assigned to each grid was derived from a desk top assessment based on ecological principles including the presence of weeds, the condition of adjacent cells and the vegetation communities present.

Vegetation viability is a statement of the likely persistence of the current condition or the risk of it declining with and/or without management. The following input data is used to determine the viability score:

- Condition of native vegetation.
- Adjacent land cleared of native vegetation.
- Mapped declared and environmental weed polygons.
- Human Infrastructure: roads, tracks, easements.

Each grid is assigned a value of 0 to 4 for viability, the definitions of which are shown below in Table 1.

Table 1 – Viability Classes

| Viability | Definition | Explanation / management |
|------------------|---|---|
| 0 | Not Applicable | Dominated by non-native vegetation. |
| 1 | Viable and self sustaining | Viable as a self-sustaining vegetation unit. |
| 2 | Viable but at risk | Viable as a self sustaining vegetation unit but at some risk of degradation. This is likely to be due to the presence of, for example, a road, a house or some cleared land in the cell. Weed monitoring is recommended. |
| 3 | Management required and or high risk | A vegetation unit that requires significant management due to the presence of weeds and/or has additional exposure to risk of degradation through the presence of roads, houses or cleared land. |
| 4 | Not viable, but may be managed as a buffer area | Considerable degradation or at very high risk of degradation. These vegetation units may perform a function as a buffer to adjacent vegetation if they are managed appropriately. If they are not managed they represent a risk to adjacent vegetation. |

For the entire grid (original and additional grid cells) a significance rating was then assigned. This data set is derived from the vegetation layer and is determined by the presence of federal or state listed threatened vegetation communities (i.e. its conservation status) and/or the presence of saltmarsh or wetland communities (prioritised under this project).

Each grid is assigned a value of 1 to 4 for significance, the definitions of which are shown below in Table 2. This table also gives an indication for each significance level - the ground area and the percentage of the total area they make up. Table 3 shows the vegetation communities, their area within the study area, their threatened status and their wetland status.

Table 2 – Significance Classes

| Significance | Vegetation Type/ Conservation Status | Area (ha) | Percentage |
|---------------------|--|------------------|-------------------|
| 1 | Listed as Threatened on the Federal EPBC Act | 53.9 | 2 |
| 2 | Listed as Threatened on the Tasmanian NCA Act or is a saltmarsh or wetland community | 430.9 | 18 |
| 3 | Non-threatened native vegetation | 559.4 | 23 |
| 4 | Non-native vegetation | 1353 | 57 |
| | Total | 2397.2 | 100% |

Table 3 – Vegetation Communities and Threatened Status

| Veg Code* | NBA_Legend | Area (ha) | Tas Threatened Status (NCA 2002) | Aus Threatened Status (EPBCA 1999) | Wetland Status |
|-----------|--|-----------|----------------------------------|------------------------------------|----------------|
| DGL | <i>Eucalyptus globulus</i> dry forest and woodland | 119.8 | Threatened | - | - |
| ASS | Succulent saline herbland | 83.3 | - | - | Yes |
| DTO | <i>Eucalyptus tenuiramis</i> forest and woodland on sediments | 57.8 | Threatened | - | - |
| ASF | Fresh water aquatic sedgeland and rushland | 52.5 | Threatened | - | Yes |
| ARS | Saline sedgeland/rushland | 47.4 | - | - | Yes |
| GPL | Lowland <i>Poa labillardierei</i> grassland | 38.1 | - | Critically Endangered | - |
| DVC | <i>Eucalyptus viminalis</i> - <i>Eucalyptus globulus</i> coastal forest and woodland | 32.1 | Threatened | - | - |
| DOV | <i>Eucalyptus ovata</i> forest and woodland | 29.4 | Threatened | - | - |
| GTL | Lowland <i>Themeda triandra</i> grassland | 15.7 | - | Critically Endangered | - |
| DRI | <i>Eucalyptus risdonii</i> forest and woodland | 5.2 | Threatened | - | - |
| AHS | Saline aquatic herbland | 1.8 | Threatened | - | Yes |
| SRI | Riparian scrub | 1.0 | Threatened | - | - |
| DAS | <i>Eucalyptus amygdalina</i> forest and woodland on sandstone | 0.4 | Threatened | - | - |
| AHL | Lacustrine herbland | 0.2 | Threatened | - | Yes |

* - Veg codes are based on Tasveg version 1.0

Vegetation priority is a statement of the overall value of the vegetation within each grid, based on its viability and significance. The priority score is based on a matrix system which intersects the values of vegetation viability and vegetation significance in each grid cell. Table 4 below shows the matrix table and the resultant vegetation priority score.

Table 4 – Vegetation Priority Matrix

| Significance | Viability | | | | |
|--------------|-----------|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 |
| 1 | 0 | 1 | 1 | 2 | 3 |
| 2 | 0 | 1 | 2 | 2 | 3 |
| 3 | 0 | 2 | 2 | 3 | 4 |
| 4 | 0 | 4 | 4 | 4 | 4 |

From this matrix, each grid cell is then assigned a priority rating value of 0 to 4. The definitions of these priority ratings are shown below in Table 5, along with the number of grid cells for each priority rating and the percentage these make up out of the total.

Table 5 – Vegetation Priority Matrix

| Priority | Conservation Status | Number of Grid Cells | Percentage |
|----------|--|----------------------|------------|
| 1 | High Priority | 443 | 19 |
| 2 | Moderate Priority | 556 | 23 |
| 3 | Low Priority | 412 | 17 |
| 4 | Lowest Priority | 358 | 15 |
| 0 | Non Priority (dominated by non-native vegetation) | 606 | 26 |
| | Total | 2375 | 100 |

This priority layer has then been used to determine priority vegetation areas around the DEP area. This can be used as a management tool to assist in determining the most appropriate areas for on-ground works and to guide where funding should be directed.

2.2 Data Gaps/ Limitations

Condition and viability data for the original 1ha grid cells is data used from a previous project and has not been updated for this project. Consequently it may be out of date and changes that may have occurred in these variables in the time between these two

projects will not have been picked up. Additionally, the new grid cells constructed as a part of this project have condition and viability data that was derived from a desk top assessment, without any field verification. Field verification was not carried out due to funding and time constraints for this project. As a result of this, the data, which was based on ecological principles and the author's knowledge of the area, is subjective and information that may have been picked up during a site visit could not be used to give the data added integrity and robustness.

The use of the matrix as a tool to determine the final priority level of each grid cell is intended to combine different values (significance and viability) to come up with a priority rating for each grid cell. It does have some limitations in that it is a broad tool, and may not pick up the finer details of some information within grid cells. It is also open to debate as to the scores attributed to the final priority score and as such is subjective in nature, and different authors could assign different values to the matrix. Consequently the ultimate priority values assigned to the grid cells are very dependant on this subjectivity and this needs to be kept in mind. Having said that, the results of the matrix in highlighting priority sites appears to have been successful in the eyes of those people with knowledge of the DEP area.

2.3 Priority Sites

Through the site prioritisation process 16 sites were identified as containing high priority vegetation communities. All sites have then been further assessed against other criteria to give more detail about each site, and to assist in the prioritisation process. The additional criteria that each site was assessed against includes;

- council area,
- access tenure (percentage of authority land within site),
- dominant vegetation communities present (top five most abundant)
- area of dominant vegetation communities (hectares)
- threatened flora recorded within site
- threatened fauna recorded within site
- main weed threats (top five most abundant)
- time needed to assess weed control works & gps weeds (for future work)
- time needed for GIS mapping(for future work)

These sites and full details are identified in table 6 below.

Table 6 – High Priority Sites

| Site No. | Site | Council Area | Access | Tenure - % authority land within site | Dominant Vegetation Communities Present (Top 5 most abundant) | Area of Dominant Vegetation Communities (ha) | Threatened Flora Recorded within site | Threatened Fauna Records within site | Main Weed Threats (Top 5 most abundant) | Time needed to assess weed control works & gps weeds | Time needed for GIS mapping |
|----------|--------------------------------|---------------------|---|---------------------------------------|---|--|---------------------------------------|--------------------------------------|---|--|-----------------------------|
| 1 | Piersons Point/Passage Point | Kingborough Council | Access through Piersons Park to coastal reserve, otherwise through private property. Also access from River Derwent. | 56.9 | <i>Euc.globulus</i> dry forest and woodland | 4.9 | none recorded | none recorded | blackberry | 4 hours | 4 hours |
| | | | | | <i>Euc. viminalis</i> grassy forest and woodland | 2.1 | | | briar rose | | |
| | | | | | <i>Allocasuarina verticillata</i> forest | 2.0 | | | | | |
| | | | | | Agricultural land | 1.5 | | | | | |
| | | | | | Lowland grassland complex | 0.9 | | | | | |
| 2 | Lucas Point to Flowerpot Point | Kingborough Council | Access is through parts of the coastal reserve, however large parts are private. Also access from River Derwent. | 56.3 | <i>Euc. globulus</i> dry forest and woodland | 13.8 | none recorded | white-bellied sea eagle | patersons curse | 8 hours | 6 hours |
| | | | | | Lowland <i>Themeda triandra</i> grassland | 7.7 | | | | | |
| | | | | | <i>Euc. tenuiramis</i> forest and woodland on sediments | 7.0 | | | | | |
| | | | | | <i>Allocasuarina verticillata</i> forest | 5.0 | | | | | |
| | | | | | Extra-urban miscellaneous | 4.5 | | | | | |
| 3 | Tyndall Beach to Taroona Beach | Kingborough Council | Good access through various public roads, with most land being coastal reserve. Walking track through coastal reserve, and also River Derwent access, although cliffs are very steep and dangerous. | 78.9 | <i>Euc. tenuiramis</i> forest and woodland on sediments | 16.8 | none recorded | none recorded | boneseed | 8 hours | 6 hours |
| | | | | | <i>Euc. globulus</i> dry forest and woodland | 10.8 | | | cotoneater | | |
| | | | | | Urban areas | 2.3 | | | mirror bush | | |
| | | | | | <i>Euc. viminalis</i> grassy forest and woodland | 1.1 | | | red valerian | | |
| | | | | | Rock (cryptogamic lithosere) | 1.0 | | | blackberry | | |

| Site No. | Site | Council Area | Access | Tenure - % authority land within site | Dominant Vegetation Communities Present (Top 5 most abundant) | Area of Dominant Vegetation Communities (ha) | Threatened Flora Recorded within site | Threatened Fauna Records within site | Main Weed Threats (Top 5 most abundant) | Time needed to assess weed control works & gps weeds | Time needed for GIS mapping |
|----------|--------------------------------------|------------------------|---|---------------------------------------|---|--|---|--------------------------------------|---|--|-----------------------------|
| 4 | Section north of Austins Ferry Bay | Glenorchy Council | Access through private school grounds. Also access from River Derwent. | 0 | <i>Euc. viminalis</i> grassy forest and woodland | 4.3 | <i>Caladenia caudata</i> | green and golden frog | boneseed | 3 hours | 4 hours |
| | | | | | Urban areas | 0.6 | <i>Lepidium pseudotasma nicum</i> | | | | |
| | | | | | <i>Euc. globulus</i> dry forest and woodland | 0.4 | <i>Velleia paradoxa</i> | | | | |
| 5 | Murphys Flat to Bridgewater Causeway | Derwent Valley Council | Access from land from the Lyell Hwy or by boat on the River Derwent. | 75.9 | Leptospermum scrub | 28.3 | <i>Austrostipa nodosa</i> | eastern barred bandicoot | african boxthorn | 16 hours | 8 hours |
| | | | | | Fresh water aquatic sedgeland and rushland | 26.6 | <i>Austrostipa scabra</i> | great crested grebe | blackberry | | |
| | | | | | Saline sedgeland/rushland | 13.9 | <i>Brachyscome rigidula</i> | masked owl (tasmanian) | fennel | | |
| | | | | | Dry scrub | 10.9 | <i>Cynoglossum australe</i> | | willow | | |
| | | | | | Agricultural land | 9.5 | <i>Lepidium pseudotasma nicum</i> | | boneseed | | |
| | | | | | | | <i>Ranunculus pumilio</i> var. <i>pumilio</i> | | | | |
| | | | | | | | <i>Vittadinia gracilis</i> | | | | |
| 6 | Barwicks Wash (southern side) | Derwent Valley Council | Access from land from the Lyell Hwy or by boat on the River Derwent. Land access involves a large amount of private property. | 0 | Dry scrub | 21.6 | none recorded | none recorded | none recorded | 8 hours (more if boat necessary) | 6 hours |
| | | | | | Leptospermum scrub | 3.3 | | | | | |
| | | | | | Agricultural land | 2.9 | | | | | |
| | | | | | Fresh water aquatic sedgeland and rushland | 1.3 | | | | | |
| | | | | | Saline sedgeland/rushland | 0.9 | | | | | |

| Site No. | Site | Council Area | Access | Tenure - % authority land within site | Dominant Vegetation Communities Present (Top 5 most abundant) | Area of Dominant Vegetation Communities (ha) | Threatened Flora Recorded within site | Threatened Fauna Records within site | Main Weed Threats (Top 5 most abundant) | Time needed to assess weed control works & gps weeds | Time needed for GIS mapping |
|----------|--|------------------|---|---------------------------------------|---|--|---|--------------------------------------|---|--|-----------------------------|
| 7 | Barwicks Wash (northern side) | Brighton Council | Access from land from the railway line (or Boyer Rd) or by boat on the River Derwent. | 76.9 | Leptospermum scrub | 16.3 | none recorded | none recorded | willow | 8 hours (more if boat necessary) | 6 hours |
| | | | | | Saline sedgeland/rushland | 13.8 | | | | | |
| | | | | | Dry scrub | 7.8 | | | | | |
| | | | | | Bursaria - Acacia woodland and scrub | 6.1 | | | | | |
| | | | | | Euc. ovata forest and woodland | 5.0 | | | | | |
| 8 | Dromedary Marshes to Mason Point | Brighton Council | Access from land from the railway line (or Boyer Rd) or by boat on the River Derwent. | 96.3 | Saline sedgeland/rushland | 47.9 | none recorded | none recorded | blackberry | 16 hours (more if boat necessary) | 8 hours |
| | | | | | Fresh water aquatic sedgeland and rushland | 47.7 | | | sweet briar | | |
| | | | | | Leptospermum scrub | 31.2 | | | willow | | |
| | | | | | Dry scrub | 23.2 | | | african boxthorn | | |
| | | | | | Euc. ovata forest and woodland | 1.6 | | | fennel | | |
| | | | | | | | | | | | |
| 9 | Jordan River (in Bridgewater/G agebrook) | Brighton Council | Access from coastal reserve or from Cove Hill Rd. | 56.5 | Bursaria - Acacia woodland and scrub | 7.1 | none recorded | none recorded | none recorded | 4 hours | 4 hours |
| | | | | | Lowland grassland complex | 4.4 | | | | | |
| | | | | | Agricultural land | 3.6 | | | | | |
| | | | | | Allocasuarina verticillata forest | 2.5 | | | | | |
| | | | | | Wetland (undifferentiated) | 1.2 | | | | | |
| | | | | | | | | | | | |
| 10 | Blackstone Point | Brighton Council | Access through coastal reserve walking track, otherwise through private property. Also access from River Derwent. | 29.9 | Bursaria - Acacia woodland and scrub | 2.7 | Cynoglossum australe | none recorded | african boxthorn | 4 hours | 4 hours |
| | | | | | Allocasuarina verticillata forest | 2.6 | Dianella amoena | | boneseed | | |
| | | | | | Urban areas | 2.1 | Ranunculus sessiliflorus var. sessiliflorus | | blackberry | | |
| | | | | | Fresh water aquatic sedgeland and rushland | 1.4 | Vittadinia gracilis | | fennel | | |
| | | | | | Wetland (undifferentiated) | 1.3 | | | sweet briar | | |
| | | | | | | | | | | | |

| Site No. | Site | Council Area | Access | Tenure - % authority land within site | Dominant Vegetation Communities Present (Top 5 most abundant) | Area of Dominant Vegetation Communities (ha) | Threatened Flora Recorded within site | Threatened Fauna Records within site | Main Weed Threats (Top 5 most abundant) | Time needed to assess weed control works & gps weeds | Time needed for GIS mapping |
|----------|---------------------------------------|------------------|--|---------------------------------------|--|--|---|--------------------------------------|---|--|-----------------------------|
| 11 | Bedlam Walls (Shag Bay Point) section | Clarence Council | Access through nature reserve walking track. Also access from River Derwent. | 80.7 | <i>Euc. globulus</i> dry forest and woodland | 6.4 | <i>Euc. risdonii</i> | none recorded | horehound | Already assessed (9 hours) | Already mapped (6 hours) |
| | | | | | <i>Euc. risdonii</i> forest and woodland | 5.2 | <i>Olearia hookeri</i> | | radiata pine | | |
| | | | | | <i>Euc. amygdalina</i> forest and woodland on mudstone | 2.2 | <i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i> | | | | |
| | | | | | Lowland Themeda grassland | 2.1 | <i>Spyridium eriocephalum</i> var. <i>eriocephalum</i> | | | | |
| | | | | | Bursaria - Acacia woodland and scrub | 2.1 | <i>Vittadinia muelleri</i> | | | | |
| 12 | Droughty Hill Point | Clarence Council | Access via Droughty Point Rd, but most land is private. Also access from River Derwent. | 8.3 | Lowland Poa labillardierei grassland | 23.3 | none recorded | none recorded | african boxthorn | 8 hours | 6 hours |
| | | | | | Allocasuarina verticillata forest | 8.2 | | | boneseed | | |
| | | | | | Lowland grassland complex | 3.5 | | | | | |
| | | | | | Weed infestation | 0.5 | | | | | |
| | | | | | Urban areas | 0.5 | | | | | |
| 13 | Racecourse Flats | Clarence Council | Access via South Arm Rd. | 90.9 | Succulent saline herbland | 40.3 | none recorded | chevron looper moth | boneseed | 16 hours | 8 hours |
| | | | | | Saline sedgeland/rushland | 9.2 | | | | | |
| | | | | | Extra-urban miscellaneous | 6.2 | | | | | |
| | | | | | Regenerating cleared land | 4.8 | | | | | |
| | | | | | <i>Euc. viminalis</i> - <i>Euc. globulus</i> coastal forest and woodland | 1.9 | | | | | |
| 14 | Gorringes Beach | Clarence Council | Access via Rifle Range Rd and coastal reserve walking tracks. Also access from Mortimer Bay. | 71.4 | <i>Euc. viminalis</i> - <i>Euc. globulus</i> coastal forest and woodland | 10.0 | none recorded | swift parrot | canary broom | 5 hours | 4 hours |
| | | | | | <i>Euc. globulus</i> dry forest and woodland | 5.9 | | | radiata pine | | |
| | | | | | Bursaria - Acacia woodland and scrub | 1.7 | | | spanish heath | | |
| | | | | | Agricultural land | 1.3 | | | agapanthus | | |
| | | | | | Plantations for silviculture | 0.8 | | | boneseed | | |

| Site No. | Site | Council Area | Access | Tenure - % authority land within site | Dominant Vegetation Communities Present (Top 5 most abundant) | Area of Dominant Vegetation Communities (ha) | Threatened Flora Recorded within site | Threatened Fauna Records within site | Main Weed Threats (Top 5 most abundant) | Time needed to assess weed control works & gps weeds | Time needed for GIS mapping |
|----------|------------------------|------------------|---|---------------------------------------|--|--|---------------------------------------|--------------------------------------|---|--|-----------------------------|
| 15 | Ralphs Bay (East Side) | Clarence Council | Access via Rifle Range Rd and Palana Court and various coastal reserve walking tracks. Most land is private. Also access from Ralphs Bay. | 42.2 | <i>Euc. globulus</i> dry forest and woodland | 23.0 | none recorded | none recorded | boneseed | 8 hours | 6 hours |
| | | | | | <i>Allocasuarina verticillata</i> forest | 8.5 | | | african boxthorn | | |
| | | | | | Lowland grassland complex | 6.8 | | | | | |
| | | | | | <i>Euc. tenuiramis</i> forest and woodland on sediments | 1.5 | | | | | |
| | | | | | Bursaria - Acacia woodland and scrub | 1.5 | | | | | |
| 16 | Ralphs Bay (West Side) | Clarence Council | Access via tracks from Opossum Bay through to coastal reserve walking tracks. Most land is private. Also access from Ralphs Bay. | 33.4 | <i>Allocasuarina verticillata</i> forest | 10.5 | none recorded | white-bellied sea-eagle | african boxthorn | 5 hours | 4 hours |
| | | | | | Bursaria - Acacia woodland and scrub | 6.6 | | | | | |
| | | | | | Agricultural land | 2.5 | | | | | |
| | | | | | <i>Euc. viminalis</i> - <i>Euc. globulus</i> coastal forest and woodland | 0.9 | | | | | |
| | | | | | Coastal grass and herbfield | 0.6 | | | | | |

3. WEED ASSESSMENT

3.1 Methodology

Weed data has been combined from 23 separate data sources (see below for list) to form a single consistent data set for this project. Data consists of point, line and polygon records. The following is a summary of the methodology used to assess, edit and compile the data into the one data set.

- Receive all data sources.
- Convert all data into point, line and polygon format and ensure all data has geographical information.
- Give all original data records a unique identifier so that records within the final data set can be linked back to the source data.
- Check and correct projections where necessary (GDA94, MGA zone 55)
- Design GIS table structure for final data set.
- Re-structure all incoming data sources to fit the final data set table structure.
- Merge all data into the one final data set.
- Clean and edit data where necessary (scientific name, common name, accuracy).
- Create data where possible (weed code, source of data, LGA, eastings & northings, MGA zone, map object shape, accuracy, accuracy range).
- Remove data outside of study area. Study area has been taken from past DEP projects - 100m grid following coastline from Tinderbox to New Norfolk to Iron Pot Lighthouse.
- Create GIS tab files.
- Analyse data and create maps as needed.

3.2 Weed Management Projects in DEP area

In order to understand where resources are currently being directed within the DEP area councils were contacted to find out what community groups were active in their areas. Currently only the Derwent Valley Council, Brighton Council and Clarence Council have been contacted. Information on the remaining council areas will be supplied by the Derwent Estuary Program (DEP).

Derwent Valley Council - source Steven Joyce

No current groups are active in the Derwent Valley Council area. A joint initiative project between the Derwent Valley Council and Greening Australia was running for some time in the Tynwald Park/ Lachlan River area. This project targeted African feather grass, but is no longer running.

Brighton Council - source Oliver Heywood

No current groups are active in the Brighton Council area. Some groups were active approximately ten years ago, however they are no longer running.

Clarence Council - source Phil Watson

Approximately 15 to 20 current groups are active in the Clarence Council area. The Derwent Estuary Program (DEP) should be aware of these groups and have their details.

3.3 Data Sources

Organisations known to be involved in weed management within the DEP area were approached to provide weed records for this project. The following table lists all of the sources of the data that were incorporated into the final data set. All weed records falling outside of the study area were removed from the data set.

Table 7 – Sources of weed data records

| Source | Details |
|---------------------------------------|---|
| North Barker Ecosystem Services | Weed records from all projects falling within the DEP study area. |
| Derwent Valley Council | Weed records from within the DEP study area. |
| Clarence Council | Weed records from within the DEP study area. |
| Southern Tasmanian Councils Authority | Asparagus weeds records from within the DEP study area. |
| Southern Tasmanian Councils Authority | Boneseed coastal values records from within the DEP study area. |
| Natural Values Atlas (DPIPWE) | Weed records from within the DEP study area. |

Weed records from the following sources were also received, but due to their arrival at a late stage in the project, were not able to be incorporated into the final data set.

Table 8 – Sources of weed data records that have not been incorporated

| Source | Details |
|------------------------|--|
| Kingborough Council | General weed records are available |
| Hobart City Council | Hard copy of a coastal values report is available. Individual weed records are not in this report. |
| Glenorchy City Council | A mud map of weed control sites and control efforts is available. Individual weed records are not available. |
| DPIPWE | Weed records from within the DEP study area. |

Full details of the data incorporated into this project are detailed in Table 9 below.

Table 9 – Data sources for original weed data

| Source ID | Original File Name | Source | Original NBES project | NBES Project Name | NBES Project Date | Data Format |
|----------------------------|---|---|-----------------------|------------------------------------|-------------------|-------------------------|
| BRI29 - KBC4320 | 2008 Priority Weed Data for DEP Councils - STWS.xls | STCA (via Fiona Wells) | - | - | - | points |
| NBES001 - NBES144, NBES244 | Weeds_NBES_Projects.tab | NBES | BRI001 | Derwent Foreshore Walk | 9/01/2006 | points, lines, polygons |
| NBES145 - NBES179 | Weeds_NBES_Projects.tab | NBES | HCC004 | Cornelian Bay | 1/02/2006 | points, polygons |
| NBES180 - NBES188 | Weeds_NBES_Projects.tab | NBES | POW002ci | Derwent Brighton | 8/06/2004 | points, polygons |
| NBES189 | Weeds_NBES_Projects.tab | NBES | POW002cii | Derwent Brighton | 8/06/2004 | points |
| NBES190 | Weeds_NBES_Projects.tab | NBES | POW003a | Hobart | 31/08/2004 | polygons |
| NBES191 - NBES216 | Weeds_NBES_Projects.tab | NBES | POW003ab | Rosny | 31/08/2004 | points, polygons |
| NBES217 - NBES226 | Weeds_NBES_Projects.tab | NBES | SHE001 | Tranmere Road | 17/10/2007 | points, lines, polygons |
| NBES227 - NBES243 | Weeds_NBES_Projects.tab | NBES | TCT001 | Murphys Flats, River Derwent | 17/11/2005 | points, lines |
| NBES245 - NBES425 | Weeds_NBES_Projects.tab | NBES | ENV001 | Derwent Estuary Program | 18/08/2008 | points, lines, polygons |
| NBES426 - NBES629 | Weeds_NBES_Projects.tab | NBES | KIN002 | Taroona Coastal Foreshore Reserves | 20/05/2008 | points, polygons |
| NBES630 - NBES636 | Weeds_NBES_Projects.tab | NBES | PAG005 | Maria Point, Sandford | 24/09/2008 | points, polygons |
| NBES637 - NBES760 | Weeds_NBES_Projects.tab | NBES | PAS021 | Granton to New Norfolk | 2/02/2007 | points, lines |
| NBES661 - NBES762 | Weeds_NBES_Projects.tab | NBES | PAS035 | The Neck | 30/01/2008 | points |
| DERV001 - DERV077 | Derwent Municipality_091011.xls | STCA (via Fiona Wells) | - | - | - | points |
| CLAR001 - CLAR2436 | Data sheets for CCC.xls | Clarence Council (via Fiona Wells) | - | - | - | points |
| STCA001 - STCA092 | AspWeedsRecords20Nov09 DEP.xls | STCA (Asparagus Weeds Records)(via Fiona Wells) | - | - | - | points |

| Source ID | Original File Name | Source | Original NBES project | NBES Project Name | NBES Project Date | Data Format |
|------------------------|---|---|-----------------------|--------------------------------|-------------------|----------------------|
| STCA093 - STCA396 | Boneseed coastal values records.xls | STCA (Boneseed Coastal Values Records)(via Fiona Wells) | - | - | - | points |
| CHER001 - CHER0566 | Tas Records Hillary Cherry.xls | STCA (Hillary Cherry Records)(via Fiona Wells) | - | - | - | points |
| NBES0763 - NBES1964 | Weeds_Clarence Derwent (DEP.TCT)_ENV001.tab | NBES | ENV001 | Derwent Estuary Program | 18/08/2008 | grid polygons/points |
| NBES1965 - NBES3388 | Weeds_THE LIST_NRM001_extract.tab | NBES | NRM001 | Coastal Mapping Project | 1/11/2006 | grid polygons/points |
| NVA0001 - NVA0051 | NVA records in study area.tab | Natural Values Atlas | - | - | - | points |
| NBES3389 - NBES3464 | FWU polygons from ENV002 veg.tab | NBES | ENV002 | Derwent Habitat Wetlands Atlas | 2008 | polygons |

3.4 Data gaps/ limitations

Sufficient time was not available during this project to go through the weed records and analyse for duplication. It is highly likely that duplicate records do exist within the data set in its current format and this should be remedied if future funding is available to work on the data set.

The Clarence, Kingborough and Derwent Valley council areas maintain weed data records that have been incorporated into this data set. The Hobart, Glenorchy and Brighton Council areas do not appear to have similar weed information. Therefore the weed information from the latter councils is likely to be less up to date and have fewer records. Weed records from several sources (see Table 8) were also received, but due to their arrival at a late stage in the project, were not able to be incorporated into the final data set. The data set is therefore incomplete and the incorporation of this additional data at a later stage may alter some of the conclusions and recommendations made in this report.

Spatial accuracy of weed records for this data set is highly variable with approximately 15% of records having an unknown accuracy. Accuracy figures for the remaining records have been given, however many of these should be treated with caution, and consequently the whole data set should be treated in the same manner. Approximately 17% of records have an accuracy of 0 – 10m, 68% @ 11- 100m, 1% @ 101m+ and 15% unknown. No records have been checked in the field.

Due to the varied nature, standard and age of the received data, many of the records do not contain attribute information for all of these fields, and therefore the quality of the information varies considerably and can not be verified. Where received records contained nonsensical data, the record has been kept but the data within that field has been eliminated.

Only weeds that are listed on the Priority Weed List for this project have been included within the data set. All weed records of other species not on the list have been excluded. See the section below on Priority Weeds for further details on how weeds were selected for this list and for the actual list itself.

3.5 Priority Weeds

A weed list has been created for this project with the aim of prioritising the most important weeds and eliminating weed records of weed species that are not considered to be as ecologically significant.

This list has been created using a priority weed list from the Southern Tasmanian Weed Strategy (created by NRM South and the Southern Tasmanian Councils Authority), with additions of declared weeds (listed under the Weed Management Act 1999) and environmental weeds (based on North Barker staff experience and advice from various other people currently working on weed projects). A total of 82 species are included in the list, with records of 71 species occurring within the database. This list can be seen below in table 10.

Table 10 also includes a statement for each weed on its invasive potential in wetland environments and also its priority level within the DEP area, which considers its priority level against its distribution in both wetland and dryland environments.

Table 10 – DEP Priority Weed List

| Common Name | Scientific Name | Reason for inclusion | Invasive potential in wetlands | Priority for DEP area |
|----------------------|------------------------------------|-------------------------------|---------------------------------------|-----------------------|
| african boxthorn | <i>Lycium ferocissimum</i> | On Southern NRM Priority List | High for dry edges only | High |
| african feathergrass | <i>Pennisetum macrourum</i> | On Southern NRM Priority List | Very High | Very High |
| african lovegrass | <i>Eragrostis curvula</i> | On Southern NRM Priority List | Medium for dry edges only | High |
| agapanthus | <i>Agapanthus praecox</i> | Environmental Weed | Low for dry edges only | Low |
| asparagus | <i>Asparagus officianalis</i> | Environmental Weed | Medium for dry edges only | Medium |
| asparagus fern | <i>Asparagus scandens</i> | On Southern NRM Priority List | Medium for dry edges only | Medium |
| banana passionfruit | <i>Passiflora mollissima</i> | Environmental Weed | Low for dry edges only | Medium |
| blackberry | <i>Rubus fruticosus</i> | Declared Weed | High on edges of fresh water wetlands | High |
| blue periwinkle | <i>Vinca major</i> | Environmental Weed | High for dry edges only | High |
| bluebell creeper | <i>Billardiera heterophylla</i> | Environmental Weed | Low for dry edges only | High |
| boneseed | <i>Chrysanthemoides monilifera</i> | Declared Weed | High for dry edges only | High |
| bracelet honeymyrtle | <i>Melaleuca armillaris</i> | Environmental Weed | Low for dry edges only | Low |
| bridal creeper | <i>Asparagus asparagoides</i> | On Southern NRM Priority List | High for dry edges only | High |
| butterfly bush | <i>Psoralea pinnata</i> | Environmental Weed | Medium | Medium |
| californian thistle | <i>Cirsium arvense</i> | Declared Weed | Medium | High |
| canary broom | <i>Genista monspessulana</i> | Declared Weed | High for dry edges only | High |
| cape ivy | <i>Delairea odorata</i> | Environmental Weed | Medium for dry edges only | High |
| cape wattle | <i>Paraserianthes lophantha</i> | Environmental Weed | Low | Low |
| cherry plum | <i>Prunus cerasifera</i> | Environmental Weed | Low | Low |
| Chilean needle grass | <i>Nasella neesiana</i> | Declared Weed | High for dry edges only | High |
| cootamundra wattle | <i>Acacia baileyana</i> | Environmental Weed | Low for dry edges only | Low |
| cotoneater | <i>Cotoneaster sp.</i> | Environmental Weed | Medium | Medium |
| cotton thistle | <i>Onopordum acanthium</i> | On Southern NRM Priority List | Medium | Medium |
| creeping yellowcress | <i>Rorippa sylvestris</i> | On Southern NRM Priority List | Low | Low |
| cut-leaf nightshade | <i>Solanum triflorum</i> | On Southern NRM Priority List | Low | Low |
| english broom | <i>Cytisus scoparius</i> | Declared Weed | High for dry edges only | High |
| espartillo | <i>Achnatherum caudatum</i> | On Southern NRM Priority List | High for dry edges only | High |

| Common Name | Scientific Name | Reason for inclusion | Invasive potential in wetlands | Priority for DEP area |
|-----------------------|---|-------------------------------|--------------------------------------|-----------------------|
| european ash | <i>Fraxinus sp</i> | Environmental Weed | High in riparian systems | Low |
| false dandelion | <i>Urospermum dalechampii</i> | On Southern NRM Priority List | Low | Low |
| feathertop | <i>Pennisetum villosum</i> | On Southern NRM Priority List | High for dry edges only | High |
| fennel | <i>Foeniculum vulgare</i> | Declared Weed | High for dry edges only | High |
| gladiolus | <i>Gladiolus spp.</i> | Environmental Weed | Low for dry edges only | Low |
| golden wattle | <i>Acacia pycnantha</i> | Environmental Weed | Low | Low |
| gorse | <i>Ulex europaeus</i> | Declared Weed | High for dry edges only | High |
| grevillea | <i>Grevillea sp.</i> | Environmental Weed | Low | Low |
| hairy fiddleneck | <i>Amsinckia calycina</i> | On Southern NRM Priority List | Low | Low |
| hawthorn | <i>Crataegus monogyna</i> | Environmental Weed | Low for dry edges only | Medium |
| heather | <i>Calluna vulgaris</i> | On Southern NRM Priority List | Low | Low |
| hemlock | <i>Conium maculatum</i> | Environmental Weed | Low | Low |
| himalayan honeysuckle | <i>Leycesteria formosa</i> | On Southern NRM Priority List | Low | Low |
| holly | <i>Ilex aquifolium</i> | Environmental Weed | Low | Low |
| horehound | <i>Marrubium vulgare</i> | Declared Weed | Low | High |
| horsetail | <i>Equisetum hyemale</i> | On Southern NRM Priority List | High | High |
| hottentot fig | <i>Carpobrotus edulis</i> | Environmental Weed | Low | Low |
| ivy | <i>Hedera helix</i> | Environmental Weed | Low | Medium |
| japanese honeysuckle | <i>Lonicera japonica</i> | Environmental Weed | Low | Low |
| japanese knotweed | <i>Fallopia japonica</i> | On Southern NRM Priority List | Low | Low |
| karamu | <i>Coprosma robusta</i> | On Southern NRM Priority List | Very High | Very High |
| lupin | <i>Lupinus sp.</i> | Environmental Weed | Low | Low |
| marram grass | <i>Ammophila arenaria</i> | Environmental Weed | High on dry edges of saline wetlands | High |
| mirror bush | <i>Coprosma repens</i> | Environmental Weed | High | High |
| myrtle leaf milkwort | <i>Polygala myrtifolia</i> var. <i>myrtifolia</i> | Environmental Weed | Low | Low |
| nodding thistle | <i>Carduus nutans</i> | On Southern NRM Priority List | Medium | Medium |
| onion weed | <i>Asphodelus fistulosus</i> | Environmental Weed | Low | Low |
| orange hawkweed | <i>Hieracium aurantiacum</i> | On Southern NRM Priority List | Low | Low |

| Common Name | Scientific Name | Reason for inclusion | Invasive potential in wetlands | Priority for DEP area |
|------------------------|--------------------------------|-------------------------------|---|-----------------------|
| pampas grass | <i>Cortaderia sp.</i> | On Southern NRM Priority List | High | High |
| panic veldtgrass | <i>Ehrharta erecta</i> | Environmental Weed | Low | Low |
| patersons curse | <i>Echium plantagineum</i> | On Southern NRM Priority List | Low | Low |
| prickly pear | <i>Opuntia sp.</i> | Environmental Weed | Low for dry edges only | Low |
| radiata pine | <i>Pinus radiata</i> | Environmental Weed | High for dry edges only | High |
| ragwort | <i>Senecio jacobaea</i> | Declared Weed | Low for dry edges only | High |
| red valerian | <i>Centranthus ruber</i> | Environmental Weed | Low | Low |
| rice grass | <i>Spartina anglica</i> | Declared Weed | Very high on edges and flats of saline wetlands | Very High |
| saffron thistle | <i>Carthamus lanatus</i> | On Southern NRM Priority List | Medium | Medium |
| serrated tussock | <i>Nassella trichotoma</i> | On Southern NRM Priority List | Low | High |
| showy honeymyrtle | <i>Melaleuca nesophila</i> | Environmental Weed | Low | Low |
| slender thistle | <i>Carduus pycnocephalus</i> | Declared Weed | High | High |
| slender thistle | <i>Carduus tenuiflorus</i> | Declared Weed | High | High |
| spanish heath | <i>Erica lusitanica</i> | On Southern NRM Priority List | High for dry edges only | High |
| st johns wort | <i>Hypericum perforatum</i> | On Southern NRM Priority List | High for dry edges only | High |
| sticky wattle | <i>Acacia howittii</i> | Environmental Weed | Low | Low |
| sweet briar | <i>Rosa rubiginosa</i> | Environmental Weed | Medium for dry edges only | High |
| sweet pittosporum | <i>Pittosporum undulatum</i> | Environmental Weed | Low | Low |
| trailing african daisy | <i>Osteospermum fruticosum</i> | Environmental Weed | Low for dry edges only | Medium |
| tree lucerne | <i>Chamaecytisus palmensis</i> | Environmental Weed | Low | Low |
| tumbleweed | <i>Amaranthus albus</i> | On Southern NRM Priority List | Low | Low |
| vipers bugloss | <i>Echium vulgare</i> | On Southern NRM Priority List | Low | Low |
| wandering jew | <i>Tradescantia albiflora</i> | Environmental Weed | Medium | Medium |
| watsonia | <i>Watsonia meriana</i> | Environmental Weed | High on edges of fresh water wetlands | High |
| white weed | <i>Lepidium draba</i> | Declared Weed | High for dry edges only | High |
| willow | <i>Salix sp.</i> | On Southern NRM Priority List | Very High | Very High |
| willow wattle | <i>Acacia salicifolila</i> | Declared Weed | Low | Low |

The weeds within the data set with the highest number of records are listed in the following table (Table 11). Only the top ten most abundant weeds are included with their number of records. The total number of records in the data set is currently 4120.

Table 11 – Highest number of weed records in data set

| Number | Common Name | Scientific Name | Record Count | Priority for DEP area |
|--------|------------------|------------------------------------|--------------|-----------------------|
| 1 | boneseed | <i>Chrysanthemoides monilifera</i> | 860 | High |
| 2 | african boxthorn | <i>Lycium ferocissimum</i> | 825 | High |
| 3 | blackberry | <i>Rubus fruticosus</i> | 427 | High |
| 4 | fennel | <i>Foeniculum vulgare</i> | 414 | High |
| 5 | radiata pine | <i>Pinus radiata</i> | 205 | High |
| 6 | sweet briar | <i>Rosa rubiginosa</i> | 168 | High |
| 7 | marram grass | <i>Ammophila arenaria</i> | 148 | High |
| 8 | willow | <i>Salix sp.</i> | 147 | Very High |
| 9 | mirror bush | <i>Coprosma repens</i> | 108 | High |
| 10 | cotoneaster | <i>Cotoneaster sp.</i> | 73 | Medium |

4. MAPPING

As a part of the vegetation prioritisation and weed assessment process, maps were produced to provide a visual analysis of the data. Five figure series were produced in A3 format corresponding to the following themes:

- Figure 1 – Vegetation Viability
- Figure 2 – Vegetation Significance
- Figure 3 – Priority Vegetation Areas
- Figure 4 – Weeds
- Figure 5 – Priority Sites

Figures 1 to 4 are divided into a series of three maps (A, B, C) corresponding with the Lower Derwent Estuary (A), the Mid Derwent Estuary (B) and the Upper Derwent Estuary (C).

All maps are shown in Appendices 1 to 13.

5. RECOMMENDATIONS

5.1 Priority Projects

One of the aims of this project was to recommend two fully scoped and costed projects so that funding can be applied for in the future. The vegetation prioritisation process identified 16 priority sites (Section 2.3) which were further prioritised based on weed priorities, presence of threatened vegetation communities, presence of threatened flora and fauna records, ease of access and lack of community group action.

Two sites were chosen from this process:

1. Karamu control in the Upper Derwent Estuary wetlands
2. Bedlam Walls bushcare

The scopes for these projects are included in Appendix 15 & 16.

5.2 Information Gaps/ Further work on this project

The following recommendations are made with the intention of guiding further work on this project and boosting the robustness and integrity of the data that the project is based on.

- Field assess the condition and viability variables for the new grid cells constructed as a part of this project.
- Analyse the weed records in the current database for duplicate records, and maintain accordingly to make the database cleaner.
- Incorporate weed records from several sources (see Table 8) that were not incorporated into the current data set.
- Ensure the Priority Weed List for this project is open to the inclusion of new high threat weeds as they arise.
- Encourage local councils that do not have weed database records (see Section 3.4) to collect and maintain this information.
- Assess all 16 priority sites (as per the project scopes in App 15 & 16) to highlight and cost the work that needs to be done to maintain these.
- Initiate partnerships with government, local councils and community groups to undertake work at priority sites.
- Ensure that any work carried out is monitored to ensure progress is being made and targets are being met.

6. REFERENCES

Blood, Kate (2001) Environmental Weeds: A field guide for SE Australia. CRC Weed Management Systems.

Muyt, Adam (2001) Bush invaders of south-east Australia: a guide to the identification and control of environmental weeds in south-east Australia. R.G. and F.J. Richardson.

North Barker Ecosystem Services (2006) Murphy's Flat – Derwent River: Terrestrial Flora and Fauna Habitat Assessment. Tasmanian Conservation Trust.

North Barker Ecosystem Services (2008) Vegetation Community and Weed Mapping, Upper Derwent Estuary Wetlands. Brief Summary and Recommendations. Derwent Estuary Program.

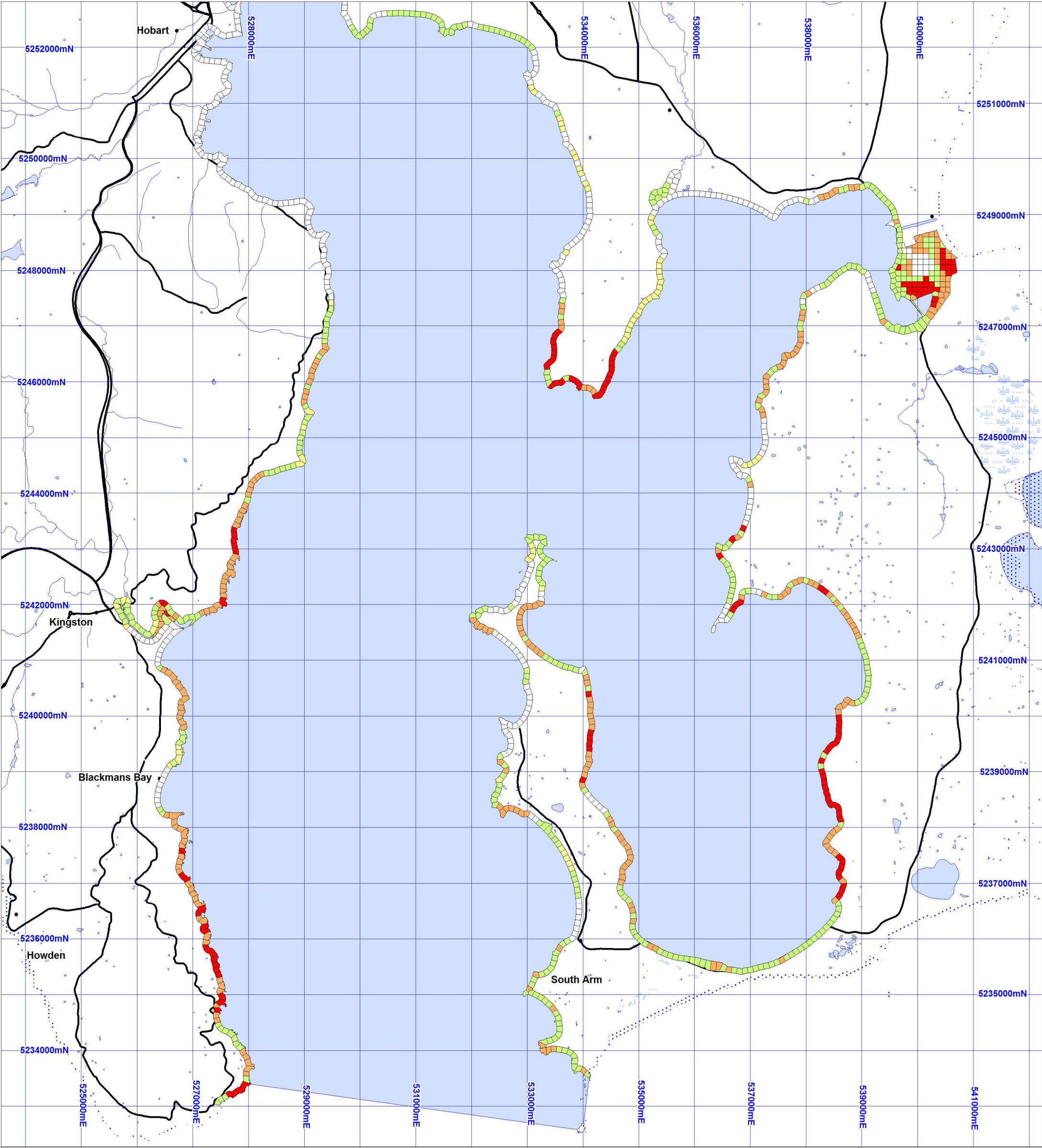


Figure 1A - Lower Derwent Estuary - Vegetation Viability

Vegetation Viability
(Native Vegetation)

| |
|---|
| 0 not applicable |
| 1 Viable and self sustaining |
| 2 Viable but at risk |
| 3 Management required and or high risk |
| 4 Not viable, but may be managed as a buffer area |

Base data from theLIST, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55

012

kilometres

(Scale 1:65 000 at A3)

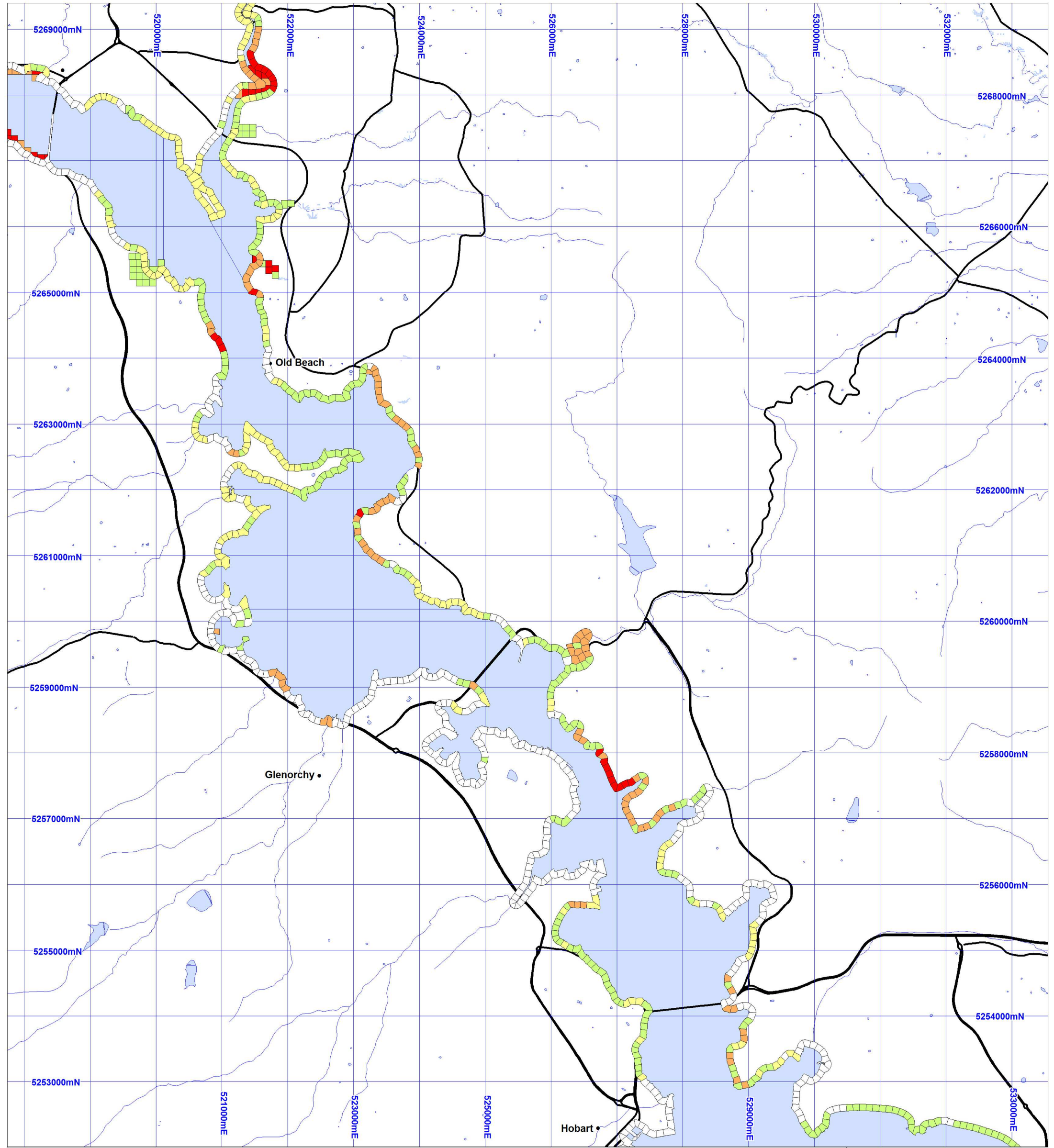




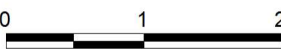
Figure 1B - Mid Derwent Estuary - Vegetation Viability

Vegetation Viability
(Native Vegetation)

| |
|---|
| 0 not applicable |
| 1 Viable and self sustaining |
| 2 Viable but at risk |
| 3 Management required and or high risk |
| 4 Not viable, but may be managed as a buffer area |

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Datum: GDA94, AHD Grid: MGA Zone 55





kilometres

(Scale 1:55 000 at A3)

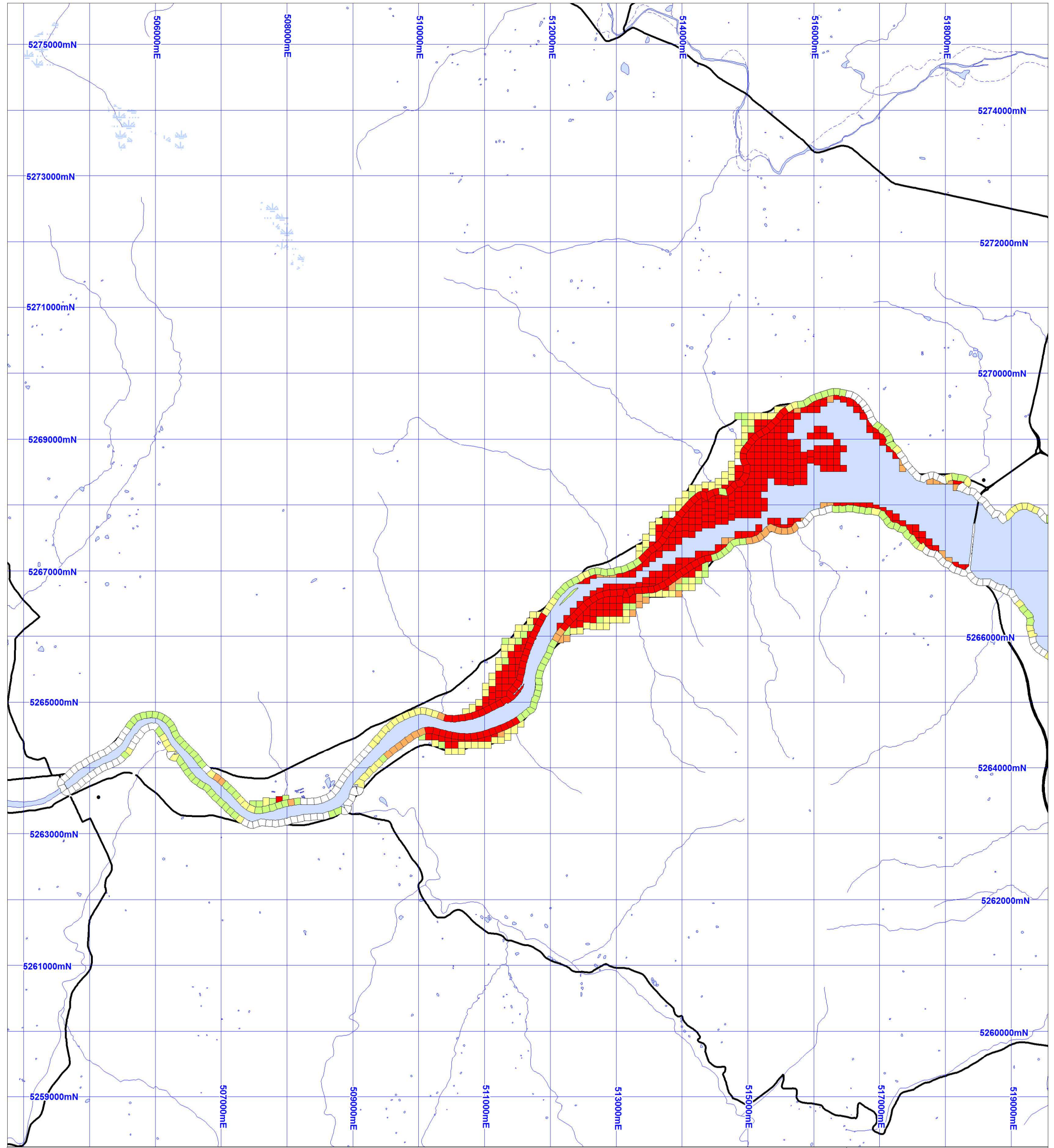
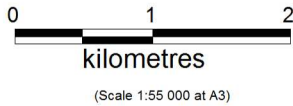


Figure 1C - Upper Derwent Estuary - Vegetation Viability

Vegetation Viability
(Native Vegetation)

| |
|---|
| 0 not applicable |
| 1 Viable and self sustaining |
| 2 Viable but at risk |
| 3 Management required and or high risk |
| 4 Not viable, but may be managed as a buffer area |

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Datum: GDA94, AHD Grid: MGA Zone 55



(Scale 1:55 000 at A3)



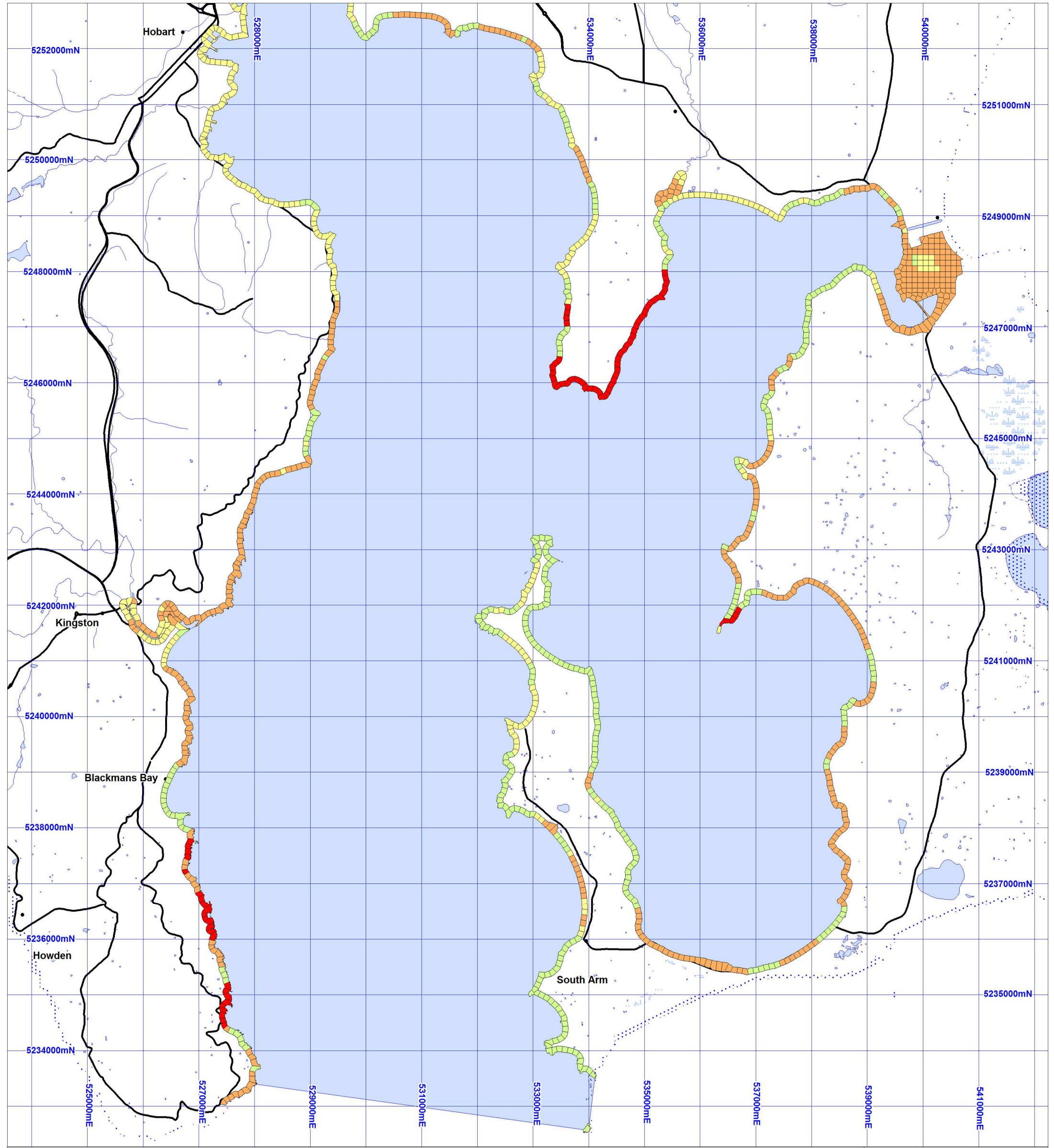
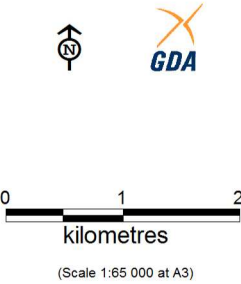


Figure 2A - Lower Derwent Estuary - Vegetation Significance

- Vegetation Significance**
(Native Vegetation)
- 1 Viable but at risk
 - 2 Not viable, but may be managed as a buffer area
 - 3 Management required and or high risk
 - 4 not applicable

Base data from theLIST, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55



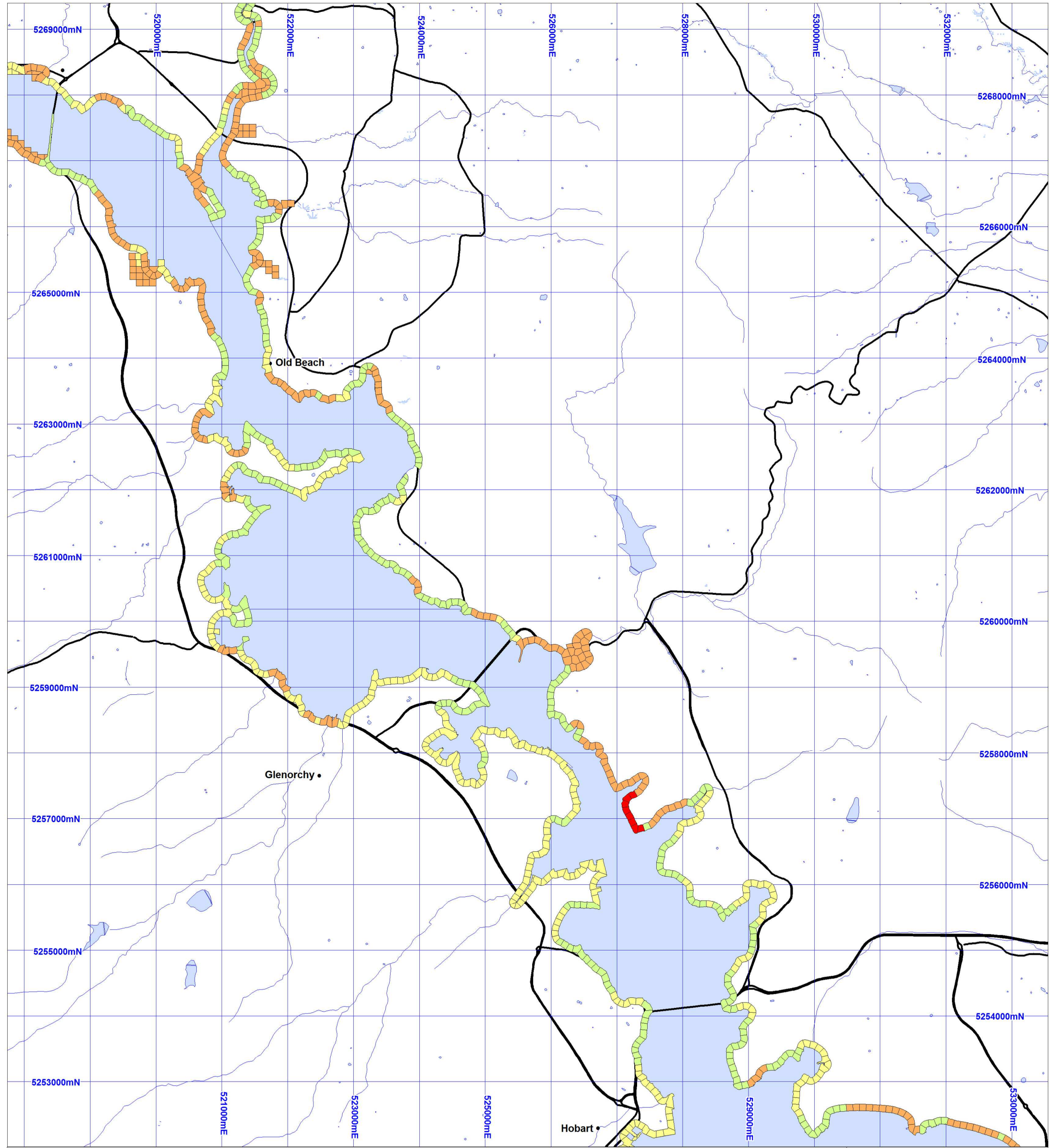




Figure 2B - Mid Derwent Estuary - Vegetation Significance

Vegetation Significance
(Native Vegetation)

| | |
|-------------|---|
| <div></div> | 1 Viable but at risk |
| <div></div> | 2 Not viable, but may be managed as a buffer area |
| <div></div> | 3 Management required and or high risk |
| <div></div> | 4 not applicable |

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Datum: GDA94, AHD Grid: MGA Zone 55



012

kilometres

(Scale 1:55 000 at A3)

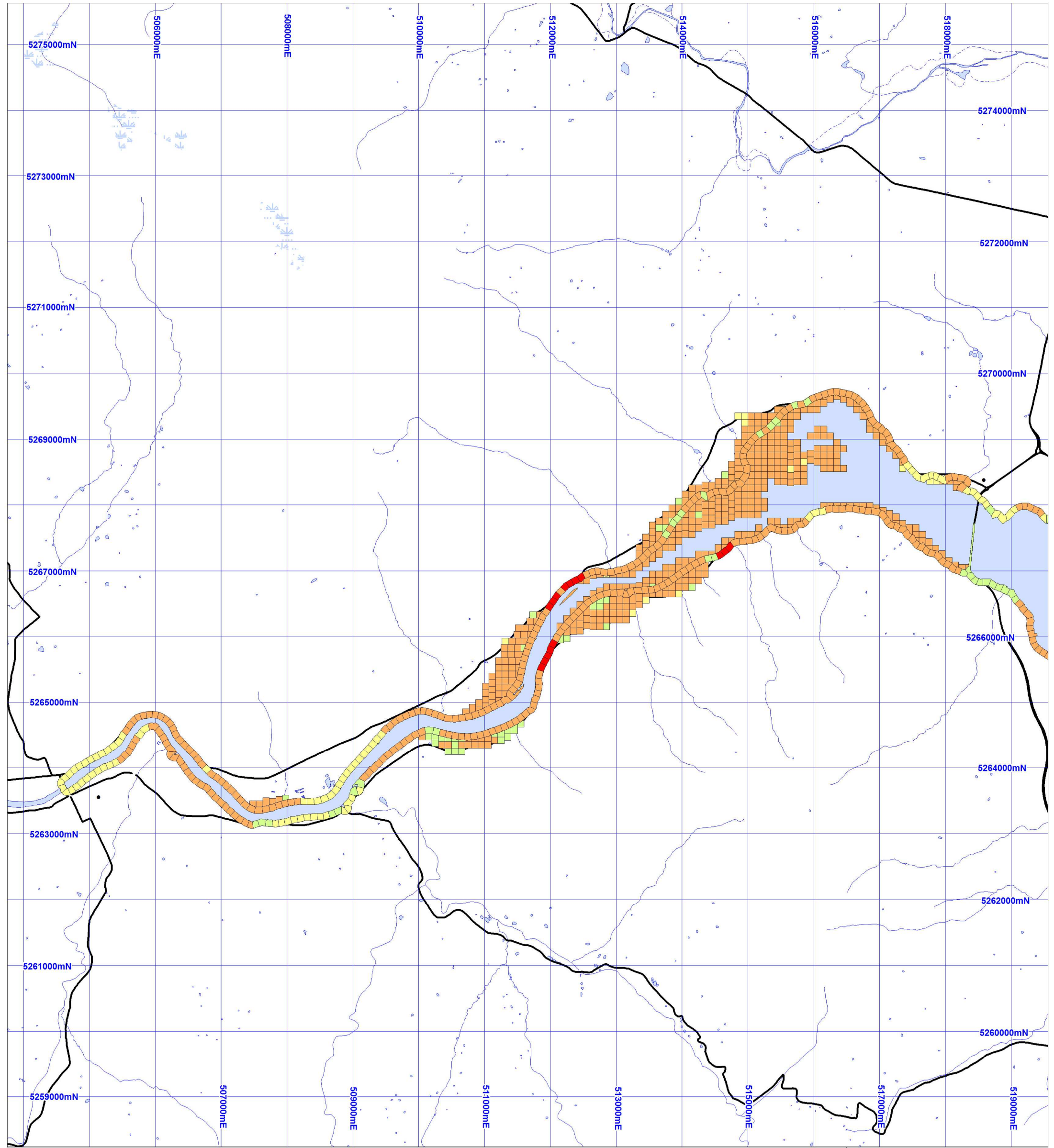


Figure 2C - Upper Derwent Estuary - Vegetation Significance

Vegetation Significance
(Native Vegetation)

| | |
|-------------|---|
| <div></div> | 1 Viable but at risk |
| <div></div> | 2 Not viable, but may be managed as a buffer area |
| <div></div> | 3 Management required and or high risk |
| <div></div> | 4 not applicable |

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Datum: GDA94, AHD Grid: MGA Zone 55



kilometres

(Scale 1:55 000 at A3)



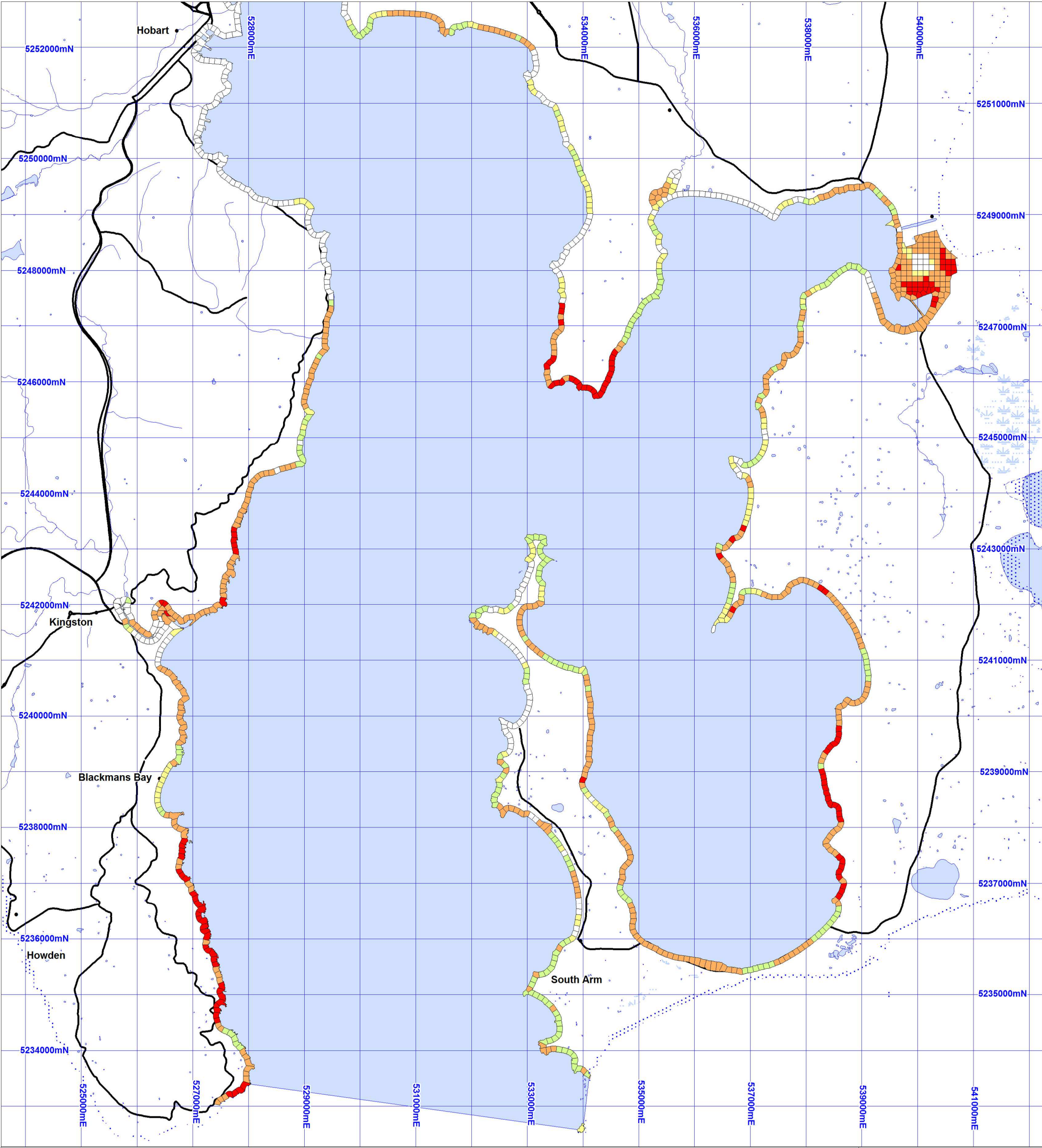


Figure 3A - Lower Derwent Estuary - Priority Vegetation Areas

Priority Vegetation Areas
Derwent Estuary Program Study Area

| | |
|-------------|-----------------------|
| White | Non-native vegetation |
| Red | High Priority |
| Orange | Moderate Priority |
| Light Green | Low Priority |
| Yellow | Lowest Priority |

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kilometres

(Scale 1:65 000 at A3)

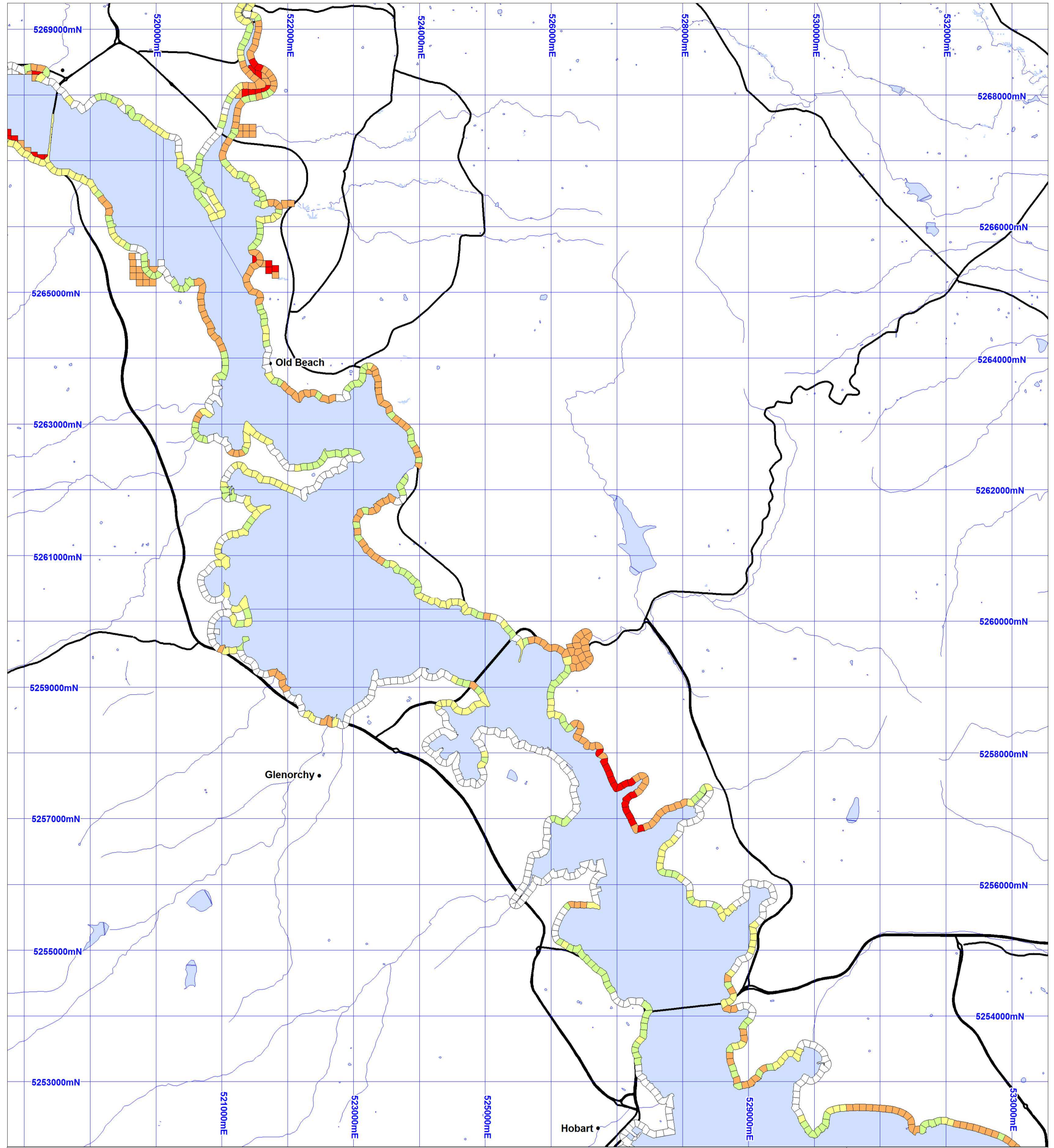


Figure 3B - Mid Derwent Estuary - Priority Vegetation Areas

Priority Vegetation Areas
Derwent Estuary Program Study Area

| | |
|--|-----------------------|
| | Non-native vegetation |
| | High Priority |
| | Moderate Priority |
| | Low Priority |
| | Lowest Priority |

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Datum: GDA94, AHD Grid: MGA Zone 55

kilometres

(Scale 1:55 000 at A3)

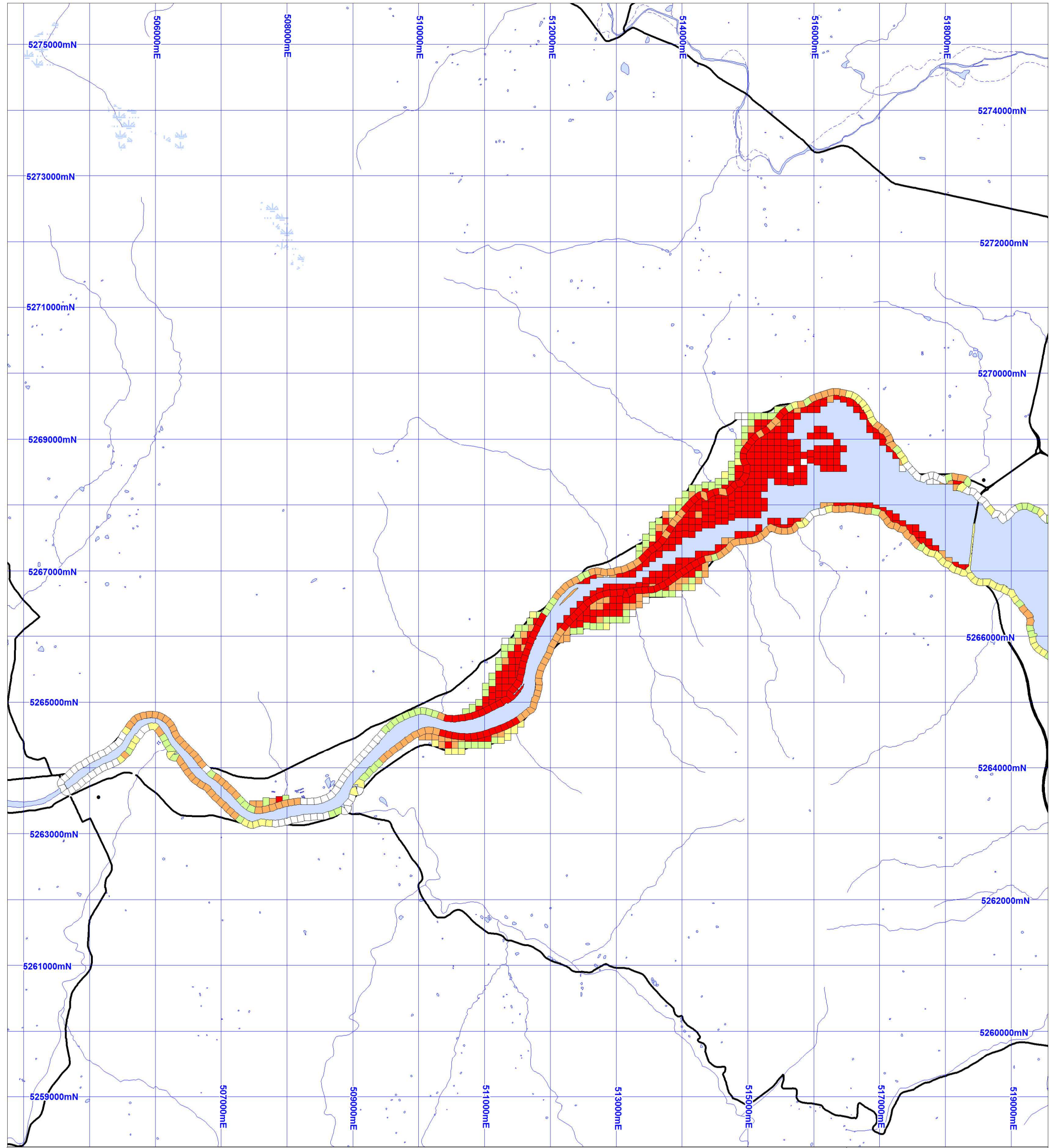
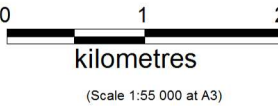


Figure 3C - Upper Derwent Estuary - Priority Vegetation Areas

Priority Vegetation Areas
Derwent Estuary Program Study Area

| | |
|--|-----------------------|
| | Non-native vegetation |
| | High Priority |
| | Moderate Priority |
| | Low Priority |
| | Lowest Priority |

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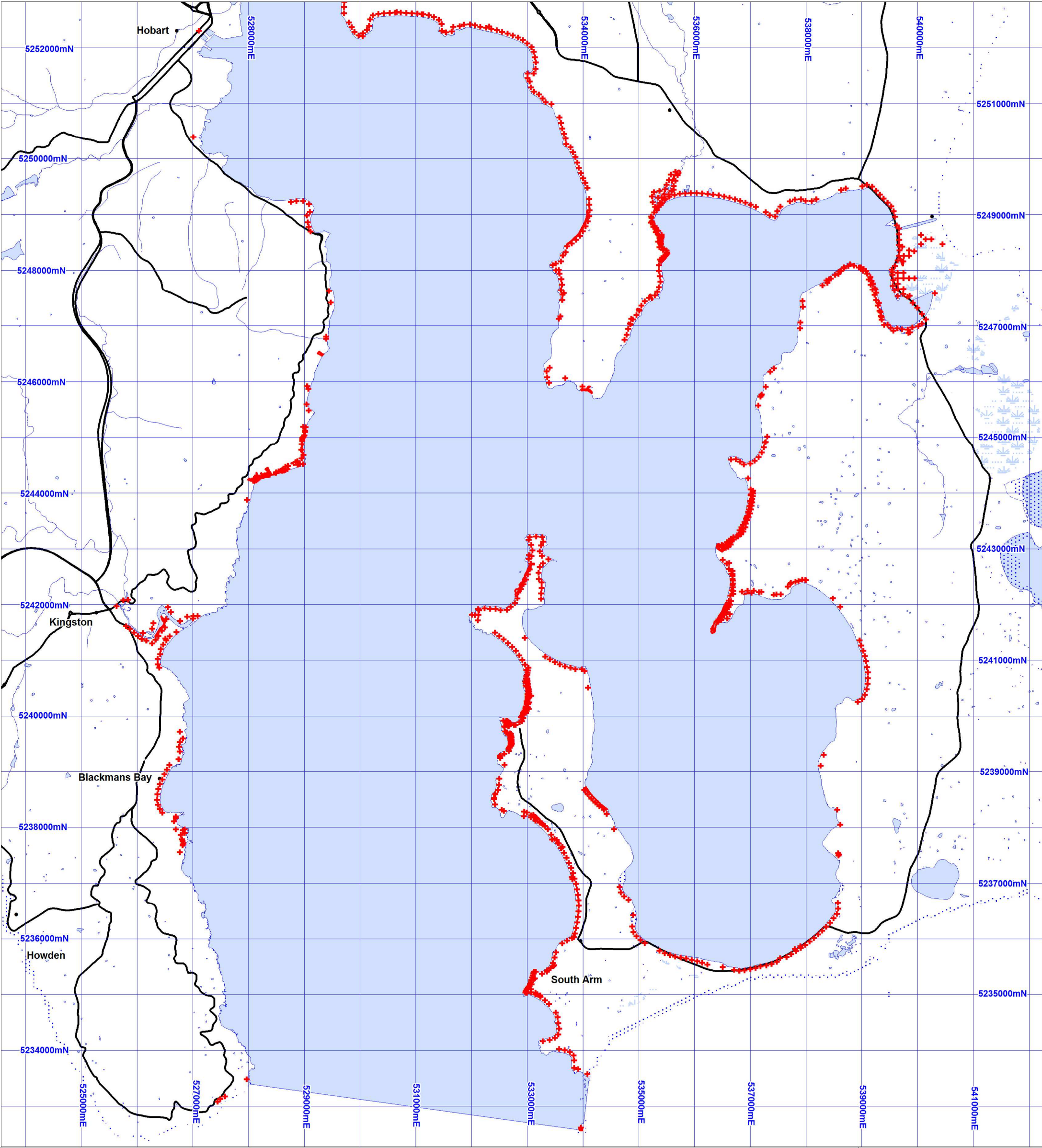




Figure 4A - Lower Derwent Estuary - Weeds

Weeds
Derwent Estuary Program Study Area

- Point
- Line
- Region

Base data from theLIST, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55

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kilometres
(Scale 1:85 000 at A3)

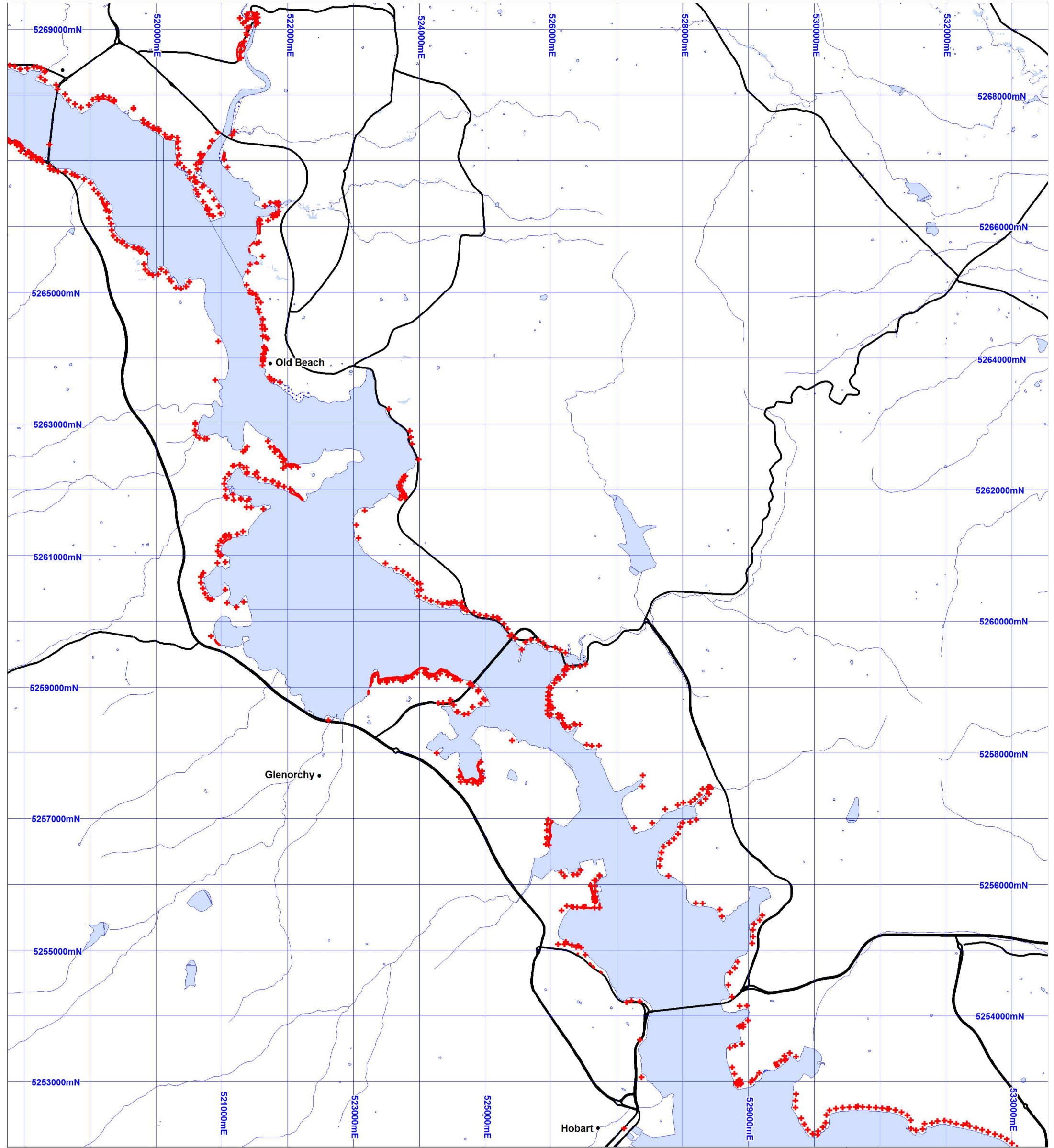




Figure 4B - Mid Derwent Estuary - Weeds


Weeds

Derwent Estuary Program Study Area

- Point
- Line
- Region

Base data from theLIST, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55





kilometres

(Scale 1:55 000 at A3)



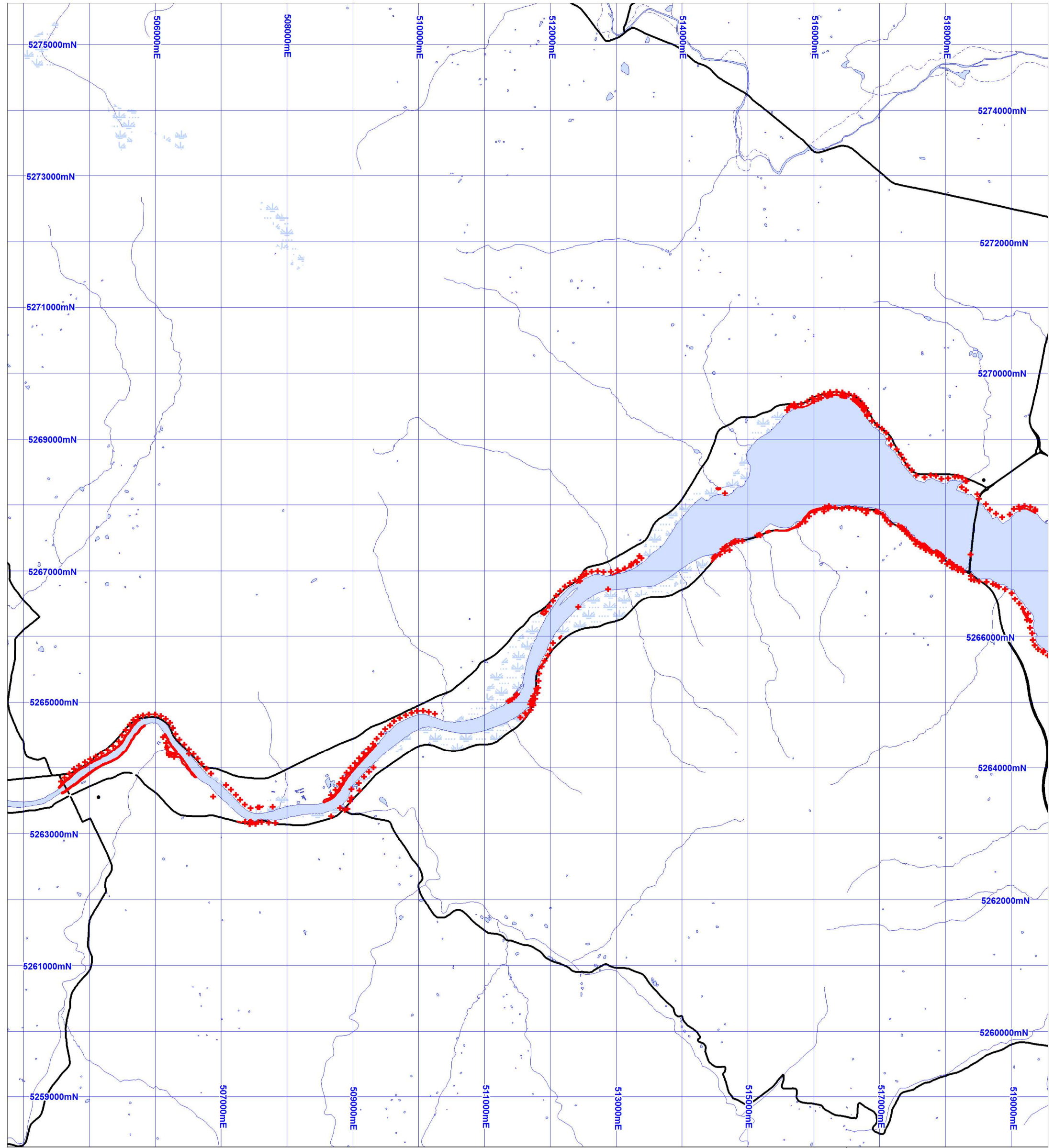
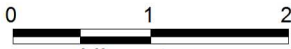


Figure 4C - Upper Derwent Estuary - Weeds

Weeds
Derwent Estuary Program Study Area

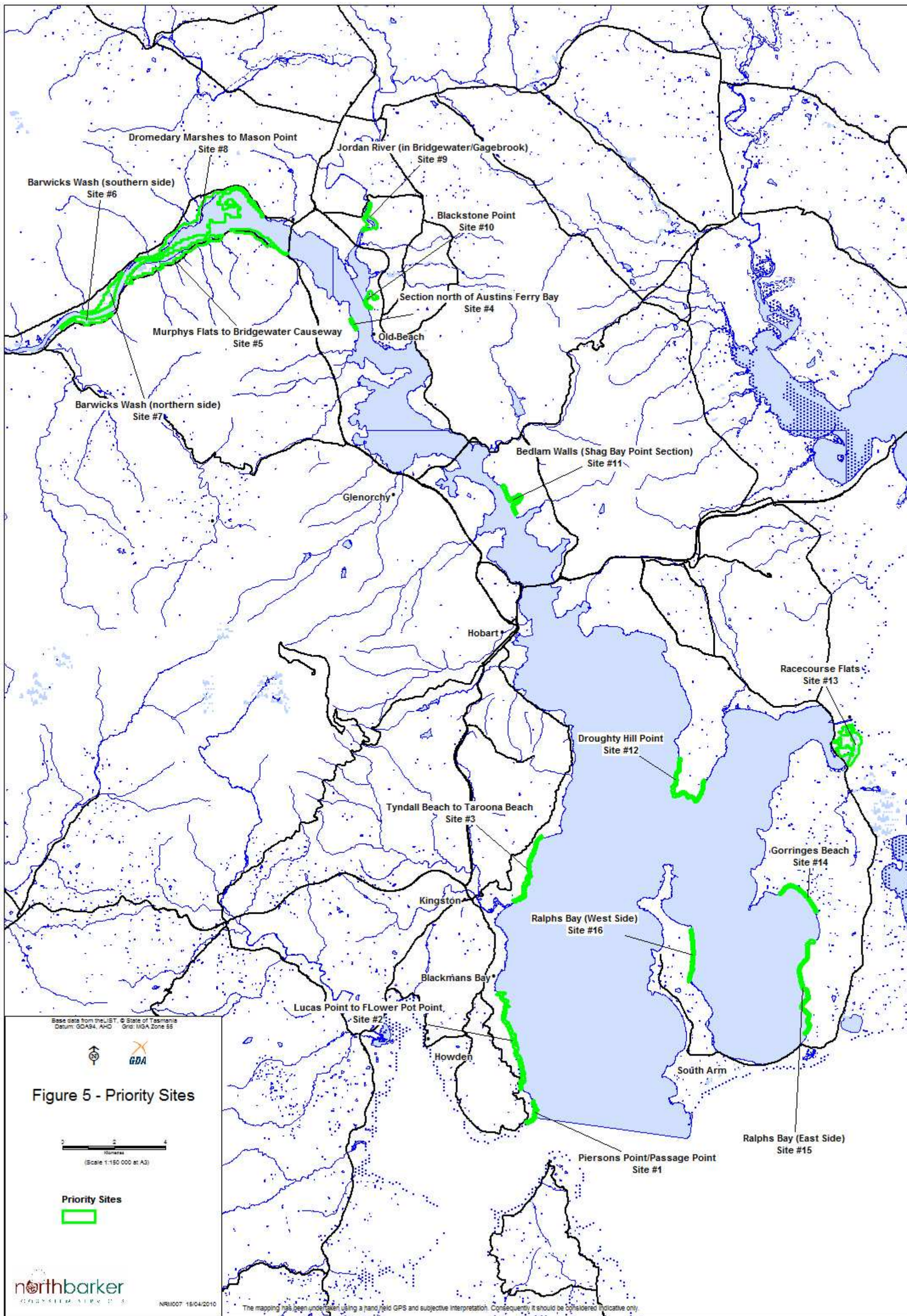
- + Point
- Line
- Region

Base data from theLIST, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55



(Scale 1:55 000 at A3)





APPENDIX 14 – DEP WEED STRATEGY WORKSHOP

Date

Thursday 10th December, 2009

Participants

- Christine Coughanowr, DEP Director
- Fiona Wells, DEP Coordinator
- Jason Whitehead, DEP Scientific Officer
- Andrew North, North Barker Ecosystem Services
- Chris Obst, North Barker Ecosystem Services
- Peter McGlone, Tasmanian Conservation Trust
- Sandy Leighton, STCA
- Michael Askey-Doran, DPIPWE
- Andrew Crane, DPIPWE
- Alli Coombe, Glenorchy City Council
- Jill Hickie, Hobart City Council
- Steven Joyce, Derwent Valley Council
- Dan Meldrum, Kingborough Council
- Jill Pearson, NRM South

Agenda

1. Introduction (Fiona Wells)
 - Round table introduction of participants
 - Project Funding
 - Weed Strategy for Derwent foreshore:
 - Purpose: identifying high priority works for future funding submissions
 - Includes: Vegetation prioritisation, current weed mapping, and developed within the context of e.g. Southern Tasmanian Weed Strategy
 - *Aim of workshop:*
 - Gain refinement of vegetation prioritisation and weed mapping and identify key areas/gaps for further survey; and identify known weed projects around the Derwent estuary.
2. Overview of Derwent Estuary (North Barker):
 - Weeds – status and mapping (sources and limitations)
 - Vegetation – mapping (sources and limitations); threatened species & wetlands
 - Coastal Mapping Project
 - Vegetation Prioritisation
3. List of known current weed projects around Derwent estuary

Workshop

For the content of the presentation given at the workshop please refer to the PowerPoint document – DEP Weed Strategy Workshop Presentation.

APPENDIX 15 - PROJECT SCOPE - KARAMU CONTAINMENT, UPPER DERWENT RIVER

Location

This project is located on the banks of the Derwent River and in the wetlands of the Upper Derwent Estuary that make up part of the Upper Derwent aquatic ecosystems. The area is bounded to the west by the bridge in New Norfolk and runs for approximately 11km to the east, to the start of the Dromedary Marshes.

Justification

This project is considered to be a priority for the Derwent Estuary Program (DEP) for the following reasons:

- Karamu (*Coprosma robusta*) is a declared weed species in Tasmania. It currently has a restricted distribution having been recorded in several locations mainly in the wetter areas of southern Tasmania. All populations are considered to be relatively small with eradication being considered the appropriate strategy under the Karamu Statutory Weed Management Plan (DPIPWE). Eradicating or containing the spread of Karamu at New Norfolk would help considerably in reducing the threat from this species. Timely implementation of a control program now may help to eradicate this species.
- Karamu is considered to have the potential to spread into parts of the Upper Derwent Estuary wetlands. These wetlands are formally classified as a High Conservation Value Ecosystem and also contain significant areas of threatened vegetation communities including fresh water aquatic sedgeland and rushland. The shrubby communities which form a network through parts of the wetlands are particularly vulnerable. Their isolation from public roads will also limit the opportunity for control. Karamu should be controlled within these high value and threatened vegetation communities, and where possible not be allowed to spread into these areas.
- Native vegetation communities along the banks of the River Derwent below New Norfolk include high conservation riparian vegetation and *Eucalyptus ovata* forest an endangered community. Some of these remnants are at risk from the further proliferation of karamu which has the potential to replace the native understorey species.
- Control of Karamu will help to maintain the fauna habitat values of the Upper Derwent Estuary wetlands which are currently a regionally important bird breeding and feeding area by ensuring native vegetation is not overtaken by this invasive species.

Current Survey

A survey of the New Norfolk infestation of Karamu was undertaken by boat on 07/01/2010. The initial scope of the survey was to survey downstream from the New Norfolk bridge (the upper limit of the DEP area) as far as possible in the given time. On the day the survey was extended upstream of the bridge to try to gain a better understanding of the overall infestation.

The survey recorded point records where infestation levels were more scattered, and line records where infestations were denser. The number of plants at each point infestation was recorded. Line infestations were recorded as a percentage cover (<5, 5-25, 25-50, 50-75 and 75-100%) between two waypoints, with most lines being a

band width from the rivers edge up to 5m back. This is an estimate only and should not be considered definitive; the intention is to give an indication of infestation levels, not an absolute area of infestation.

Infestation Levels

Karamu was found to be extensive on both sides of the bridge in New Norfolk. Downstream from the bridge the infestation was heavy as far as the Norske Skög mill, after which it became isolated occurrences only. Surveying east of the bridge was stopped at the beginning of the Dromedary Marshes. Further occurrences of Karamu downstream of here are considered unlikely, although point infestations are possible.

Upstream of the bridge the infestation was less dense but still common, particularly on the northern side. Surveying west of the bridge was stopped at the first set of power lines crossing the river, approximately 2.5km upstream. Further occurrences of Karamu upstream of here are considered almost certain. Anecdotal evidence suggests it extends at least 4km upstream.

Refer to Map 1 and 2 for a representation of the Karamu infestations.

Spread

The main vector of spread of Karamu is birds which eat the berries and move the seed in their droppings. Another likely vector is water - as many of the plants occur on the rivers edge near New Norfolk, seed dropping into the river are also likely to be transported downstream. It is unknown whether branches of Karamu can take root (in a similar fashion to willow).

If the main vector of Karamu spread is birds, then there is a reasonable expectation that buffering of sensitive areas (e.g. Upper Derwent Wetlands) will be an effective protection policy from this weed. Several studies have shown that birds do not travel much more than 400m with seed. Therefore a policy that keeps a buffer of at least 400m (preferably 500m or more) around any sensitive areas could be a good practical policy in the protection of priority areas.

Control Options

Results from the survey have indicated that Karamu infestation levels are much higher than anticipated and that Karamu is well established around New Norfolk. Given this information eradication would require a considerable commitment of resources in time and funding. Value judgements and prioritisation will need to be made by the relevant authorities as to whether or not an attempt at eradication should be made, or whether the funding available should be directed towards other priorities.

Given the highly weedy nature of the River Derwent banks around New Norfolk it could also be questioned as to the value of eradication from such a weedy site, and whether a containment strategy would be of more value. Such a strategy would involve the control of outlier infestations, thus restricting the Karamu to its current extent, allowing no further increase in its range.

This project scope will recommend a containment strategy, involving the control of Karamu point infestation at the eastern end of its range. In addition to this a trial control effort of a denser area of Karamu within an area of intact native vegetation

will also be attempted to gain a better insight into the feasibility of further control in the denser areas and possible eventual eradication.

Control Site 1

Within site 1 the aim is to control all point infestations at the eastern end of the Karamu distribution. On the northern side of the river this extends from 507856/5263373 running downstream to 512893/5266928. On the southern side of the river this extends from 507152/5263395 running downstream to 511787/5265456.

Control Site 2

Within site 2 the aim is to control a moderate (25-50%) Karamu infestation within a priority area of native vegetation (*Eucalyptus ovata* forest). This stretch of vegetation lies approximately 420m to the west of the Norske Skog mill, and is approximately 230m in length. The vegetation lies on the north side of the river and extends from 507470/5263320 running downstream to 507700/5263324.

Methodology

The proposed methodology for Karamu is the standard one for most woody weeds – cutting and swabbing. Cutting can be carried out with chainsaws, loppers or secateurs depending on the size of the shrub, and swabbing needs to be carried out immediately after the cut has been made, with approved woody weed herbicides. As this site is part of an aquatic environment, care will need to be taken to not allow herbicide into the river itself.

Access

Site access is one of the main difficulties with this population. Much of this infestation occurs on the banks of the Derwent River which can be steep, inaccessible by land or crowded by other weeds, particularly willows and blackberry. Where road access is possible control will be easier, but many of the infestations will only be accessible by boat, being accessed from the river itself. A large stable craft, such as a barge would be ideal for this situation.

Many of the properties along the river are private down to the river edge, and therefore permission to access this land will need to be negotiated.

Timing

Control of Karamu can occur all year round, but is more likely to be effective when Karamu is actively growing. The active growing season will occur during the warmer months from November to April inclusive.

Duration

Follow up work is considered vital for Karamu control as this species is likely to be persistent and difficult to kill. This of course means an ongoing commitment will be required for any strategy to be worthwhile. Therefore this control program is to include the initial year plus two years of follow up work. It is acknowledged here that additional funding may need to be sought to continue the control effort beyond three years, if control is proving to be difficult.

Cost

Weed control costs with two people and a boat are estimated to be up to \$1000 (ex GST) per day. This costing allows for all cut weeds to be transported to Norske Skög mill land where the material could be stockpiled and burnt. At this stage, this has not been agreed to by Norske Skög but seems a logical, central location to do this. Norske Skög have indicated a willingness to become involved in this issue, and this could form part of their contribution to this proposal.

To cart out and chip weeds and remove off site has not been allowed for in this costing. This would significantly increase the costs and logistics of this project, and would need to be costed by a contractor. The hire of a chipper and team is estimated at \$1500 (ex GST) per day.

| Control Site 1 | | | | |
|----------------|------------------|-------------|-------------------|----------------|
| Year | Target | Time (days) | Rate (\$1000/day) | Cost (ex GST) |
| 1 | 60 plants | 2.5 | 1000 | \$2,500 |
| 2 | any regeneration | 2 | 1000 | \$2,000 |
| 3 | any regeneration | 1.5 | 1000 | \$1,500 |
| | | | Total Cost | \$6,000 |

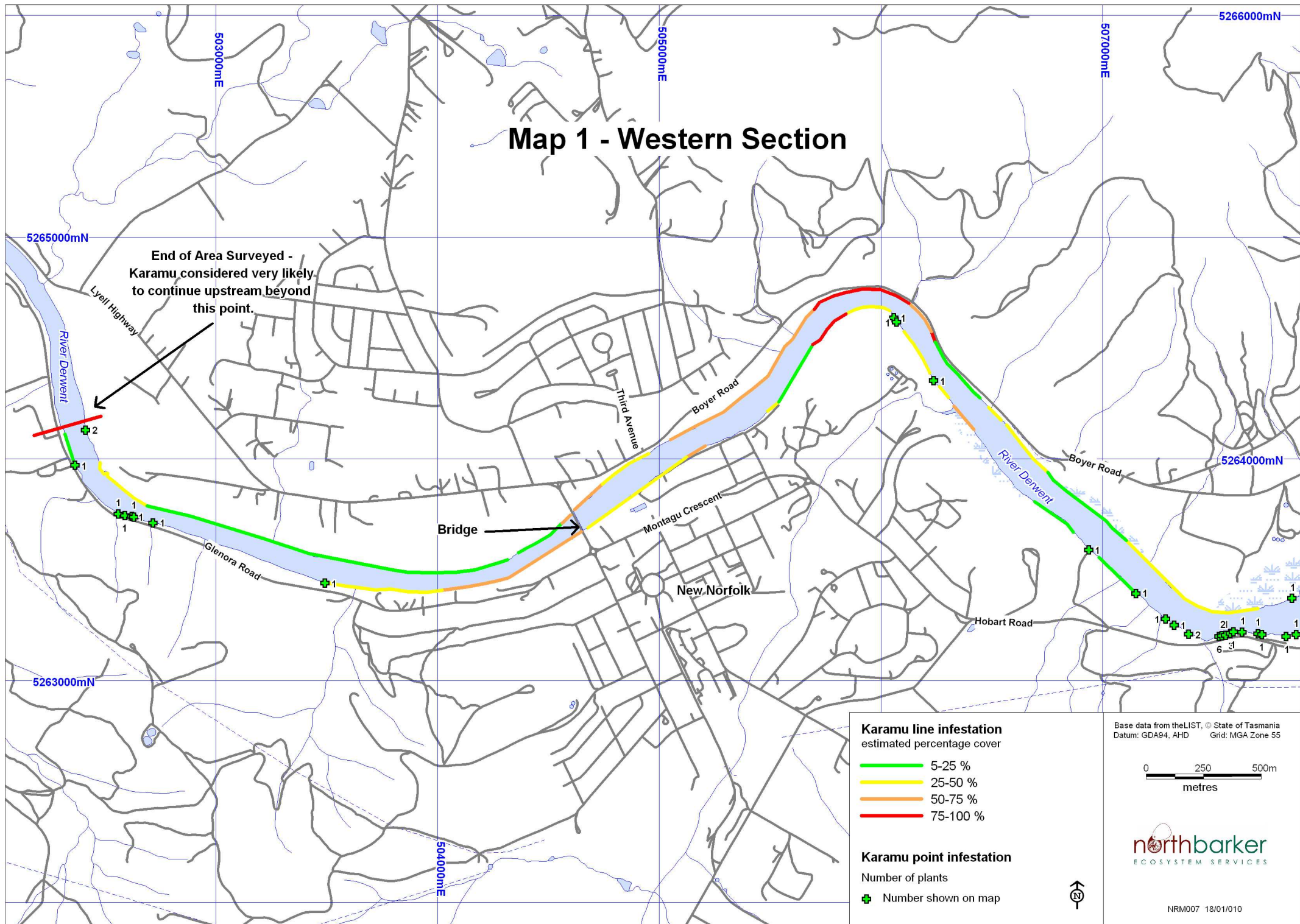
| Control Site 2 | | | | |
|----------------|--|-------------|-------------------|----------------|
| Year | Target | Time (days) | Rate (\$1000/day) | Cost (ex GST) |
| 1 | 230m vegetation, 25 - 50% Karamu cover | 4 | 1000 | \$4,000 |
| 2 | any regeneration | 2 | 1000 | \$2,000 |
| 3 | any regeneration | 1 | 1000 | \$1,000 |
| | | | Total Cost | \$7,000 |

To undertake additional survey work by boat to extend the area of the initial survey would require two people and a boat. The cost of this for one day would be \$1,000 (ex GST) per day. At this stage one day's work would be anticipated to be enough time, but this could change depending on what is found.

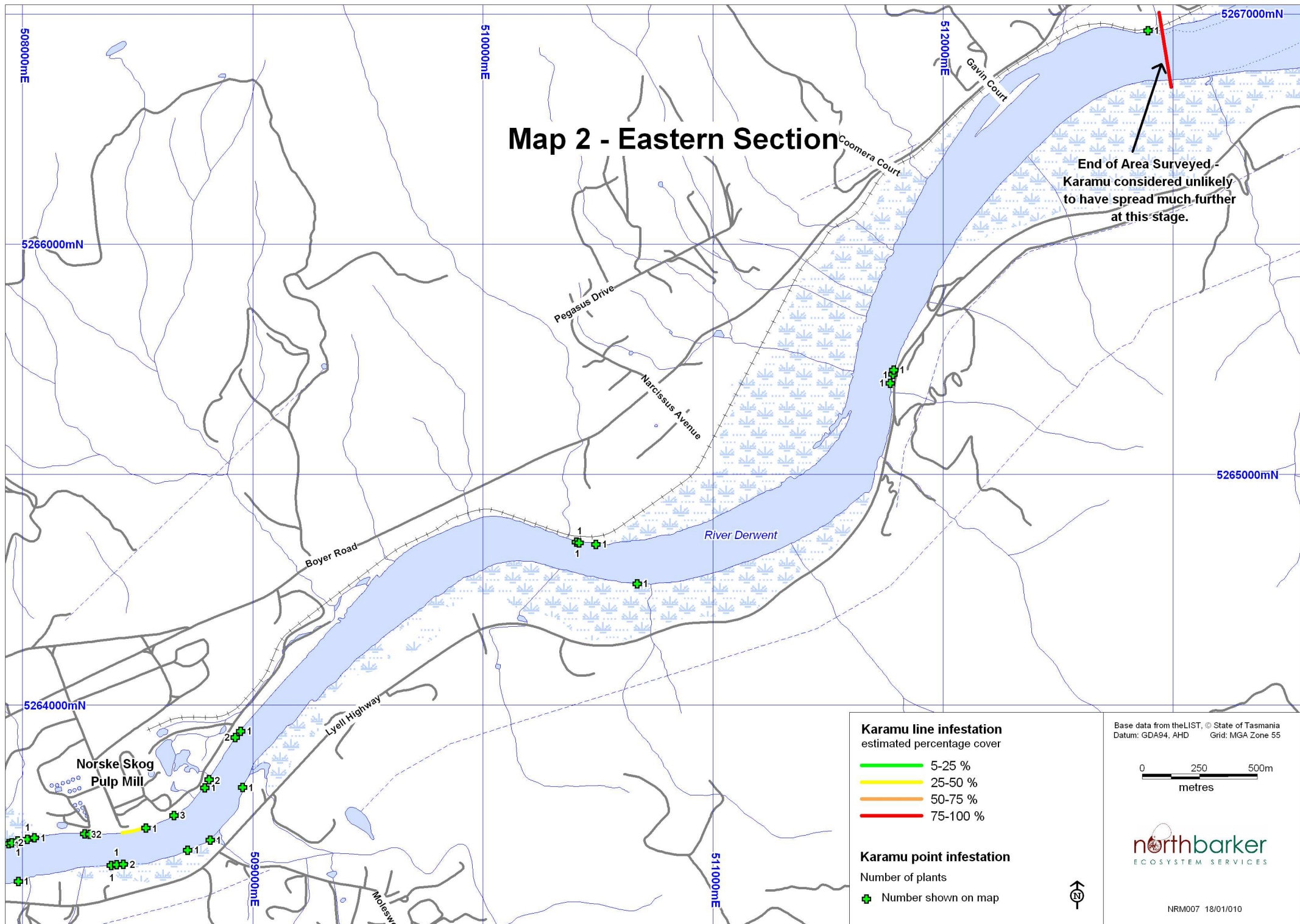
Future Efforts

The DEP project area is limited up to the bridge at New Norfolk; however Karamu is not restricted by this boundary. If work is to be carried out on Karamu it would make sense for other agencies to become involved so that an integrated control effort is implemented. The successful containment or eradication of this Karamu population will be dependant on such an effort. Whilst this project will help to protect the Upper Derwent Estuary wetlands, an integrated project targeting the whole New Norfolk population will have environmental and economic benefits into the future.

Map 1 - Western Section



Map 2 - Eastern Section



APPENDIX 16 - PROJECT SCOPE – BEDLAM WALLS BUSHCARE

Location

This project is located on the banks of the Derwent River and in the terrestrial ecosystems of the Bedlam Walls region and the East Risdon Nature Reserve. The area is bounded to the south by the suburbs of Geilston Bay, and to the north by the suburbs of Risdon. The survey area extended from the coastline up to 100m inland, for a distance of approximately 4 kilometres.

Justification

This project is considered to be a priority for the Derwent Estuary Program (DEP) for the following reasons:

- The Bedlam Walls area has been identified as a priority site through this project's prioritisation process. This prioritisation process is based on the condition, viability and significance assessment of the DEP study area. This is also supported by an internal DEP threatened flora report that identifies the Bedlam Walls area as a priority site.
- Native vegetation communities present include one that is listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA), and two that are listed as threatened under the Tasmanian *Nature Conservation Act 2002* (NCA). Lowland *Themeda triandra* grassland is listed as critically endangered under the EPBCA, while *Eucalyptus risdonii* forest and woodland, and *Eucalyptus globulus* dry forest and woodland are listed as threatened under the NCA. Some of these remnants are at risk from the further proliferation of weeds which has the potential to replace the native understorey species.
- Control of weeds will help to maintain the fauna habitat values of the Bedlam Walls and East Risdon Nature Reserve area.
- Five threatened flora species have been recorded from the site, including;

| Species Name | Common Name | Status Tasmania | Status Commonwealth |
|---|----------------------|-----------------|---------------------|
| <i>Eucalyptus risdonii</i> | risdon peppermint | r | - |
| <i>Lepidium pseudotasmanicum</i> | shade peppergrass | r | - |
| <i>Olearia hookeri</i> | crimsontip daisybush | r | - |
| <i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i> | rockplate buttercup | r | - |
| <i>Spyridium eriocephalum</i> var. <i>eriocephalum</i> | heath dustymiller | e | - |

- No community groups are currently working on site, which means that without weed control work the site will deteriorate further, and also cost significantly more in the future to remedy.
- Stakeholders in the region (Phil Watson, Clarence Council and Paul Hellerman, PWS) are supportive of a weed control project in the Bedlam Walls area. Neither of these people will have funding to allocate to this site.
- A large proportion of the area is public land, which will facilitate ease and timeliness of access.

Current Survey

A survey of the Bedlam Walls area was undertaken on foot on 20/01/2010. The survey was carried out between 528020/5257210 at the eastern end of Geilston Bay, to 526391/5258395 at the eastern end of Porter Bay, a distance of approximately 4 kilometres. The survey area extended from the coastline up to 100m inland.

The survey recorded all weed species on the DEP priority weed list (see Appendix 1). General herbaceous and grassy weeds were not recorded as a part of this survey unless they occurred on this list. Weeds were recorded with a hand held GPS and were recorded as either point records where infestation levels were smaller, or polygon records where infestations were larger. The number of plants at each point infestation was recorded. Polygon infestations were recorded as an area in square metres and an estimate of the percentage cover within the polygon was also made.

Infestation Levels

Weeds were found throughout the survey area, although distribution was patchy. Levels of infestation for the recorded species are currently considered to be at low levels, to moderate levels in small patches. Timely intervention now would have a significant impact on the priority weeds in this area, and at the current level of infestation, the impact would be great for a relatively low funding investment. Delays in implementing a control program would allow the weeds to consolidate further, thus having more of an impact on biodiversity and costing more to control in the future.

The following table (Table 1) lists the weeds that were recorded during this survey. Gorse was the most abundant weed recorded, followed by boneseed.

Table 1 – Weeds recorded and suggested control methods

| Common Name | Scientific Name | Control Method |
|------------------------|------------------------------------|-------------------------|
| agapanthus | <i>Agapanthus</i> sp. | Dig out |
| boneseed | <i>Chrysanthemoides monilifera</i> | Hand pull or cut & swab |
| spear thistle | <i>Cirsium vulgare</i> | Spray |
| cotoneaster | <i>Cotoneaster</i> sp. | Cut & swab |
| quince | <i>Cydonia oblonga</i> | Cut & swab |
| fennel | <i>Foeniculum vulgare</i> | Spray |
| african boxthorn | <i>Lycium ferrocissimum</i> | Cut & swab |
| horehound | <i>Marrubium vulgare</i> | Spray |
| trailing african daisy | <i>Osteospermum fruitcosum</i> | Dig out |
| pine | <i>Pinus radiata</i> | Cut down or ring bark |
| wild mignonette | <i>Reseda luteola</i> | Spray |
| sweet briar | <i>Rosa rubiginosa</i> | Cut & swab |
| blackberry | <i>Rubus fruticosus</i> | Spray |
| gorse | <i>Ulex europeaus</i> | Cut & swab |
| blue periwinkle | <i>Vinca major</i> | Spray |

Refer to Map 1 and 2 for a representation of the weed infestations.

Methodology

The proposed methodology for this project depends on the type of weed being controlled. See table 1 above for suggested control methodologies.

Access

Access at the Bedlam Walls site is relatively easy with access by foot along walking tracks and vehicle tracks, or at low tide along the coastline. Access by boat is also possible but is not considered necessary for this project.

The majority of the land here is public land making access easy. A small portion of land in the southern half of the area is private and therefore permission to access this land will need to be negotiated.

Timing

The best time of year to control the different weed species varies, but is generally during the active growing season, which occurs during the warmer months from November to April inclusive.

Duration

Follow up work is considered vital for any weed control program. An ongoing commitment will be required to consolidate control results. Therefore this control program is to include the initial year plus two years of follow up work. It is acknowledged here that additional funding may need to be sought to continue the control effort beyond three years, as regeneration of weeds is likely to continue.

Cost

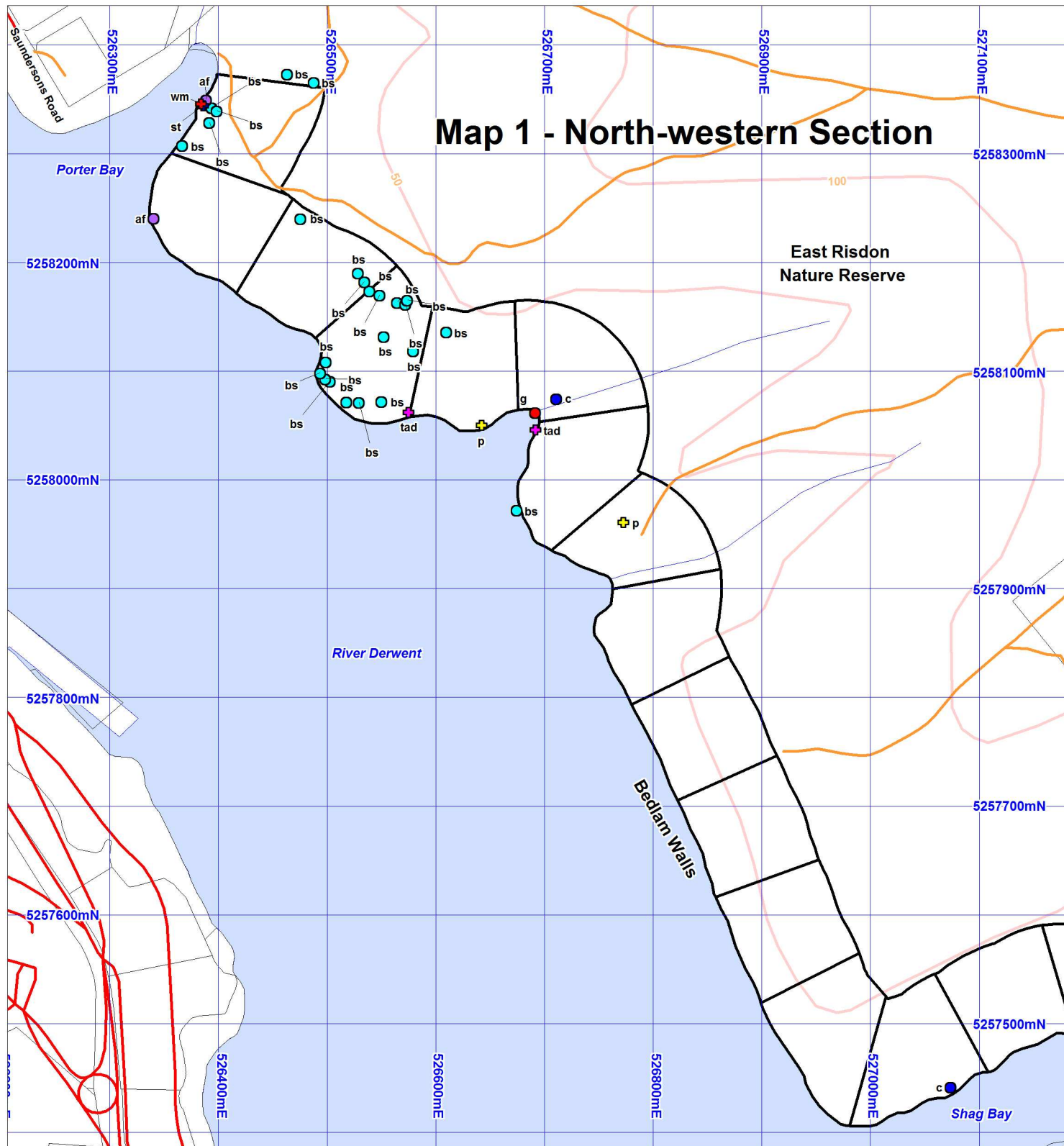
Weed control costs with a team of two people are estimated to be up to \$700 (ex GST) per day. This costing allows for all cut weeds to be scattered and left on site. To cart out and chip weeds and remove off site has not been allowed for in this costing, and is not considered necessary or practical for this project.

| Year | Target | Time (days) | Rate (\$700/day) | Cost (ex GST) |
|-------------|------------------|--------------------|-------------------------|----------------------|
| 1 | All weeds | 9 | 700 | \$6,300 |
| 2 | any regeneration | 5 | 700 | \$3,500 |
| 3 | any regeneration | 2.5 | 700 | \$1,750 |
| | | | Total Cost | \$11,550 |

Future Efforts

For the work undertaken within the suggested three years of this project to be of benefit, control work should be ongoing into the future. This will involve follow up control on the work already undertaken and control of any new infestations. Additional funding will need to be found for this or an active community group supported to carry out the work.

Map 1 - North-western Section



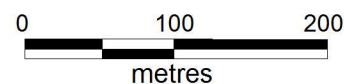
Weeds

- af african boxthorn
- ag agapanthus
- bp blue periwinkle
- bs boneseed
- c cotoneaster
- f fennel
- g gorse
- hh horehound
- sb sweet briar
- q quince
- sb sweet briar
- st spear thistle
- tad trailing african daisy
- wm wild mignonette

Weed Polygons

- bp blue periwinkle
- g gorse
- q quince
- sb sweet briar

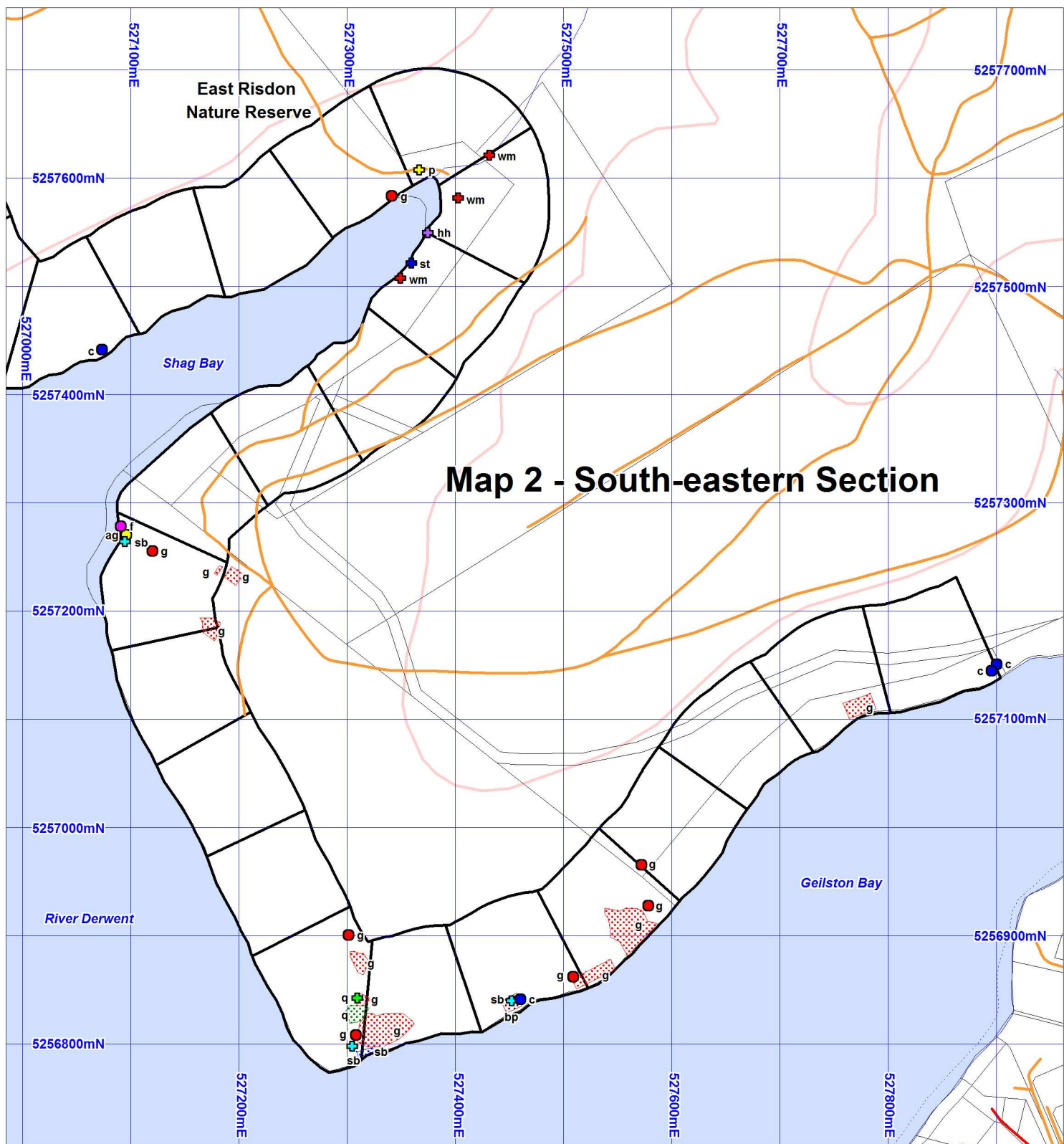
Base data from theLIST, © State of Tasmania
Base image by TASMAR, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55



northbarker
ECOSYSTEM SERVICES

The mapping has been undertaken using a hand held GPS and subjective interpretation.
Consequently it should be considered indicative only.

NRM007 22/012010



Weeds

- af african boxthorn
- ag agapanthus
- bp blue periwinkle
- bs boneseed
- c cotoneaster
- f fennel
- g gorse
- hh horehound
- sb sweet briar
- q quince
- sb sweet briar
- st spear thistle
- tad trailing african daisy
- wm wild mignonette

Weed Polygons

- bp blue periwinkle
- g gorse
- q quince
- sb sweet briar

Base data from the LIST, © State of Tasmania
Base image by TASMAR, © State of Tasmania
Datum: GDA94, AHD Grid: MGA Zone 55



0 100 200
metres

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ECOSYSTEM SERVICES

The mapping has been undertaken using a hand held GPS and subjective interpretation.
Consequently it should be considered indicative only.

NRM007 22/012010

APPENDIX 17 – THREATENED FLORA AND FAUNA

The following lists show threatened flora and fauna records from the Natural Values Atlas (DPIPWE) as at 05/08/2009 that fall within the grid cells used for this project.

Threatened Flora

| Scientific Name | Common Name | Status Tas (TSPA) | Status Aus (EPBCA) |
|---|------------------------------|-------------------|--------------------|
| <i>Asperula scoparia</i> var. <i>scoparia</i> | prickly woodruff | r | - |
| <i>Austrodanthonia induta</i> | tall wallabygrass | r | - |
| <i>Austrodanthonia popinensis</i> | blue wallabygrass | e | EN |
| <i>Austrostipa bigeniculata</i> | doublejointed speargrass | r | - |
| <i>Austrostipa nodosa</i> | knotty speargrass | r | - |
| <i>Austrostipa scabra</i> | rough speargrass | r | - |
| <i>Austrostipa scabra</i> subsp. <i>falcata</i> | sickle speargrass | r | - |
| <i>Austrostipa scabra</i> subsp. <i>scabra</i> | rough speargrass | r | - |
| <i>Bolboschoenus caldwellii</i> | sea clubsedge | r | - |
| <i>Bossiaea obcordata</i> | spiny bossia | r | - |
| <i>Brachyscome rigidula</i> | cutleaf daisy | v | - |
| <i>Brachyscome sieberi</i> var. <i>gunnii</i> | forest daisy | r | - |
| <i>Caladenia anthracina</i> | blacktip spider-orchid | e | CR |
| <i>Caladenia caudata</i> | tailed spider-orchid | v | VU |
| <i>Carex gunniana</i> | mountain sedge | r | - |
| <i>Carex tasmanica</i> | curly sedge | | VU |
| <i>Cuscuta tasmanica</i> | golden dodder | r | - |
| <i>Cynoglossum australe</i> | coast houndstongue | r | - |
| <i>Dianella amoena</i> | grassland flaxlily | r | EN |
| <i>Eucalyptus morrisbyi</i> | morrisbys gum | e | EN |
| <i>Eucalyptus risdonii</i> | risdon peppermint | r | - |
| <i>Juncus amabilis</i> | gentle rush | r | - |
| <i>Lachnagrostis punicea</i> subsp. <i>filifolia</i> | narrowleaf blowgrass | r | - |
| <i>Lachnagrostis punicea</i> subsp. <i>punicea</i> | bristle blowgrass | r | - |
| <i>Lepidium hyssopifolium</i> | soft peppercress | e | EN |
| <i>Lepidium pseudotasmanicum</i> | shade peppercress | r | - |
| <i>Lepidosperma tortuosum</i> | twisting rapiersedge | r | - |
| <i>Lotus australis</i> | australian trefoil | r | - |
| <i>Olearia hookeri</i> | crimsontip daisybush | r | - |
| <i>Pimelea curviflora</i> var. <i>gracilis</i> | slender curved riceflower | r | - |
| <i>Pomaderris pilifera</i> subsp. <i>talpicutica</i> | moleskin dogwood | e | - |
| <i>Ranunculus pumilio</i> var. <i>pumilio</i> | ferny buttercup | r | - |
| <i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i> | rockplate buttercup | r | - |
| <i>Senecio squarrosus</i> | leafy fireweed | r | - |
| <i>Spyridium eriocephalum</i> var. <i>eriocephalum</i> | heath dustymiller | e | - |
| <i>Stenopetalum lineare</i> | narrow threadpetal | e | - |
| <i>Teucrium corymbosum</i> | forest germander | r | - |
| <i>Velleia paradoxa</i> | spur velleia | v | - |
| <i>Vittadinia cuneata</i> var. <i>cuneata</i> | fuzzy new-holland-daisy | r | - |
| <i>Vittadinia gracilis</i> | woolly new-holland-daisy | r | - |
| <i>Vittadinia muelleri</i> | narrowleaf new-holland-daisy | r | - |

Threatened Fauna

| Common Name | Scientific Name | Status Tas (TSPA) | Status Aus (EPBCA) |
|--------------------------|---|-------------------|--------------------|
| chevron looper moth | <i>Amelora acontistica</i> | v | - |
| eastern barred bandicoot | <i>Perameles gunnii</i> | - | VU |
| fairy tern | <i>Sternula nereis</i> | v | - |
| great crested grebe | <i>Podiceps cristatus</i> | v | - |
| green and golden frog | <i>Litoria raniformis</i> | v | VU |
| masked owl (tasmanian) | <i>Tyto novaehollandiae</i> subsp. <i>castanops</i> | e | - |
| saltmarsh looper moth | <i>Dasybela achroa</i> | v | - |
| seastar | <i>Marginaster littoralis</i> | e | CR |
| swift parrot | <i>Lathamus discolor</i> | e | EN |
| tasmanian devil | <i>Sarcophilus harrisii</i> | e | EN |
| tunbridge looper moth | <i>Chrysolarentia decisaria</i> | e | - |
| white-bellied sea-eagle | <i>Haliaeetus leucogaster</i> | v | - |

TSPA = Tasmanian Threatened Species Protection Act 1995

EPBCA = Environment Protection and Biodiversity Conservation Act 1999

Tasmanian Status: r=rare, v=vulnerable, e=endangered, x=extinct

Commonwealth Status: VU=Vulnerable, EN=Endangered, CR=Critically Endangered, EX=Extinct