Vegetation Community Mapping and Baseline Condition Assessment of the Lauderdale Race Course Flats Saltmarsh, Derwent Estuary

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July 2012

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Acknowledgements

Acknowledgements are due to Jason Whitehead from the Derwent Estuary Program (DEP) for coordinating and driving the project, and for liaising with the Clarence City Council for organising access to the site. Jill Pearson is acknowledged for organising the necessary administrative support from NRM South. Josh Kelcey is acknowledged for support with image acquisition. Rachel Walter is acknowledged for her support during field work. Chris Obst from North Barker Ecosystem Services is acknowledged for information on plant identification.

This report was prepared by Vishnu Prahalad for the Derwent Estuary Program. Funding provided through NRM South, the Derwent Estuary Program and the Australian Government's *Caring for Our Country* Initiative.

Project Outputs

The project generated the following vector layer:

1. RaceCourseFlats_VegCommunities_2012_MGA55_EN: vegetation community mapping of the Race Course Flats saltmarsh area, Ralphs Bay, Derwent Estuary.

Refer to metadata in Appendix I: Metadata of the Race Course Flats Vegetation Community Mapping – 2012 for more information.

Disclaimer

1. Saltmarsh Vegetation Community Mapping

1.1. Study Area and Mapping Methods

The Lauderdale Race Course Flats Saltmarsh (the Site) lies in the Ralphs Bay area of Derwent Estuary and is the single largest section of saltmarsh associated with the estuary (Prahalad *et al*., 2009). The Site covers an area of 68.5 ha and is part of the wetland cluster referred to as 'Lauderdale saltmarshes' that occupy a combined area of 87 ha (Figure 1; more details in Whitehead, 2012). Almost the entire extent of the Site is under the ownership and management of Clarence City Council, with the land being used for nature conservation. The Site is bordered by residential areas, private land, old Lauderdale tip, Lauderdale oval, South Arm Highway, a large lagoonal waterbody previously part of Ralphs Bay but now fractured by the highway (East Marsh Lagoon), and some remnant native vegetation. Along the outskirts of the Site runs a popular horse trial (Tangara Trail) which is also used as a walking track.

The entire extent of the Site has been severely impacted due to the developments and activities listed above. In particular, the highway development has fractured the Site from Ralphs Bay and consequently affected tidal mixing. Although three small drains have been provisioned along the highway, these drains have been ineffective as they are too small to service the large area of the Site and are not managed for debris which clogs the drains. Hence the Site has remained largely isolated from Ralphs Bay (and tidal mixing), which has likely had a considerable effect on the ecological function and vegetation composition. Additionally, the Lauderdale tip and oval has impacted the Site primarily due to loss of extent and continually due to legacy effects from the tip (through leachates) and access issues from the oval (leading to rubbish dumping, vehicle access, weeds etc.).

The Site has been mapped using a two-pass mapping process employing high resolution aerial imagery obtained as an 'orthophoto mosaic' generated from vertical digital SLR images and orthorectified using control points selected from the QuickBird aerial imagery compiled for the Greater Hobart Area in 2005 (provided by DigitalGlobe, with a combined mean error of 0.85 m). The two-pass mapping process included a first pass mapping with the orthophoto mosaic as the base image. Boundaries of vegetation communities were digitised on-screen using ESRI ArcMAP™ Version 9.3 based on discernible colour differences. All on-screen digitising was carried out at a scale of 1:2000. The output of the first pass mapping was a series of polygons, with each polygon representing a discernible 'vegetation community patch.' Several copies of the first pass vegetation maps were printed out in colour at various scales and taken in to the field for on-ground validation.

More than 90% of the polygons digitised in the first pass mapping were visited where the vegetation structure and composition was noted – defined as 'a vegetation community roughly contained in the digitised polygon and structurally dominated by one or a mixture of canopy forming flora.' Secondly, about 75% of the boundaries of the digitised polygons were validated to ensure that they represent actual community type boundaries

on the ground. Field observations were augmented by oblique field photographs, and sketches and notes made on the printed colour maps of the section being surveyed.

Once field-validation was completed, second pass mapping was carried out with the data gathered from the field. Initially, each polygon was assigned a vegetation community type (identified to scale of 1:2000) and the boundaries edited where corrections were required (digitised on-screen at a scale of 1:500 to 1:1000). NearMap provided as an additional source of high resolution aerial imagery to pick up some colour differences between communities that were not apparent in the orthophoto mosaic.

Figure 1. Orthophoto mosaic showing the full extent of the Site within the Lauderdale area.

1.2. Results and Discussion of the Mapping

A total area of 68.5 ha was mapped as part of the project covering about 70 vegetation community types. Of these, 21 community types were identified to be of importance in terms of their relative contribution to ground cover and accounted for about 64 ha (~93%) of the mapped area (listed in Table 1). These community types were identified based on the dominant plant species (or bare ground) considered important in terms of their contribution to relative extent within the patch (or polygon). The naming of the community types includes the genus of the plant species that were observed to cover approximately more than 25% of the digitised patch, listed in the order of their contribution to total cover within the patch.

Within these vegetation communities, the low lying succulents *Sarcocornia spp.* and *Disphyma crassifolium* were found to be the two most important plant species occurring extensively, both by themselves and in combination with several other plant species. In particular, they were strongly associated with *Spergularia spp*. that co-occurred consistently with the succulents in various degrees of abundance. These three species combined with the low grasses *Lachnagrostis spp.* (can also include some *Agrostis spp.*, not verified to the required level of detail) and *Puccinellia stricta* to cover close to half the area mapped.

Bare ground devoid of plant cover was recorded extensively across the Site making up to 10% of the total area mapped. Apart from two small patches adjacent to the Lauderdale oval where excessive filamentous algae was noted, most other bare areas had no signs of excessive algal growth and hence are product of high evaporation and low rainfall characteristic of the area (see Prahalad, 2009). Indeed, two years of more than average rainfall in the area has observably promoted the colonisation of the bare flats by *Sarcocornia quinqueflora* (pers. obs. and pers. comm. Phil Watson).

Apart from the low lying succulents and bare ground which covered close to 60% of the mapped area, other areas were largely dominated by graminoids including primarily *Juncus kraussii* and others, namely *Austrostipa stipoides*, *Gahnia spp.*, *Poa spp.* and *Ficinia nodosa*. Numerous small patches of *J. kraussii* was mapped across the Site but covered less than 1% of the area mapped. However, importantly *J. kraussii* combined strongly with *Poa spp.* making up close to 8% of the total area mapped. Notably, one large patch (8496 sq m, 1.2% of total area) mapped to the west of the Lauderdale tip was dominated by *J. kraussii* but co-occurred with other species characteristic of a less saline marsh with *Typha spp.*, *Phragmites australis* and an understory dominated by *Selliera radicans*. Numerous weeds including *Rosa spp.* and *Rumex crispus* were recorded in this patch.

The long lived succulent saltmarsh shrub *Tecticornia arbuscula* was recorded to be occurring either by itself as a dominant community or co-occurring with both the low lying succulents and the graminoids. Of these, *T. arbuscula* dominated community type covered close to 2% of the mapped area, largely restricted between the Lauderdale tip and the oval (see Figure 2). Outside this area, numerous single shrubs of *T. arbuscula*

was recorded within other community types and was mapped (attributed as '*Tecticornia* shrub') to be able to analyse distribution changes in the future, especially in relation to changes in tidal mixing.

Table 1. Important vegetation community types (in terms of % cover) mapped across the Race Course Flats Salrmarsh Site, identified based on the dominant plant species (or bare ground) considered important in terms of their contribution to relative extent within the patch. * additional information to qualify vegetation community type with finer scale information.

Vegetation community type	Ground cover category	Area in sq m	% Cover	Patches recorded
Sarcocornia + Disphyma + Spergularia + Lachnagrostis + Puccinellia	Low Grassy-Succulent Saltmarsh	246,326	35.97	1
Bare ground	Bare Ground	66,656	9.73	52
Sarcocornia + Disphyma + Spergularia (with some Lachnagrostis + Puccinellia)*	Low Succulent Saltmarsh	62,188	9.08	1
Juncus + Poa	High Grassy Saltmarsh	53,494	7.81	19
Sarcocornia + Disphyma + Spergularia	Low Succulent Saltmarsh	26,354	3.85	18
Sarcocornia + Disphyma + Spergularia + Lachnagrostis + Puccinellia (with Plantago and Vellereophyton)*	Low Grassy-Succulent Saltmarsh	23,650	3.45	1
Sarcocornia + Disphyma + Spergularia + Tecticornia	Succulent Saltmarsh	20,294	2.96	1
Sarcocornia + Disphyma	Low Succulent Saltmarsh	19,234	2.81	14
Wilsonia + Disphyma + Spergularia (with weeds)*	Low Succulent Saltmarsh	18,192	2.66	1
Sarcocornia + Disphyma + Tecticornia	Succulent Saltmarsh	14,515	2.12	2
Tecticornia	High Succulent Saltmarsh	13,508	1.97	38
Juncus + Gahnia + Austrostipa + Poa	High Grassy Saltmarsh	11,088	1.62	3
Juncus (brackish marsh with Selliera in understorey and Typha patches, numerous weeds)*	Brackish Marsh	8,496	1.24	1
Gahnia	High Grassy Saltmarsh	7,992	1.17	12
Sarcocornia + Disphyma + Hemichroa + Spergularia + Tecticornia	Succulent Saltmarsh	7,848	1.15	1
Gahnia + Austrostipa	High Grassy Saltmarsh	7,510	1.10	5
Austrostipa	High Grassy Saltmarsh	7,383	1.08	16
Sarcocornia	Low Succulent Saltmarsh	7,022	1.03	9
Disphyma + Spergularia	Low Succulent Saltmarsh	6,770	0.99	2
Juncus	High Grassy Saltmarsh	5,829	0.85	44
Sarcocornia + Disphyma + Spergularia + Lachnagrostis	Low Grassy-Succulent Saltmarsh	3,665	0.54	19

Among other vegetation types recorded, notably *Lawrencia spicata* occurred commonly across the Site either by itself as a dominant community or co-occurring both with the graminoids and succulents. Low lying succulents *Wilsonia backhousei* and *Hemichroa pentandra* are two other notable vegetation types recorded, mostly co-occurring with other succulent species. *Suaeda australis* had restricted distribution within the Site.

Numerous weeds were recorded within the Site. Of these, *Plantago spp.* and *Vellerophyton dealbatum* were extensively noted and found to be important in terms of their relative contribution to ground cover. Other notable weeds include *R. crispus*, *Rosa spp*. and *Pinus radiata* which occurred restricted within graminoid ground cover types. The locations of all *P. radiata* plants have been recorded for follow up weed management. Some areas within the Site are vegetated by native tree species and have been mapped (and attributed) to be dominated by 'native large woody species.' Other areas which are not dominated by saltmarsh plant species have been mapped to as 'not saltmarsh.'

All community types identified and mapped have been categorised broadly under the following eight 'ground cover categories' (Figure 2), including:

1. **Low Succulent Saltmarsh**: Made up of one or many of the species including *Sarcocornia spp.*, *Disphyma crassifolium*, *Spergularia spp.*, *Wilsonia backhousei*, *Hemichroa pentandra*, *Samolus repens.*
2. **High Succulent Saltmarsh**: Made up of one or many of the species including *Tecticornia arbuscula*, *Lawrencia spicata*, *Suaeda australis*, *Atriplex spp.*
3. **Succulent Saltmarsh**: Made up of one or many of the species from low and high succulent saltmarsh listed above.
4. **Low Grassy-Succulent Saltmarsh**: Made up of one or many of the species including *Sarcocornia spp.*, *Disphyma crassifolium*, *Spergularia spp.*, *Lachnagrostis spp.*, *Agrostis spp.*, *Puccinellia spp.*, *Plantago spp.*, *Vellerophyton dealbatum.*
5. **High Grassy Saltmarsh**: Made up of one or many of the species including *Juncus kraussii*, *Austrostipa stipoides*, *Gahnia filum*, *Poa spp.*, *Ficinia nodosa* (with *Senecio spp.* and several weeds, importantly *Rumex crispus*).
6. **High Grassy-Succulent Saltmarsh**: Made up of one or many of the species from low/high succulent saltmarsh and high grassy saltmarsh listed above.
7. **Bare Ground**: Bare ground, dry or waterlogged, devoid of plant cover (except dry ground covered by filamentous algae).
8. **Brackish Marsh**: Vegetation characteristic of a less saline marsh.
9. **Not Saltmarsh**: Vegetation types not known to be associated with saltmarshes.

These categories can be helpful for comparison with other vegetation community mapping undertaken for saltmarshes at various spatial scales. Indeed, such mapping is available for several saltmarshes within the same biogeographic area as the Race Course Flats saltmarsh, including saltmarshes from the Lauderdale saltmarsh cluster (Prahalad, 2009). All the marshes seaward from the South Arm Highway have been mapped (see in

Figure 1) and recorded to be dominated primarily by *T. arbuscula* and secondarily by *S. quinqueflora*. Further, the extent of *D. crassifolium* was recorded to be less than 1% and *Lachnagrostis spp.* was not identified as a community type of interest. Hence, the vegetation complex of the Race Course Flats saltmarsh is quite different from the nearby Lauderdale saltmarshes and can be explained primarily due to the difference in tidal mixing regimes (also see Saltmarsh Vegetation Condition Assessment).

Given the extensive areas covered by succulent saltmarsh species, the entire Site can be classified as Succulent Saline Saltmarsh (ASS) under the TASVEG Classification Scheme.

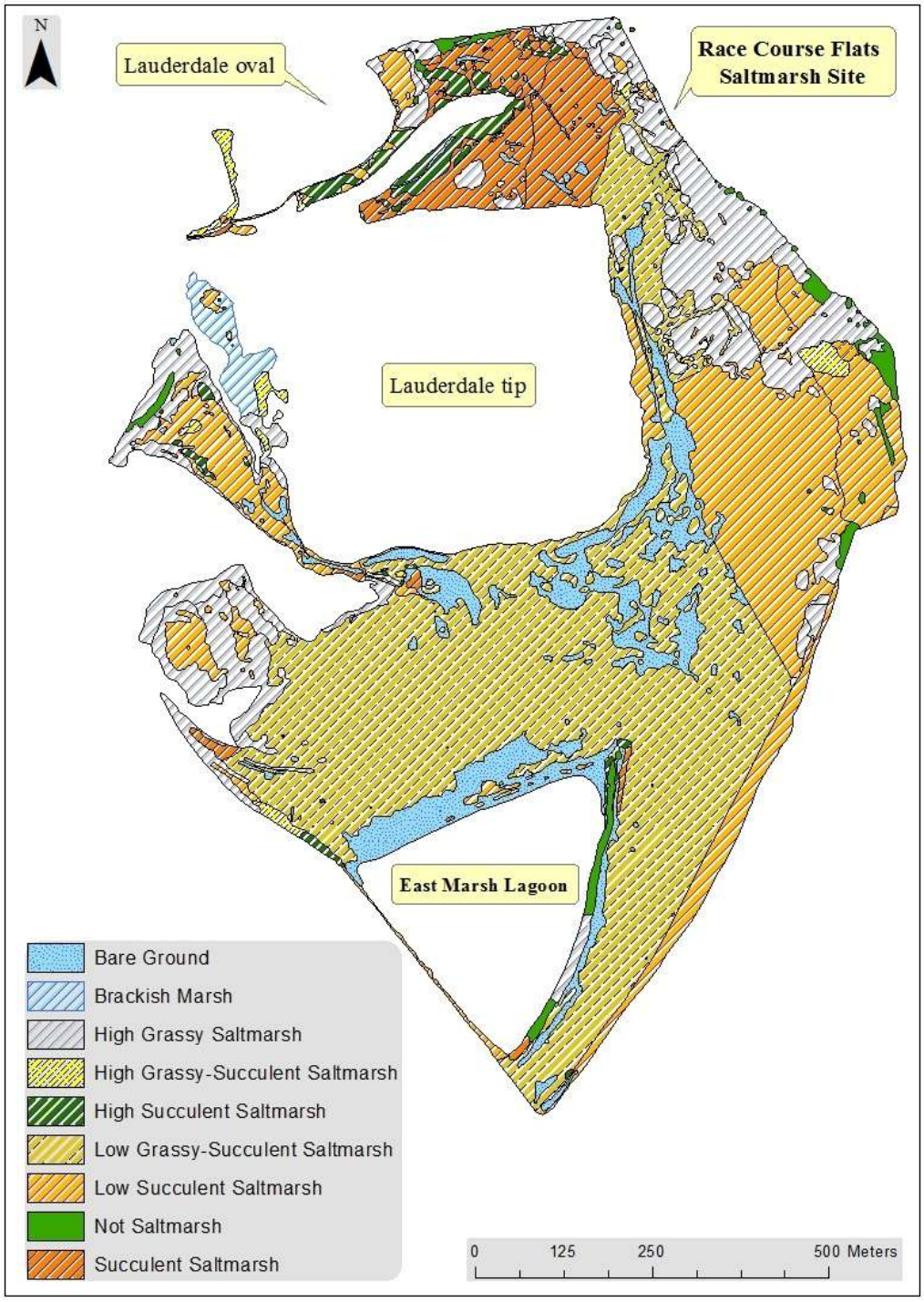

Figure 2. Classification of the ground cover types into eight broad categories based on the vegetation communities mapped.

2. Saltmarsh Vegetation Condition Assessment

2.1. Background to Vegetation Condition Assessment

The condition assessment was undertaken employing line transects along the northern, middle and southern sections of the Race Course Flats Saltmarsh Site. The location for the line transects were selected to maximise spatial coverage of the marsh and also focus on key areas of interest from a land management perspective (i.e. improving tidal exchange). Hence, three transects were placed on each of the three marsh sections taking into account the three main drainages connecting the Site to Ralphs Bay under the South Arm Highway (Figure 1). Seven permanent stakes were planted securely on the marsh, with two each for the two smaller transects (L1 - 80m long and L2 - 86m long) and three for the longer transect (L3 - 367m long) in the southern section of the marsh. Stakes were planted at the marsh boundary marking the beginning and end of each transect. An additional stake was planted in L3 (at 120m from the landward edge) to improve tracking the transect line across the two boundary stakes.

Vegetation survey was undertaken along each smaller transect at 20 m intervals, and at 40 m intervals for the longer transect. A 1x1 m quadrant was employed to estimate the percentage cover of each species. The quadrant was placed in front of the stake towards the right of a 'brick line' that was used to connect the two stakes (see Figure 3). All subsequent quadrants were placed in the right of the brick line running along the transect line while the field personnel walked on the left of the line to avoid trampling of vegetation likely to be surveyed. Species percentage cover was calculated by first listing all the species falling under the quadrant, and then estimating percentage cover starting with the least significant species in terms of cover. Species which had less than 1% cover were only recorded as being present but not assigned a cover estimate. The total cover was totaled to be 100% to avoid any observation or data entry errors. In addition to species percentage cover, the mean height of each cover type was recorded by placing the quadrant upright and estimating mean height in multiples of 10 cms. Height estimates are used mainly for the succulent shrubs *Tecticornia arbuscula* and *Sarcocornia spp*. as a proxy measure for their health.

At each quadrant, an oblique photograph was taken of the marsh covered by the quadrant and a GPS waypoint was recorded. These were later used during data entry as additional evidence to cross check field notes for species listings, cover estimates and in the allocation of a unique code for each quadrant.

To provide as a 'natural reference' to compare the results from these three transects, two additional transects were employed in the adjacent Dorans Road Saltmarsh which has not been impacted by tidal restriction (Figure 1). A permanent stake was installed at the landward boundary of the two reference transects (L4 and L5) and vegetation survey was conducted using similar methods as detailed above. A 20 m interval was used to survey vegetation along the smaller transect (L4 - 80m long) and a 25 m interval was used to survey vegetation along the longer transect (L5 - 133m long). Transect L4 was delimited at

80m as further low lying areas were sparsely vegetation by *Sarcocornia quinqueflora* and covered by high tide at the time of survey. All surveys were conducted during the first week of May 2012 at the end of the growing season.

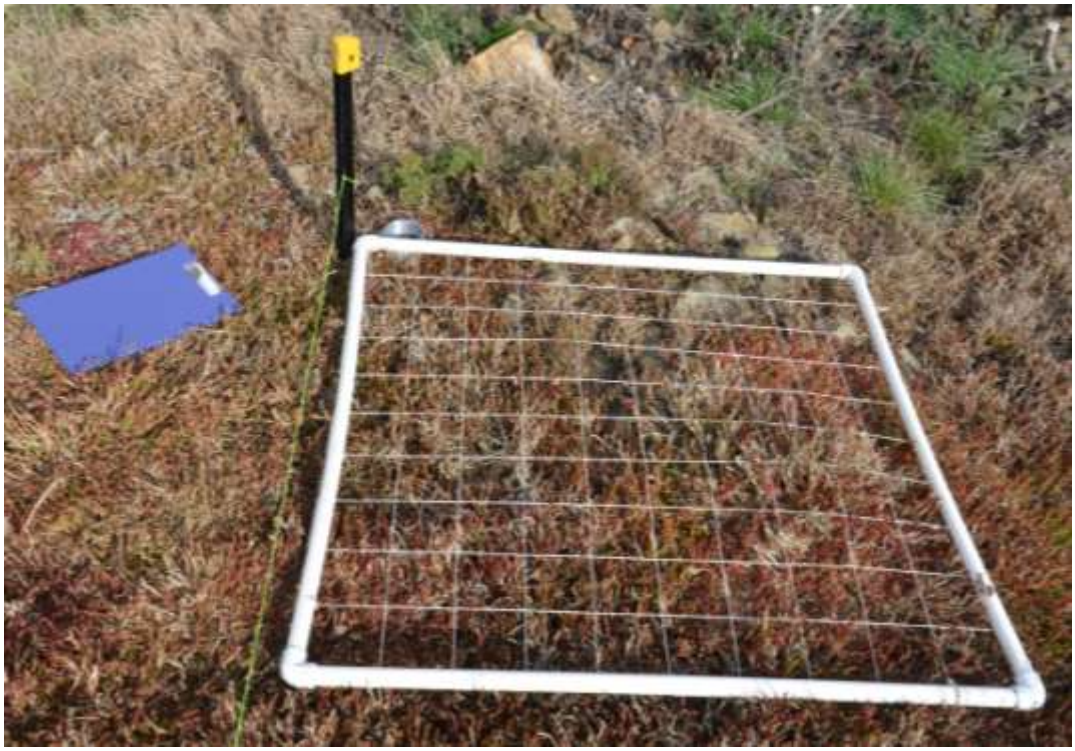

Figure 3. A quadrant (L1Q5) placed on the line transect (L1) on the right side of the brick line adjacent to the stake planted to mark the end of L1.

2.2. Results and Discussion of the Assessment

A total of 31 quadrants were placed on the five line transects, with L1 (80m) and L2 (86m) comprising of five quadrants each, L3 (367m) comprising of 10 quadrants, L4 (80m long) comprising of five quadrants, and L5 (133 m long) comprising of six quadrants (Refer to Appendix III: Data Recorded from the Line Transects). Twenty one vegetation types were identified within the 31 quadrants along with an additional cover type attributed to bare ground, either as dry ground, rock or as waterlogged (see Table 2).

Within Race Course Flats saltmarsh, low lying succulents *Sarcocornia spp.* (includes both *S. quinqueflora* and *S. blackiana*) covered close to 62% of the entire extent surveyed within the quadrants, and was recorded as present in all of the 20 quadrants. Another low lying succulent *Disphyma crassifolium* was the second most abundant species recorded and was noted within 17 of the 20 quadrants. Bare ground and *Spergularia spp.* were the third most commonly observed ground cover types, occurring in nine of the 20 quadrants. However, they covered a modest area (<5% of total cover) in comparison to both *Sarcocornia spp.* and *D. crassifolium*. Among other species, notably *Austrostipa stipoides* and *Tecticornia arbuscula* were recorded within three quadrants covering about 5% of the total area.

Results from the Dorans Road saltmarsh also reveal that *Sarcocornia spp.* dominated both in terms of percentage cover (close to 50%) and number of occurrences (being recorded in all of the 11 quadrants). However, in contrast to Race Course Flats saltmarsh, *S. quinqueflora* was more common with only one record of *S. blackiana* in the back marsh. The second most commonly recorded species was *T. arbuscula,* covering close to 20% of the total quadrant area and occurring within five of the 11 quadrants. The low lying saltmarsh herb *Samolus repens* was recorded to be the third most important species covering close to 9% and occurring within eight quadrants. Bare ground was next most important in terms of cover and was recorded within six quadrants.

In terms of mean height recorded for each cover type, the height of *T. arbuscula* was about 40 cm (the recorded range being 10 to 70 cm) within Race Course Flats saltmarsh. Comparatively, the shrubs measured from the Dorans Road saltmarsh had a mean height of 50 cm (with the range being 20 to 70 cm).

A similar study was conducted in a saltmarsh along the Coal River estuary in the nearby Pitt Water area (Prahalad, 2012) and can be used here as additional reference data for comparison with the results reported above. A total of 24 quadrants were placed on four line transects spread across a 29 ha Coal River saltmarsh site (with the transects being 376 m, 295 m, 222 m and 148 m long). The saltmarsh was tidally connected and surrounded by agricultural land with no backing vegetation. The marsh is likely to have been receiving high nutrient inputs and had been open to grazing by cattle.

In comparing the results from the three saltmarsh sites (see Table 3) the following observations can be made:

- Both Dorans Road and Coal River saltmarshes had similar vegetation cover indicative of a typical saltmarsh found in the bioregion that is open to tidal mixing.

The Dorans Road saltmarsh is relatively natural in condition with no tidal restriction as the Coal River saltmarsh, but differs in that the former has some natural backing vegetation and no notable sources of nutrient inputs. Consequently, in comparison, while the four major ground cover types were similar, the notable distinction is the relatively lower cover of bare ground and increased health (in terms of height) of T. arbuscula shrubs (see Table 3)

- The vegetation cover of the Race Course Flats saltmarsh was considerably different from both the other reference sites. Notably, the drier saltmarsh species Sarcocornia blackiana, Disphyma crassifolium and Spergularia spp. were more dominant compared to Sarcocornia quinqueflora, T. arbuscula and Samolus repens. This strongly signifies a changed ecological character of the Race Course Flats saltmarsh that is likely to have been driven primarily due to the impeded tidal connectivity of the Site.

- Another notable difference between the Race Course Flats saltmarsh and the two reference sites is the presence of weeds. No weeds were recorded within Dorans Road saltmarsh and three occurrences of weeds were recorded within Coal River saltmarsh at the boundary with the nearby agricultural land. In comparison, numerous weeds were recorded (and mapped) within the Race Course Flats saltmarsh. The extensive presence of weeds within the Site can be construed to be a further indication of the changed ecological character of the Site consequent on the lack of tidal connectivity.

Table 2. Various vegetation types and bare ground recorded, their cover % abundance, number of occurrences and mean height across the 24 quadrants placed along the four line transects.

Genus	species	Total cover (in %)	Number of occurrences (in %)	Weighted average (in %)	Mean height (range) (in cm)
Race Course Flats Saltmarsh Site					
Sarcocornia	***spp.***	**61.60**	**26.32**	**43.96**	**10**
Disphyma	***crassifolium***	**16.30**	**22.37**	**19.33**	**<10**
Bare ground		**4.40**	**11.84**	**8.12**	**na**
Spergularia	***spp.***	**1.20**	**11.84**	**6.52**	**10**
Austrostipa	*stipoides*	6.95	3.95	5.45	40 (30-50)
Tecticornia	*arbuscula*	4.05	3.95	4.00	40 (10-70)
Puccinellia	*stricta*	1.90	5.26	3.58	20
Plantago	*spp.*	0.30	2.63	1.47	10
Atriplex	*spp.*	0.25	2.63	1.44	20
Wilsonia	*backhousei*	0.75	1.32	1.03	<10
Thinopyrum	*spp.*	0.75	1.32	1.03	20
Vellereophyton	*dealbatum*	0.50	1.32	0.91	10
Hemichroa	*pentandra*	0.40	1.32	0.86	<10
Poa	*spp.*	0.40	1.32	0.86	30
Lachnagrostis	*spp.*	0.25	1.32	0.78	30
Epilobium	*billardierianum*	na	1.32	na	30
Dorans Road Saltmarsh Site					
Sarcocornia	***spp.***	**49.82**	**25.00**	**37.41**	**10**
Tecticornia	***arbuscula***	**19.55**	**11.36**	**15.45**	**50 (20-70)**
Samolus	***repens***	**8.64**	**18.18**	**13.41**	**10**
Bare ground		**7.82**	**13.64**	**10.73**	**na**
Lawrencia	*spicata*	2.73	4.55	3.64	75 (50-100)
Disphyma	*crassifolium*	1.91	4.55	3.23	<10
Triglochin	*striata*	1.82	4.55	3.18	15 (10-20)
Austrostipa	*stipoides*	4.09	2.27	3.18	100
Hemichroa	*pentandra*	1.45	4.55	3.00	<10
Suaeda	*australis*	0.55	4.55	2.55	15 (10-20)
Atriplex	*paludosa*	1.36	2.27	1.82	20
Wilsonia	*backhousei*	0.18	2.27	1.23	<10
Puccinellia	*stricta*	0.09	2.27	1.18	10

Table 3. Comparison of data from the Race Course Flats saltmarsh and Dorans Road saltmarsh with the only available comparable data from a saltmarsh along the Coal River located in similar biogeographic area, in the nearby Pitt Water, data from Prahalad (2012).

Saltmarsh site name	Area	Sampling effort	Dominant vegetation recorded		Notes
Race Course Flats Saltmarsh	68 ha	3 transect lines with 20 quadrants	*Sarcocornia sp.*	44%	1. Average height of *Tecticornia* shrubs: 50 cm 2. *Sarcocornia blackiana* co-occuring 3. Bare ground primarily dry
			Disphyma crassifolium	19%	
			Bare ground	8%	
			Spergularia sp.	6.5%	
Dorans Road Saltmarsh	11.3 ha	2 transect lines with 11 quadrants	*Sarcocornia sp.*	37%	1. Average height of *Tecticornia* shrubs: 65 cm 2. *Sarcocornia blackiana* limited to back marsh 3. Bare ground primarily wet
			Tecticornia arbuscula	15.5%	
			Samolus repens	13%	
			Bare ground	11%	
Coal River Saltmarsh	29 ha	4 transect lines with 24 quadrants	*Sarcocornia quinqueflora*	42%	1. Average height of *Tecticornia* shrubs: 35 cm 2. *Sarcocornia blackiana* not recorded 3. Bare ground both wet and dry
			Bare ground	18%	
			Tecticornia arbuscula	13%	
			Samolus repens	8%	

The vegetation assessment indicates the dominance of four major vegetation or ground cover types in the Race Course Flats saltmarsh. They include: *Sarcocornia spp*., *Disphyma crassifolium*, bare ground devoid of plant cover, and *Spergularia spp*. This concurs with the larger scale extent cover mapping undertaken for the entire Site (see Saltmarsh Vegetation Community Mapping). Future monitoring the relative abundance and structure (mean height) of these cover types within the Site can throw light into effects of changed tidal regimes and other land use practices on their health and function.

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Appendix I: Metadata of the Race Course Flats Vegetation Community Mapping – 2012

Dataset TITLE

Vegetation community mapping of the Race Course Flats saltmarsh, Lauderdale/Ralphs Bay area, Derwent Estuary.

Dataset CUSTODIAN

Derwent Estuary Program (DEP), Natural Resource Management South (NRM South)

Dataset JURISDICTION

Tasmania

Description ABSTRACT

This dataset is a polygon representation of saltmarsh and associated vegetation communities within the Race Course Flats saltmarsh area, Lauderdale, Tasmania. Each polygon represents a single vegetation patch/community identified to scale of 1:2000 and the boundaries digitised on-screen at a scale of 1:500 to 1:1000.

Description SEARCH WORDS

VEGETATION mapping

Description GEOGRAPHIC EXTENT NAME(S)

The entire extent of Race Course Flats saltmarsh area, Lauderdale/Ralphs Bay area, Derwent Estuary.

Description GEOGRAPHIC BOUNDING COORDINATES

North Bounding Coordinate:

-42.54

South Bounding Coordinate:

-42.55

East Bounding Coordinate:

147.29

West Bounding Coordinate:

147.29

Data Currency BEGINNING DATE

2012

Data Currency ENDING DATE

Current

Dataset Status PROGRESS

Complete

Dataset Status MAINTENANCE AND UPDATE FREQUENCY

Not planned

Access STORED DATA FORMAT

DIGITAL – ESRI ArcMAP™ Version 9.3, vector coverage, 388 polygons

Access AVAILABLE FORMAT TYPE(S)

DIGITAL ESRI Shapefile

DIGITAL MapInfo Professional TAB files

Access CONSTRAINTS

Contact Derwent Estuary Program (DEP)

Data Quality LINEAGE

Mapping was undertaken using an 'orthophoto mosaic' generated from vertical digital SLR images and orthorectified using control points selected from the QuickBird aerial imagery compiled for the Greater Hobart Area in 2005 (provided by DigitalGlobe, with a combined mean error of 0.85 m). Boundaries of vegetation communities were digitised on-screen based on discernible colour differences at a scale of 1:2000.

Data Quality POSITIONAL ACCURACY

More than 90% of the polygons were visited for improving positional accuracy of the vegetation community patches. Secondly, about 75% of the boundaries of the digitised polygons were validated to ensure that they represent actual community type boundaries on the ground. Field observations were augmented by oblique field photographs, and sketches and notes made on the printed colour maps of the section being surveyed and NearMap imagery available online.

Data Quality ATTRIBUTE ACCURACY

More than 90% of the polygons were visited for improving attribute accuracy of the vegetation community patches.

Data Quality LOGICAL CONSISTENCY

The attributes were carefully checked for errors. All features were attributed. The features do not intersect with each other, and are also not duplicated.

Data Quality COMPLETENESS

COMPLETENESS OF COVERAGE

The entire extent of Race Course Flats saltmarsh area has been mapped along with additional non saltmarsh features of interest.

COMPLETENESS OF CLASSIFICATION

All the features mapped have been comprehensively attributed with a vegetation community type, ground cover category, area, update person and update date.

COMPLETENESS OF VERIFICATION

The mapping has been ground truthed as briefly outlined above.

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Metadata Date

2012-06-06

Additional Metadata

Refer to “Prahalad, V.N. (2012). Vegetation Community Mapping and Baseline Condition Assessment of the Lauderdale Race Course Flats Saltmarsh, Derwent Estuary. NRM South. Tasmania.”, available from the Derwent Estuary Program.

Appendix II: Images of Vegetation Community Types

Plate 1. Low Succulent Saltmarsh – mixture of *Sarcocornia spp*., *Disphyma crassifolium* and *Spergularia spp*., three most extensively found species in Race Course Flats saltmarsh site.

Plate 2. Low Grassy-Succulent Saltmarsh – *Lachnagrostis spp*. and *Puccinellia stricta* co-occurring with Low Succulent Saltmarsh species.

Plate 3. Common weeds *Vellereophyton dealbatum* and *Plantago spp.* occurring within Low Grassy-Succulent Saltmarsh.

Plate 4. Low Grassy-Succulent Saltmarsh and Low Succulent Saltmarsh divided by a fence line set up for the Tangara Horse Trial.

Plate 5. High Grassy Saltmarsh – dominated by a mixture of *Juncus kraussii* and *Poa spp.*, recorded here with a *Pinus radiata* weed.

Plate 6. Brackish Marsh – *Juncus spp*. dominated marsh with areas dominated by *Typha spp*. as recorded here.

Plate 7. Succulent Saltmarsh – mixture of Low and High Succulent Saltmarsh species with *Sarcocornia spp*., *Disphyma crassifolium*, *Spergularia spp*. and *Tecticornia arbuscula*.

Plate 8. High Succulent Saltmarsh species *Tecticornia arbuscula* – numerous individual shrubs were mapped within the study area such as the one recorded here.

Appendix III: Data Recorded from the Line Transects

Line Transect 1: Quadrant 1-5	Genus	Species	Cover (%)	Height (cm)	GPS coordinates (E, N)
L1Q1 (0 m) (land edge, north)	*Sarcocornia*	*quinqueflora*	61	10	540068, 5248622
	Thinopyrum	*spp.*	15	20	
	Poa	*spp.*	8	30	
	Hemichroa	*pentandra*	8	<10	
	Disphyma	*crassifolium*	4	<10	
	Atriplex	*spp.*	2	20	
	Platago	*spp.*	2	10	
	Spergularia	*spp.*	<1	10	
L1Q2 (20 m)	*Sarcocornia*	*blackiana*	83	<10	540075, 5248599
	Disphyma	*crassifolium*	16	<10	
	Bare ground	dry	1	na	
L1Q3 (40 m)	*Austrostipa*	*stipoides*	95	50	540079, 5248581
	Sarcocornia	*blackiana*	5	10	
	Disphyma	*crassifolium*	<1	<10	
L1Q4 (60 m)	*Tecticornia*	*arbuscula*	50	40	Not recorded
	Sarcocornia	*blackiana*	30	10	
	Disphyma	*crassifolium*	20	<10	
L1Q5 (80 m) (land edge, south)	*Sarcocornia*	*quinqueflora*	90	10	540086, 5248543
	Tecticornia	*arbuscula*	1	10	
	Bare ground	rock	9	<10	
5 qadrants at 20m intervals			**500**		

Line Transect 2: Quadrant 1-5	Genus	Species	Cover (%)	Height (cm)	GPS coordinates (E, N)
L2Q1 (0 m) (land edge, north)	*Sarcocornia*	*blackiana*	40	10	539758, 5248043
	Austrostipa	*stipoides*	40	40	
	Wilsonia	*backhousei*	15	<10	
	Bare ground	dry	4	na	
	Disphyma	*crassifolium*	1	<10	
L2Q2 (20 m)	*Sarcocornia*	*quinqueflora*	90	10	539740, 5248038
	Bare ground	dry	10	na	
L2Q3 (40 m)	*Disphyma*	*crassifolium*	55	<10	539722, 5248032
	Sarcocornia	*quinqueflora*	40	<10	
	Spergularia	*spp.*	5	10	
L2Q4 (60 m)	*Sarcocornia*	*quinqueflora*	60	10	539705, 5248027
	Tecticornia	*arbuscula*	30	70	
	Disphyma	*crassifolium*	10	<10	
L2Q5 (86 m) (land edge, south)	*Sarcocornia*	*spp.*	60	10	539678, 5248016
	Disphyma	*crassifolium*	35	<10	
	Austrostipa	*stipoides*	4	30	
	Bare ground	dry	1	na	
5 qadrants at 20m intervals			**500**		

Line Transect 3: Quadrant 1-10	Genus	Species	Cover (%)	Height (cm)	GPS coordinates (E, N)
L3Q1 (0 m) (north, land edge)	*Sarcocornia*	*spp.*	97	10	539961, 5247901
	Atriplex	*spp.*	3	20	
	Epilobium	*billardierianum*	<1	20	
L3Q2 (40 m)	*Sarcocornia*	*quinqueflora*	65	10	539964, 5247866
	Disphyma	*crassifolium*	20	<10	
	Vellereophyton	*dealbatum*	10	10	
	Plantago	*spp.*	4	10	
	Spergularia	*spp.*	1	10	
L3Q3 (80 m)	*Sarcocornia*	*quinqueflora*	70	<10	539971, 5247825
	Disphyma	*crassifolium*	30	<10	
L3Q4 (120 m)	*Sarcocornia*	*quinqueflora*	60	10	539974, 5247786
	Disphyma	*crassifolium*	20	<10	
	Spergularia	*spp.*	15	10	
	Bare ground	dry	5	na	
	Puccinellia	*stricta*	<1	10	
L3Q5 (160 m)	*Sarcocornia*	*quinqueflora*	88	10	539978, 5247746
	Bare ground	dry	8	na	
	Disphyma	*crassifolium*	4	<10	
	Spergularia	*spp.*	<1	10	
L3Q6 (200 m)	*Puccinellia*	*stricta*	35	20	539980, 5247704
	Sarcocornia	*quinqueflora*	30	10	
	Disphyma	*crassifolium*	30	<10	
	Agrostis	*spp.*	5	30	
	Spergularia	*spp.*	<1	10	
L3Q7 (240 m)	*Sarcocornia*	*spp.*	69	10	539984, 5247665
	Disphyma	*crassifolium*	25	<10	
	Bare ground	dry	4	na	
	Puccinellia	*stricta*	1	20	
	Spergularia	*spp.*	1	10	
L3Q8 (280 m)	*Sarcocornia*	*quinqueflora*	66	10	539987, 5247625
	Disphyma	*crassifolium*	30	<10	
	Puccinellia	*stricta*	2	20	
	Spergularia	*spp.*	2	10	
L3Q9 (320 m)	*Sarcocornia*	*spp.*	75	10	539988, 5247588
	Disphyma	*crassifolium*	25	<10	
	Spergularia	*spp.*	<1	10	
L3Q10 (367 m) (south, water edge)	*Sarcocornia*	*quinqueflora*	53	10	Not recorded
	Bare ground	dry	46	na	
	Disphyma	*crassifolium*	1	<10	
10 qadrants at 40m intervals			**1000**		

Line Transect 4: Quadrant 1-5*	Genus	Species	Cover (%)	Height (cm)	GPS coordinates (E, N)
L4Q1 (80 m) (north, water edge)	*Sarcocornia*	*quinqueflora*	80	10	539543, 5246993
	Bare ground	waterlogged	20	na	
L4Q2 (60 m)	*Sarcocornia*	*quinqueflora*	85	10	539532, 5246976
	Bare ground	waterlogged	10	na	
	Samolus	*repens*	5	10	
L4Q3 (40 m)	*Sarcocornia*	*quinqueflora*	93	15	539516, 5246963
	Tecticornia	*arbuscula*	5	30	
	Samolus	*repens*	1	10	
	Hemichroa	*pentandra*	1	<10	
L4Q4 (20 m)	*Sarcocornia*	*quinqueflora*	70	10	539501, 5246950
	Hemichroa	*pentandra*	15	<10	
	Triglochin	*striata*	10	10	
	Samolus	*repens*	4	<10	
	Puccinellia	*stricta*	1	10	
L4Q5 (0 m) (south, land edge)	*Tecticornia*	*arbuscula*	50	70	539483, 5246940
	Atriplex	*paludosa*	15	20	
	Triglochin	*striata*	10	20	
	Sarcocornia	*quinqueflora*	10	15	
	Samolus	*repens*	10	10	
	Suaeda	*australis*	5	20	
5 qadrants at 20m intervals			**500**		

Line Transect 5: Quadrant 1-6	Genus	Species	Cover (%)	Height (cm)	GPS coordinates (E, N)
L5Q1 (133 m) (north, water edge)	*Sarcocornia*	*quinqueflora*	75	10	539951, 5247059
	Bare ground	waterlogged	15	na	
	Samolus	*repens*	10	10	
L5Q2 (100 m)	*Samolus*	*repens*	55	10	539961, 5247029
	Sarcocornia	*quinqueflora*	40	10	
	Tecticornia	*arbuscula*	4	20	
	Suaeda	*australis*	1	10	
L5Q3 (75 m)	*Sarcocornia*	*quinqueflora*	70	10	539968, 5247006
	Bare ground	waterlogged	25	na	
	Samolus	*repens*	5	<10	
L5Q4 (50 m)	*Tecticornia*	*arbuscula*	77	50	539973, 5246979
	Sarcocornia	*quinqueflora*	15	10	
	Bare ground	dry	8	na	
L5Q5 (25 m)	*Tecticornia*	*arbuscula*	79	70	539981, 5246958
	Lawrencia	*spicata*	10	50	
	Sarcocornia	*quinqueflora*	5	10	
	Samolus	*repens*	5	10	
	Disphyma	*crassifolium*	1	<10	
L5Q6 (0 m) (south, land edge)	*Austrostipa*	*stipoides*	45	100	539985, 5246932
	Lawrencia	*spicata*	20	100	
	Disphyma	*crassifolium*	20	<10	
	Bare ground	dry	8	na	
	Sarcocornia	*blackiana*	5	10	
	Wilsonia	*backhousei*	2	<10	
6 qadrants at 25m intervals			**500**		