Poole Harbour

Saltmarsh Monitoring 2006

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AN OVERVIEW OF SPARTINA MARSHES IN POOLE HARBOUR

Spartina anglica is the dominant plant in the middle and lower salt-marsh areas of the Harbour, and currently occupying an area of approximately 320 hectares (Edwards, 2004). However, it is a relatively recent arrival first recorded around 1890 (Raybould, 2005).

Probably originating from Southampton Water the species quickly became established at Ower on the southern shore and spread rapidly throughout the intertidal. Between 1917 and 1924 *Spartina anglica* reached its peak ,covering some 800 ha of the Harbour (Gray *et al*, 1991). In Holes Bay it covered some 63% of the intertidal area by 1924 (Gray & Pearson, 1984).

From 1924 onwards there was an overall trend of loss in *Spartina*, with Gray *et al* (1991) estimating a loss of 200 ha between 1924 and 1952, and Gray & Pearson (1984) estimating a further loss of 250 ha between 1952 and 1980, leaving some 350 ha remaining in the Harbour.

The reasons for the rapid and sustained decline of *Spartina* are complex with several different factors working together (Raybould, 2005). These are summarised below:

i). Erosion of the salt-marsh edges. This was, and possibly still is, particularly noticeable on the intertidal salt-marsh 'islands' rather than where salt-marsh adjoins the land.

ii). Natural die-back occurs at the back of the marshes where anaerobic conditions cause the death of the rhizomes due to lack of oxygen (Gray *et al*, 1991). This process is still happening at Brand's Bay and at Fitzworth.

iii). Invasion of other species. An important feature of the Harbour is the extensive reedbeds that are found at the back of the salt-marsh where there are freshwater seepages into the back of the marsh. In some areas in the west of the Harbour *Phragmites communis* has invaded some areas where salinity levels are low. However, compared with the other factors the amount of loss through the invasion of other species is likely to be very low.

THE FUTURE

The loss of *Spartina* continues, due to factors i and ii, albeit at a reduced rates as most of the smaller 'intertidal islands' have already been lost. With the predicted rises in sea levels over the next 100 years the losses are likely to accelerate. A further and more recent impact is erosion of creek edges due to trampling by Sika deer (House *et al*, 2005). This is very localised and currently confined to the west of the Harbour, particularly the Arne peninsula.

REFERENCES:

Edwards, B 2004 The Vegetation of Poole Harbour. Wareham, Poole Harbour Study Group.

Gray, AJ & Pearson. JM 1984 *Spartina marshes* in Poole Harbour, Dorset, with special reference to Holes Bay. pp. 11-14. In: *Spartina anglica* in Great Britain. Doody, P (ed). Peterborough, Nature Conservancy Council.

Gray, AJ, Marshall, DF & Raybould, AF 1991 A century of evolution in *Spartina anglica*. Advances in Ecological Research, **21**: 1-62.

House, C, May, V & Diaz, A 2005 Sika Deer Trampling and Salt-marsh Creek Erosion: Preliminary Investigation. pp. 189-193. In: The Ecology of Poole Harbour Humphreys, J & May, V (eds). Proceedings in Marine Science 7. Elsevier.

Raybould, AF 2005 History and Ecology of *Spartina anglica* in Poole Harbour. pp. 71-90. In: The Ecology of Poole Harbour Humphreys, J & May, V (eds). Proceedings in Marine Science 7. Elsevier.

METHODOLOGY

This study was undertaken using the aerial photographs taken by Getmapping and supplied by the County Council. The extent of the saltmarsh was digitised using MapInfo GIS software at a resolution of 1:1000. All channels greater than 2 – 3 metres in width were digitised. Fields included in the attribute table were: 'Polygon ID', 'Habitat', 'Location', ' SMU', 'Area ha', 'Data source', 'Data provider', 'Date provided'. Polygons were also split into the different management units (Site Management Units - SMU), as used by English Nature.

There are inherent problems when comparing two sets of data using photographs from two different sources is whether the two match when they are overlaid. The two set used for this study did not match exactly, but the difference was only in the region of 1-3 metres and therefore was not considered to be a problem when comparing the data sets.

Areas of obvious change to the saltmarsh were identified by comparing this survey (2005) survey with the 2001 survey that was digitised using 2002 aerial photos. By splitting the polygons of the 2001 survey with those from the 2005 survey, and vice versa, it was possible to obtain figures (in hectares) for area lost and area gained in these areas. The figures calculated by these comparisons should be regarded as approximate as the 2001 survey was digitised at a lower resolution than this survey and fewer channels were digitised. However, the 2001 survey including ground-truthing the landward edge of the salt-marsh. Most of the apparent 'gains' are actually small islands of *Spartina* marsh that were not digitised using the 2001 photographs, largely due to the quality of the photographs, therefore these have been omitted from the figures below. The exception is Sterte where a small island clearly visible on the 2005 photos is definitely absent on the 2002 photos. One possible reason is the state of the tide when the 2002 photos were taken as some areas of *Spartina* areas are submerged at high tide.

The 2001 survey was digitised by Bryan Edwards and the 2005 comparison by Jon Corkill.

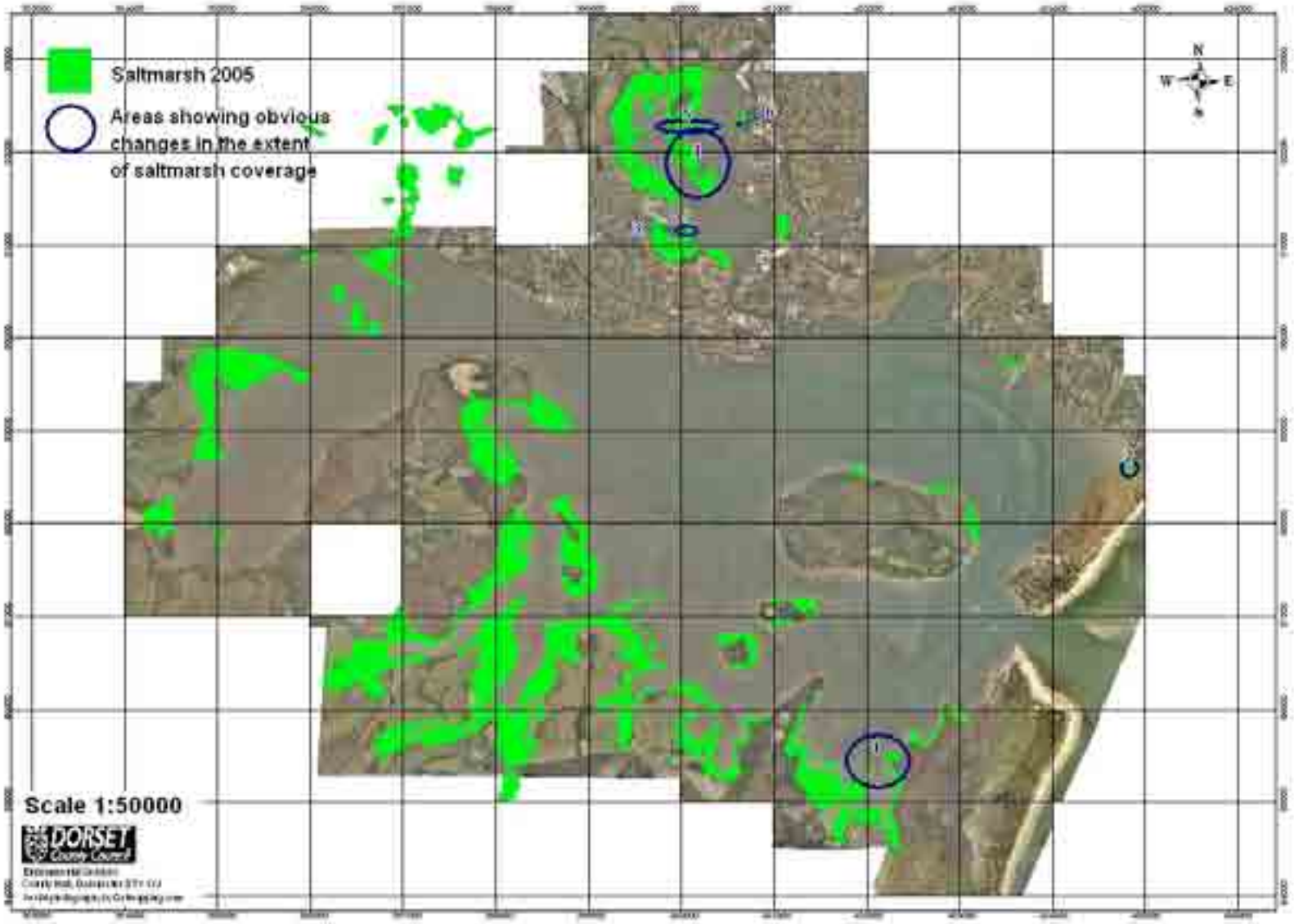
Areas of Change

Areas of change	SMU	Saltmarsh lost (ha)	Saltmarsh gained (ha)
1 – Brand's Bay	SZ08/004/53 & SZ08/004/54	0.3	
2 – Shore Road	No SMU	0.3	
3 – Hole's Bay South	SZ08/004/12	0.1	
4 – Holes Bay Central	SZ08/004/10	1.2	
5 – Hole's Bay Railway	SZ08/004/10	0.4	
6 - Sterte	SZ08/004/07		0.01
	Total	**2.3**	**0.01**

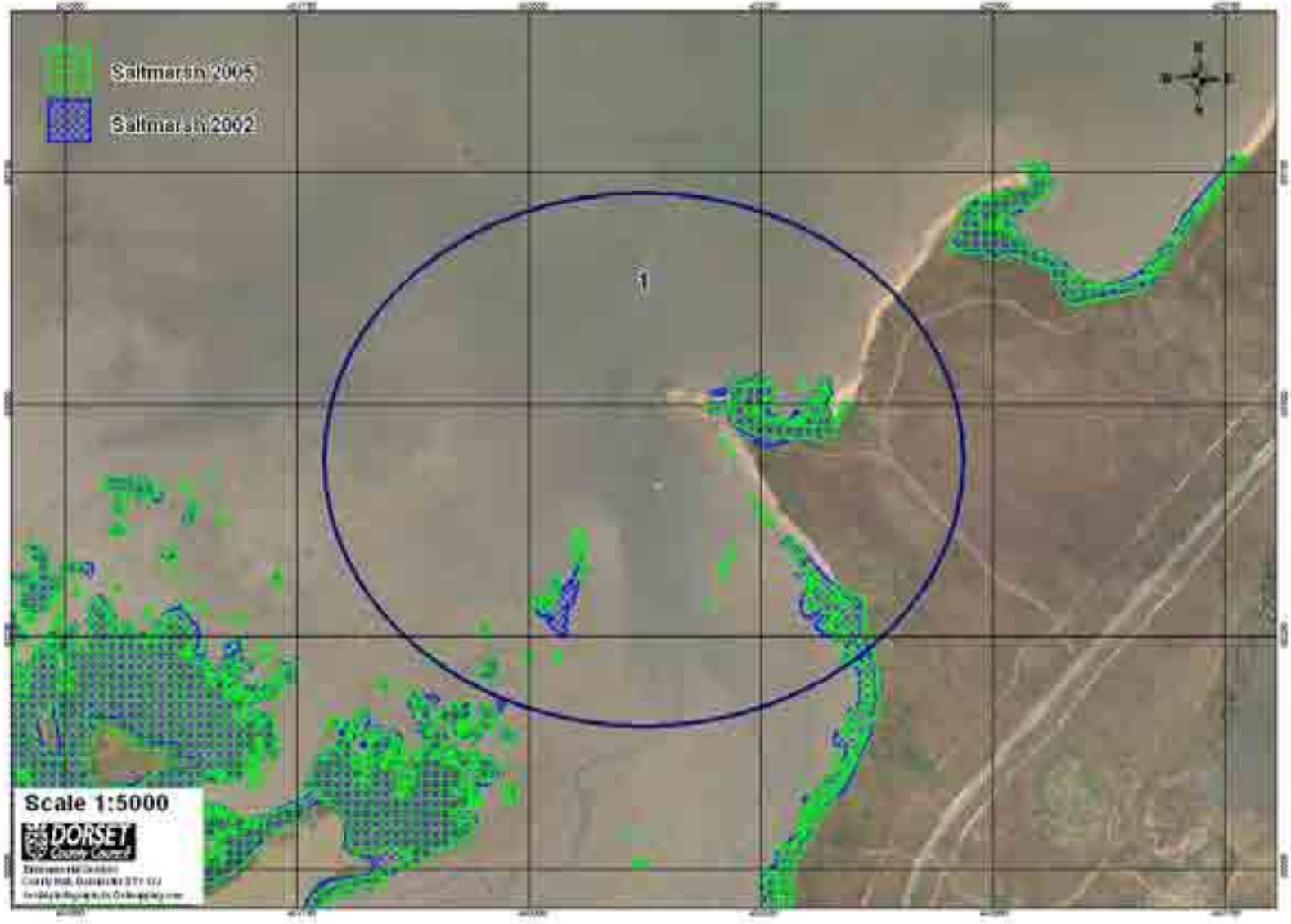
The actual losses (i.e. those not attributable to the differences in mapping) are very small and in those areas where there has been a long term decline in the *Spartina* marsh, namely Brand's Bay and Holes Bay.

At Shore Road the losses are interesting in that some are due the small sand and shingle beaches increasing and encroaching onto the salt-marsh (Maps 2 & 3).

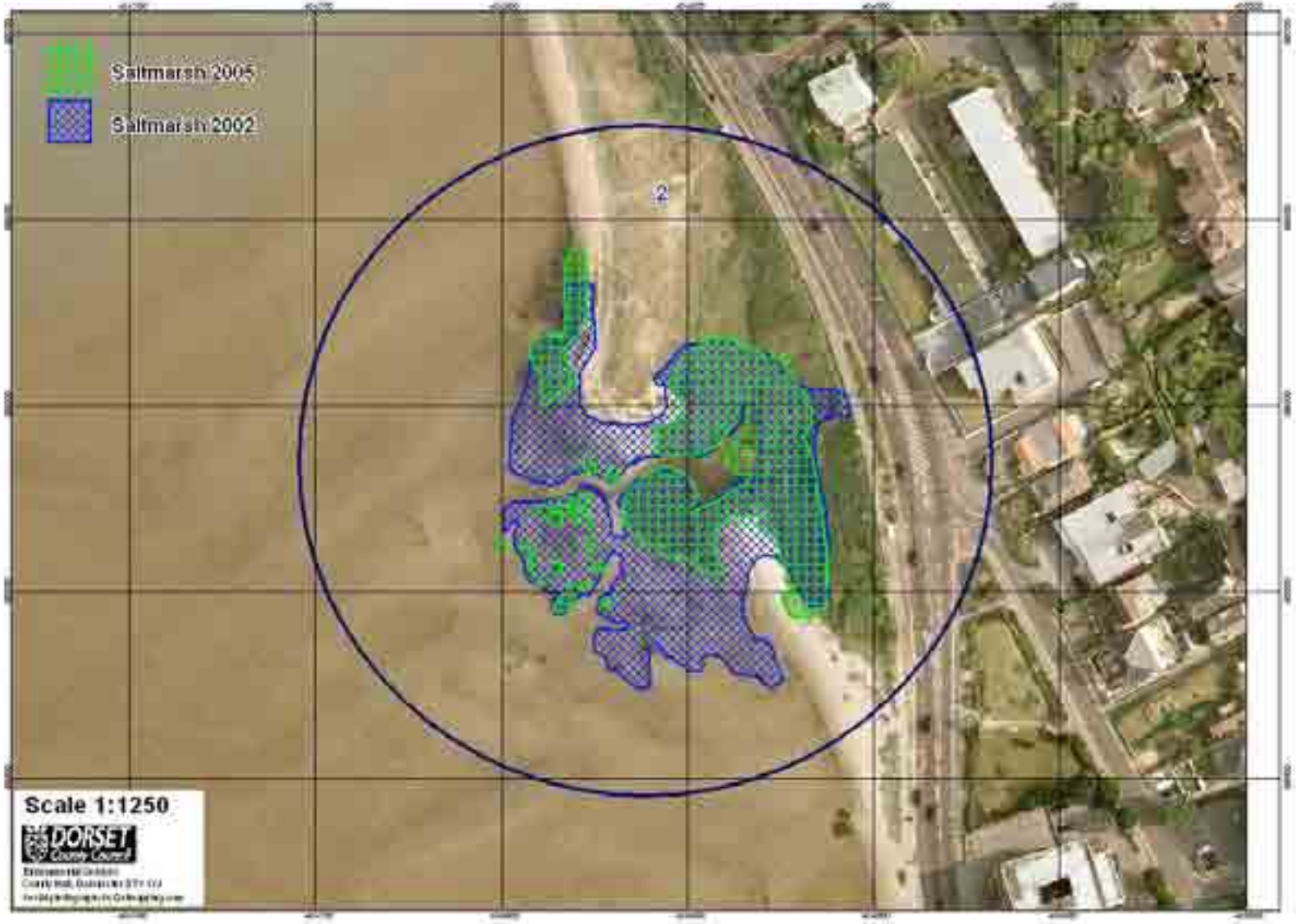
Key to Maps


Saltmarsh 2005
Areas showing obvious changes in the extent of saltmarsh coverage
N
W
E
Scale 1:50000
DORSET

Area 1 - Brand's Bay

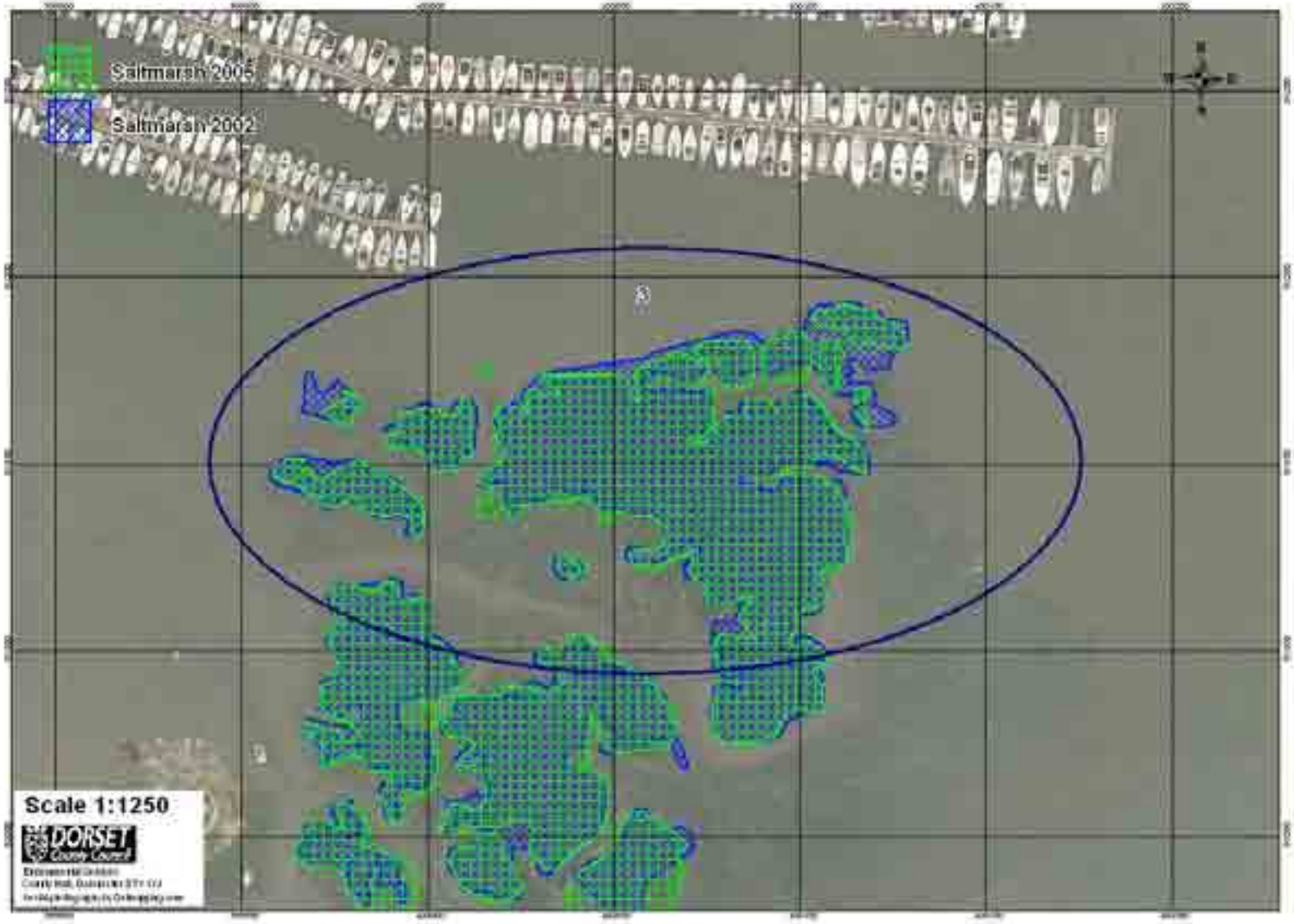


Area 2 – Shore Road

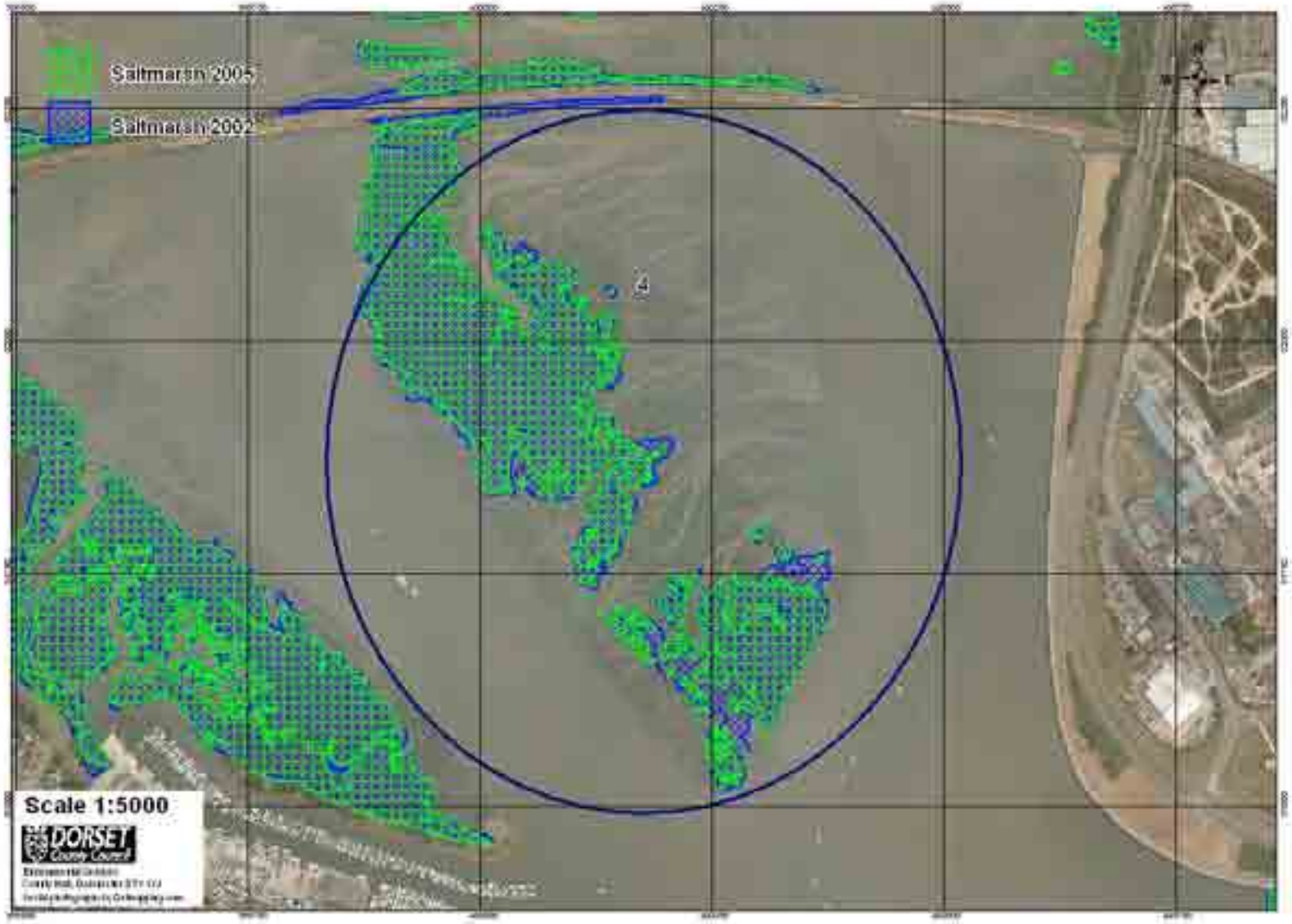


Area 2 b – Shore Road 2002 Aerial Photograph

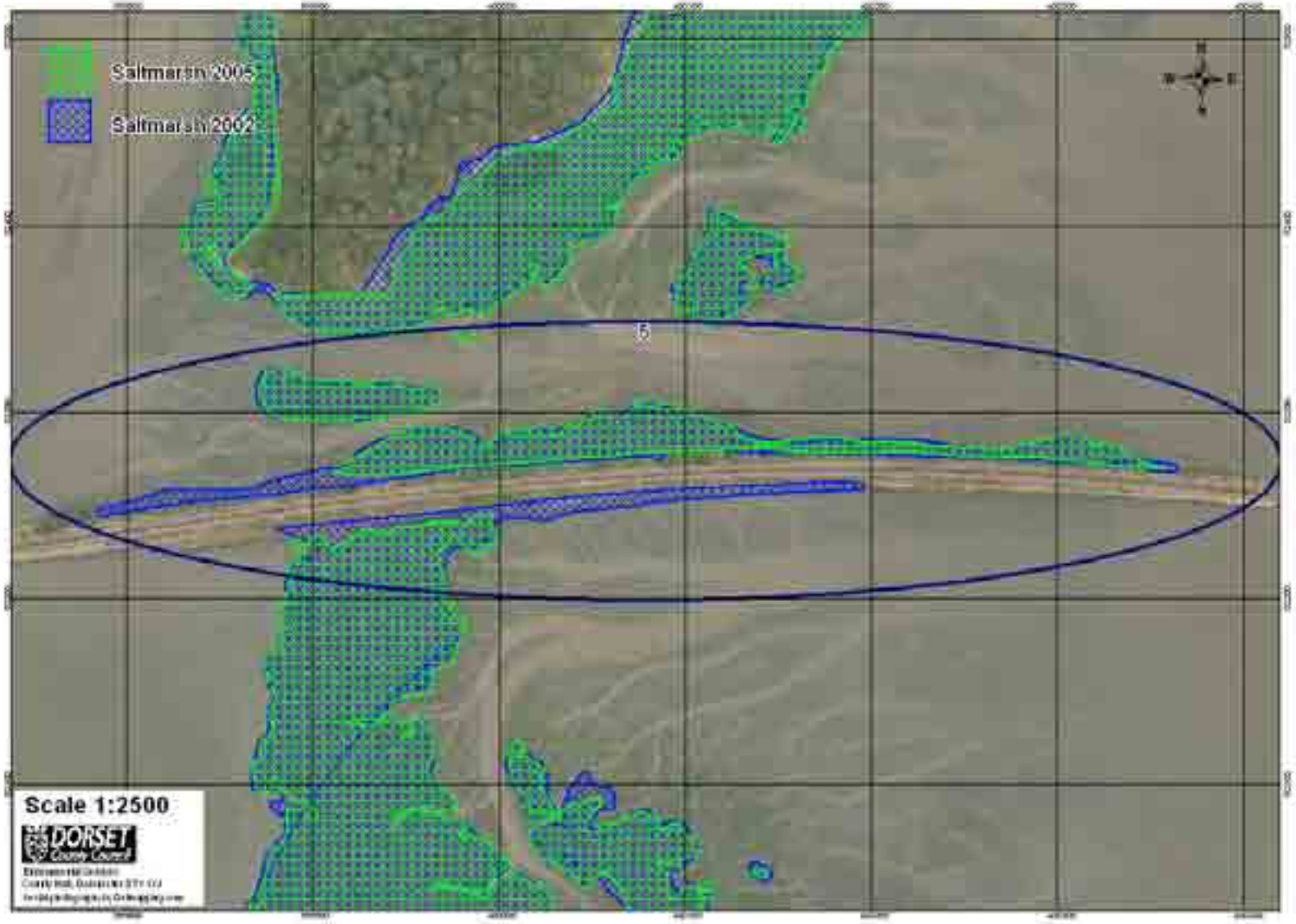
Area 3 – Holes Bay South



Area 4 – Holes Bay Central



Area 5 – Holes Bay Railway Bridge



Area 6 - Sterte