

Sediment Management Strategy Waterways Specification Compliance
Report by Senior Waterways and Recreation Officer

<p>Summary: This report provides members with a summary of the work officers have been undertaking to develop a new methodology for reporting on waterway specification compliance for the Authority's Sediment Management Strategy (SMS). It includes the current assessment of waterway specification compliance in the navigation area, officers' assessment of the priority sites for sediment removal and proposals for reporting on compliance in the future.</p>
<p>Recommendation: To note the contents of the report and support the proposed method of reporting on waterway specification compliance in the future.</p>

1 Background

- 1.1 Members will recall that the Navigation Committee considered a report on the review of the SMS in December 2012. The report also provided an update on waterway specification compliance based on a methodology that has been used since the SMS was published in 2007.
- 1.2 The methodology used for compliance monitoring was based on an assessment of cross sections of the river bed taken at regular intervals in each management unit defined in the SMS using AutoCAD software and then calculating the proportion of those cross sections which achieved the required width and depth below mean low water level. So in a river reach of 1km where cross sections were taken at 100m intervals, if six of the cross sections achieved the required specification the compliance in the reach would be deemed to be 60%.
- 1.3 Officers considered that this process was overly complicated and, moreover, did not provide a particularly accurate assessment of bed levels in each management unit. This is because the cross section analysis method did not allow for an assessment of compliance for the entire river bed area. As cross sections were taken at intervals, no assessment of the bed between selected cross sections was undertaken and it is possible that shoals could either be missed or picked up by a selected cross section. Additionally this method could show non-compliance because a small proportion of the width of the selected cross section was above the required dredge profile or the entire width of the cross section had a very thin layer of sediment above dredge profile which would be difficult to dredge economically.

1.4 It was therefore agreed that a new method of assessing compliance with the agreed waterway specifications should be developed using more detailed analysis of the hydrographic survey data available to the Authority.

2 New Methodology for Compliance Reporting

2.1 Since then officers have worked on a new process which allows for a more accurate assessment to be made of the percentage of the bed level in each management unit that is compliant. This involves analysis of the most up to date hydrographic survey data and use of Geographical Information System (GIS) software to create GIS layers referenced to accurate mean low water levels which have to be set for various parts of the river system. Direct comparison of the GIS layers gives an assessment of the percentage of the bed area in each unit which is above dredge specification.

2.2 Following the calculation of the percentage of the bed of each management unit that is deemed to be compliant further detailed analysis of the hydrographic survey data and comparison of the GIS layers is then carried out in order to determine how severe the non-compliant areas of the river bed actually are. This analysis also calculates the volume of sediment that needs to be removed in each unit to achieve compliance, and the volume of sediment that can be economically dredged. This is shown by producing maps showing compliant and non-compliant areas in different colours with a third colour used to indicate the economically dredgable areas. Officers have assessed that when sediment is 300mm above dredge profile it should be economic to remove. Appendix 1 illustrates how this is shown in map form.

2.3 The process has been completed the entire river system and Table 1 shows the results of this exercise.

Table 1

	Non Compliant Volume	Economically Dredgable Volume	% Non compliant (SA)	% Eco Dredgable (SA)
River Ant	145294.96	102171.80	52.84	20.06
River Bure	245109.85	202214.46	29.49	13.92
River Chet	9842.47	8232.35	31.13	18.66
River Thurne	427535.20	337535.18	68.80	42.96
River Waveney	79722.50	70236.38	8.17	4.69
River Yare	135803.77	115601.96	13.96	7.00
TOTAL	1,043,308.74	835,992.14	30.20	16.20

- 2.4 As can be seen from Table 1 the GIS calculations show that approximately 30% of the navigation area is non-compliant and the total volume of sediment that would need to be removed to achieve full compliance is 1,043,308.74m³ of which 835992.14m³, which equates to 16.2%, is economically dredgable. These figures include large volumes from one or two particular sites, such as Hicking Broad for a which a complete dredge to meet the 1.3m specification outside the channel accounts for approximately 325,493 m³ and to meet the 1.5m specification inside the channel 40,001m³ would need to be dredged.
- 2.5 The last time a compliance assessment was carried out using the old methodology for the 2010/11 Sediment Management Strategy Action Plan it was assessed that 1,172,803 m³ of sediment needed to be removed from the navigation area to achieve full compliance. Therefore the current calculation of the total amount of sediment that would need to be removed to achieve full compliance has reduced by 129,495m³.
- 2.6 This reduction in the amount of sediment can be explained by two main factors. First, the Authority has been achieving its target of dredging 50,000m³ of sediment from the navigation area on an annual basis. Second, analysis of the new hydrographic survey data available using the Authority's GIS system provides a more accurate assessment of bed levels across the river system.

3 Dredging Prioritisation

- 3.1 The new methodology allows for more sophisticated analysis of the hydrographic survey data than the previous system. Comparison of the GIS layers created allows for a more accurate assessment to be made of dredging

requirements in individual management units and better identification of the precise areas and quantities of sediment that can be economically removed.

- 3.2 However, Waterway Specification Compliance is not the sole deciding factor in determining where dredging operations should be programmed. Issues such as availability of disposal sites, the level and type of boat use in particular areas, the cost of sediment removal per cubic metre and unresolved safety incidents are also considered by officers in developing future dredging programmes.
- 3.3 Taking account of all these factors officers have identified an initial list of priority sites for dredging operations in the coming years and this is shown at Table 2.

Table 2

Management Unit	% Non-Compliant (SA)	% Economically Dredgable	Economically Dredgable Volume m ³
Slaughterhouse Yard to Bure Mouth	72	48	19,182
Ant Barton Broad to Ludham Bridge	67	26	17,008
Mautby Marsh Mill to Slaughterhouse Yard	57	42	63,131
Barton Broad	51	9	12,023
Heigham Sound	84	39	9,511
South Walsham Fleet Dyke	57	30	9,605
Haddiscoe Cut	45	30	22,096
Hickling Broad (channel)	99	45	23,750
Limekiln Dyke	69	54	3,325
Coltishall Common to Juby's farm	64	34	15,564
Total m ³			195,195

- 3.4 The priority list shown in Table 2 is derived from analysis of the data available at the time this report was written. A full hydrographic survey of the River Yare has recently been carried out and post dredge hydrographic surveys are also being carried out in a number of areas. The list of priority dredging sites will therefore be reassessed when this data has been analysed and a full report and updated SMS Action Plan for 2015/16 will be presented to the Navigation Committee and this meeting in September. This compliance report can then be used as a baseline against which to assess progress in annual update reports.

4 Conclusions

- 4.1 The new methodology being used to assess waterways specification compliance allows for easier and more accurate identification of non-

compliant areas of river and will be more effective for prioritising the annual dredging programme, potentially delivering efficiencies. The use of GIS to map sediment locations also provides a more visual way of illustrating the location of priority sites.

- 4.2 Members are invited to note the contents of this report, and support the approach outlined at paragraph 3.4 above.

Background papers:	Nil
Author:	Adrian Clarke
Date of report:	1 May 2014
Broads Plan Objectives:	NA1
Appendices:	Appendix 1 – Waterway compliance example map

