Navigation Committee
12 December 2013
Agenda Item No 10

Sediment Management Strategy Compliance Monitoring Update

Report by Senior Waterways and Recreation Officer

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). The report provides members with an example of a suggested way to show compliance data upon which members' comments are welcomed.

1 Background

1.1 Members will recall that the Navigation Committee considered a report on the review of 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 The report highlighted the fact that officers considered 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 does 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.

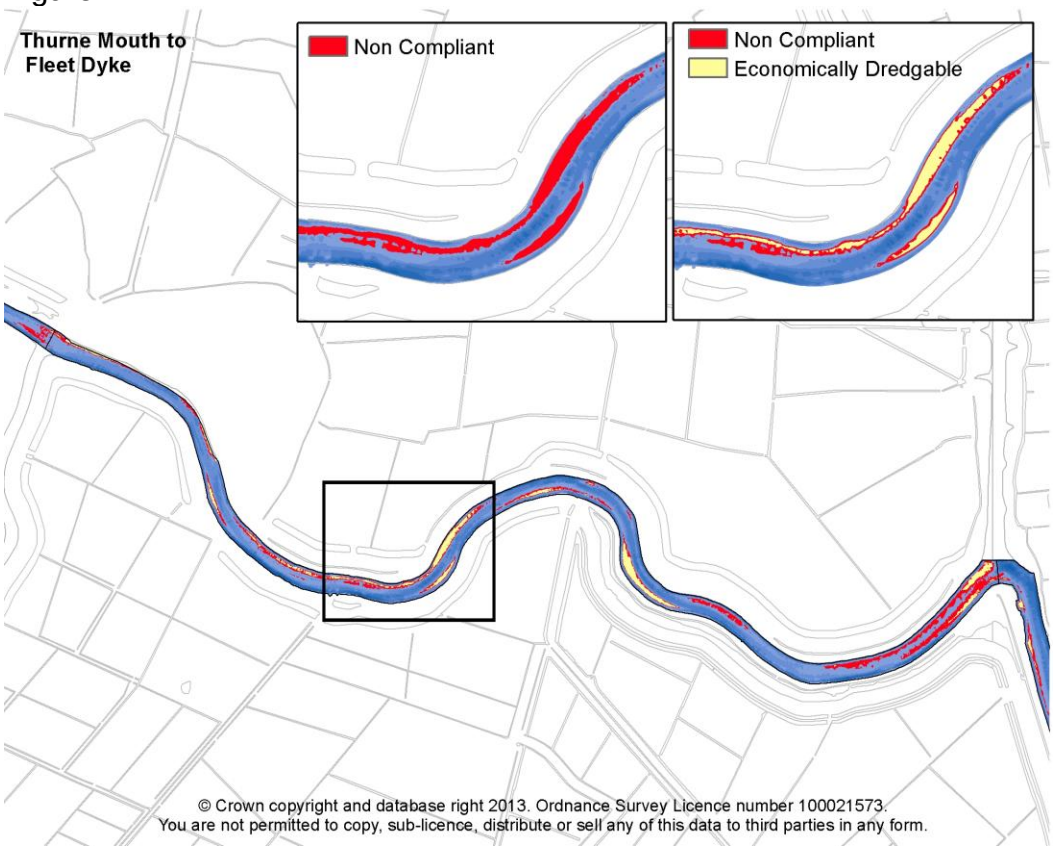
1.4 Officers therefore recommended that a new method of assessing compliance with the agreed waterway specifications should be developed using more detailed analysis of the hydrographic survey data available to the Authority.

2 New Methodology for Compliance Reporting

2.1 Since then officers have been working on a new process which will allow 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 referenced to a new centre line for the river system which has been developed for analytical purposes and gives an accurate length of the navigation system.

2.3 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 can be 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. Figure 1 illustrates how this might be shown in map form.

Figure 1



2.4 Officers have carried out this process for the River Bure and the results of this exercise are shown at Appendix 1 to this report.

2.5 As can be seen from the first table in Appendix 1 this process shows that approximately 28% of the River Bure is non-compliant and the total volume of sediment that would need to be removed to achieve full compliance is 217,000m^3 of which 185,000m^3 is economically dredgable. The second table breaks this assessment down to show how this relates to the compliance categories that have previously been used for reporting purposes.

2.6 The first table also shows the results of the assessment that has been carried out for Breydon Water and this shows that only 2% of the Breydon channel is non-compliant equating to approximately 4,500m^3 of sediment of which 3,900m^3 is economically dredgable. This reflects the results of surveys that were recently carried out to determine the effect of the training structures on Breydon like Turntide Jetty on the functioning of Breydon Water.

3 Conclusions

3.1 Officers consider that this is a more sophisticated way of analysing the hydrographic survey data than the previous methodology. Comparison of the GIS layers 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 Members have previously indicated that performance against waterway specification compliance should be used as the public indicator rather than referring to the volumes of sediment that have been dredged annually in reports as this is less easy for users to visualise. Officers consider that the methodology proposed in this report will simplify the compliance reporting process, allow for easier identification of non- compliant areas and be more effective for prioritising the annual dredging programme potentially delivering efficiencies. It is extremely difficult to draw comparisons to previous compliance reports as the new methodology is so different and the centre line that has been created for GIS purposes defines a shorter length for the river system than was used in previous compliance reports. Officers therefore consider that this exercise should be completed for the rest of the river system and be used to define a new baseline against which performance can be measured in the future. Officers anticipate being able to provide a full report on compliance for the April meeting of the Navigation Committee using the proposed methodology. Members' comments are welcomed.

Background papers: Nil

Author: Adrian Clarke
Date of report: 1 December 2013

Broads Plan Objectives: NA1

Appendices: Appendix 1 - SMS compliance assessment for the River Bure

		2013					
Chainage	River	Management Unit	Length (m)	% Non Compliant (SA)	% Eco Dredgable (SA)	Non Compliant Volume (m³)	Economically Dredgable Volume (m³)
	River Bure	**N/A**	**48420.57**	**28.93**	**15.01**	**217839.95**	**185118.16**
67*	Bure Mouth to Upton Dyke	B4	17071.31	38.31	27.14	138837.83	128988.39
17138	Upton Dyke to Acle Dyke	B4	3222.80	12.52	6.21	6435.86	5275.26
20360	Acle Dyke to Thurne Mouth	B3/B4	2474.99	4.44	1.07	964.53	515.46
22835	Thurne Mouth to Fleet Dyke	B3	2704.73	20.50	7.22	6036.35	4124.03
25540	Fleet Dyke to Ant Mouth	B3	490.39	12.85	3.17	483.77	267.53
26030	Ant Mouth to Ranworth Dam	B3	1861.47	16.45	5.17	3005.87	1923.03
27892	Ranworth Dam to Cockshoot Dyke	B3	2215.23	26.29	6.88	5460.60	3231.78
30107	Cockshoot Dyke to Hoveton Little Broad	B3	2765.62	17.91	3.58	3719.40	1794.88
32873	Hoveron Little Broad to Salhouse Downstream	B2/B3	2308.71	29.45	9.19	8163.34	5716.45
35182	Salhouse Downstream to Salhouse Upstream	B2	201.65	19.48	9.29	523.65	418.71
35383	Salhouse Broad Upstream to Wroxham Broad	B2	1714.65	21.11	5.40	3543.91	2187.95
37904	Wroxham Broad Upstream to Bridge Broad Downstream	B2	2154.11	22.15	6.46	3128.81	2175.23
37908	Wroxham Broad Downstream to Wroxham Broad Upstream	B2	805.99	50.55	16.18	3983.91	2303.03
40058	Bridge Broad Downstream to Bridge Broad Upstream	B2	437.15	21.12	5.09	562.13	310.12
40495	Bridge Broad Upstream to Coltishall Canal Junction	B2	8012.89	44.57	21.76	32989.98	25886.31
	Coltishall Canal	**B2**	**531.23**	**71.36**	**61.01**	**4073.80**	**3930.20**
	River Yare	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Breydon Water (channel) 2m specification	B4	5737.80	2.12	1.13	4565.93	3907.03

* 0 chainage is the junction of the River Bure and Yare. For this example only 1 set of survey data was used.

RIVER BURE

Percentage compliance by navigation length*		
Category	Length of channel (m)	Compliance (%)**
0	100.00	0.20
1-20	2801.01	5.72
21-49	5822.96	11.89
50-74	14261.64	29.12
75-90	17889.36	36.53
91-100	8097.95	16.54
TOTAL	48972.92	100

* This data in this table will not include broads unless there is a clearly marked channel e.g Breydon, Hickling and
** Each navigable channel has been split into units of approximatly 100m in length to generate comparable units.