Report to:	**Salcombe Harbour Board**
Date:	**13 June 2022**
Title:	**Water quality**
Portfolio Area:	***Salcombe Harbour***

Wards Affected:	**All**		
Urgent Decision:	**N**	Approval and clearance obtained:	**N**

Date next steps can be taken: **Post meeting**

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Recommendation: That the Harbour Board

1. That the Board **notes** the analysis of water quality data provided by the Environment Agency (EA), and
2. That the Board **agrees** to seek comments from the EA and South West Water on the results.

1. Executive summary

1.1. Water quality in Salcombe Harbour has been a long-standing concern of the Board. This paper presents an analysis of trends in the water quality in the Harbour over the last six years.

2. Background

2.1 For some time the water quality at the Harbour's bathing beaches has been consistently rated as "*Excellent",* which is the standard for a Blue Flag beach. This was confirmed again in 2021. Salcombe is one of few harbours with safe, sandy, beaches within the harbour limits. It follows that it is absolutely essential to safeguard its excellent water quality.

2.2 However, the water quality in the upper Harbour is known to be not of a sufficiently high enough standard to be generally suitable for shell fisheries, which used to be a traditional industry for the Harbour. Water quality is so critical for the local economy that any potential threats to water quality, or any downward trends, need to be identified as soon as possible.

2.3 Without a major river to flush it, the main way in which water in the Harbour is refreshed is through the tide, resulting in the water quality being at its best at high tide. The principal threats to water quality come from outfalls from sewage treatment works, including storm overflows, and run-off from farms, especially after heavy rain.

2.4 Although its main focus was shell fisheries, the 2009 Cefas sanitary survey report[1] gave an excellent account of how these various elements affect water quality in the Harbour.

2.5 A number of initiatives over the last few years should have improved the water quality, particularly enhanced treatment at Kingsbridge (Gerston) sewage treatment works to remove nitrates, and extensive drainage work in Salcombe aimed at reducing overload spills from Malborough sewage treatment works. However, until now, the Board has never seen systematic information about water quality to judge whether this is the case.

2.6 At the September meeting of the Harbour Board, I reported that the Environment Agency (EA) had been approached for current data on water quality, both for the bathing beaches in the south of the Harbour and for the Kingsbridge Basin and the upper Harbour.

2.7 On 15 October, following correspondence initiated by Anthony Mangnall MP, Mr Ben Johnstone, Environment Agency Acting Area Director for Devon, Cornwall and the Isles of Scilly, wrote to Mr Mangnall with a link to the database held by the EA. Mr Johnstone's letter is at Annex A. This paper reports the results of an analysis of relevant sections of the database.

2.8 The EA's Salcombe database is large: there are 2615 lines with 26 columns, although about half of it (1072 lines) concerns readings collected for fisheries purposes outside the harbour limits, at Bolt Head and Shag Rock. There are data for the bathing beaches at North and South Sands but none for Mill Bay. In the upper Harbour, there are data for the Kingsbridge sewage treatment works outfall, the West Charleton sewage treatment works outfall, and from a point near the Saltstone in the mouth of Frogmore Creek (known as Geese Quarries). As the result of Covid-19, some readings were not taken in 2020.

2.9 The EA has not informed us of any analysis which it has made of these data.

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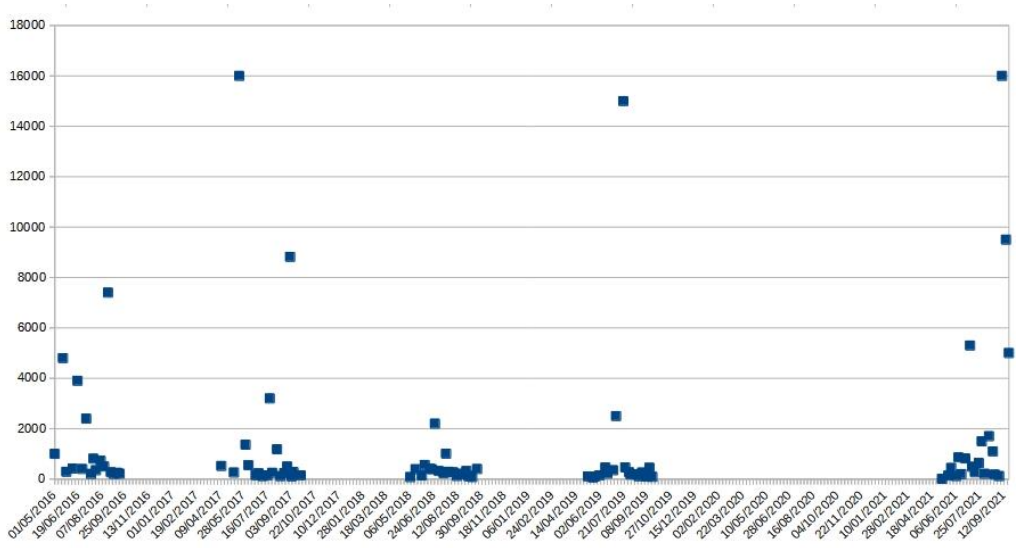
1 https://www.cefas.co.uk/data-and-publications/sanitary-surveys/england-and-wales/reports/salcombe-kingsbridge-estuary-2009/

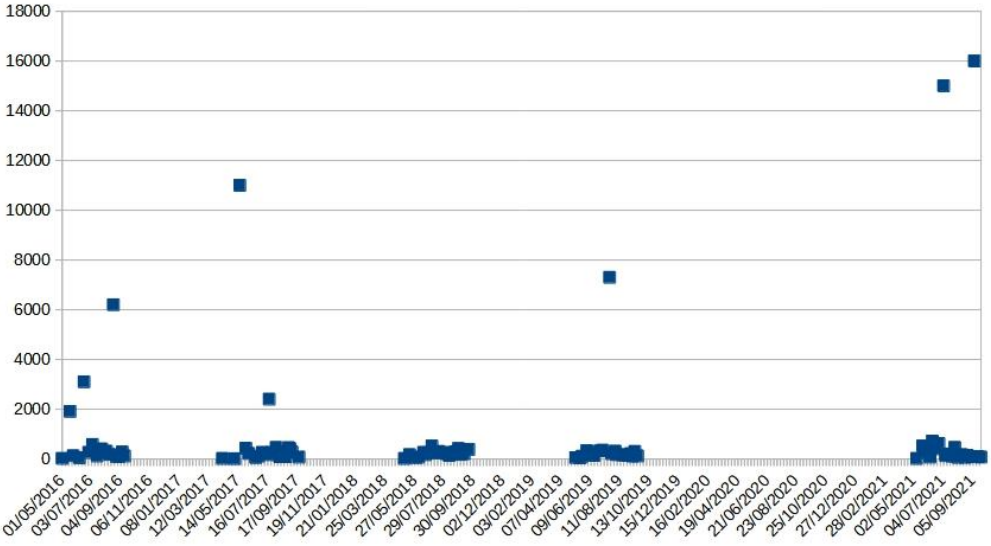
3. Outcomes/outputs

3.1 ***Bathing beaches***

North Sands



E.coli levels at North Sands

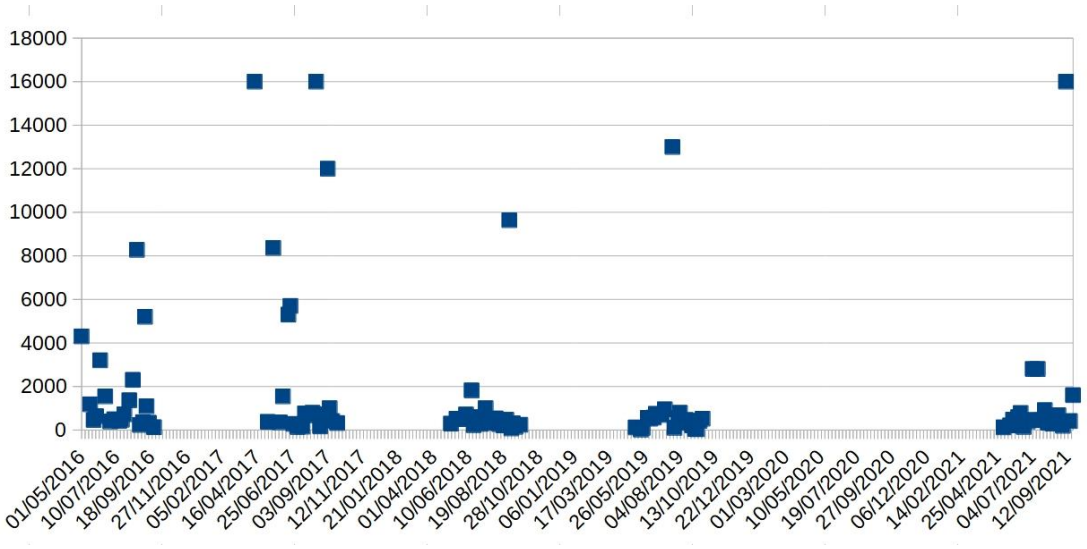


Enterococci levels at North Sands

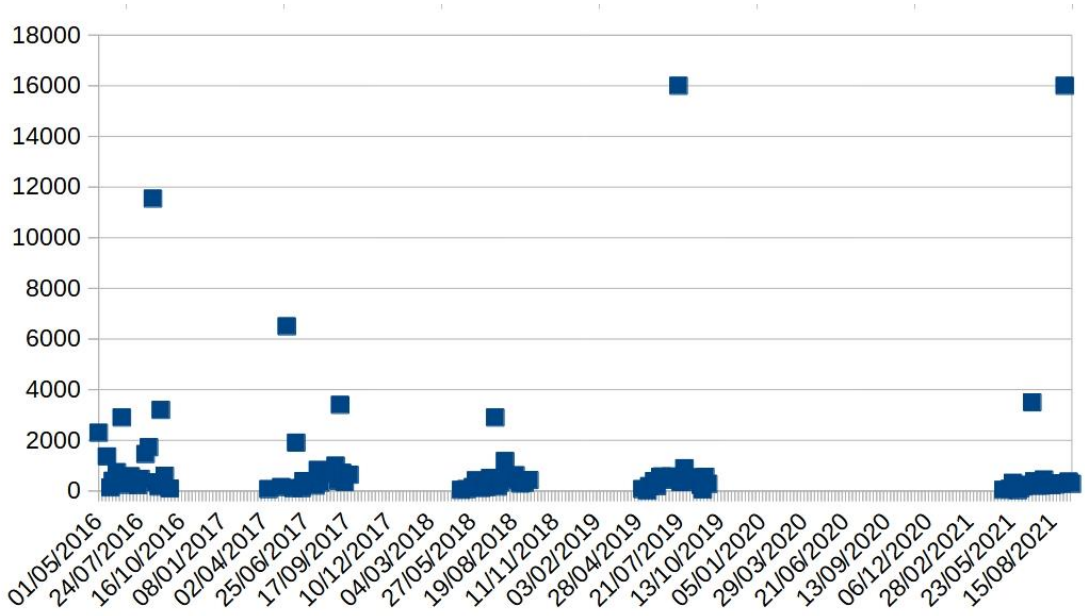
These plots show the levels of enterococci and E.coli at North Sands in *colony forming units per 100ml*. Where the level equals or exceeds 16000, it is shown as 16000 in order to restrain the scale of the plot.

Although North Sands has generally low levels, it appears to be subject to episodic spikes, most probably as the result of heavy rainfall. This could possibly be remedied either by work to protect the stream more from cattle or by changes in management of the reed bed.

South Sands



E.coli levels at South Sands



Enterococci levels at South Sands

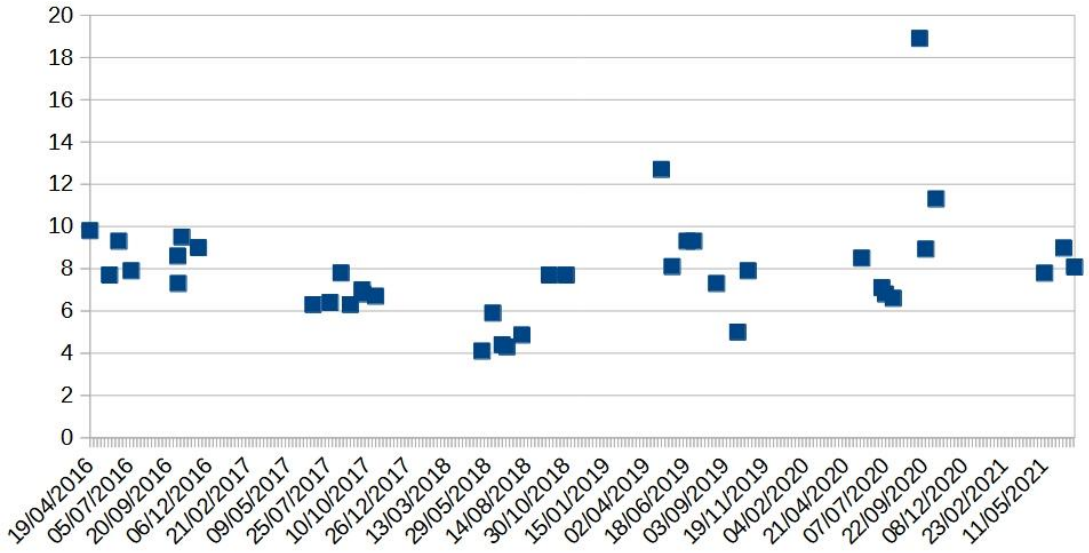
These plots show the levels of enterococci and E.coli at South Sands in *colony forming units per 100ml*. Where the level equals or exceeds 16000, it is shown as 16000 in order to restrain the scale of the plot.

Like North Sands, these levels at South Sands are generally low but at South Sands there looks to be some reduction in extreme events since 2016, possibly as the result of fewer discharges from Malborough.

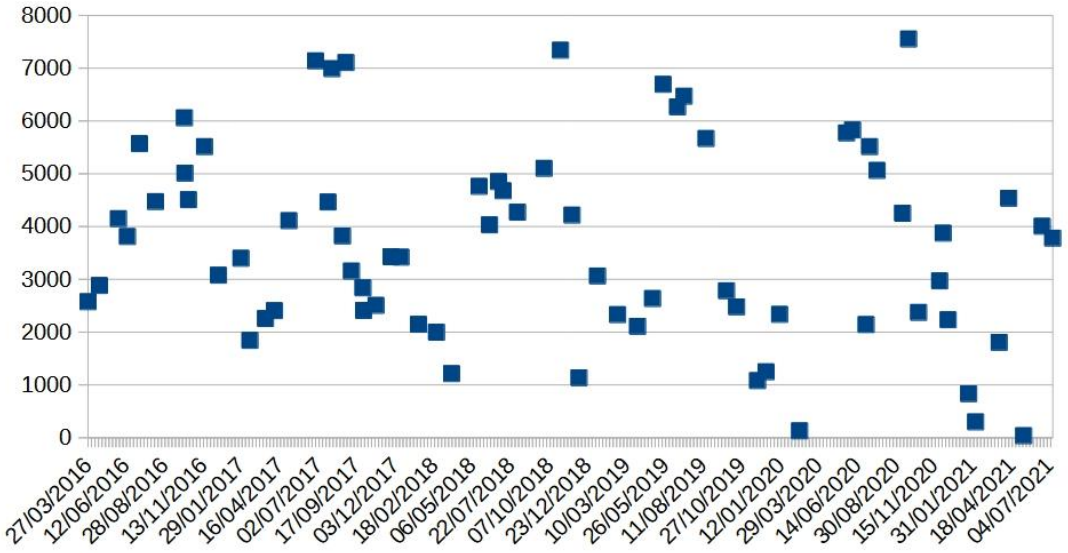
Apart from salinity, these are the only data held by EA relating to bathing beaches.

3.2 ***Sewage treatment plant outflows in upper Harbour***

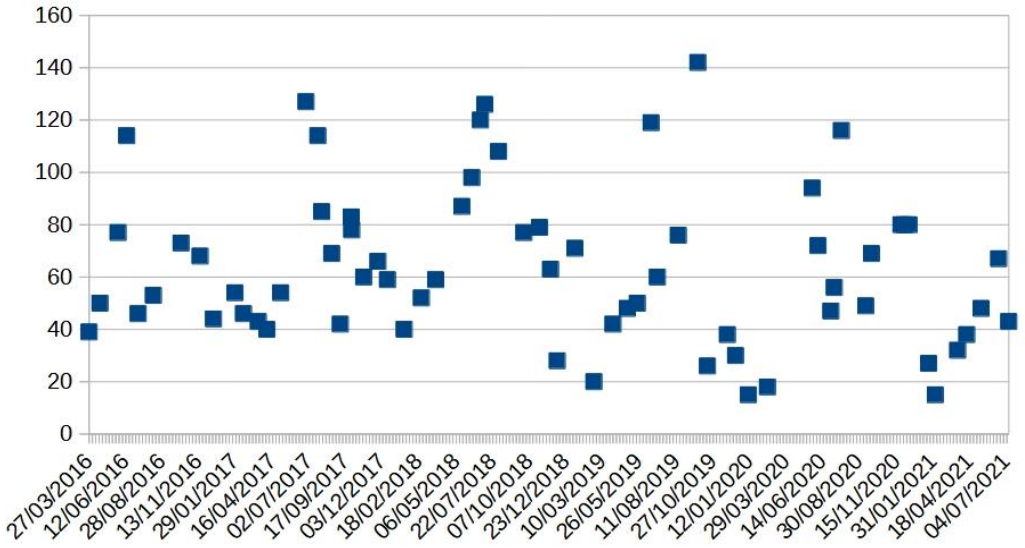
Kingsbridge



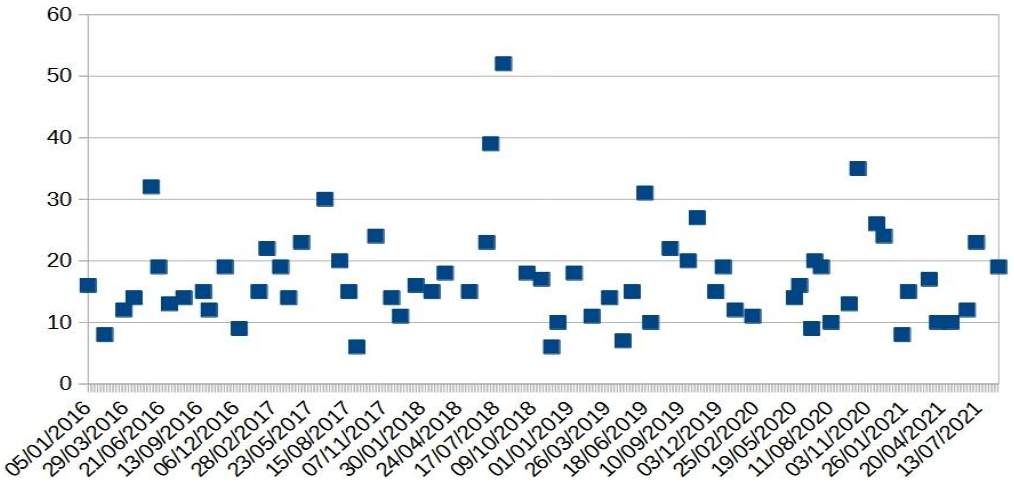
Nitrogen at Kingsbridge outfall in mg/l



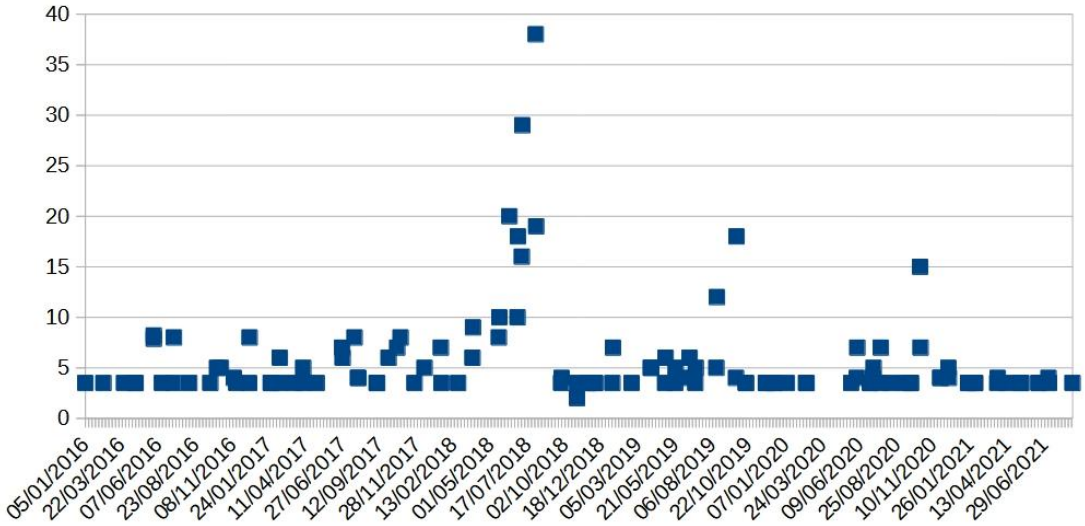
Chloride at Kingsbridge outfall in mg/l



Solids at Kingsbridge outfall in mg/l



Chemical oxygen demand at Kingsbridge outflow in mg/l



Biochemical oxygen demand at Kingsbridge outflow in mg/l

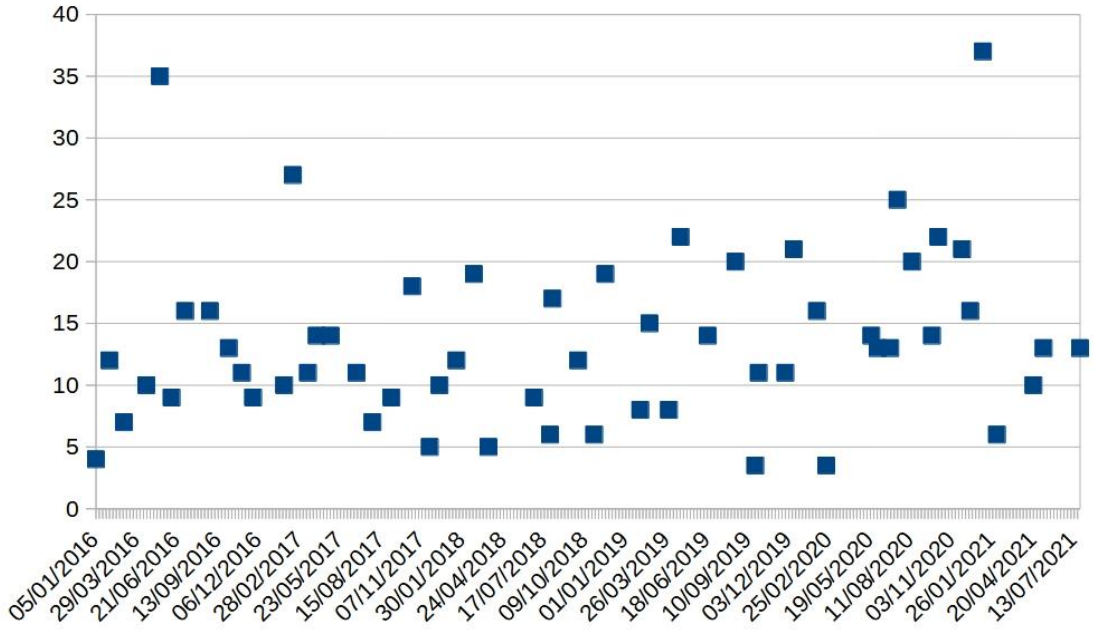
These readings were taken at the Kingsbridge outfall after ultraviolet treatment.

Chloride seems to have fallen over the last six years but, since 2019, nitrogen has been showing signs of increasing. The levels of solids has remained fairly constant over the six-year period.

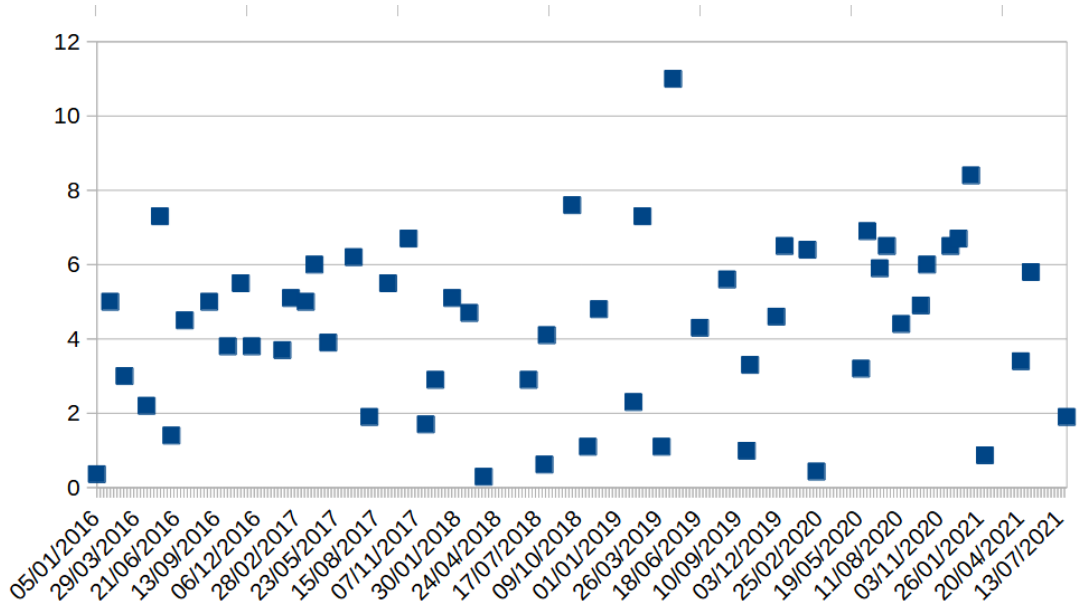
There seems to be a welcome reduction in the chemical oxygen demand (COD). COD is both a gauge of how efficient a water treatment system is operating and an indication of the ability of the water to decompose organic matter. The UK maximum permissible COD is 250 mg/l: Kingsbridge is well below that and it looks as if the overall position has improved since 2016.

Biochemical oxygen demand (BOD) is a similar measure to COD, although it yields a lower absolute number as it relates only to the oxidisation of organic matter. BOD is a standard measure of sewage treatment efficiency. Untreated sewage will have a BOD of around 600 mg/l, whilst a well-treated sewage outflow could have a BOD of around 20 mg/l or less. A river would be considered significantly polluted if it had a BOD of above 10mg/l. The UK maximum permissible BOD level is 50mg/l. Encouragingly, the most recent readings at Kingsbridge look better than the rest.

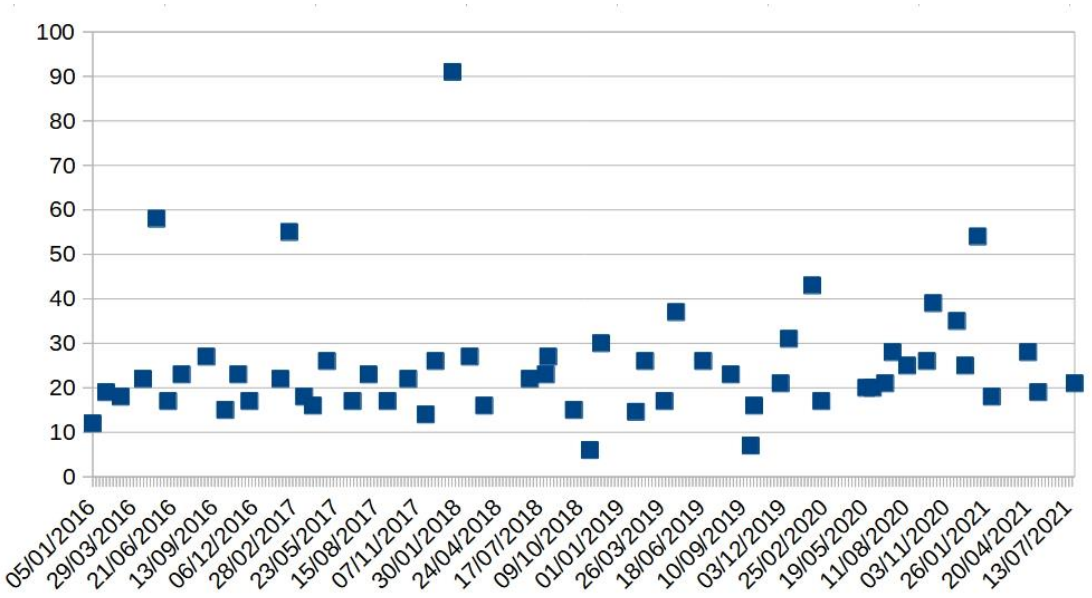
3.3 ***West Charleton***



Biochemical oxygen demand at West Charleton outflow in mg/l



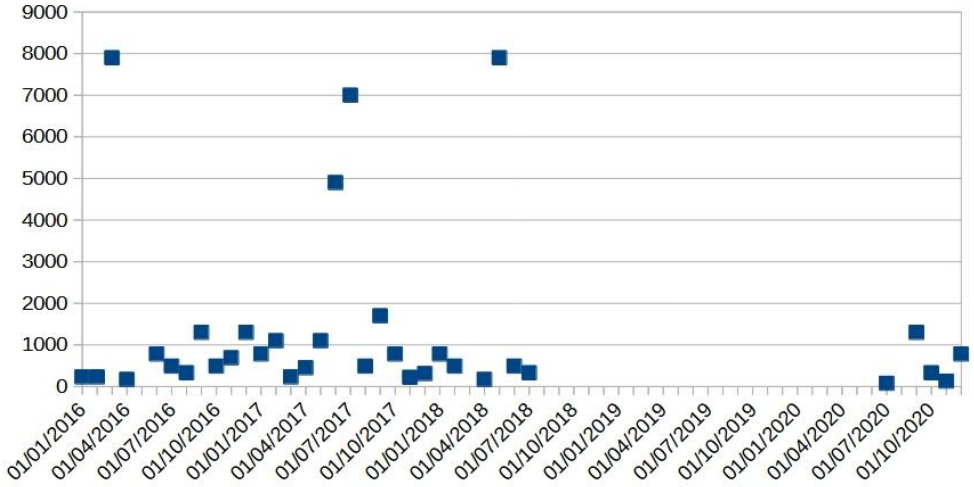
West Charleton Nitrogen levels in mg/l



West Charleton Solids in mg/l

At West Charleton sewage outflow measurements are taken of BOD, nitrogen and solids. West Charleton water treatment does not appear to be as effective as Kingsbridge. The nitrogen is relatively constant but less than in Kingsbridge; but the solids seem to be increasing slightly. The BOD levels at West Charleton are higher than those at Kingsbridge and increasingly above the 20 mg/l level.

3.4 ***Geese Quarries***



E.coli levels at Geese Quarries in mg/l

Geese Quarries is a sampling point in the mouth of Frogmore Creek, not far from the Saltstone. It was used by Cefas for its 2009 report. The only data recorded by the EA relate to E.coli. The E.coli levels (mean and standard deviation) are the same as the bathing beaches of North and South Sands and could even be falling at Geese Quarries, but there are no recent readings.

4. Conclusion and Way Forward

This is the first time that the Harbour Board has seen data relating to trends in water quality, at least since the Board was re-constituted in 2006.

The headline points are:

a) The availability of the EA's database means that it has now become possible to establish baselines and see trends for various aspects of water quality throughout the Harbour.

b) The EA's database contains no information about Mill Bay, but the water quality of the bathing beaches at North and South Sands remains safely "Excellent" and, in the case of South Sands, may be experiencing fewer pollution spikes due to a reduction in storm discharges.

c) In the upper Harbour, there seems to have been some improvement in the outflows from Kingsbridge (Gerston) over the last six years.

d) The outfall levels at West Charleton do not look as good as Kingsbridge and could become a point of concern.

e) Judging by the data from Geese Quarries, it may be that, south of the Saltstone, at high tide at least, the water quality could equal the bathing beaches in the south of the Harbour.

f) As well as the EA database lacking data on Mill Bay bathing beach, there are no readings of nitrate or phosphate levels (as such) in the upper Harbour, which have long been a matter of concern. The EA measures nitrate and phosphate levels for Bolt Head and Shag Rock, so has the technology to monitor nitrate and phosphate levels.

g) The EA's database is a public document so it should be possible to keep the Board updated on any further changes to the water quality in the Harbour.

If the Board agrees, as a next stage, this paper will be copied to the Environment Agency and South West Water to seek any comments they may have.

5. Implications

Implications	Relevant to proposals Y/N	Details and proposed measures to address
Legal/Governance	N	The Pier and Harbour Order (Salcombe) Confirmation Act 1954
Financial implications to include reference to value for money	N	None.
Risk	Y	There is a significant risk if control is lost over water quality.
Supporting Corporate Strategy		Salcombe Harbour is part of the 'Enterprise Theme', creating places for enterprise to thrive and business to grow, contributing to the marine and tourism economy.
Climate Change - Carbon / Biodiversity Impact		None directly .
Comprehensive Impact Assessment Implications		
Equality and Diversity	N	None
Safeguarding	N	None
Community Safety, Crime and Disorder	N	None
Health, Safety and Wellbeing	Y	Excellent water quality is essential for the health and safety of all those participating in water sports and Harbour staff.
Other implications		

Supporting Information

Appendices:

None

Process checklist	**Completed**
Portfolio Holder briefed/sign off	**Yes/No**
SLT Rep briefed/sign off	**Yes/No**
Relevant Heads of Practice sign off	**Yes/No**
Data protection issues considered	**Yes/No**
Accessibility checked	**Yes/No**