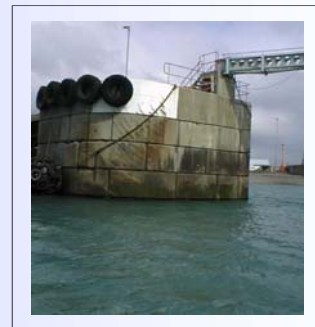




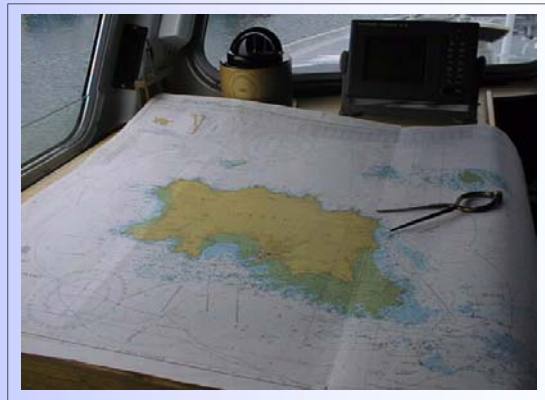
# Assessment of Water Quality in St Helier Harbour

Report N<sup>o</sup> 14.



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## **Harbour Sampling Programme.**

### **1. Introduction**

In 1998 an Environmental Review was undertaken by Jersey Harbours. Within this review, which covered a wide range of environmental issues, the subject of water quality was highlighted. The review suggested that some form of monitoring was implemented for public health and general environmental well-being. Aesthetics were also considered.

This report presents the 14<sup>th</sup> review of certain physical, biological and chemical parameters, following sampling on Wednesday 8 July 2009.

### **2. Methods and Results**

Biological and chemical parameters were analysed at the States Analyst. Physical parameters were recorded in situ and the location of the 12 sample sites can be found in Appendix 1.

A detailed description of the techniques involved in the collection and subsequent laboratory analysis extends beyond the remit of the report suffice to say that all collections followed the protocols laid down in the Environmental Review as did the analysis within the guidelines of the laboratory.

#### **2.1. Weather**

Wind	W-NW F4/5	
Temperature	Max 20 <sup>0</sup> C	Min14 <sup>0</sup> C
Cloud	2	
Visibility	Good	
Rain	Nil	
Tide	0757 (BST)	1428 (BST)
	9.66m	2.50m
Sampling regime	HW +/- 1hr	

#### **2.2. Physical Parameters.**

The physical parameter data are shown in Table 1 (see page 2). The average (mean) sea temperature within the confines of the harbour complex was 17.06<sup>0</sup>C +/- 0.5<sup>0</sup>C. These temperatures are approximately consistent with the average sea temperature for this time of year. Slight temperature variations are to be expected given the various depths of water, surface heating, water exchange and fresh water input.

The average (mean) levels of dissolved oxygen were 6.0mg/L +/- 0.2mg/L. The % saturation of the water with reference to dissolved oxygen ranged from 79.7% to 74.8%. These levels are less than previous years, where a fully saturated body of water (>100%) was detected. The lower levels detected this year may be due to increased biological activity and growth of phytoplankton. Such an increase in Biological Oxygen Demand (BOD) can be associated with raw sewage pollution. However there was no uniform increase in faecal coliforms across sites, as one would expect from a pollution problem (Table 2.). At the time of sampling there had been a prior period of high water temperatures and fair weather, which may have driven an increase in phytoplankton growth and BOD.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Station</b>	<b>Temperature/°C</b>									
1	15.6	20.4	15.7	16.9	16	13.6	14.4	15.4	16.7	17.3
2	16.1	18.5	15.5	16.7	16.4	13.6	14.1	15.4	17.0	17.2
3	16.3	18.5	15.6	16.7	16	13.6	14.1	15.3	16.2	17.1
4	16.0	18	15.4	16.6	15.5	13.6	14.0	15.5	16.9	17.2
5	15.4	17.2	15.7	16.6	15.5	13.8	14.2	15.3	17.1	17.1
6	15.3	17.1	15.6	16.6	15.3	13.7	14.7	15.0	16.7	17
7	15.6	16.9	15.7	16.6	15.5	13.7	14.2	14.8	16.3	16.9
8	16.3	16.8	15.3	16.6	15.4	-	14.3	15.0	16.4	16.9
9	15.3	16.8	15.7	16.7	15.3	13.5	14.1	14.9	16.1	16.8
10	15.3	19.1	15.5	16.7	15.2	13.9	14.2	15.0	16.2	17.6
11	15.8	18.6	15.2	16.8	15.5	13.7	14.2	14.8	16.3	17.2
12	15.4	16.6	15.3	16.4	15.2	13.5	14.4	14.9	15.7	16.5
	<b>Mg/L O<sub>2</sub></b>									
1	9.0	8.2	8.5	7.8	8.1	8.2	8	8	11.8	6.2
2	8.9	7.2	11.1	7.9	8.1	8.8	9.2	7.5	11.4	6.1
3	7.7	7.1	9.7	7.8	8.7	10	9.2	9	10.4	6.1
4	7.8	6.9	7.9	8.0	9.0	10.8	8.2	10.6	10.4	6.1
5	9.4	7.1	7.5	8.5	9.1	9.1	10.3	11	10.7	6
6	10.3	7.3	9.0	8.1	8.4	9.4	9.3	10.3	10.1	6.1
7	8.9	7.8	9.2	7.6	8.9	9.3	10	10.2	10.1	6
8	7.5	9.1	9.2	7.5	9.0	-	10.2	10.2	11.7	5.9
9	8.2	9.1	9.2	7.7	8.7	9.4	9.7	11.1	11.6	6.1
10	8.5	7.8	7.4	7.8	8.4	11	9	10.4	11.6	5.9
11	9.9	6.4	7.5	7.7	8.4	9.6	8.9	9.1	11.6	5.8
12	9.6	11.7	12.2	7.9	9.1	9.2	10	12	11.7	6.2
	<b>% O<sub>2</sub> Saturation</b>									
1	108	111	102	99	101	101	100	96	124	79.7
2	108	93	120	99	101	105	101	89	130	79.3
3	95	139	104	98	111	104	104	106	123	78.9
4	95	88	99	100	112	120	97	120	122	79.5
5	113	70	104	100	110	107	104	121	124	77.4
6	121	75	99	101	101	111	101	115	121	79.4
7	105	77	102	96	108	109	101	111	119	77.3
8	91	149	101	94	120	-	102	111	123	75.4
9	99	137	107	99	106	101	101	122	123	78.3
10	104	144	90	101	103	100	100	116	124	75.2
11	119	140	100	100	103	101	101	90	122	74.8
12	115	145	107	99	127	101	101	130	122	78.4

**Table 1.** Physical Parameters (Temperature; mg/L O<sub>2</sub>; % O<sub>2</sub> saturation)

### 2.3. Biological Parameters.

The biological parameter data are shown in Table 2. Most stations sampled had very low levels of total coliforms, E. coli and faecal streptococci, below the stringent guide levels set in the bathing water directive. Noticeably, St. Helier Marina had high levels of total coliforms and faecal coliforms, suggesting sewage pollution from either vessels in harbour, or terrestrial run-off.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Station</b>	<b>Total Coliforms (cfu/100ml)</b>									
1	327	-	300	700	100	100	200	<100	<100	<b>22200</b>
2	100	-	1600	500	200	<100	<100	<100	100	<100
3	400	-	600	800	<100	<100	<100	<100	<100	<100
4	100	-	1500	100	<100	<100	100	<100	<100	<100
5	200	-	100	100	<100	100	<100	<100	<100	<100
6	100	-	100	300	1100	<100	6700	300	<100	300
7	200	-	<100	100	<100	<100	<100	<100	100	<100
8	200	-	100	<100	<100	-	<100	<100	<100	<100
9	<100	-	100	100	<100	<100	100	<100	<100	100
10	<100	-	1000	<100	<100	<100	<100	<100	<100	<100
11	<100	-	500	<100	<100	<100	<100	<100	<100	<100
12	<100	-	<100	<100	300	<100	<100	<100	<100	<100
	<b>Faecal Coliforms (cfu/100ml)</b>									
1	60	20	245	130	90	<10	20	<10	<10	335
2	90	82	927	60	18	10	<10	<10	<10	<10
3	20	95	227	50	5	<10	10	<10	<10	50
4	<10	15	573	40	<10	<10	45	<10	<10	<10
5	10	<10	<10	40	<10	<10	20	<10	<10	20
6	50	73	10	327	927	27	6800	218	70	36
7	20	<10	27	40	10	10	10	20	<10	10
8	<10	<10	10	40	<10	-	<10	<10	<10	<10
9	30	100	10	110	<10	20	10	10	<10	10
10	20	<10	82	10	30	10	<10	<10	10	<10
11	10	<10	136	18	20	<10	10	<10	<10	<10
12	18	<10	10	10	<10	<10	30	<10	<10	10
	<b>Faecal Streptococci (cfu/100ml)</b>									
1	20	<3	17	5	17	3	3	10	10	67
2	17	17	717	10	267	<3	<3	3	<3	<3
3	67	76	593	30	33	7	3	<3	10	27
4	7	14	793	7	7	20	10	3	<3	3
5	7	<3	17	3	7	<3	<3	<3	50	<3
6	43	13	<3	23	117	<3	353	10	<3	7
7	47	3	17	3	7	<3	<3	<3	<3	3
8	13	<3	43	7	<3	-	3	17	<3	3
9	7	<3	3	3	3	<3	3	<3	<3	<3
10	3	<3	10	<5	13	<3	<3	<3	<3	13
11	3	<3	13	<3	10	3	<3	3	<3	<3
12	<3	<3	3	3	<10	<3	7	3	<3	<3

**Table 2.** Biological Parameters (Total coliforms; faecal coliforms; faecal streptococci)

## 2.4. Chemical Parameters

As with previous surveys very low levels of hydrocarbon pollutant was detected with the harbour complex. Levels of less than 0.01 mg/L were recorded at three sample stations with a slightly higher level at the La Collette Yacht Basin. However this level is still below the 0.05 mg/L found in previous years.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Station</b>	<b>Hydrocarbon content (mg/L)</b>									
1	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	0.02
2	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.09	<0.05	<0.05	<0.01
3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
4	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	0.07	<0.01

**Table 3.** Chemical Parameter (Hydrocarbon content)

## 3. Comment.

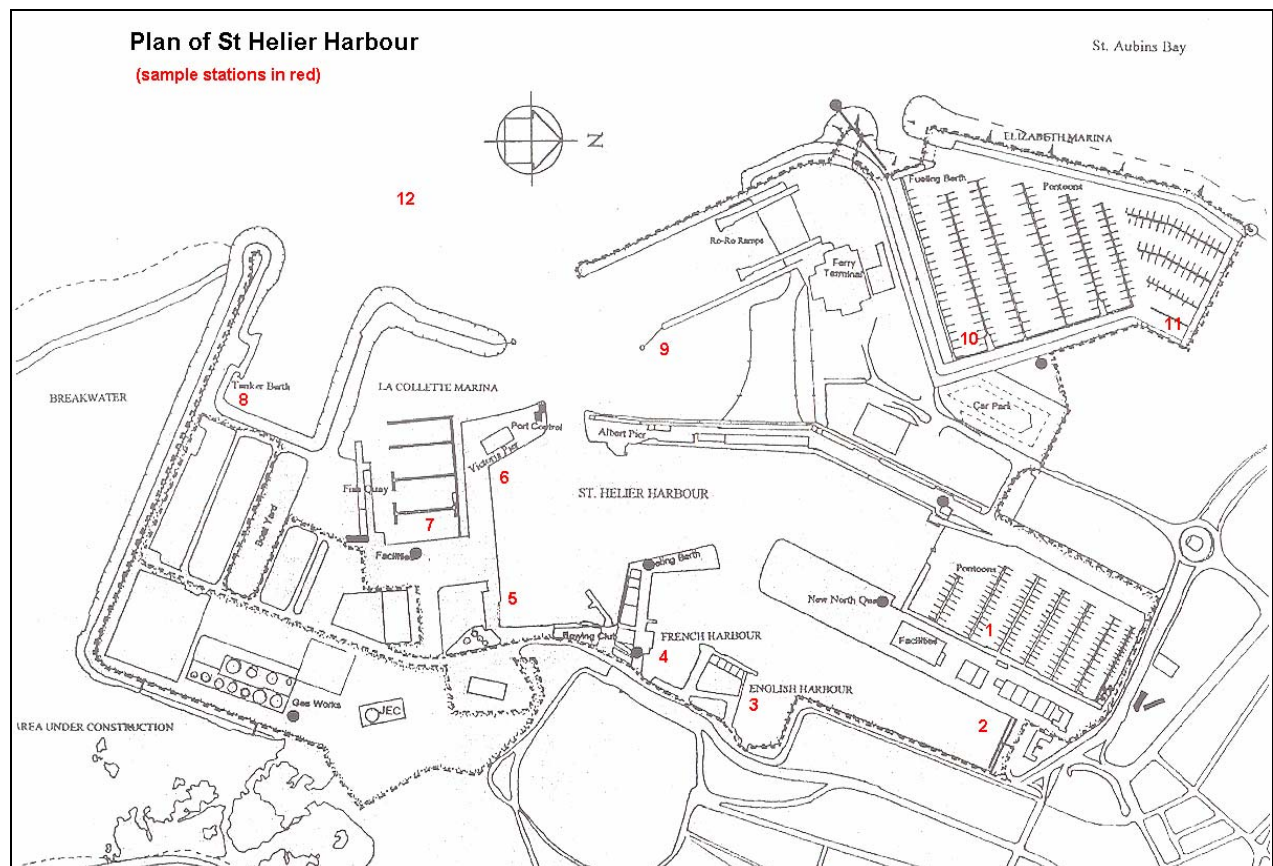
In general, the water quality within the Harbour complex remains good, comparable with previous surveys and conforms to the high standards laid down for EU bathing waters, with the exception of the high coliform counts found in St. Helier Marina. The uniformly low dissolved O<sub>2</sub> at all sites is most likely not associated with a pollution problem due to the absence of uniformly high coliform counts across all sites. This may be the result of high BOD from a period of comparatively good weather. The high coliform result for St. Helier Marina maybe caused by flushing of heads whilst in the Marina and may warrant further investigation by Jersey Harbours.

JPS 6/8/21

Appendix 1

Sampling stations

Station Number	Station Location	Biological Sampling	Hydrocarbon Sampling
1	St Helier Marina	X	X
2	Old Harbour	X	-
3	English Harbour	X	X
4	French Harbour	X	-
5	St Helier Harbour	X	-
6	London Berth	X	-
7	JEC Outfall LCYB	X	X
8	Tanker Berth	X	X
9	Elizabeth Harbour E berth	X	-
10	Elizabeth Marina SE	X	-
11	Elizabeth Marina NE	X	-
12	Small Roads	X	-



**Appendix 2**EU Bathing Water Directive (76/160/EEC)

<b>Organism</b>	<b>Standard</b>	
	<b><i>Imperative</i></b>	<b><i>Guide</i></b>
Total Coliform	10,000 cfu/100ml	500 cfu/100ml
Faecal Coliform	2,000 cfu/100ml	100 cfu/100ml
Faecal Streptococci	-	100 cfu/100ml

Note cfu colony forming unit