

**MONITORING REPORT No. 11
DREDGING AND RECLAMATION PROGRAMME IN
KINGSTON HARBOUR**

June 21, 2002

**Prepared for:
The Port Authority of Jamaica**

Prepared by:

1.0 BACKGROUND

Dredging at Rackhams Cay continued, except for a break for repairs to pipes on Saturday 15th until June 17th and another break to carry our dredging at Beacon Shoal on June 19th. This allowed an examination of the reef to determine the condition of the reef restoration site and corals on the windward side of the reef nearest to the dredge cut line. The screen at Rackhams Cay was also examined.

Water quality sampling occurred on June 18th and dives were done at Rackhams Cay on June 17th and June 20th. A monitoring flight was made on June 21st.

2.0 DIVES

Dives carried out by TEMN concentrated on setting out sediment traps to monitor the impact of dredging plumes on the reefs that may have been affected by dredging and especially at the Rackham restoration site.

The examination dive carried out by NEPA on Wednesday 19th confirmed that there was little impact on the coral restoration area to date, and corals on the eastern (windward) side of Rackham Cay, north of the restoration, showed signs of stress, but were coping with the impact of the plume. Dredging is expected to continue until June 25. The activity so far did not appear to cause a major negative impact on the coral beyond the dredge site. However, it is recommended that a “clean-up” operation be carried out when dredging ceases to help speed the restoration of the site to its former condition.

3.0 AERIAL MONITORING

Aerial photographs taken on June 21st show the silt screen being undercut by deep, tidal driven currents. However the dives revealed that corals appeared to be coping. Photos attached show the extent of the plume generated by dredging.

4.0 WATER QUALITY MONITORING

This report is based primarily on fieldwork carried out on June 18,2002. The objective was to provide measurements of TSS (total suspended solids) and turbidity in the vicinity of Rackham Cay dredging operations.

METHODOLOGY

Field Work

Eight sites were identified for the monitoring exercise as follows:

- KTP 1 - Dredge Site (Bow of the Da Vinci – Landward/Port Side)
- KTP 2 - Dump Site (Just West of the Pipeline)
- KTP 3 – Dump Side (Further West)
- KTP 4 – East of the Dump Site
- KTP 5 - Bow of the Da Vinci (Seaward/Starboard Side)
- KTP 6 – Rackham’s Cay (At Screen – Landward Side)
- KTP 7 – Rackham’s Cay (At Screen – Reef Side)
- KTP 8 – Rackham’s Cay (Along South East Border)

Deep water sampling was carried out from tug boat DN50 while the reef sites were sampled from a fisherman’s canoe. All sites were assigned a GPS location except for Stations 7 and 8 (Table 1 and Figure 1).

Table 1: Dredging And Reclamation In Kingston Harbour
Water Quality Sampling Sites – June 18, 2002

STATION NO	DESCRIPTION	N COORD.	W COORD
KTP 1	Bow of the Da Vinci (Towards Land)	17° 56.733'	76° 50.985'
KTP 2	Dump Site - W. Side of Pipe	17° 55.428'	76° 51.405'
KTP 3	Western Edge of Dump Site	17° 55.612'	75° 51.650'
KTP 4	East of Dump Site	17° 55.331'	76° 51.356'
KTP 5	Bow of Da Vinci (Towards Reef)	17° 56.733'	76° 50.985'
KTP 6	Rackham Cay At Screen (Landward side)	17° 55.572'	76° 50.605'
KTP 7	Rackham Cay At Screen (Reef side)		
KTP 8	R. Cay Along S. E. Border - Restoration Site		

Sub-surface samples were collected using a Van Dorn type sampler. Samples were designated T (surface), M (middle depth) and B (bottom depth). Sampling was carried out between 1127 and 1310 hours.

Sample Analysis

Samples from were analysed by the Mines & Geology Division laboratory in accordance with Standard Methods for the Analysis of Water and Waste Water to determine TSS and turbidity.

TSS was determined by filtration of a known sample volume through a dried, pre weighed filter. After filtration, the filter was dried and re-weighed. TSS in mg/l is obtained through a determination of the weight difference of the filter before and after filtration.

Turbidity was performed using the colorimetric method and reported in FAU (formazin attenuated units). FAU incorporates a correction for colour and thus gives a more realistic determination of turbidity.

OBSERVATIONS AND RESULTS

General Observations

The screens at Rackhams Cay appeared to be intact and maintained their positions.

Sampling was carried out during sunny conditions. Sea state was choppy and winds easterly. During this sampling exercise the Leonardo Da Vinci was engaged in dredging. The dredge was positioned with the bow facing east, and

the pipe extending towards the west. The dredge and pipe formed a semi-enclosed area with the north boundary of Rackham Cay.

There was a noticeable plume in the vicinity of the dredge. The plume appeared more concentrated in the semi-enclosure. Spread of the plume appeared more concentrated to the north-east and north-west. There seemed to be less migration of material to the south.

At the West Middle Shoal dump site the plume was observed to extend mainly westward and eastward but becoming diffuse about 200m west of the pipeline. East of the pipeline the plume ceased to be visible long before arriving at the screen protecting the Shoal (See attached Photographs).

Laboratory Results

Laboratory results are presented in Table 2, and graphically in Figure 2. The results indicate a TSS range of 2 – 298mg/l for all the stations monitored. The NEPA proposed Coral Reef Standard for suspended solids is 10mg/l.

Table 2: Dredge Monitoring -TSS at Rackham's Cay/Dump Site Jun 18, 2002

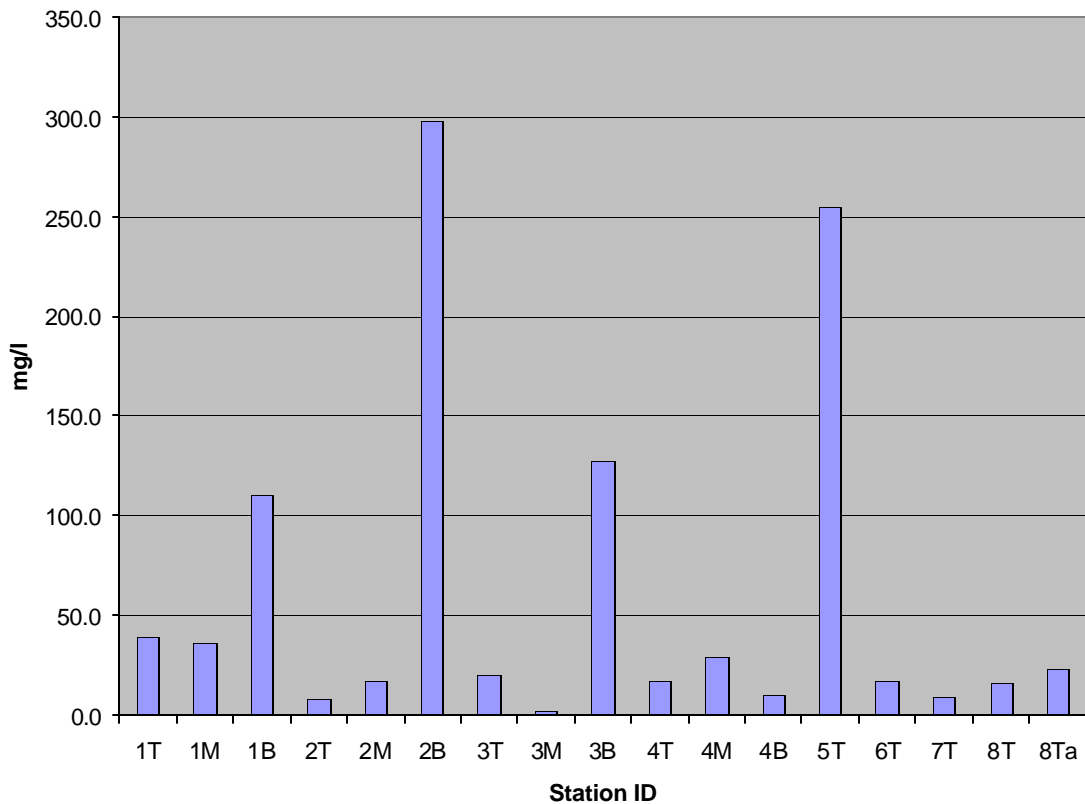
STATION NO	TIME	DEPTH (M)	LAB. RESULTS	
			T (FAU)*	TSS (mg/l)
1T	1127		35	39.0
1M		8.0	74	36.0
1B		17.0	97	110.0
2T	1151		<14	8.5
2M		8.0	<14	17.0
2B		15.0	509	298.0
3T	1211		<14	20.0
3M		7.0	<14	2.0
3B		13.0	260	128.0
4T	1232		<14	17.0
4M		7.0	14	29.0
4B		13.0	17	10.0
5T	1255		353	255.0
6T	1257		<14	17.0
7T	1300		<14	9.5
8T	1303		<14	16.5
8Ta			<14	23.0
T - Surface sample				
B - Depth sample				
M – Middle sample				
(a) - duplicate sample				

The highest values were determined for samples taken at the dredge site, and the dump site. The highest value was obtained for the dump site bottom sample (KTP 2B). At the bow of the dredge on the reef side, TSS was 255mg/l. On the landward side of the bow of the dredge (KTP 1B), TSS was 110mg/l in the bottom sample.

At the bow of the dredge on the landward side (KTP 1), TSS at the surface was 39mg/l at the surface, and 36mg/l at middle depth.

At the dump site about 10m west of the pipe KTP 2), TSS was 8.5mg/l at the surface, 17mg/l at middle depth, and 298mg/l at the bottom.

Figure 2: TSS At Rackham's Cay/Dump Site June 18, 2002



Around 100m west of the dumpsite (KTP 3) TSS was determined to be 20mg/l at the surface, 2mg/l at middle depth, and 128mg/l at the bottom.

About 30m east of the pipe at the dumpsite (KTP 4), TSS was 17mg/l at the surface, 29mg/l at middle depth, and 10mg/l at the bottom.

At the screen just east of Rackhams Cay on the landward side (KTP 6) TSS was 17mg/l while on the reef side (KTP 7) it was determined to be 9.5mg/l. Duplicate samples taken along the south east border of Rackhams Cay in the vicinity of the restoration area (KTP 8T and 8Ta) had values of 16.5mg/l and 23mg/l.

CONCLUSION/ENVIRONMENTAL IMPACT

- Sea conditions appeared to favour material remaining in suspension and spreading mainly in a north east to a northwest direction.
- The silt screens appear to be withstanding the rough seas
- At the eastern silt screen at Rackham Cay the plume appeared to be no different on both sides of the screen.

- The silt screen to the west of West Middle Shoal seemed to be in a position that is not visibly subject to much TSS load.
- Material from the dredging appeared to pose visible threat to water quality at the restoration site
- Material being deposited at West Middle Shoal appeared to pose no visible threat to the Rackhams Cay restoration area.