



LOIS RACS(C) Core Programme
***Tamaris* Tweed 11**
Preliminary Fieldwork Report
2nd-8th June 1997

Personnel:

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Monday 2nd: The scientific and boat party traveled to Berwick from Plymouth and Hull.

Tuesday 3rd: High Water 1350. Low Water approx 0750.

The scientific party arrived at Berwick Docks in time to sort out the equipment in preparation for loading the *Tamaris*. The vessel was positioned against the harbour wall, inside the Pilot Boat. Between 0900 and 0945 the equipment was loaded on board the *Tamaris* and the semi-rigid inflatable was launched using the hired crane.

At 0950 the party left Berwick docks to deploy the the EMP2000 and NAS-2 at station 16 (1030) returning at 1115.

Throughout the day laboratory equipment was set up and calibrated for the following surveys. This included the nutrient analysers (nitrate, nitrite, phosphate and silicate) and the YSI6000 standard suite (salinity, temperature, turbidity, pH and DO).

The semi-rigid was used on a transect from station 20 to station 3 (PML/U of Plymouth). This transect which took place between 1335 and 1530 involved depth profiling using the YSI for standard parameters (salinity, temperature, turbidity, pH and dissolved oxygen). In the upper estuary (stations 20-16) which was found to homogeneous with depth measurements were made at the surface only. Downstream of this information was recorded at the surface, middle and bottom of the water column. Surface samples were analysed, in addition to standard suite for nutrients, gravimetry, chlorophyll and C/N. In addition samples were collected for incubation experiment at stations 20 and 3.

On returning to the *Tamaris* work continued in setting up the equipment. In the late afternoon the parties from the U of Plymouth and U of Southampton arrived and loaded their laboratory equipment and set it up for the following surveys.

Work was completed at 2000.

Wednesday 4th: High Water 1440 Low Water approx 0840.

Arrived onboard the *Tamaris* at 0345. Before departure at 0415 the semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The vessel arrived at the anchor station (station 5) at 0430. Tidal cycle observations have been recorded at this station during previous LOIS work on the Tweed. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0433. The first of the planned samples for nutrient analysers (nitrate, nitrite, phosphate and silicate) was collected at 0445.

Surface samples were collected for nutrient analysis at 15 minute intervals throughout the day. Hourly samples were analysed, in addition to standard suite and nutrients, for gravimetry, chlorophyll and C/N.

Time (salinity): 0500 (15.57), 0600 (14.25), 0700 (4.18), 0800 (1.65), 0900 (1.01), 1000 (0.92), 1100 (0.90), 1200 (3.18), 1300 (25.18), 1400 (31.74), 1500 (32.74), 1615 (31.48), 1700 (22.01) and 1800 (15.12).

An EMP2000 was deployed from the *Tamaris* at a depth of 1.5 m between 0544 to 1800 to look at internal waves.

Throughout the day incubation experiments were carried out. The samples were incubated *in situ* on moorings attached to the *Tamaris*.

Sediment samples were collected in the lower Tweed between 0910 and 0950.

The semi-rigid was used on a transect from station 20 to station 3 to collect saline and riverine endmember samples for U of Plymouth. The transect took place between 1400 and 1515. Surface samples were collected. The surface water was monitored at all the stations using the SUDO-YSI6000.

The generator was down between 1440 and 1445. This affected collection of data by the EMP2000. As the YSI6000 had internal batteries data collection was not affected.

The final measurements were made at 1800 and the *Tamaris* returned to the dock at 1830.

The party disembarked the vessel after analysis of samples and standards at 2000.

Thursday 5th: High Water 1525 Low Water approx 0925

Arrived at the boat at 0645. The semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The vessels left the dock at 0710 and was on station just below the old road bridge (station 5) at 0720. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0725. The nutrient analysers (nitrate, nitrite, phosphate and silicate) measured samples at 15 minute intervals, from 0730, when 'anchored' at station 5. During the axial profiles samples were collected for nutrient analysis at each passage through the stations.

At low water (0825-0910) the EMP2000 from the Lifeboat Slipway (station 4) was recovered and replaced by a second instrument.

At approximately half tide *Tamaris* left the anchor station (at 1220) and went downstream to station 3 at the breakwater. From 1238 to 1720 (the high water period) ten repetitive transects were carried out on *Tamaris* between station 3/4 and 8.

The semi-rigid was used on a transect from station 20 to station 3 (PML/U of Plymouth). This transect which took place between 1435 and 1710 involved using the YSI6000 for standard parameters. Samples were analysed, in addition to standard suite (all stations) for nutrients, and for later determination of gravimetry, chlorophyll, C/N and trace metals at stations 20, 18, 16, 14, 12, 10, 8, 6, and 4. The transect also collected the saline and riverine endmember samples.

On completion of the transects the *Tamaris* returned to the dock (1720). The vessel was alongside, inside the Pilot Boat, at 1745 and analysis continued until the party disembarked at 2000.

Friday 6th: High Water 1610. Low Water approx 1010.

The scientific party arrived at the boat at 0715. Before the *Tamaris* left the dock the semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The vessels left the dock at 0730 and was on station just below the old road bridge (station 5) at 0740. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0744. The nutrient analysers (nitrate, nitrite, phosphate and silicate) measured samples at 15 minute intervals, from 0745, when 'anchored' at station 5. During the axial profiles samples were collected for nutrient analysis at each passage through the

stations. An EMP2000 was deployed from the *Tamaris* at a depth of 1.5 m from 0900 to monitor was over the low tide period between 0800 to 1315.

At approximately half tide *Tamaris* left the anchor station (at 1320) and went downstream to station 3. From 1340 to 1738 (the high water period) eight repetitive transects were carried out on *Tamaris* between station 3/4 and 8.

The semi-rigid was to be used on a transect from station 20 to station 3. This transect which took place between 1500 and 1620 was to involved depth profiling using the YSI6000 for standard parameters. Problems with the YSI6000 led to this transect being abandoned, however the saline and riverine endmember samples were collected as required.

On completion of the transects the *Tamaris* returned to the dock at 1750 . The vessel was along side the Pilot Boat and the party disembarked after analysis of samples and standards at 2015.

Saturday 7th: High Water 1650. Low Water approx 1050

The party arrived onboard the *Tamaris* at 0800. Before departure at 0840 the semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. In addition the van was unloaded to make space for the rigs that were to be collected later in the day. The vessel arrived at the anchor station (station 5) at 0843. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0845. The nutrient analysers (nitrate, nitrite, silicate and phosphate) measured samples at 15 minute intervals from 0845. An EMP2000 was deployed from the *Tamaris* at a depth of 1.5 m from 0900. All monitoring was over the low tide period from 0845 to 1500.

Between 1020 and 1145 the rigs at 16 (1040-1100) were recovered. The instruments were packed away but the data was not downloaded.

The *Tamaris* departed from the station at 1510 and was fast inside the Pilot Boat at 1545. The hired Crane was used to unload the equipment and recover the semi-rigid between around 1615 and 1700. The equipment was packed into the van and the semi-rigid put on its trailer. The semi-rigid was stored in Shed H. Work was completed at 1830.

Sunday 8th: Traveled from Berwick to home bases.

Acknowledgment:

The help and advice from Norman Revill and Peter Rendle was greatly appreciated by all working on board *Tamaris*.

Results:

Summery:

This was the eleventh of the LOIS RACS(C) Core Programme surveys of the Tweed. The work went well and most of the objectives were met. For the core programme, in brief.

a) Axial transects from station 3 to 20

Tuesday: standard suite (depth profiles), nutrients, gravimetry, chlorophyll and C/N

Wednesday: standard suite (surface samples)

Thursday: standard suite (surface samples), nutrients, gravimetry, chlorophyll, C/N and trace metals.

Friday: standard suite (depth profiles). Abandoned

b) Tidal Cycle at station 5

Wednesday: 1; surface monitoring for standard suite (5 sec) and nutrients (15 min),

2; hourly surface sampling for gravimetry, chlorophyll and C/N,

3; EMP2000 at 1.5 m for standard suite (1 sec).

c) Profiling over lower estuary, stations 3 to 8 (high tide period)

Thursday: ten transects, standard suite and nutrients

Friday: eight transects, standard suite and nutrients

d) Sampling over the low tide period at station 5

Wednesday: standard suite and nutrients and hourly for gravimetry, chlorophyll, C/N.

EMP2000 at 1.5 m (1 sec) for standard suite.

Thursday: standard suite and nutrients.

Friday: standard suite, nutrients and for gravimetry, chlorophyll and C/N (2.5 hourly).

EMP2000 at 1.5 m (1 sec) for standard suite.

Saturday: standard suite, nutrients. EMP2000 at 1.5 m (1 sec) for standard suite.

e) Rig deployments Tuesday 3rd-Saturday 7th

station 16: EMP2000 and NAS-2

f) endmembers

Tuesday; fresh and marine sample collected

Wednesday; fresh and marine sample collected

Thursday; fresh and marine sample collected

Friday; fresh and marine sample collected

Notes:

YSI6000s:

The instrument (ss) usually used for standard suite measurements on board *Tamaris* had a fault so that the temperature reading was fixed at 100 c. As a result the instrument (rib) usually used for the axial profiles (on the semi-rigid) was transferred and used for the measurements on board *Tamaris*. This had one unforeseen advantage in that as it had internal batteries installed no data was lost when the generator had to be switched off. *It thus would be a good idea to install batteries in the instrument to be used on board Tamaris.*

For the axial profiles the (rib) instrument was used on Tuesday and the U of Southampton YSI6000 was used for the transect on Wednesday. The later instrument developed a fault. Thus for the transects on Thursday and Friday the (ss) YSI6000 with the temperature/oxygen probe from the U of Southampton instrument was used.

During the transect on the Friday the (ss) YSI6000 was damaged during a depth profile. When monitoring the bottom water the instrument became fast around an obstruction. In the attempt to free the instrument the cable was damaged. *Thus the cable has to be repaired or replaced and the instrument checked before the next survey.*

semi-rigid boat

A propellor on the semi-rigid was damaged by a submerged object during one of the transects leading to the suggestion that; *a spanner and pair of pliers should be carried on the semi-rigid.* Thus if possible the boat could be beached and the propellor changed.

When collected from shed H the semi-rigid was partially deflated. This was the first time this has been immediately apparent. It may be the start of a more serious problem.

The painter on the semi-rigid needs replacing as it is showing signs of ware.

overflights

Throughout the week we were in contact with John Cook (NERC aircraft) about possible overflights in support of the remote sensing project. Flights occurred on Tuesday and Wednesday. Due to cloud cover on all other days the overflight were canceled.

fieldwork reports

In addition to the reports sent to Roger Swinfen copies should be sent to the *Tamaris* crew as they are interested in the work undertaken. The later could be in the first instant be copies of the preliminary report.

unloading

During unloading on the Saturday a violent thunderstorm occurred. (This led to the fire brigade pumping water from flooded parts of Berwick). As a result most of the boxes and containers of equipment were soaked.

off-shore rigs

The Bliss Buoys were observed from station 3 during the transects on the *Tamaris*.

LOIS LOIS-RACS(C) Core Programme TWEED Station Grid			
Station No	Position*	Station Description	Station Name
1		Offshore	
2		Offshore	
3	009 524	Lighthouse	Lighthouse
4	002 520	Lifeboat Station	Lifeboat Station
5	997 527	Chandlery	Chandlery
6	993 532	Just before Rail Bridge	Royal Border Bridge
7	984 532	White House on RHS	High Pool
8	981 530	Derlict Building/Telegraph Poles on LHS	Lower Yarrow Shiel
9	979 523	Building Past Outfall on LHS	Toddles Shiel
10	978 521	Prominent tree on either side of River	English New Water Shiel
11	974 517	Just before A1 Road Bridge	A1 Road Bridge
12	968 516	2nd set of Pylons/cables	North Middle Ord
13	964 517	Disused Fishery on LHS & RHS	Heugh Shiel
14	958 518	Disused Fishery on LHS (blue door)	West Ord
15	951 519	Next Fishery/Power Cables	Coroners Meadow
16	946 521	Next Fishery on RHS (red roof)	Low House
17	930 522	Green/Blue hut/shed on RHS	Yardford Shiel
18	935 520	Boat House on RHS	Paxton
19	932 516	End of Trees before Big House on RHS	Quarry
20	934 510	Chain Bridge	Union Bridge
* Ordnance Survey Pathfinder 438			