



LOIS RACS(C) Core Programme
Tamaris Tweed 7
Preliminary Cruise Report
6th -12th February 1997

Personnel:

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Thursday 6th: The scientific and boat party traveled to Berwick from Plymouth, Southampton, Wallingford and Hull.

Friday 7th: High Water 1405. Low Water approx 0800.

The scientific party arrived on the vessel at 0800. The *Tamaris* was positioned against the wall, inside the two Pilot Boats. As it was low water and the crane was not available we could not load the *Tamaris* until later in the day. Equipment and the semi-rigid boat were collected from Dock Shed H. At 0900 the party left Berwick docks to deploy the EMP2000 at station 9 (0915) and the EMP2000 and NAS-2 at station 16 (1015). The later deployment was in conjunction with the HI water sampler. On returning to the *Tamaris* (1045) the equipment for the semi-rigid boat was sorted out prior to it from the slip between the two road bridges (1145-1220). Loading of the smaller equipment onto the *Tamaris* commenced followed by the heavier and larger equipment as the time of high water approached.

The semi-rigid was prepared for a survey and left the harbour at 1350 returning at 1600. During the survey water samples were collected for incubation experiments from stations 20, 5 and between 3 and 4. Bathymetric surveys across the width of the river were undertaken at stations 20, 18, 16, 14, 12, 10, 8 and 6 using the echo sounder.

Throughout the day laboratory equipment (nutrient analysers and YSI600s) was set up, and calibrated, on the *Tamaris* for the following surveys. The party departed from Berwick Docks at 1830.

Saturday 8th: High Water 1450. Low Water approx 0900.

Arrived at the boat at 0630. The semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The vessels left the dock at 0715 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 and samples for the nutrient analyser (nitrate, nitrite, silicate and phosphate) were collect from 0800. Discrete samples were collected for chlorophyll, gravimetry and C/N analysis at approximately hourly intervals at station 5 between 0800 and 1800 (10 samples).

At low water (0915-0940) the EMP2000 was recovered from the Lifeboat Slipway and taken to *Tamaris* for downloading data and servicing.

At approximately half tide *Tamaris* left the anchor station (at 1300) and went downstream to station 3 at the breakwater. From 1314 to 1703 (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 4 to station 20 to collect samples for U of Southampton and IH Wallingford. The later transect took place between 1300 and 1640. Surface and a 'bottom' samples were collected at stations 4 to 10 and surface samples at stations 10-20. The water was monitored using the YSI6000 for salinity, temperature, turbidity, pH and dissolved oxygen values.

On completion of the transects the *Tamaris* returned to station 5 (1710) and continued monitoring until leaving at 1800 for the dock. The vessel was alongside, inside the Pilot Boat, at 1830 and analysis continued until 2000 and the party disembarked at 2030.

Sunday 9th: High Water 1530. Low Water approx 0930.

Arrived at the boat at 0700. The semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The vessels left the dock for station 5 (just below the old road bridge) at 0730. At 0750 monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started and samples for the nutrient analyser (nitrate, nitrite, silicate and phosphate) were collect from 0800. At two-hourly intervals discrete samples were collected at station 5 for chlorophyll, gravimetry and C/N analysis between 0800 and 1800 (6 samples).

At low water (0930-1005) the EMP2000 was reinstated at the Lifeboat Slipway. Between 1100 and 1150 the semi-rigid boat was used to calibrate the echo sounder. A further bathymetric survey was conducted across the river (station 4) between 1300 and 1320.

At approximately half tide *Tamaris* left the anchor station (at 1340) and went downstream to station 3 at the breakwater. From 1352 to 1720 (the high water period) eight repetitive transects were carried out on *Tamaris* between stations 3 and 8. The semi-rigid was used on a transect from station 3 to station 20 to collect samples for U of Plymouth and PML. The later transect took place between 1340 and 1600. During this part of the transect bulk discrete samples were collected in 10l pots for standard suite, nutrients, chlorophyll, gravimetrics, C/N and later determination of trace metals (and related parameters). As the first transect on *Tamaris* coincided with the start of the survey in the semi-rigid the samples collected from each vessel can be compared (stations 3-8).

On completion of the transects the *Tamaris* returned to station 5 (1737) and continued monitoring until leaving at 1845 for the dock. The vessel was alongside, inside the Pilot Boat, at 1910 and analysis continued until 1945 and the party disembarked at 2000.

Monday 10th: High Water 1615. Low Water 1015.

Arrived onboard the *Tamaris* at 0615. Before departure at 0630 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 0650. Station 5 was chosen for the tidal cycle station as it was the most seaward position that could be used. During the repetitive profiling on Saturday and Sunday salinities of fresh water to almost 30 psu had been found. In addition tidal cycle observations had been recorded at this station during previous LOIS work on the Tweed.

At 0700 monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started and samples for the nutrient analyser (nitrate, nitrite, silicate and phosphate) were collect from 0715. In addition to the continuous monitoring bulk discrete samples were collected in 10l pots for chlorophyll, gravimetrics, C/N and later determination of trace metals (and related parameters). The first sample was collected at 0730. A further

eleven samples were collected throughout the day until 1930. After initially being at 6 psu the salinity fell to fresh water (0830) up to around 26 psu (1600) and to fresh water again.

Tidal cycle samples, time/salinity: 0730/3.49, 0815/0.21, 1000/0.18, 1200/0.16, 1400/0.60, 1405/3.36, 1500/8.70, 1510/17, 1533/22, 1700/14, 1815/4.99, 1930/0.17.

In addition fourteen samples were collected between 1050 and 1325 to look at short term variations in the freshwater runoff.

The anchor station was completed at 2000. The vessel was alongside the Pilot Boat at 2015 and analysis continued until 2045 and the party disembarked at 2100.

At 1420 an attempt was made to do an additional axial survey of the Tweed from station 3 to 20 recording the standard parameters (salinity, temperature, turbidity, pH and dissolved oxygen) but this had to be abandoned due to inclement weather at station 8.

Tuesday 11th: High Water 1705. Low Water approx 1100.

The party arrived onboard the *Tamaris* at 0800. Before departure at 0900 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 rig that were to be collected later in the day. The vessel arrived at the anchor station (station 5) at 0910. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0915. The nutrient analysers (nitrate, nitrite, silicate and phosphate) measured samples at 15 minute intervals from 0915. Monitoring was over the low tide period from 0900 to 1500.

Between 1005 and 1215 the rigs at station 9 (at 1030) and 16 (at 1115) were recovered. The instruments were packed away but the data was not downloaded. On the way back to *Tamaris* equipment was collected from the shore based laboratory in the Main Guard. At 1320 the semi-rigid departed down stream to collect higher salinity water samples returning at 1350.

The *Tamaris* departed from the station at 1500 and was fast inside the Pilot Boat at 1530. The hired Crane was used to unload the equipment and recover the semi-rigid between around 1615 and 1645. The equipment was packed into the van and the semi-rigid put on its trailer. Work was completed at 1800.

Wednesday 12th: Traveled from Berwick to home bases.

Summery: This was the seventh of the LOIS RACS(C) Core Programme surveys of the Tweed. The work went well and all of the objectives were met. In brief.

a) Axial transects from station 3 to 20

Friday: bathymetric survey.

Saturday: standard suite, trace metals and related parameters.

Sunday: standard suite, nutrients, gravimetry, chlorophyll, C/N, trace metals and related parameters.

Monday: standard suite (stations 3-8 only)

b) Tidal Cycle at station 5

Monday: standard suite, nutrients, gravimetry, chlorophyll, C/N, trace metals and related parameters

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

Saturday: ten transects, standard suite and nutrients

Sunday: eight transects, standard suite

d) Sampling at station 5 over the low tide period

Saturday; standard suite, nutrients, gravimetry, chlorophyll and C/N.

Sunday, standard suite, nutrients gravimetry, chlorophyll and C/N.

Monday, standard suite, nutrients gravimetry, chlorophyll, C/N, trace metals and related parameters (part of the tidal cycle).

Tuesday, standard suite and nutrients.

e) Rig deployments Friday 7th-Tuesday 11

station 9: EMP2000s and NAS-2.

station 15: EMP2000s.

f) Long term deployment of EMP2000 at Lifeboat Jetty

The instrument was recovered on Saturday and redeployed on Sunday.

Notes:

This was the seventh of the LOIS RACS(C) Core Programme surveys of the Tweed and the sixth to be carried out using the *Tamaris* and the semi-rigid inflatable. The work went well and all of the objectives were met.

For part of the work a land based laboratory was employed by the teams from the U of Southampton, U of Plymouth and IH Wallingford. Samples were transferred from the vessels to the laboratory for preliminary treatment and analysis. This part of the programme worked well. The facilities were adequate and convenient.

Following recent practice the programme was altered from that published in that the thirteen hour tidal cycle was brought forward to the Monday. It is not practicable to do this work on the final day and allow adequate time for unloading and packing. Thus in future weeks the programme should be written accordingly.

While attempting to inflate the semi-rigid boat on Sunday a valve in one of the compartments became detached and fell inside it. This problem was overcome by 'gaffer taping' the hand pump into the hole. Throughout the following surveys the semi-rigid had to be reinflated at regular intervals. This could have had more serious consequences for the programme if it had resulted in the canceling of the axial surveys. The semi-rigid has been returned to Plymouth for repairs.

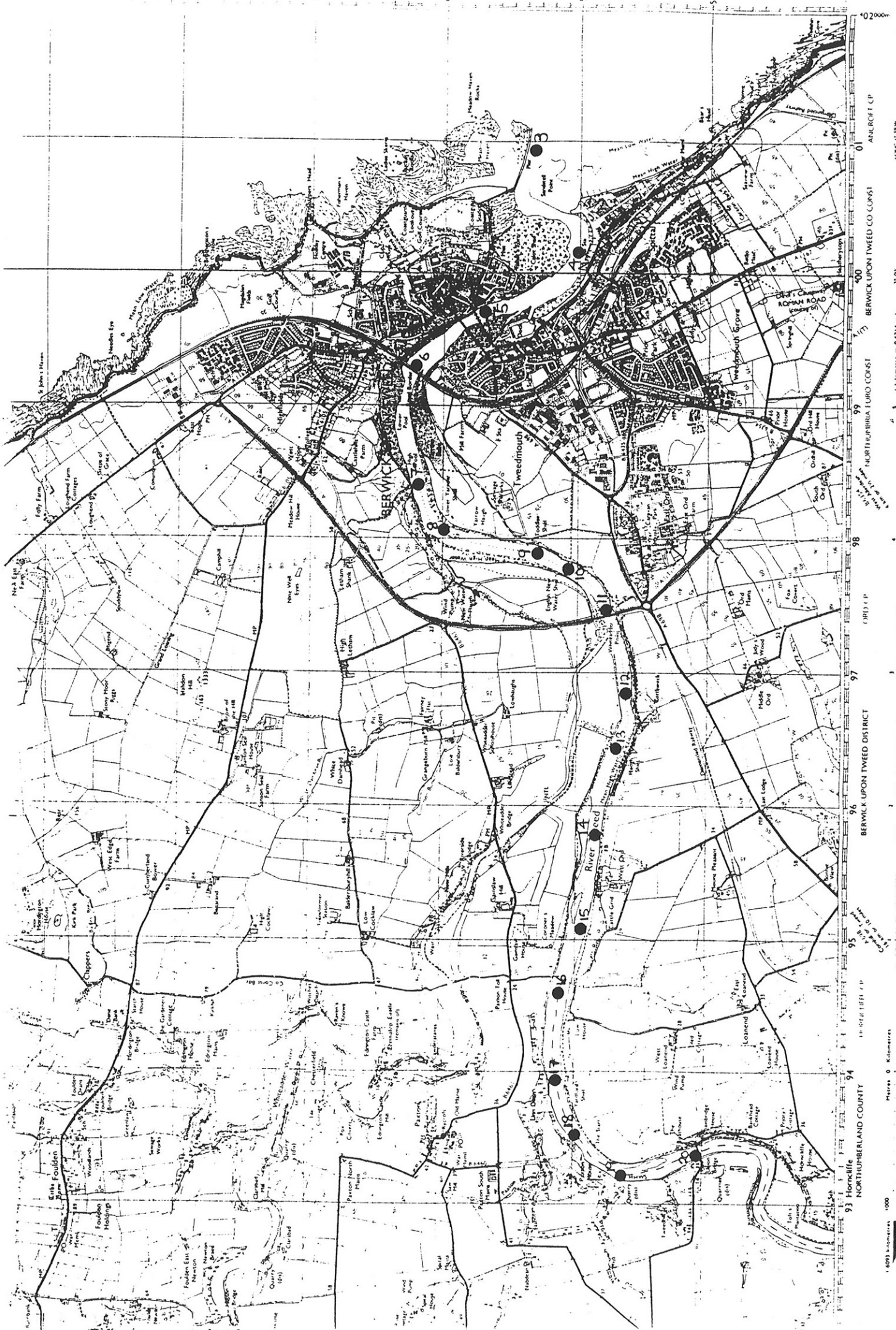
The weather was kind throughout the week. Only the additional 'standard suite' survey on the Monday was affected by the worsening weather. This survey had to be curtailed at station 8. The heavy rainfall overnight on Monday was seen in the measurements recorded on Tuesday. The turbidity and river flow had increased and the salinity remained at freshwater levels throughout the monitoring period.

The help and advice from Ron Easton and Alan Greaves was greatly appreciated by all working on board the *Tamaris*.

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 Quarry RHS	
20	934 510	Chain Bridge	Union Bridge

* Ordnance Survey
Pathfinder 438



Scale 1:25 000

Meters 0 Kilometres
Yards 0 Miles

1:25000 1000
1:25000 1000

PATHEINDER 420