



LOIS RACS(C) Core Programme
***Tamaris* Tweed 8**
Preliminary Fieldwork Report
6th -12th March 1997

Personnel:

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

Friday 7th: High Water 1300. Low Water approx 0700.

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 0930 and 1000 the equipment was loaded on board the *Tamaris* and the semi-rigid inflatable was launched using the hired crane.

At 1000 the party left Berwick docks to deploy the EMP2000 at station 9 (1030) and the EMP2000 and NAS-2 at station 16 (1100). As the NAS-1 cadmium column had not been prepared it was not deployed at this time but after the highwater period (1730).

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

The semi-rigid was used on a transect from station 3 to station 20. The transect took place between 1330 and 1445. The surface water was monitored using the YSI6000 for salinity, temperature, turbidity, pH and dissolved oxygen values.

On returning to the *Tamaris* work continued in setting up the equipment. Work was completed at 1830.

Saturday 8th: High Water 1346. Low Water approx 0745.

Arrived at the boat at 0515. The semi-rigid was prepared and the on-board monitoring equipment was set up and calibrated. The *Tamaris* had problems with the power supply on the bridge being down. As a result the vessels was unable to leave the dock as planned as the echo sounder and radio were affected.

Between 0650 and 0745 the semi-rigid was away from the dock and the EMP2000 on the Lifeboat slipway (station 4) was recovered and replaced by a second instrument. In addition samples were collected for nutrient and BOD analysis.

The NERC aircraft flew a series of lines starting at 1030 and again at 1300. This was in support of the remote sensing project.

At 1115 the electrical fault had been rectified and at 1130 *Tamaris* left the dock and was on station just below the old road bridge (station 5) at 1145. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 1155. Nutrient analysis started at 1200. Samples were collected at each passage through the stations.

As it was approximately half tide the *Tamaris* began the repetitive axial transects of the lower estuary (1212). From 1226 (station 3) to 1634 (the high water period) eight repetitive transects were carried out on *Tamaris* between station 3 and 8. The semi-rigid was

used from station 8 to extend the third axial profile to station 20. This transect which took place between 1325 and 1517 involved depth profiling using the YSI for standard parameters (salinity, temperature, turbidity, pH and dissolved oxygen). This involved recording information at the surface and at approximately one metre intervals throughout the water column. At station 10 the water column was found to be homogeneous. All measurements upstream of this station were made at the surface.

Surface samples from the extended survey (station 3 to 20) were analysed for standard suite, nutrients, and later determination of gravimetry, chlorophyll, C/N, nitrous oxide, methane and trace metals..

On completion of the transects the *Tamaris* returned to station 5 (1647) and continued monitoring until leaving at 1650 for the dock. The vessel was along side the Pilot Boat at 1712 and the party disembarked after completion of analysis of samples and standards at 2000.

Sunday 9th: High Water 1430. Low Water approx 0830.

The scientific party arrived at the boat at 0600. 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 0630 and was on station just below the old road bridge (station 5) at 0645. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0650. The nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) measured samples at 15 minute intervals, from 0700, when 'anchored' at station 5. During the axial profiles samples were collected for nutrient analysis at each passage through the stations.

At approximately half tide *Tamaris* left the anchor station (at 1135) and went downstream to station 3. From 1144 (station 3) to 1706 (the high water period) eleven repetitive transects were carried out on *Tamaris* between station 3 and 8. The semi-rigid was used from station 8 to extend the fifth axial profile to station 20. This transect which took place between 1334 and 1531 involved depth profiling using the YSI for standard parameters (salinity, temperature, turbidity, pH and dissolved oxygen). This involved recording information at the surface and at approximately one metre intervals throughout the water column. After station 12, which was found to be homogeneous with depth, all measurements were made at the surface. Samples from the extended survey (station 3 to 20) were analysed, in addition to standard suite and nutrients, for gravimetry, chlorophyll and C/N.

At 1330 the NERC aircraft flew a set of lines in the Tweed area in support of the remote sensing project.

On completion of the transects the *Tamaris* returned to station 5 (1710) and continued monitoring until leaving at 1720 for the dock. The vessel was along side the Pilot Boat at 1750 and the party disembarked after completion of analysis of samples and standards at 1830.

Monday 10th: High Water 1515. Low Water 0915.

Arrived onboard the *Tamaris* at 0545. Before departure at 0615 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 0625. 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 0630. The first of the planned samples for nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) was collected at 0630.

Just after arrival at station 5 problems with one of *Tamaris* engines necessitated a return to the harbour (0650). Work started on identifying the problem. As low water was approaching it became apparent that it would not be possible (even if the problem with

Tamaris could be rectified quickly) to leave the dock on this tide. Hence the programme was altered to enable all work to be carried out from the semi-rigid boat.

The revised programme involved hourly visits to station 5 (from 0900). This involved depth profiling using the YSI for standard parameters (salinity, temperature, turbidity, pH and dissolved oxygen) at one metre intervals throughout the water column. Surface samples were collected for analysis, in addition to standard suite, for nutrients, gravimetry, chlorophyll and C/N, and DO by winkler titration. In addition to the samples collected at 0630 (surface salinity 2.8) sampling occurred at 0910 (0.7), 1005 (0.17), 1100 (0.15), 1155 (0.15), 1300 (3.83), 1357 (10.17), 1504 (24.21), 1606 (14.33) and 1700 (10.20). The proposed visits to station 5 at 1800 and 1900 had to be canceled for safety reasons as it had become dark. In addition to the above from 1458 (station 3) to 1547 (station 20) an axial transect recording standard parameters at the surface was carried out.

The party disembarked the vessel after completion of analysis of samples and standards at 1930.

Tuesday 11th: High Water 1600. Low Water approx 1000.

When the party arrived onboard the *Tamaris* at 0830 the whole area was covered in thick fog. The van was unloaded to make space for the rigs that were to be collected later in the day. Between 0915 and 1030 the rigs at station 16 (at 0930) and 9 (at 1015) were recovered. The instruments were packed away but the data was not downloaded.

At 1315 the *Tamaris* left the dock to test the recently repaired engines (the trial took place on a rising tide). After successfully completing the exercise the *Tamaris* returned to the dock at 1440 and was fast inside the Pilot Boat at 1450. The hired Crane was used to unload the equipment and recover the semi-rigid between around 1600 and 1630. The equipment was packed into the van and the semi-rigid and rigs stored in shed H. Work was completed at 1800.

Wednesday 12th: Traveled from Berwick to home bases.

Summary:

This was the eighth of the LOIS RACS(C) Core Programme surveys of the Tweed. Despite problems with the *Tamaris* the work went well and most of the objectives were met. In brief.

a) Axial transects from station 3 to 20

Friday: standard suite (surface samples).

Saturday: standard suite (depth profiles), nutrients, gravimetry, chlorophyll, C/N, methane and nitrous oxide and trace metals.

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

Monday: standard suite (surface samples).

b) Tidal Cycle at station 5

Monday: hourly sampling for standard suite (depth profiles), nutrients, gravimetry, chlorophyll, C/N and DO by winkler titration.

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

Saturday: eight transects, standard suite and nutrients

Sunday: eleven transects, standard suite and nutrients

d) Sampling over the low tide period at station 5

Sunday: standard suite and nutrients

e) Rig deployments Friday 7th-Tuesday 11th

station 9: EMP2000

station 15: EMP2000 and NAS-2

Acknowledgment:

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

Notes:

With 50 filters available for gravimetric and C/N analysis the following procedure was used. It was thought that this protocol would maximise the information collected.

2 axial transects from station 3-20	36 filters
hourly samples during tidal cycle	14 filters
total	50 filters

The LoiS lifejackets require their annual service. The offer to take these back to the Hull Laboratory and arrange the service by CoSalt in Grimsby was declined. The lifejackets are to be serviced in Plymouth.

There are problems with the doors to the LoiS van. The side door does not open at all and the back door is 'temperamental'.

The data collected in the main log books should be transcribed after each survey (or the book photocopied). If this does not occur it could be a disaster waiting to happen.

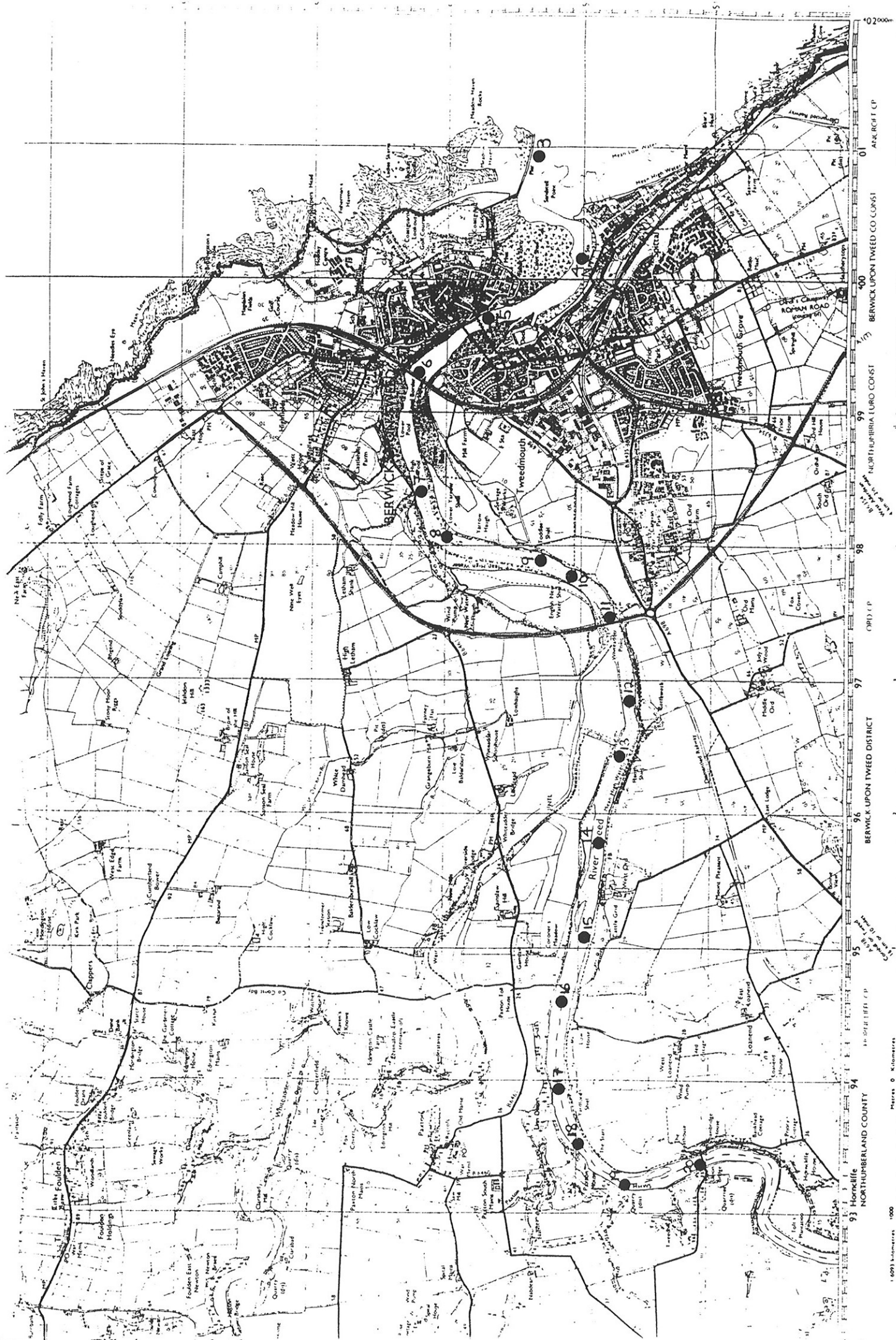
Further to the Addendum contained in the Fieldwork report of December 1996 (Tweed 5) referring to the non availability of a back up engine on the semi-rigid inflatable. It should be possible to clamp a small engine on the transom (opposite side to the 'bailer') for use in emergencies. If it is difficult for the *Tamaris* to anchor in the lower Tweed then the same must apply to the semi-rigid boat.

Results:

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



1:25,000
1:6093 Kilometers 1000
1:6093 Miles 1000
Metres 0 Kilometres
Feet 0 Miles
93 Horncliffe NORTHUMBERLAND COUNTY
94
95
96 BERWICK UPON TWEED DISTRICT
97
98
99 NORTHUMBRIA LURO CONST
100 BERWICK UPON TWEED CO CONST
101
102
A 2K RIGHT CP
1:25,000
1:6093 Miles 1000
1:6093 Kilometers 1000

Scale 1:25 000

PATLEINDER 130