



LOIS RACS(C) Core Programme
***Tamaris* Tweed 5**
Preliminary Cruise Report
7th -13th December 1996

Personnel:

Bob Clifton (PML)	Senior Scientist
Duncan Plummer (PML/LOIS Hull)	
Mike Griffiths (PML)	
Axel Miller (PML)	
Jon Barnes (U of Newcastle)	
Ron Easton (PML)	
Norman Revill (PML)	

Saturday 7th: The scientific and boat party traveled to Berwick from Plymouth and Hull.

Sunday 8th: High Water 1243. Low Water approx 0645.

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 wall, inside the Pilot Boat. Between 0900 and 1000 the equipment was loaded on board the *Tamaris* and the semi-rigid inflatable was launched using the hired crane.

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

The time of high water on Thursday precluded recovery (and hence deployment) of the rigs, holding the EMP2000s and the NAS-2 nitrate analyser, using the semi-rigid inflatable. As a result the rigs were deployed from the bank of the Tweed using the LOIS van. In an attempt to deploy the rigs as close to low water as possible, but before it got dangerously dark, the following procedure was adopted. The first rig was set up, but not deployed at station 9, the second rig was set up and deployed near station 16 (1615), then the rig at station 9 was deployed (1645). It was however dark at the time of the second deployment.

On returning to the *Tamaris* work continued in setting up the equipment. Work was completed at 1900.

Monday 9th: High Water 1323. Low Water approx 0720.

Arrived at the boat at 0730. 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 0940 and was on station just below the old road bridge (station 5) at 0950. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 1000. The nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) measured samples at 15 minute intervals, from 1015, 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 1130) and went downstream to station 3 adjacent to the Lighthouse at the mouth of the Tweed. Due to inclement weather it was not possible to go further seaward. From 1145 (station 3) to 1539 (the high water period) seven repetitive transects were carried out on *Tamaris* between station 3 or 4 and 8. The semi-rigid was used from station 8 to extend the first axial profile to

station 20. This part of the transect took place between 1240 and 1400. Samples from the extended survey (station 3 to 20) were analysed, in addition to standard suite and nutrients, for gravimetry, chlorophyll and C/N.

On completion of the transects the *Tamaris* returned to station 5 (1547) and continued monitoring until leaving at 1730 for the dock. The vessel was along side the Pilot Boat at 1745 and the party disembarked after completion of analysis of samples and standards.

Tuesday 10th: High Water 1403. Low Water approx 0800.

The scientific party arrived at the boat at 0530. 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 0615 and was on station just below the old road bridge (station 5) at 0627. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0630. The nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) measured samples at 15 minute intervals, from 0830, when 'anchored' at station 5. During the axial profiles samples were collected for nutrient analysis at each passage through the stations.

Between 0830 and 0910 the semi-rigid was away from the *Tamaris* as an attempt was made to service the EMP2000 on the Lifeboat slipway ('station 4'). Despite being at the site at low water the instrument was still submerged. It could be seen about 5 m away and 60 cm below the surface. Thus it was not possible to reach the instrument. The EMP2000s remains at the site.

At approximately half tide *Tamaris* left the anchor station (at 1215) and went downstream to station 3. Due to inclement weather it was not possible to go further seaward. From 1234 (station 3) to 1552 (the high water period) six repetitive transects were carried out on *Tamaris* between station 3 and 8. The semi-rigid was used from station 8 to extend the first axial profile to station 20. This part of the transect took place between 1315 and 1446. Samples from the extended survey (station 3 to 20) were analysed, in addition to standard suite and nutrients, for gravimetry, chlorophyll, C/N, DOC, nitrous oxide, methane and later determination of trace metals.

On completion of the transects the *Tamaris* returned to station 5 (1616) and continued monitoring until leaving at 1700 for the dock. The vessel was along side the Pilot Boat at 1715 and the party disembarked after completion of analysis of samples and standards at 1830.

Wednesday 11th: High Water 1443. Low Water 0845.

Arrived onboard the *Tamaris* at 0430. Before departure at 0515 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 0522. 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 0530. The nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) measured samples at 15 minute intervals from 0700.

During the tidal cycle discrete samples were collected for chlorophyll, gravimetrics, C/N and later determination of trace metals at hourly intervals from 0600. The anchor station was completed at 1800.

Between 1400 and 1500 the semi-rigid was used for a transect of the Tweed for standard suite parameters from station 4 to 20.

The *Tamaris* departed from the station at 1810 and was fast inside the Pilot Boat at 1830.

Thursday 12th: High Water 1525. Low Water approx 0930.

The party arrived onboard the *Tamaris* at 0700. Before departure at 0735 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 0745. Monitoring of the standard suite (salinity, temperature, turbidity, pH and dissolved oxygen) started at 0800. The nutrient analysers (nitrate, nitrite, phosphate, silicate and ammonia) measured samples at 15 minute intervals from ****. Monitoring was over the low tide period from 0800 to 1400.

Between 0915 and 1115 the rigs at station 9 (at 1000) and 16 (at 1030) were recovered. The instruments were packed away but the data was not downloaded.

The *Tamaris* departed from the station at 1400 and was fast inside the Pilot Boat at 1430. The hired Crane was used to unload the equipment and recover the semi-rigid between around 1530 and 1630. The equipment was packed into the van and the semi-rigid stored as arranged in the dockside shed. Work was completed at 1700

Friday 13th: Traveled from Berwick to home bases.

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

Summery:

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

a) Axial transects from station 3 to 20

Monday: standard suite, nutrients, gravimetry, chlorophyll and C/N

Tuesday: standard suite, nutrients, gravimetry, chlorophyll, C/N, DOC, methane, nitrous oxide and trace metals.

Wednesday: standard suite

b) Tidal Cycle at station 5

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

c) Profiling over lower estuary, stations 3/4 to 8 (high tide period)

Monday: seven transects, standard suite and nutrients

Tuesday: six transects, standard suite and nutrients

d) Sampling at station 5 over the low tide period)

Monday, Tuesday, Wednesday (part of tidal cycle) and Thursday, standard suite and nutrients

e) Rig deployments Sunday 8th-Thursday 12th

station 9: EMP2000s and NAS-2

station 15: EMP2000s

Results:

Notes:

Loading equipment and launching the semi-rigid with the crane went well. This makes the operation much more manageable and thus safer.

The semi-rigid is stored in Shed H. Although undercover and protected from the elements a tarpaulin, or similar, is required to protect it from birds.

The green laminated sheets is an excellent idea that works well however some need updating and/or amending.

The data has not been unloaded from the EMP2000s and NAS-2 this will need doing when the instruments return to Plymouth.

The chart recorders require attention and may need to be serviced.

Rig Deployments; Safety considerations

1) the long chain must be cut to size. It is not safe to carry (unnecessarily) large amounts of heavy chain.

2) This operation should not be carried out in the dark. At all times daylight must take precedence over tidal conditions.

3) we should consider stopping deployments at station 9 as it is very close to the sewage outfall. This also questions the deployment of the nitrate analyser at this site.

Semi-Rigid Inflatable

1) include a laminated chart of Tweed showing station positions (copy of that included in the programme would suffice), with the table of station number, position, name and brief description on the reverse (enclosed)

2) a laminated table to record information (with felt tip pen) during rib work (table to be large enough to allow it to be filled in with cold hands!). The order of the columns should reflect that on the hand held display. This would be easier than a book when it is wet. The data to be transferred to the cruise book on completion of the transect.

Safety

3) there must always be more than one person in the boat when it is used. This must include all work including the short 'ferry' trips.

4) a small back up engine is required (in case of engine failure) rowing in the outer Tweed is not a realistic option.

A meeting was held with Capt Jenkinson (Berwick Harbour Master) who confirmed the following;

- a) LOIS will not be able to have a mooring (at station 5) for *Tamaris*,
- b) tide tables for 1997 for the Tweed were not yet available
- c) LOIS can store the semi-rigid in Dock Shed H.

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

