

AIMS:

- Part A - To test and modify equipment for Parts B and C.
- Part B - To survey the Leman and Well Banks using sector scanning sonar, the MS 47 and the Huntec ED 10 boomer.
- Part C - To track acoustically tagged salmon off the North East Coast using the sector scanning sonar.

NARRATIVE:

Tests to and calibrations of relevant equipment were completed locally in the Corton Roads during the morning of 2 July. CLIONE left Lowestoft at 1000 h the following morning for Part B and the survey took place between 1900 h 3 July and 1600 h 5 July the ship returning to Lowestoft at 2200 h that night. Equipment belonging to I.O.S. was unloaded the next morning and CLIONE sailed at 1200 h the next morning for the North East Coast. A rendezvous was made with the cable SERENITY at 1300 h 7 July off Coquet Island. That afternoon undamaged salmon were taken aboard and stored in large deck tanks. CLIONE then steamed to the release site and acoustically tagged fish were released in the following manner. Tagged fish were placed in a large plastic lined carrier bag and taken out some 150 m ahead of the ship in the rubber boat which was located on the sector scanner using a marker tag. The fish was then released on command via radio. This method overcame earlier problems and worked satisfactorily on every occasion. The collection release and tracking of fish continued until 13 July and a grid of salinity and temperature profiles was made between the Farn Is. and the R. Tyne before CLIONE docked in Blyth at 1500 h 14 July. The following day Messrs Shreeve, Davies and Edwards were replaced by Messrs Riches, Storeton West and Witthames. CLIONE left Blyth at 2000 h 15 July and work resumed at 0400 h the following morning off Coquet Island. At 1500 h 21 July tracking work was concluded and following measurements with the spectroradiometer a grid of temperature and salinity profiles was carried out between the R. Tees and Flamborough Head. This was completed at 1100 h. CLIONE docked at Lowestoft at 0430 h 23 July.

RESULTS:

Part B

This survey was part of an I.O.S. project to study the growth and evolution of sand banks. Four close-grid surveys were run in turn over the south end of the Well Bank, the north end of the Well Bank and the north and south ends of the Leman Bank. The Huntec boomer system was used to look for internal layers and structures within the sand banks. The sector scanning sonar in horizontal mode at 90° to starboard and a Kelvin Hughes MS 47 sonar mounted on the port hull were used to show bedforms around and over the sandbanks.

The boomer records were reasonably good for the first three surveys and showed some sub sand bank reflections but deteriorating weather conditions marred those for the south end of the Leman Bank. The sector scanner linked to the Alden recorder gave high quality records throughout. The MS 47 although lacking the resolution of the sector scanner extended the sonar coverage. The results will make possible accurate plotting of the sand wave trends and thus of the implied sand transport paths at the ends of the sand banks.

Part C

Salmon 1-3 (7-9 July) were translocated to positions 15-35 naut. miles east of Coquet Island and were tracked for periods of 16, 3 and 18 h respectively.

In conjunction to the standard tag fish 2 also carried a 75 KHz long range tag. It appeared that these two tags interacted continuously making an assessment of its performance difficult. Although these tracks ended prematurely it was noted that the vertical movements appeared to be correlated with the depth (20-30 m) of the thermocline existing offshore. Temperature and salinity profiles were made at intervals during tracking and on 14-15 July measurements were made over a grid extending from the Farne Islands to the R. Tyne.

Salmon 4 released at 1709 h 10 July 12 naut. miles east of Coquet Island was tracked for 42 h. During this period the fish moved south and west on southerly tides but held position on northerly tides in a manner similar to the onshore movements seen off Whitby last year. Contact was lost on the Gresswell skeres in Druridge Bay. Attempts to take over the tracking with the portable 300 KHz sounder mounted on the rubber boat failed and once lost the fish was not relocated.

Salmon 5 was released $3\frac{1}{2}$ miles east of Coquet Island at 1526 h 12 July and tracked for 24 h. This fish showed fast directed movement northwards and was lost 2 miles north west of the Farne Islands.

Salmon 6 was released 40 miles east of Coquet Island at 1808 h 16 July. This fish carried a compass tag but after 6 h during which time it made 7 miles in a north easterly direction it was lost amidst large shoals of spawning mackerel.

Salmon 7 was released with a compass tag 5 miles east of Coquet Island at 1031 h 17 July. It was followed for 8 h during which time it moved inshore along the northern edge of the Island towards Amble and then northwards along the edge of Alnmouth Bay. It was lost close to the entrance of the R. Aln. This inshore movement was followed in some detail and position fixes were made by ships radar.

Salmon 8 was released at 0748 h 8 July 6 miles east of Castle point. It was tracked for 6 h before being lost 6 miles north east of the release point.

Salmon 9 was released at 1549 h 8 July 13 miles east of Castle Point. It was tracked for 33 h and moved 16 miles in a north westerly direction but towards the end there were doubts as to the health of the fish and the track was terminated.

Salmon 10 was released 3 miles east of Coquet Island at 1707 h 20 July and was tracked for 18 h. This fish moved in towards Coquet Island and eventually was left in Alnmouth Bay. Towards the end of the track contact was maintained using the 76 KHz system together with the rubber boat and portable 300 KHz echo sounder.

MISCELLANEOUS:

1. Mackerel

A sample of spawning mackerel caught on rod and line at Lat. $55^{\circ} 20' N$ and Long $0^{\circ} 25' W$ was returned to the Laboratory.

2. Long range tag

Conventional 300 KHz and 76 KHz long range tags were attached to salmon 2 and 10. In the first instance interaction made tracking impossible but on the second occasion the sensitivity of the 76 KHz tag was reduced and reasonable results were obtained. It was possible to use either transmitter to trigger both tags and good signals were received out to 650 m. An attempt to relocate the tag after the track had been terminated was not successful.

3. Spectroradiometry

Following a recent calibration the spectroradiometer was tested on 10 July. It was found to be too sensitive in the top 20 m and following adjustments it was tested again on 21 July. The measurements were satisfactory and confirmed a local anomaly seen previously in the area.

4. Equipment

There was some doubt as to the proper functioning of the lithium battery tags and further tests may be necessary.

A slow oil leak noticed early on in the cruise suggests that the azimuth slip rings need replacing.

The sector scanner and associated equipment performed well during the entire cruise.

5. Temperature, salinity and depth

On July 13/14 CLIONE steamed over a grid of 24 stations extending from the Farne Islands to the R Tyne and comprising two legs reaching out to longitude 0°30'W. On 21 July this was supplemented by a further leg of 18 stations from the R Tees out to Long 0°30'E and thence down to Flamborough Head. The stations were 5 miles apart and at each a profile of temperature and salinity was obtained. It is proposed to delineate the development of the offshore thermocline and to investigate the vertical movements of the tracked salmon in relation to it.

M Greer Walker

6 August 1981

SEEN IN DRAFT:

Master - G R Oliver

Fishing Skipper - R Graham

INITIALLED: DJG

DISTRIBUTION:

Basic List +

- M Greer Walker
- F R Harden Jones
- R B Mitson
- E Shreeve
- T Edwards
- G Caston
- R Stubbs
- P Hooper

I.O.S. Wormley
Taunton

- B Riches
- A Swain/E Potter
- B Holford
- I Davies
- P Witthames
- T Storeton West
- M Beach
- N Henderson (Amble)

4 copies for I.O.S.
+ 4 Spare