

COCKLE TRANSPLANT TRIAL- LYTHAM

Purpose of Report

To inform members of the outcome of the cockle transplant trial at Lytham St Annes in 2011.

Recommendations

1. That the report be received.
2. That when cockle settlement levels are substantial enough in the future to allow further more in-depth studies that the NWIFCA authorises transplantation earlier in the season to take advantage of the preferential weather.
3. That Officers consider the possibilities of transplanting cockles to other beds within the District having taken full biosecurity measures into account prior to movement.

Background

1. A trial to assess the feasibility and effects of transplanting small cockles from densely populated areas to more sparsely populated areas within the intertidal zone off Lytham St Annes was approved by the North Western Inshore Fisheries and Conservation Authority (NWIFCA) in September 2011 (Figure 1).
- 2.. A draft Method Statement was drawn up and agreed by the NWIFCA Technical, Science and Byelaw Sub-Committee (TSB) in October and Officers began work on implementing the project soon after.
3. As reported to the Authority in December 2011, although by the time the trial had been approved and was ready to begin the stock had been heavily predated and eroded, officers considered that there was still sufficient stock to make the trial worthwhile. The necessary Habitats Regulations Assessment was undertaken and byelaw derogations provided. An interim report with detail of the work undertaken was penned by Bob Houghton in December 2011 and is available from the science team.
4. Officers returned to survey the area in February 2012. The results are given below.
5. The operator returned to sample the relay area in late April 2012 and their findings corroborated with those of Officers.

Methodology

6. The area of the North Run cockle bed having the greatest density of cockles was defined as the donor area (DA) – an area of 16.4 ha. Three potential relay areas were initially identified as Lytham relay area a (LRAa) consisting of 4.7ha, Lytham relay area b (LRAb) consisting of 4.5ha and Fairhaven relay area (FRA) consisting of 11.5ha.
7. The donor area was surveyed at the beginning of November 2011, using a 0.1m² quadrat. Data was collated on the mean density of cockles per m² and length frequencies.
8. Following a number of trial-runs to refine the machinery used and areas for relaying, on 2nd December 2011 approximately 3 tonnes of cockles were gathered by dry tractor dredge from the donor area. They were relayed in a 1 ha area as shown in Figure 1, by specially designed transplanter at a density of between 90 to 120 per m². The technique used for relaying saw the transplanter 'ploughing' a furrow into which cockles were dropped by gravity having been fed down a cleated belt. The furrows were not covered over as in past experiments as it had been found that the tide had a natural effect of covering the area. The depth into the substrate was between 1 – 2cm.
9. On 28th February a repeat survey of the donor area (dredged and un-dredged) and the relay area was undertaken.
10. On 27th April the operator sampled the area and reported to Science Officers.

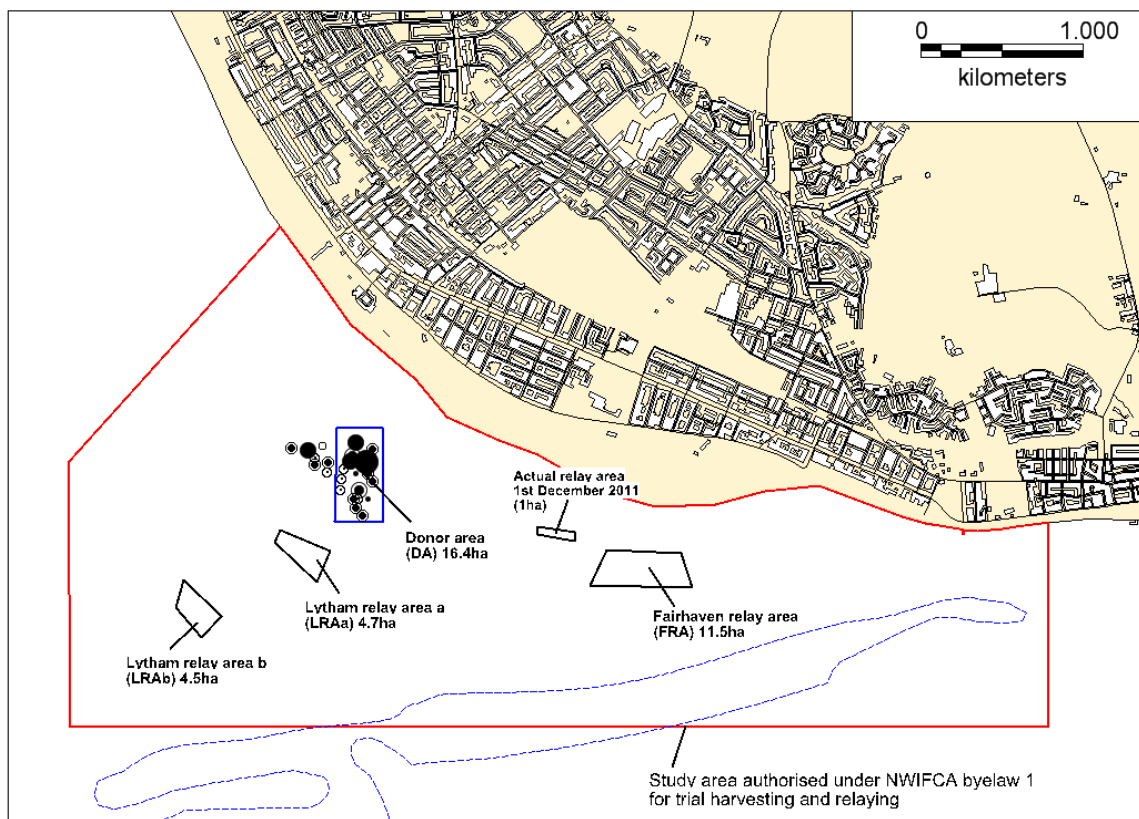
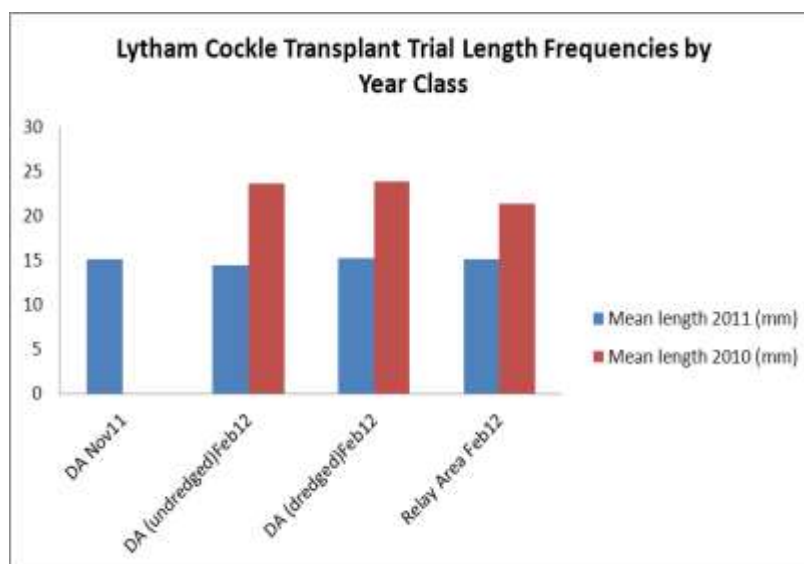


Figure 1: Overview of the Lytham cockle transplant project (Dec 2011)

Results

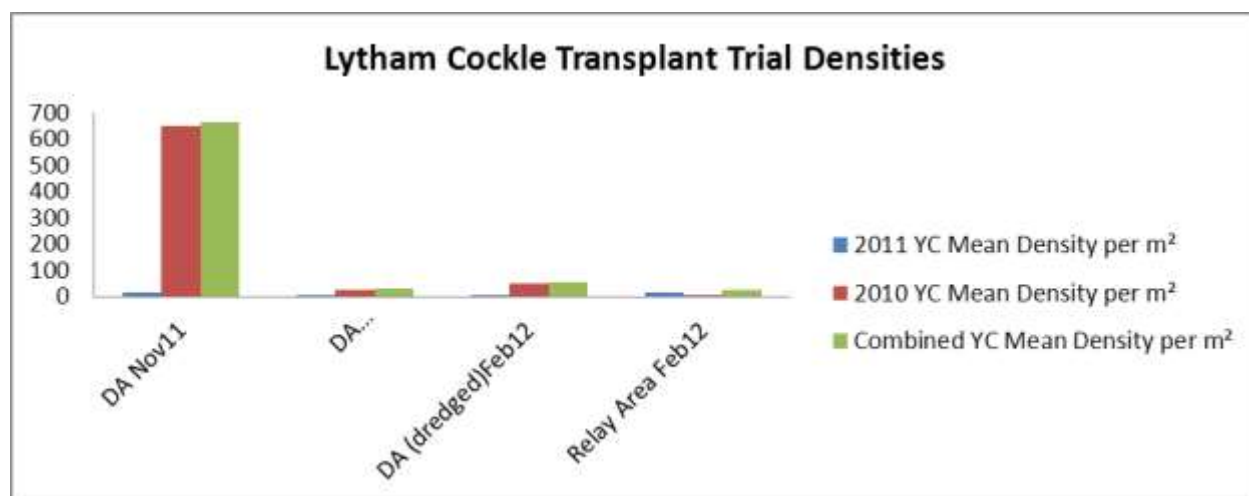
11. Length Frequency

Survey	Mean length 2011 (mm)	Mean length 2010 (mm)
DA Nov11	15.1	n/a
DA (undredged)Feb12	14.4	23.6
DA (dredged)Feb12	15.2	23.9
Relay Area Feb12	15.1	21.4



12. Density

Survey	2011 YC Mean Density per m ²	2010 YC Mean Density per m ²	Combined YC Mean Density per m ²
DA Nov11	17	648	665
DA (undredged)Feb12	4.9	27.7	32.6
DA (dredged)Feb12	6.5	49	55.5
Relay Area Feb12	16.8	8.4	25.2



Analysis

13. Due to constraints imposed on the work by time of year and pressure on staff time, it had been agreed by the TSB (October 2011) that the cockle transplanting on Lytham should proceed as a trial rather than with a full robust experimental design. It had been pointed out that November / December was not the optimum season for moving cockles around due to their ecology and seasonal mortality rates. However, the Authority had been waiting for an opportunity for an abundance of young cockle and felt that by authorising the trial some benefits could be gained to help inform future, more in depth transplantation studies.
14. Due to staff changes in the NWIFCA there has been a loss of consistency in data input and analysis.
15. The results and analysis should be considered in the context of 4.1 and 4.2, and caution should be exercised in making assumptions from the results.
16. The weather greatly affected the trial. Severe gales were experienced immediately prior to, during and after relaying. It is not known to what extent this affected the distribution and survivability of live cockle.
17. The trial provided the opportunity for the operator and the Authority to test and fine tune the machinery in the field, and for representatives from Natural England to observe the dry dredging and recovery of the substrate post dredging. It was felt that the machinery performed comparatively smoothly and efficiently despite appalling weather conditions. The cockle breakage rate was reported at an estimated <1%.
18. During transplantation oystercatchers were observed feeding on the beach. As the tractor passed they stepped aside, and then immediately resumed feeding in the ruts left behind.
19. The length frequency data provides evidence of little or no change in length from November to February. This is to be expected due to the time of year.
20. The density data provides evidence of the high rate of natural mortality of cockle on the donor area between November and February, a loss of ~95% for un-dredged and ~92% dredged areas (32.6 per m² compared to 55.5 per m²). This is an interesting result as it suggests that thinning the cockles out provided more suitable conditions for survival than leaving them. Whether bird predation was higher in the un-dredged area due to lower energy costs associated with feeding is a possible explanation.
21. It is known that the cockles were relayed at a density of between 90 - 120 per m². For 2011 cockle the February survey recorded 16.8 per m², and 8.4 per m² for 2010 year class surviving relaid cockle. Mean density for both year classes was 25.2 per m². This provides a mortality rate of between 72 – 79%, noticeably less than the recorded natural mortality in the donor area. In February there was no dead cockle shell evident, although there was an abundance of washed up razor clam shell and other marine detritus on the beach in this area in particular (it is relatively close to the main Ribble channel). The overall low density levels and these observations suggest that cockles were lost due to natural erosion processes through storms, wind and tide.

Although there is no baseline data for cockle density in the relay area, officers recollect this area being void of cockles in autumn 2011, and so it may not have been suitable cockle habitat. The rationale behind using this area has been explained by the operator. On the day transplantation was to be carried out the ground in the three areas previously identified as

potential relaying area had been shaped by the weather into a cratered landscape, unsuitable for relaying. With time being short and taking into account the harsh weather conditions the decision was taken to relay in the only part of the beach that had a large expanse of relatively level ground. It is acknowledged that this area is high up on the beach and subject to less than optimal inundation.

22. On 27th April the operator sampled the relay area and reported 22-23 cockles per m², which corroborates Officers' findings. Discussions with them have focused on the suitability of the relay area, and the need in subsequent studies to investigate site suitability more rigorously, and to consider opportunities for transplanting to alternative beds than the donor bed, following thorough testing of cockles to ensure biosecurity is not compromised.
23. In summary, the equipment and machinery performed efficiently and breakage rates of transplanted cockle were low. Mortality rates for the un-dredged donor area were higher than for the dredged area. Mortality rates for the transplanted cockle were lower than either the dredged or un-dredged donor area.

Although no firm conclusions or assumptions can be drawn from the trial due to the scale and lack of consistency in the monitoring of results, it has nevertheless provided evidence to support further in depth transplantation experiments when stocks allow.

Science and Morecambe Bay Fishery Order Officer
22nd May 2012

Data:

- a) Donor area surveyed beginning November 2011
Stations = 42. Mean density of 2011 cockles = 17 per m². Mean density of 2010 cockles = 648 per m². Mean density of undersize cockle = 668 per m².
Mean length frequency of 2011 cockles (n = 100) = 15.1 cm (range 12.66 – 17.29cm).
- b) Donor area (un-dredged) acting as a control – survey 28th February 2012.
Stations = 7. Mean density of 2011 cockles = 4.9 per m². Mean density of 2010 cockles = 27.7 per m².
Mean length frequency of all cockles (n = 114) = 19 mm.
Mean length frequency of 2011 cockles (n = 17) = 14.4 mm.
Mean length frequency of 2010 cockles (n = 97) = 23.6 mm.
- c) Donor area (dredged) – survey 28th February 2012.
Stations = 4. Mean density of 2011 cockles = 6.5 per m². Mean density of 2010 cockles = 49 per m².
Mean length frequency of all cockles (n = 111) = 19.55 mm.
Mean length frequency of 2011 cockles (n = 13) = 15.2 mm.
Mean length frequency of 2010 cockles (n = 98) = 23.9 mm.
- d) Relay area – survey 28th February 2012.
Stations = 5. Mean density of 2011 cockles = 16.8 per m². Mean density of 2010 cockles = 8.4 per m².
Mean length frequency of all cockles (n = 63) = 18.25 mm.
Mean length frequency of 2011 cockles (n = 42) = 15.1 mm.
Mean length frequency of 2010 cockles (n = 21) = 21.4 mm.