The Environment (Northern Ireland) Order 2002:

Assessment on potential impacts to the Carlingford Lough Area of Special Scientific Interest (ASSI) features.

Application for an amendment to licensed aquaculture site C15 in Carlingford Lough

Prepared by AFBI Fisheries and Aquatic Ecosystems Branch for the Department of Agriculture and Rural Development

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Introduction

The Fisheries and Environment Division of the Department of Agriculture and Rural Development (DARD) commissioned AFBI to undertake an assessment of the potential impacts of an application for a proposed amendment to licensed aquaculture site C15 within Carlingford Lough on the designated features of the Carlingford Lough ASSI. This document therefore assesses the potential impacts of aquaculture activities resulting from the proposed licence amendment at site C15 on the designated features of the ASSI. This assessment is based on information supplied by DARD, the Northern Ireland Environment Agency (NIEA), through site visits, and through information provided by the applicant.

Proposed amendments to licensed site C15

The operator of licensed site C15 within Carlingford Lough has applied to DARD for an amendment to the current Fish Culture Licence (FCL) for this site. The current licence permits the culture of Pacific oysters (*Crassostrea gigas*) and native oysters (*Ostrea edulis*) on trestles within the intertidal zone at C15 which is located on the Northern shore of Carlingford Lough (Figures 1 and 2). The proposed amendments are to increase the numbers of trestles permitted from 1,000 (as currently licensed) to 3,000, and include mussels (*Mytilus edulis*) to the list of species permitted to be cultured.

These trestles will be placed as far out beyond the normal low water mark as possible in order to obtain maximum water coverage minimising their visual impact and maximising the immersion of the shellfish. The operator is proposing to culture mussels within some of the additional trestles alongside the Pacific (*C. gigas*) and native (*O. edulis*) oysters already permitted. Pacific oysters cultured at this site are sourced from hatcheries and it is proposed that mussels will be cultured from naturally occurring local spat settlements.

The operator has stated that servicing and maintenance activities at site C15 will not change as a result of the increase in trestle number (see AFBI 2013 for further

information). The maximum time on site undertaking servicing and maintenance activities by two individuals will be between **24 - 30 hours per month** spread over **7** low tides. Access to the site will not change as a result of the proposed amendments (see AFBI 2013 for further information). The timing of seeding and harvesting activities at the site will not change as a result of the proposed amendments (see AFBI 2013 for further information).

The applicant is proposing to install an additional 2,000 trestles (making 3,000 trestles in total). Each trestle is 3 m x 0.8 m x 0.65 m in dimension which amounts to an area of approximately 7,200 m^2. The area of site C15 is approximately 29 hectares (or 290,000 m^2) therefore the proposed number trestles will occupy approximately **2.48%** of the current licensed site.

Approximately 22 hectares (220,000 m^2) of site C15 is within the boundary of the Carlingford Lough ASSI (Figure 3). Therefore 7 hectares of the site, which equates to approximately 23.37% of the licensed area, is outwith the ASSI boundary. The total area of Carlingford Lough ASSI is 1105 hectares (11,050,000 m^2) so therefore the licensed site occupies approximately **1.99%** of the total designated area. The site operator has indicated that they wish to deploy the additional trestles within the lower regions of the site, a portion of which is outside the ASSI boundary (Figure 4).

Carlingford Lough ASSI

Area: 1105 hectares

Site Centre Location: Irish Grid Reference J180140

Carlingford Lough ASSI (Figure 5) has been designated due to the presence of; Coastal saltmarsh, Mudflats, Seagrass (*Zostera* sp) beds, Wintering Waterbirds, Breeding Terns, and Carboniferous Limestone.

The paragraphs below detail the possible impacts of the proposed amendments to aquaculture site C15 on those designated features of the ASSI which are not also designated features of the Carlingford Lough Special Protection Area (SPA). The ASSI features which are also SPA features, are reported on within the Habitats Regulations Assessment (HRA) for this application (AFBI 2015). Therefore this report should be read in conjunction with the HRA report for this application (AFBI 2015).

Coastal saltmarsh

This licensed site is not in the vicinity of an area of coastal saltmarsh and therefore the proposed activity will not negatively impact this feature.

Mudflats

The bioaccumulation of pseudofaeces and faeces beneath intertidal oyster trestles has the potential to impact benthic community structures. It is generally believed that these impacts are small scale and localised (Nuges *et al*, 1996; Forrest and Creese 2006; Forrest *et al,* 2009 and the literature reviewed within). Nuges *et al* (1996) investigated the environmental impacts of Pacific oyster trestle culture in the River Exe estuary in Devon. They noted small but detectable changes in benthic communities and sedimentation levels beneath trestles that were twice those in the control areas, although the changes in sedimentation were not found to be statistically significant. Increased sedimentation beneath Pacific oyster trestles was observed by Forrest and Creese (2006) in a New Zealand estuary, however impacts from oyster culture was not noted at sampling stations 35 m from the sites. Forrest and Creese (2006) also noted that “effects on macrofauna were not severe enough to produce a marked trend in species richness”.

Alongside increased deposition beneath the trestles it is also possible that some sediment scouring in the vicinity of the proposed trestles could occur as a result of alterations to tidal flows within the area.

Mitigation: The effects mentioned above can be minimised through proper management and positioning of the trestles to ensure adequate water flow and circulation between them.

The proposed additional trestles to be deployed at this site will be the same as those currently used by the operator. These trestles are approximately 0.65 m above the ground. This ensures that there is adequate circulation around the trestles and reduces sedimentation beneath them.

In order to ensure that any changes in benthic sediments and communities remain small (i.e. not statistically significant) and localised a programme of monitoring within and adjacent to this intertidal aquaculture site will be established. ***With these measures in place the proposed activity will not negatively impact on this feature.***

Seagrass (*Zostera* sp) beds

NIEA mapped the distribution of eelgrass within the Northern shores of Carlingford Lough during 2009 (Beer and McQuaid 2011). However due to access issues this survey was not completed and so the distribution of eelgrass within Carlingford Lough was mapped again in 2012 (Figure 6). From Figure 6 it can be seen that the intertidal eelgrass beds are confined to a small portion of the Mill Bay area of the Lough.

Previous surveys of this area (AFBI 2013) confirmed that the access route and site boundary were free from eelgrass. The proposed additional trestles will be deployed within the boundary of the current licensed site. AFBI Scientific Staff undertook a site survey of the area within which the operator wishes to deploy the additional trestles in January 2015 (see report in Annex I) and determined the area to be free of eelgrass. ***Therefore the proposed activity will not negatively impact this feature.***

Wintering Waterbirds

Preliminary studies on the effects of oyster trestles on bird feeding behaviour undertaken by Hilgerloh *et al* (2001) found that the percentage of birds observed feeding did not differ between the reference areas (free of aquaculture) and the trestle areas. For some species of bird the trestles provided an additional food source.

Seven species of waterbird are named within the citation document for the Carlingford Lough ASSI. These are; Shelduck, Scaup, Red-breasted Merganser, Great crested Grebe, Oystercatcher, Dunlin and Redshank. WeBS core count data for these species for the winters of 2009/10 to 2013/14 are shown in Table 1.

Table 1: WeBS core count data (counted at high tide) for Carlingford Lough ASSI designated species for the winters of 2009/10 to 2013/14. Taken from Holt *et al.* (2015). CSM (Common Standards Monitoring baseline value) = minimum record for the winters 1990/91 to 1995/96 as taken from the Northern Ireland Environment Agency (NIEA) conservation objectives for the Carlingford Lough SPA (NIEA 2015).

Species	Year					CSM	5 year mean	% CSM
	2009/10	2010/11	2011/12	2012/13	2013/14			
Shelduck	278	237	292	37	37	165	176	**106.67**
Scaup	62	57	12	22	4	197	36	**18.27**
Red-breasted Merganser	24	35	37	13	6	9	23	**255.56**
Great crested Grebe	186	110	68	2	2	33	75	**227.27**
Oystercatcher	839	710	933	726	241	373	690	**184.99**
Dunlin	1370	2210	1159	561	351	200	1130	**565.00**
Redshank	801	608	919	659	481	557	694	**124.60**

From Table 1 it can be seen that 5 year mean, for the period 2009/10 to 2013/14, for Scaup within Carlingford Lough is below the CSM baseline value. The UK trends for each of the ASSI waterbird species discussed above are shown in Table 2. From this it can be seen that the decrease in numbers of Scaup in Carlingford Lough (to below the CSM value) is in line with current UK trends.

Table 2: Population trends of Shelduck, Scaup, Red-breasted Merganser, Great Crested Grebe, Oystercatcher, Dunlin and Redshank in the UK. As taken from Holt *et al* (2015). Trends are stated as % changes.

Species/Population	25-year trend (1987/88-2012/13)	10-year trend (2002/03-2012/13)
Shelduck	-23	-26
Scaup	-39	-47
Red-breasted Merganser	-15	-20
Great Crested Grebe	19	-25
Oystercatcher	-21	-19
Dunlin	-27	-24
Redshank	-23	-26

Gittings and O'Donoghue (2012) investigated the effects of intertidal oyster aquaculture on the distribution of waterbirds within six sites in Ireland. They classified species responses to intertidal oyster culture as; neutral/positive, variable (species responses varied between sites), negative, and exclusion (species completely excluded from oyster trestle areas). Within these investigations Gittings and O'Donoghue (2012) found that; Oystercatchers, and Redshank showed a neutral/positive response, and Shelduck and Dunlin showed a negative response to oyster trestles.

This aquaculture site was licensed in October 2013 and to date no negative impacts of activities at the site on the designated features of the Carlingford Lough ASSI have been reported.

Gittings and O'Donoghue (2012) state that "detectable disturbance impacts to birds were only observed occasionally and were usually minor (birds which flushed but resettled nearby)".

As mentioned previously, the operator has stated that the level of human presence (whilst undertaking servicing and maintenance activities) at site C15 will not change as a result of the increase in trestle number. Therefore there will not be any potential for additional disturbance resulting from this application.

The proposed additional trestles will be placed on the lower shore in an area that will not be readily available as a feeding area for bird species as it is only expected to be

exposed at very low tides. When the site is exposed waterbirds will be able to forage under, on and around the trestles. ***Therefore the proposed activity will not negatively impact this feature.***

Breeding Terns

Potential impacts to this feature are discussed within the HRA report for this application (AFBI 2015).

Carboniferous Limestone

As previously stated access to the site will not change as a result of the proposed additional trestles. Figure 7 highlights the areas of carboniferous limestone present within Carlingford Lough, as named within the Carlingford Lough ASSI citation document (Department of the Environment for Northern Ireland, 1996). As can be seen in Figure 7 licensed aquaculture site C15 is not in the vicinity of these areas. ***Therefore the proposed aquaculture site will not negatively impact this feature.***

Invertebrate assemblage

The citation document for the Carlingford Lough ASSI (Department of the Environment for Northern Ireland, 1996) states that, “the invertebrate community of the saltmarsh in Mill Bay is also of interest, being one of the most species rich in Northern Ireland”. As mentioned previously this licensed site is not in the vicinity of an area of coastal saltmarch. ***Therefore the proposed activity will not negatively impact this feature.***

Figures (all maps are projected in ING)

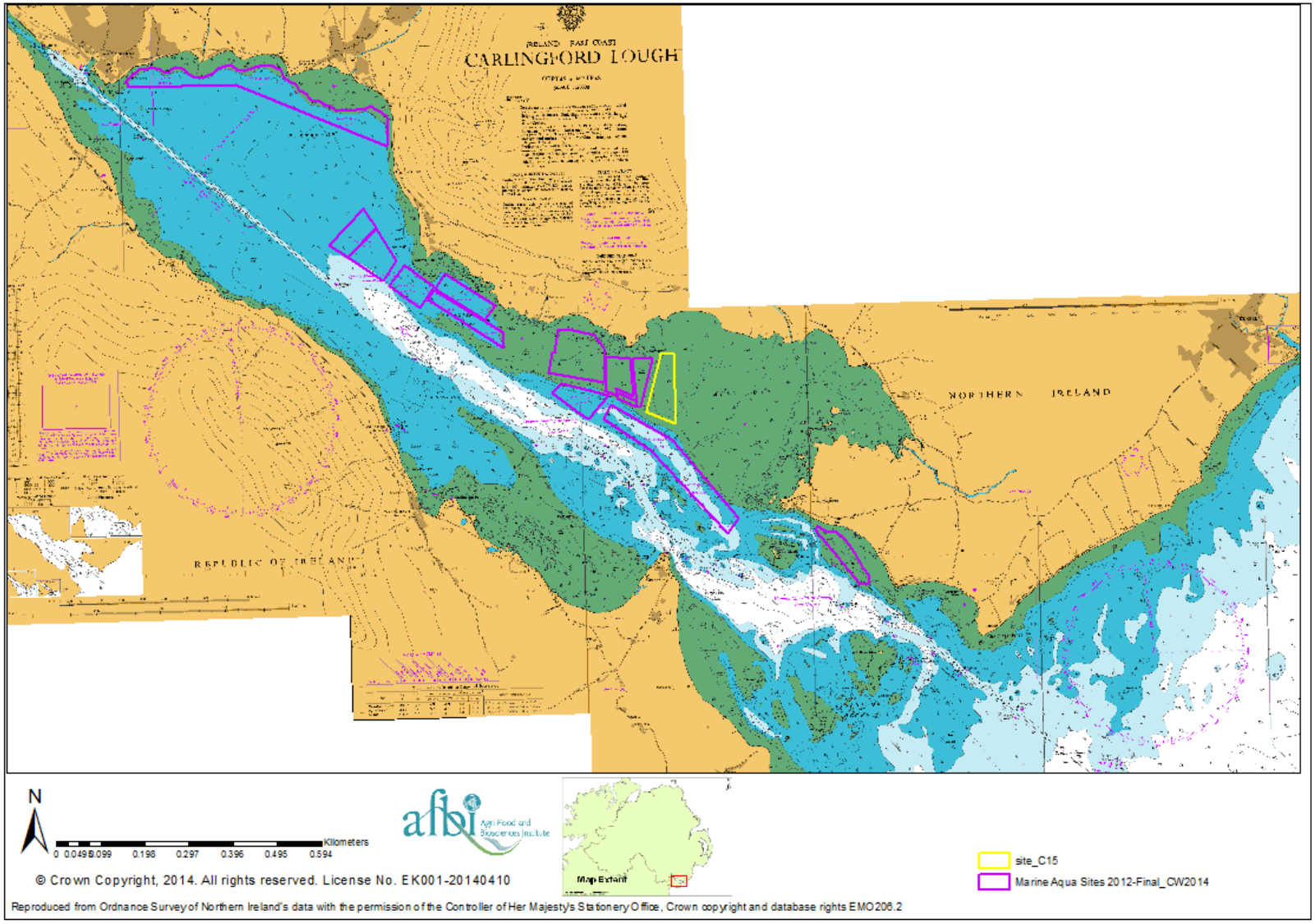

Figure 1: Map showing distribution the location of site C15 (yellow outlined area on the map) within Carlingford Lough.

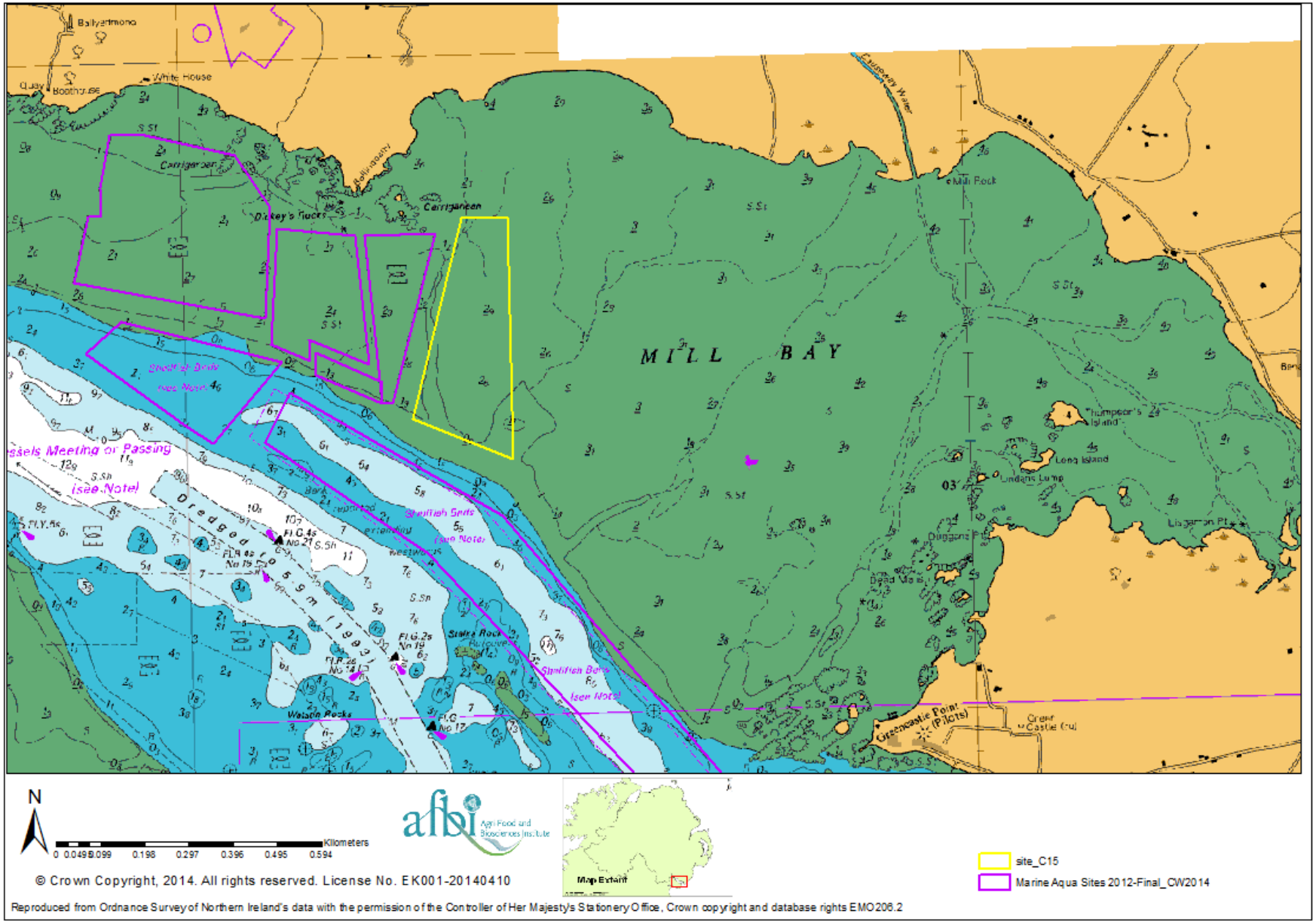

Figure 2: Map showing the location of site C15 (yellow outlined area on map) within the Mill Bay area of Carlingford Lough.

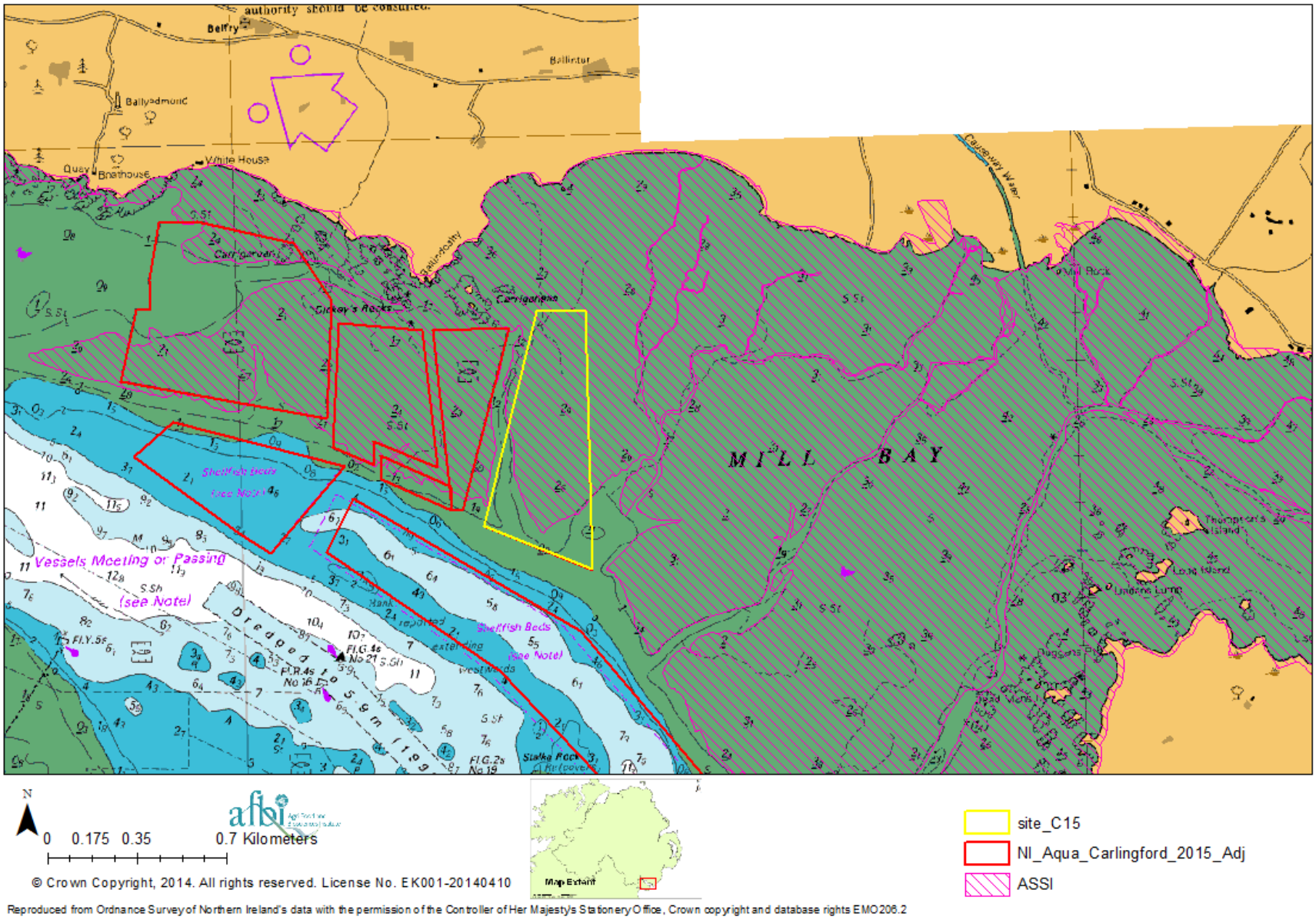

Figure 3: Map showing the location of site C15 (yellow outlined area) in relation to the boundary of the Carlingford Lough ASSI.

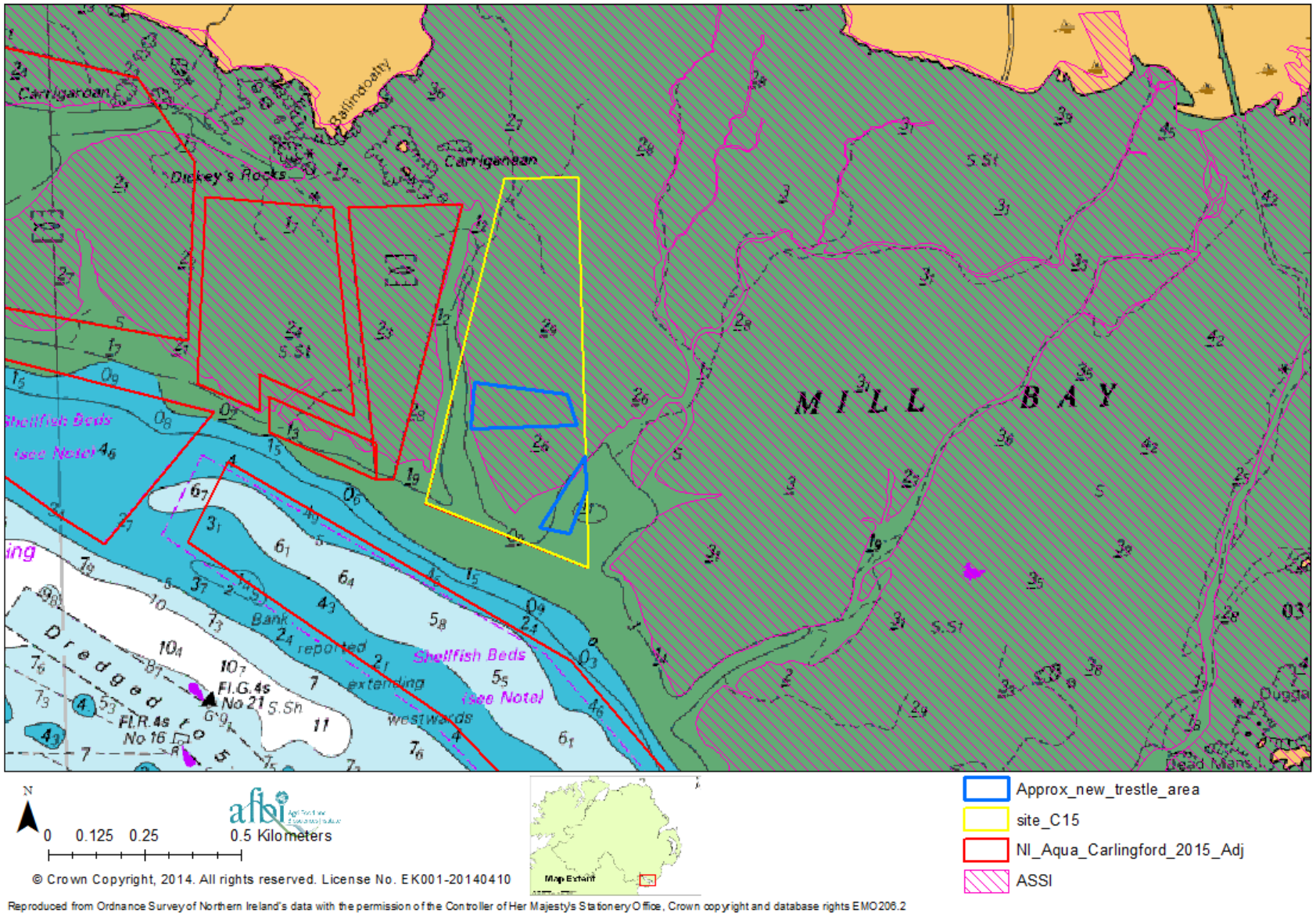

Figure 4: Map showing the approximate location of the areas within which the applicant has indicated the proposed additional trestles will be deployed (blue outlined areas on map).

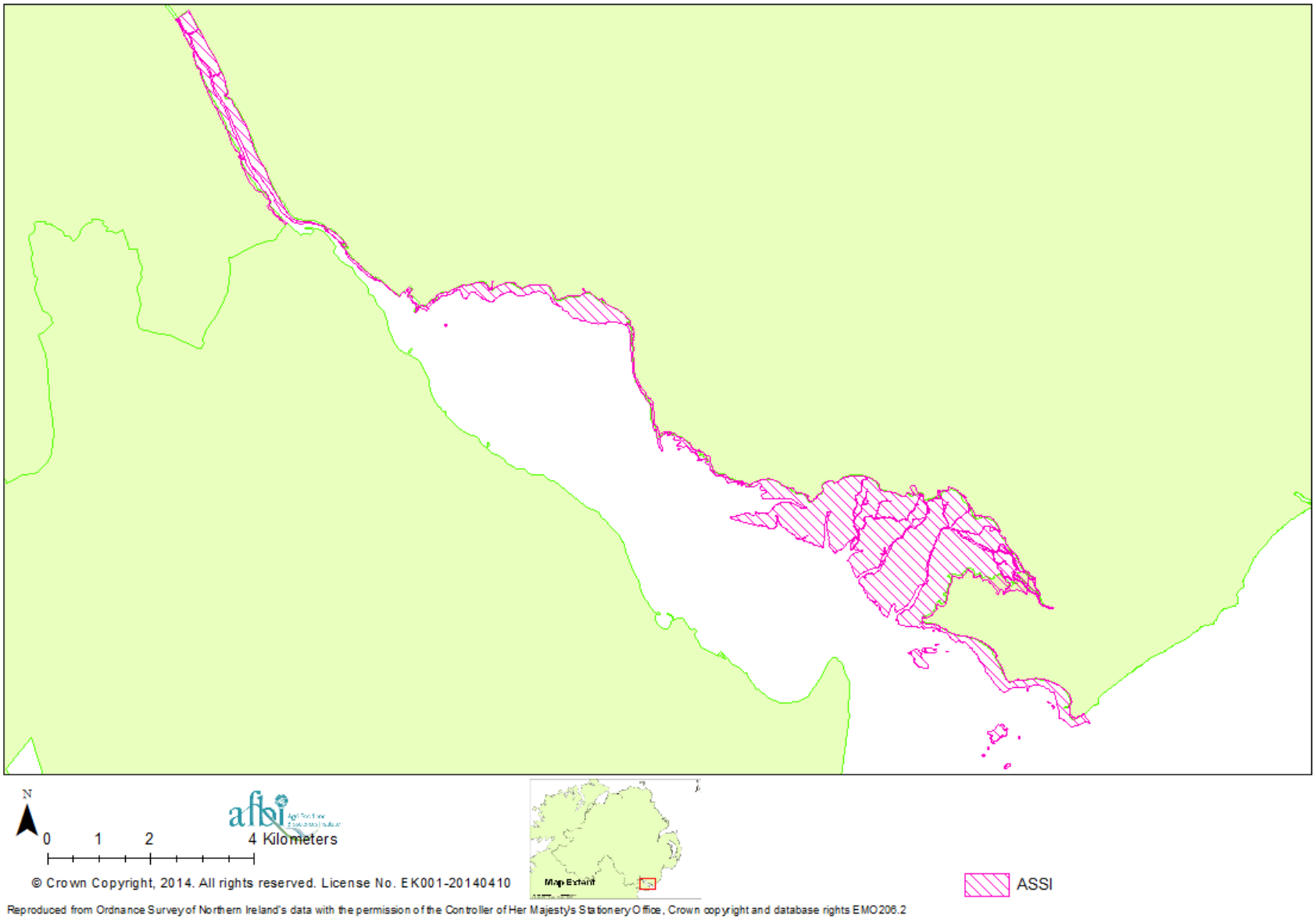

Figure 5: Map showing the boundary of the Carlingford Lough ASSI.

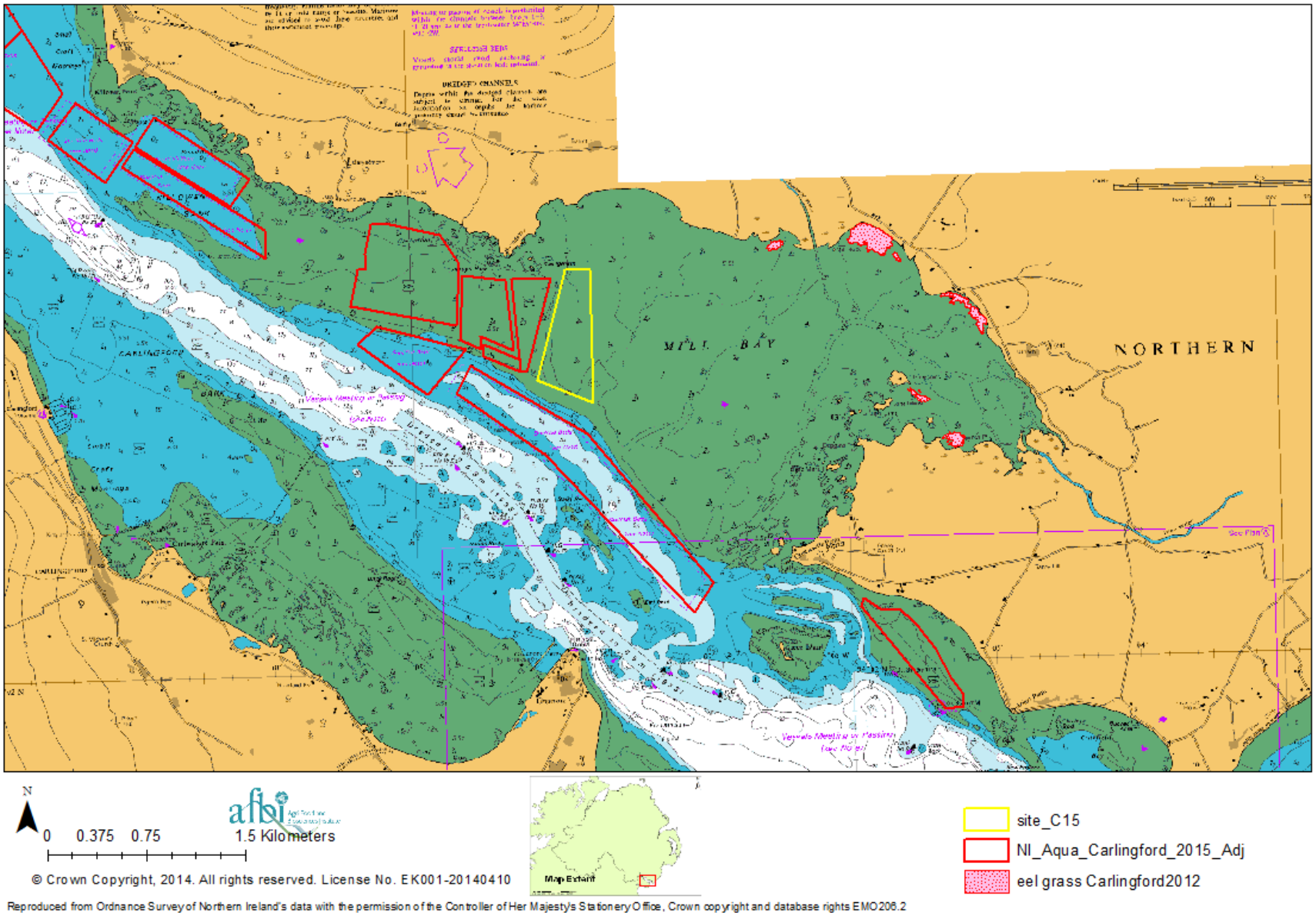

Figure 6: Map showing the distribution of intertidal eelgrass on the Northern shores of Carlingford Lough as mapped by NIEA.

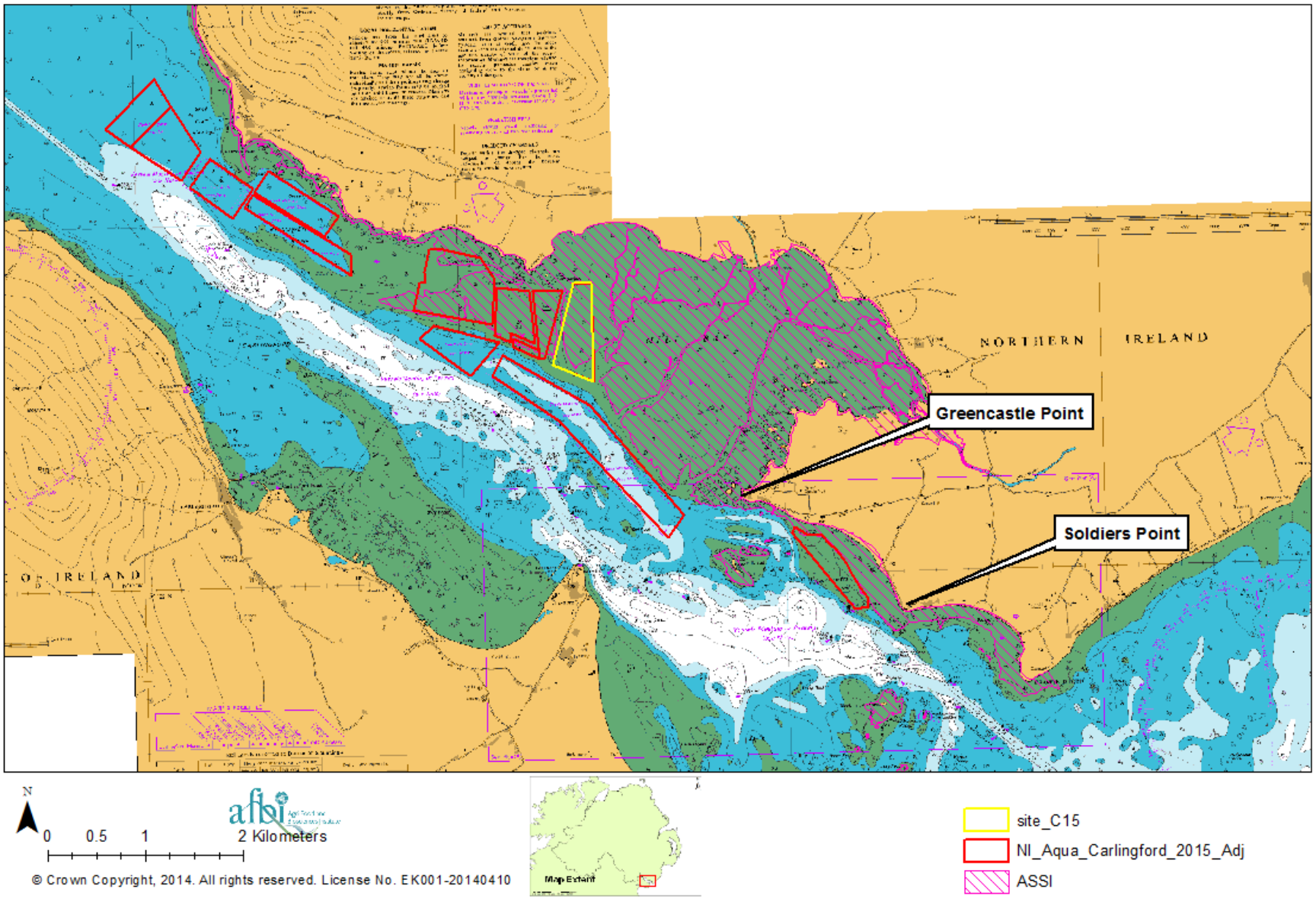

Figure 7: Map showing the location of the areas of Carboniferous limestone within the Carlingford Lough ASSI.

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Annex I: AFBI site survey January 2015.

Fisheries & Aquatic Ecosystems Branch
Marine Inshore Monitoring

Survey Title: Aquaculture Site Access Assessment at Site C15

Survey date: 23.01.2015

Location: Mill Bay, Carlingford Lough, Co. Down

Purpose: To carry out a site assessment within the boundary of licensed site C15 to inform the HRA for a licence amendment application.

Client: Department of Agriculture and Rural Development (Fisheries and Environment Division)

Equipment used: Garmin GPS device (GPSmap 62), waterproof digital camera, waterproof site aerial photographs/OS maps and waterproof notebook and pencil.

Types of sample collected: Photographs accompanied by; GPS waypoints (coordinates),and observational notes

AFBI Staff Involved: Gavin McNeill (SO) and Yaiza Ontoria Gomez (TASO)

Additional Information:

Introduction

The Fisheries and Environment Division of the Department of Agriculture and Rural Development (DARD) commissioned AFBI to undertake a Habitats Regulations Assessment report for proposed amendments to the Fish Culture Licence of licensed aquaculture site C15 within Carlingford Lough Special Protection Area (SPA) in Northern Ireland. Part of this assessment involved a site visit by AFBI Scientific staff to investigate the area within which the applicant intends to deploy the proposed additional trestles. This brief report outlines the initial findings of the AFBI site survey undertaken on the 23rd of January 2015 within the boundary of aquaculture site C15.

Methods

The applicant accompanied AFBI scientific staff and identified the areas within which the proposed additional trestles would be deployed. Sampling stations were placed at the corners of each of the two proposed trestle locations. In order to investigate the benthic composition of these areas sediment samples were collected for Particle size Analysis (PSA) and a quadrat was randomly placed on the seabed and photographs and notes on benthic habitats and conspicuous epifauna recorded at each sample station.

Results

Field notes and positional information from each sample station are presented within Table 1. The location of the route taken across site C15 and the position of each of the waypoints described within Table 1 are shown within Figure 1. The location of each sample station is shown in Figure 2. The areas within which the applicant wishes to deploy the additional trestles (if granted) are shown by the blue outlined areas within Figure 3. The photographic quadrats are shown in Figure 4 and overview photographs taken at additional waypoints are shown in Figure 5.

No species of conservation significance were observed within or adjacent to the survey area.

Table 1: Sample station locations and brief description of the benthos.

Latitude (decimal degrees)	Longitude	WP	Photo quadrat + PSA	Photo no.	Notes
54.05348	-6.12978	566	No		Corner 1 of the 1st block of existing trestles currently in use on site.
54.05353	-6.12992	567	No		Corner 2 of the 1st block of existing trestles currently in use on site.
54.05392	-6.12937	568	No	1656 - 1658	Corner 3 of the 1st block of existing trestles currently in use on site. Photographs showing extent of Block 1 taken at this point.
54.05388	-6.1293	569	No		Corner 4 of the 1st block of existing trestles currently in use on site.
54.05355	-6.1289	570	Yes	1635 - 1639	Waypoint marking 1st corner of proposed area of expansion; Area 1. Shore comprised of compact rippled sand.
54.05228	-6.12993	571	Yes	1640 - 1645	Waypoint marking 2nd corner of proposed area of expansion; Area 1. Shore comprised of compact rippled sand.
54.05245	-6.13108	572	Yes	1646 - 1651	Waypoint marking 3rd corner of proposed area of expansion; Area 1. Shore comprised of compact rippled sand. Area of shore containing medium to small sized rocks covered with fucoids to the outside of the proposed area of expansion at this point.
54.05407	-6.12927	573	Yes	1652 - 1655	Waypoint marking 4th corner of proposed area of expansion; Area 1. Shore comprised of compact rippled sand.
54.0541	-6.12942	574	No	1659 - 1660	Waypoint along a route used to access existing area of trestles; Block 1. Photo 1659 taken in a southerly direction from this point. Photo 1660 taken in a northerly direction from this point shows a clearing through the rock covered shoreline.
54.05507	-6.1291	575	No	1661 - 1663	Waypoint along a route used to access existing area of trestles; Block 1. Photo 1661 - 1663 taken in a southerly direction from this point shows the upper end of the cleared route through the rock covered shoreline.
54.05478	-6.13373	576	Yes	1664 - 1669	Waypoint marking 1st corner of proposed area of expansion; Area 2. Shore comprised of compact rippled sand. Area of shore containing medium to small sized rocks covered with fucoids to the outside of the proposed area of expansion at this point. Photos 1668 & 1669 show the 2nd area of trestles currently in use on this site to the south of this point.
54.05585	-6.13352	581	Yes	1670 - 1675	Waypoint marking 2nd corner of proposed area of expansion; Area 2. Shore comprised of compact rippled sand containing worm casts and medium to small sized rocks covered with fucoids. Photos 1674 & 1675 show the 2nd area of trestles currently in use on this site to the south of this point.
54.05545	-6.13207	577	No		Corner 1 of the 3rd block of existing trestles currently in use on site.
54.0553	-6.13208	578	No	1676 - 1677	Corner 2 of the 3rd block of existing trestles currently in use on site. Photographs showing extent of Block 3 taken at this point.
54.05532	-6.1314	579	No		Corner 3 of the 3rd block of existing trestles currently in use on site.

54.05543	-6.13138	580	No		Corner 4 of the 3rd block of existing trestles currently in use on site.
54.05553	-6.12988	582	Yes	1678 - 1682	Waypoint marking 3rd corner of proposed area of expansion; Area 2. Shore comprised of compact rippled sand containing worm casts. Area of shore containing medium to small sized rocks covered with fucoids to the outside of the proposed area of expansion at this point.
54.0548	-6.12953	583	Yes	1683 - 1686	Waypoint marking 4th corner of proposed area of expansion; Area 2. Shore comprised of compact rippled sand containing worm casts and medium to small sized rocks covered with fucoids.
54.05585	-6.12972	584	No	1687	Waypoint at a divergence point along a route used to access either the existing area of trestles at Block 1 or Blocks 2 & 3. Photo 1687 taken in a northerly direction at this point.
54.0575	-6.12997	585	No		Waypoint marking a point along the route towards the shoreline access point.
54.05873	-6.12985	586	No		Waypoint marking a point along the route towards the shoreline access point.
54.06048	-6.12943	587	No	1688	Waypoint at a divergence point between the route used to access the O'Hare site and a main communal route. Photo 1688 taken in a south westerly direction at this point.
54.0614	-6.1272	588	No		Waypoint marking a point along the main communal route towards the shoreline access point.
54.06298	-6.12455	589	No		Waypoint marking a point along the main communal route towards the shoreline access point.
54.06532	-6.12003	590	No	1689	Waypoint marking the shoreline access point at the beginning of the communal route. Photo 1689 taken in a south westerly direction at this point.

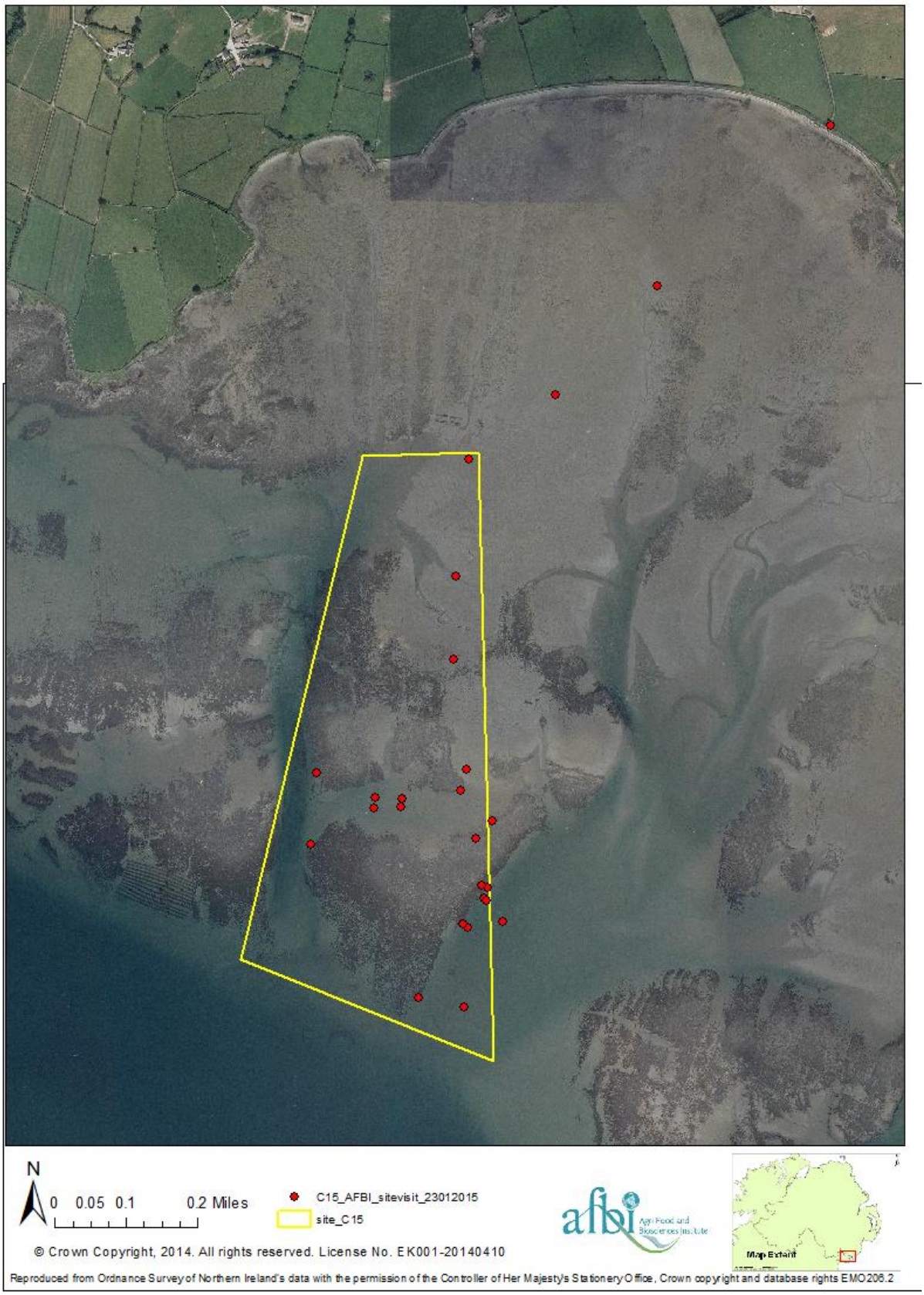

Figure 1: C15 boundary showing all AFBI waypoints.

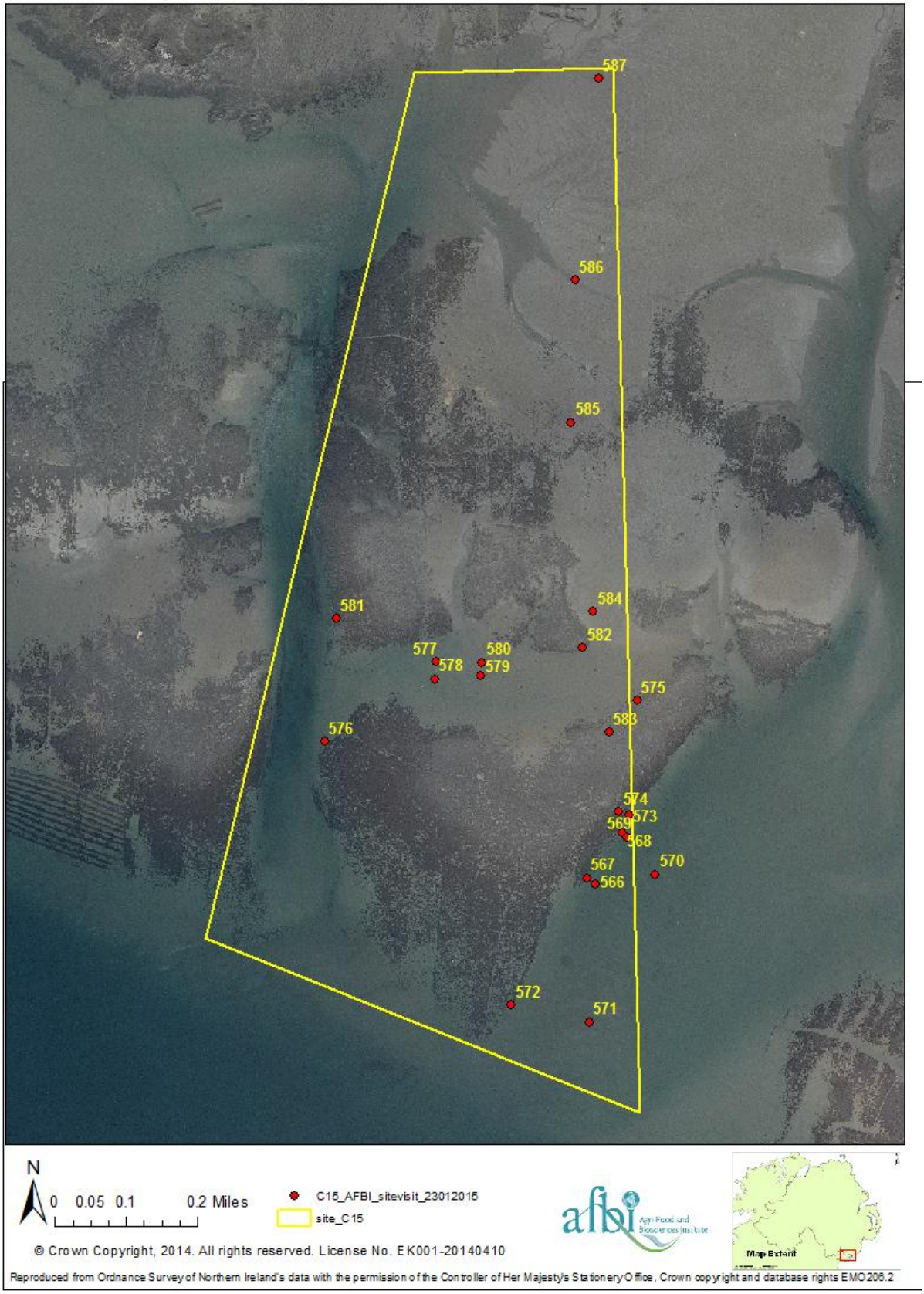

Figure 2: C15 boundary showing the labelled waypoints within this area.

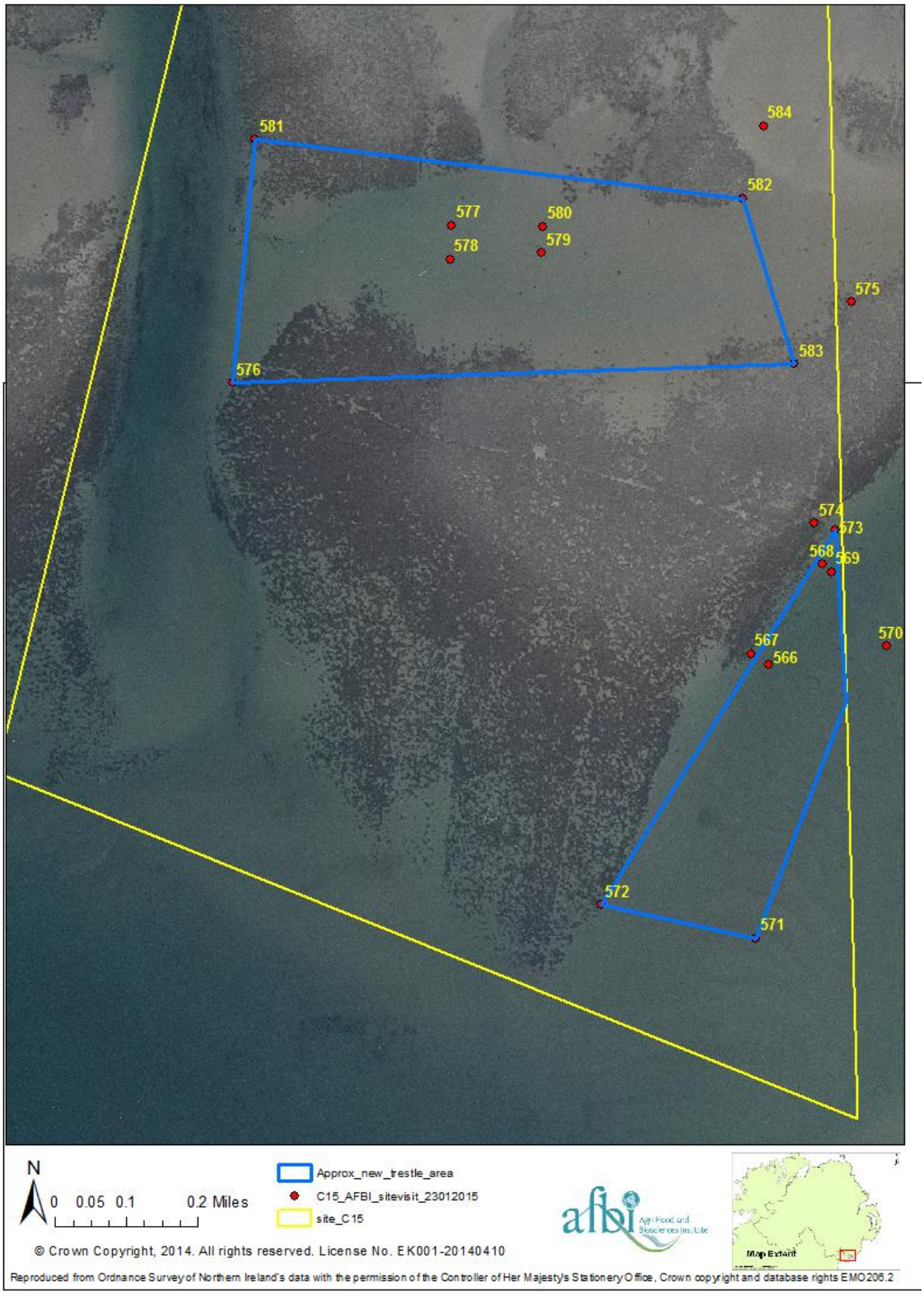

Figure 3: C15 boundary showing the proposed location of the additional trestles applied for (blue areas outlined on the map).

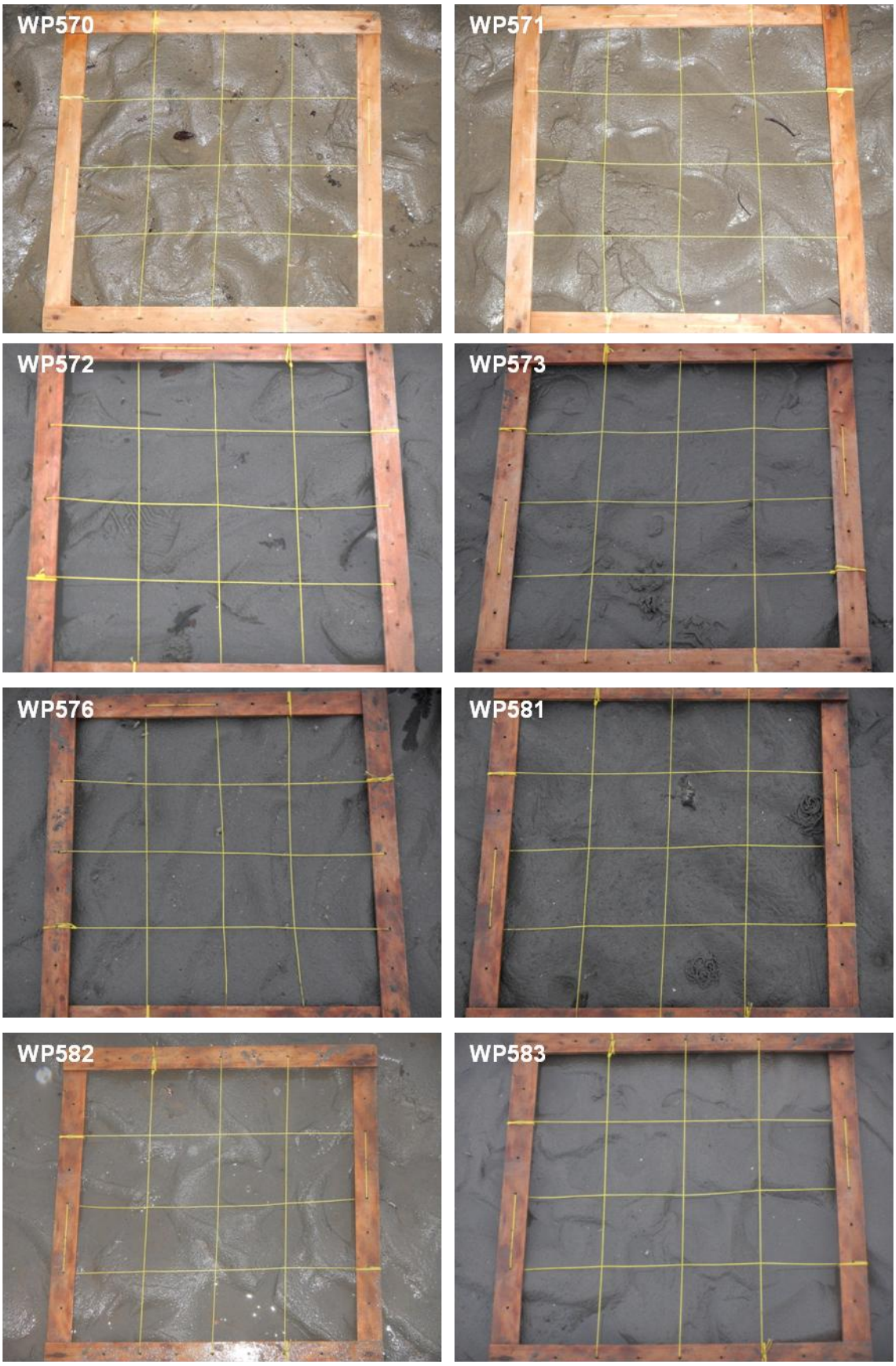

Figure 4: Photographic quadrats with associated waypoint numbers.

Figure 5: Overview photographs taken during the survey, with associated waypoint numbers.