



Northern
Lighthouse
Board

NORTHERN LIGHTHOUSE BOARD

INSPECTION/AUDIT OF LOCAL AIDS TO NAVIGATION OFFSHORE STRUCTURES & AQUACULTURE SITES

2019/20 REPORT



**INSPECTION/AUDIT OF LOCAL
AIDS TO NAVIGATION, OFFSHORE
STRUCTURES & AQUACULTURE SITES – 2019/20 REPORT**

This report is submitted to the Secretary of State pursuant to section 198(4) of the Merchant Shipping Act 1995, and to the Scottish Ministers in accordance with section 55 of the Scotland Act 2016.

This report covers the period April 2019 to March 2020 inclusive.

1. POLICY

- 1.1 Section 198(1) of the Merchant Shipping Act 1995 (the Act of 1995), empowers the General Lighthouse Authorities to inspect all lighthouses, buoys and beacons under Local Lighthouse Authority management. In addition, Section 195(1) of the Act vests in the General Lighthouse Authorities (GLA) the superintendence and management of all lighthouses, buoys and beacons within their areas.
- 1.2 Emphasis continues to be placed on a combination of inspecting local Aids to Navigation (AtoN) and/or auditing local AtoN Availability Statistics and Casualty Response targets against known requirements.
- 1.3 Under the UK Government's Port Marine Safety Code all Aids to Navigation (AtoN) maintained by Harbour Authorities and any other existing Local Lighthouse Authorities must be maintained in accordance with the availability criteria laid down by the General Lighthouse Authorities, and must be subject to periodic review. The characteristics of these aids to navigation must comply with the guidelines and recommendations as laid down by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA). The General Lighthouse Authorities require Harbour Authorities and any other existing Local Lighthouse Authorities to be responsible for ensuring that any third party aids to navigation, within their areas of responsibility are also established and maintained to the same standards.
- 1.4 The General Lighthouse Authorities also require those responsible for Local Aids to Navigation, which lie outwith Statutory Harbour and Local Lighthouse Authorities' areas of jurisdiction, to establish and maintain their Aids to Navigation to the same standards.
- 1.5 The General Lighthouse Authorities require those responsible for Local Aids to Navigation to maintain appropriate records of AtoN Availability Statistics and AtoN casualty responses and to provide summaries of these records to the relevant GLA on an annual basis.
- 1.6 In addition, each Authority is required to establish procedures for responding to AtoN casualties within the timescales as laid down and applied by the General Lighthouse Authorities.

2. PURPOSE

- 2.1 Northern Lighthouse Board, as a General Lighthouse Authority, has a statutory duty of superintendence and management, to ensure that AtoN maintained by other authorities within the NLB area of responsibility meet the agreed international standards. The Northern Lighthouse Board discharges this duty by a combination of audit, inspection, review and consenting to changes requested by any appropriate authority via the Statutory Sanction process. NLB are also routinely consulted regarding marine developments by Marine Scotland, who are responsible for the issue of marine licences under the Marine (Scotland) Act 2010; by the Scottish Government, who are responsible for granting Harbour Empowerment and Harbour Revision Orders under the Harbours Act 1964; and by the Department for Business, Enterprise and Industrial Strategy, who are responsible for oil and gas licensing under the Energy Act 2008.
- 2.2 Site visits give Local Lighthouse Authorities the opportunity to discuss with the Inspecting Officer all matters relating to their AtoN provision – i.e. the level of provision, recommendation for changes and/or review of their existing maintenance procedures.
- 2.3 Many Local Lighthouse Authorities welcome this visit, as they consider the audit/inspection to form an important external audit element of their Quality and/or Safety Management Systems.
- 2.4 Whilst inspection provides a snapshot of the standard of AtoN provision on a particular day, the audit of Local Lighthouse Authority records allows a more detailed examination of their performance over a longer period of time.
- 2.5 Within the Northern Lighthouse Board, external LLA Audits under the Port Marine Safety Code are conducted by members of the Navigation Section. Inspections of AtoN are generally carried out by Ships' staff, with other inspections undertaken during site visits and/or scheduled audits or compliance visits.

3. LOCAL ATON

3.1 Inspections

- 3.1.1 Inspections of Aids to Navigation can fall into one or more of the following categories:
 - Seaward inspection undertaken by NLB vessels (day/night) from a seaward aspect, checking the bearing, range and sectors of directional, leading and sector lights. Other aids to navigation including lights, traffic signals, lit/unlit beacons and lit/unlit buoys are also checked for light characteristic, range, conspicuity of daymark and for floating aids to navigation (buoys), conspicuity of topmark and geographical position. Automatic identification systems (AIS) and radio beacons (RACONS) are checked for code/signal transmitted from the aid to navigation to that received on board the vessel, including nominal range. All data is cross referenced against current Admiralty charts, and published information within the Admiralty List of Lights and Fog Signals and the Admiralty List of Radio Signals.

- Shore based inspection (day) undertaken in response to a direct request, enquiry or in conjunction with other work in the surrounding area. The inspection includes a physical check of the structure, position, description, character, daymark, colour and general condition of the light. Additional information regarding ownership and maintenance responsibilities are also verified at this time.
- Shore based inspection (night), usually undertaken as part of a sample inspection required for the purposes of auditing a Port or Harbour Authority under the Port Marine Safety Code. Inspections are either carried out from shore or via local Pilot Boat with prior agreement from the relevant Port or Harbour Authority.

Inspection findings are input by the Inspecting Officer into the web-based Aids to Navigation and Reporting (*AtonRep*) software, jointly developed by Irish Lights and the Northern Lighthouse Board. Inspections submitted by NLB vessels are monitored by the Navigation section, with any reported defects registered on the *AtonRep* database and notification issued to the relevant owning authority for verification/rectification.

Thereafter, routine checks are made against the list of outstanding defects to ensure that these are successfully closed out within the required timescale. Statistics regarding the number of inspections and associated failures are provided to NLB's Director of Operations on a monthly basis. Monthly reports regarding outstanding/overdue inspections and those scheduled for inspection in the current year are also passed to the Marine Operations Manager, to inform vessel programming.

3.2 Results of 2019/20 Local Lighthouse Authority AtoN Inspections

- 3.2.1 There are currently 217 authorities registered in the *AtonRep* database with responsibility for marine Aid to Navigation within NLB's area of jurisdiction.
- 3.2.2 At 31 March 2020 there were 2238 active LLA Aids to Navigation registered on the *AtonRep* database. Consistent with previous Annual Inspection reports, these figures exclude aquaculture sites in Scottish waters.
- 3.2.3 1867 of the 2238 LLA AtoN (83.4%) were inspected in 2019/20. Of these, 107 were found to be defective representing a deficiency rate of 5.7%. This represents a slight decrease in failure rates, and remains consistent with historic levels.

LLA Annual Inspection Failure Trend										
Inspection Year	2010	2011	2012	2013	2014	2015	2016	2017	2018 /19	2019 /20
No. of AtoN	1883	1939	1958	1963	2018	2034	2043	2074	2127	2238
No. of Inspections	1389	1191	1747	1350	1692	1443	1710	1614	1730	1867
No. of Failures	117	61	110	108	83	64	88	71	114	107
Percentage Failure	8.4	5.2	6.3	8	4.9	4.4	5.1	4.4	6.6	5.7

Fig. 1 - LLA Annual Inspection Results

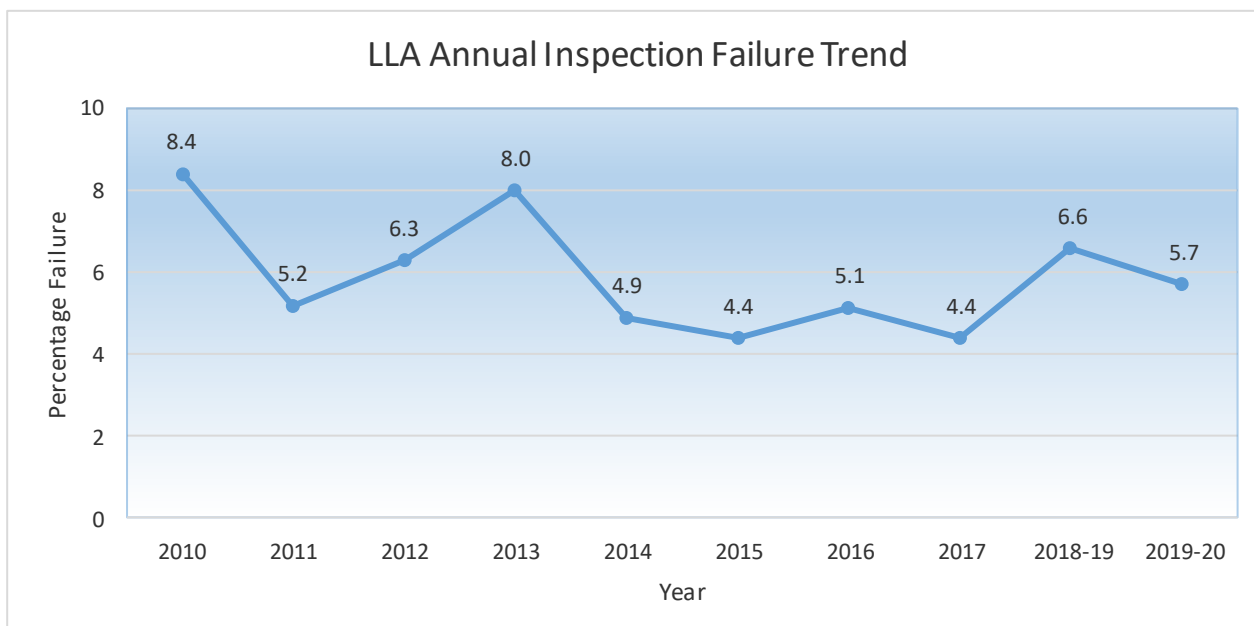


Fig. 2 - LLA Annual Inspection Failure Trend

3.3 Local AtoN Audits

3.3.1 The Department for Transport UK Ports database shows a total of 688 ports in Scottish waters, however many of these are extremely limited in size and scope of operations. 251 of these are Statutory Harbour Authorities, with their own governing legislation, but again many are limited in size and most are operated by Local Authorities. 25 are classed as Competent Harbour Authorities, with additional statutory powers relating to pilotage; in general these are the most active ports in terms of commercial activity. NLB undertakes an audit cycle under the Port Marine Safety Code for all Competent and major Statutory Harbour Authorities within our area of jurisdiction.

3.3.2 For all other authorities with responsibility for Marine Aids to Navigation, not deemed to be either a Competent or major Statutory Harbour Authority, a formal audit is not undertaken, however the more significant of these are subject to a compliance visit.

Compliance with the Port Marine Safety Code for these authorities is voluntary, although some sections are based on statute. Therefore emphasis is placed on encouraging the authority to follow best practice, with a view to increasing the authorities' awareness of their responsibilities with regard to the provision and maintenance of their AtoN. The authorities are also encouraged to participate in a data verification exercise to ensure that their aids to navigation are registered with the Northern Lighthouse Board, and that these are also charted and published by the UK Hydrographic Office.

3.3.3 Four harbour authorities were re-audited in 2019/20, with all four found to be fully compliant (with respect to provision and maintenance of marine aids to navigation) with the Port Marine Safety Code. Two smaller authorities were subject to compliance visits.

3.4 Local AtoN Availability

3.4.1 Local AtoN maintained by LLA and other providers are required to be maintained in accordance with the availability criteria laid down by the General Lighthouse Authorities, which are based on IALA guidelines.

3.4.2 Availability is calculated based on a three year rolling average, with the minimum/target availability for each AtoN Category as shown below:

Category 1	(99.8% Availability)
Category 2	(99.0% Availability)
Category 3	(97.0% Availability)

3.4.3 When an AtoN is reported defective, it is regarded as a casualty when the AtoN component falls below the advertised characteristics for the station and the details are then included in the calculation for availability.

3.4.4 Northern Lighthouse Board requires all Competent and major Statutory Harbour Authorities to submit an annual return to demonstrate their performance against the required standards.

3.4.5 Utility companies and other authorities with responsibility for a large number of marine AtoN are also encouraged to maintain casualty records, either via the submission of a pre-formatted Excel spreadsheet provided by Northern Lighthouse Board, or via access to the *Aton Reporting Online* web based database. Either method provides an accurate record of their Aton defects and enables an electronically generated return of their achieved availability statistics to be submitted to the Northern Lighthouse Board for review.

3.5 Results of the 2019/20 Local AtoN Availability Returns

3.5.1 Of the 35 Local Lighthouse Authorities from whom Annual Returns were requested, 35 complied within the required timescale.

For the three year rolling period ending 31 March 2020, two of these authorities failed to meet the IALA standard for Category 1 AtoN; nine failed to meet the IALA standard for Category 2 AtoN and two failed to meet the IALA standard for Category 3 AtoN. In summary, eleven authorities have failed to meet the required standard of availability for a particular category of AtoN.

In general, when LLAs fail to meet the target availability, this is a result of difficulties in accessing more remote aids to navigation, and this is sometimes compounded by limited resources.

3.6 Overview of Local Aids to Navigation

- 3.6.1 2019/20 has seen a steady flow of Statutory Sanction Applications from port and harbour authorities, utility companies, private industry, renewable energy and aquaculture operators to alter, discontinue or exhibit marine aids to navigation.

20 applications to establish new aids to navigation were received for the deployment of 37 lit buoys (including eleven data gathering buoys); the establishment of 14 lights (including three sets of traffic signals); one wind farm (which include the use of multiple lights, AIS AtoN devices and fog signals). These were primarily to improve the marking of navigable channels, hazards on approach to harbours, an existing bridge, harbour/ marina infrastructure and renewable energy developments.

Nine applications to alter existing aids to navigation were received for twelve lights (including four traffic signals) and three lit buoys.

Fourteen applications to discontinue existing aids to navigation were received and approved for four lights, 27 lit buoys, two wave energy devices and one port closed daymark, which were mainly associated with wind farm construction/data gathering buoyage and ongoing reviews of aids to navigation.

- 3.6.2 NLB is a statutory consultee for all Marine Licence applications under The Marine Licensing (Consultees) (Scotland) Order 2011. For the 12 month period April 2019 to March 2020, Northern Lighthouse Board responded to some 120 applications and 16 Pre-Application Consultations (excluding Aquaculture, Offshore Oil and Offshore Renewables).

- 3.6.3 NLB has also provided comment to Scottish Ministers on a number of Harbour Designation, Enforcement and Revision Orders under the Harbours Act 1964, covering powers of harbour direction, pilotage direction, revised harbour limits and marine construction to develop existing ferry terminals, along with port and harbour infrastructure upgrades.

NLB have given marking and lighting advice regarding several proposed harbour developments, including the development of Granton Marina in Edinburgh; the pier redevelopment at St Ola's Pier in Thurso Harbour; a new quay at the Nigg Energy Park in Cromarty Firth; traffic control measures in confined sea lochs; and major ferry terminal projects (including the redevelopment of the 'Skye Triangle' ferry terminals Tarbert, Uig and Lochmaddy).

Other notable projects have been commented on by NLB including a new opening bridge over the River Clyde between Govan and Partick; Forth Rail Bridge Experience; and Airspace changes associated with Rocket launching sites in Shetland, Caithness and Outer Hebrides.

4. OFFSHORE RENEWABLE ENERGY DEVELOPMENTS

4.1 Offshore Wind

There has been considerable growth in offshore wind energy in Scottish waters over recent years, adding to the established wind farm at Robin Rigg in the Solway Firth.

The Hywind floating wind farm, a world first, consisting of five 6MW turbines some 15 miles East of Peterhead, was commissioned in October 2017. The Kincardine floating wind farm, East of Stonehaven, established a single 2 MW turbine in October 2018, with a further five 9.5 MW devices planned for 2020 installation.

The European Offshore Wind Deployment Centre (EOWDC) is an offshore wind test and demonstration facility located around 3 kilometres to the east of Aberdeen. The scheme consists of eleven wind turbines with an installed capacity of 93.2 MW. Full commissioning was completed in September 2018.

Construction work at the Beatrice wind farm site in the Moray Firth was completed in 2019, with the wind farm becoming fully operational shortly after. The site consists of 84 turbines producing up to 588 MW.

Construction of the adjacent (Round 3) Moray East site has also commenced. A further site in this area, Moray West, is also planned to take up the remaining licensed capacity.

The Outer Firth of Forth region is also the focus of considerable development for offshore wind. The Neart na Gaoithe wind farm commenced both onshore and offshore construction in early 2020, and the Seagreen Round 3 project is scheduled to commence construction later in the year.

The Inch Cape Offshore Wind Farm project, also located within the Outer Firth of Forth, was not successful in the most recent Contract for Difference auctions, but planning for the project continues to progress.

The two 5 MW wind turbine demonstrators adjacent to the Beatrice Oil Field in the Moray Firth are now non-operational, and the operators are examining decommissioning options.

4.2 Wave & Tidal

There is also significant interest in the deployment of wave & tidal renewable energy devices around the coast of Scotland, however this has yet to result in significant development.

The Meygen tidal energy site, south of Stroma, started generating power to grid in December 2016, with a further three 1.5 MW turbines installed by February 2017. A further two turbines are planned in the short term.

A number of smaller turbines have also been installed by Nova Innovation in Bluemull Sound, Shetland.

4.3 Test & Development

Scottish waters continue to attract renewable energy developers to the wave and tidal energy test sites operated by the European Marine Energy Centre (EMEC) in Orkney. A number of wave energy devices have been trialled at the Billia Croo (Hoy Mouth) site over several years, and several tidal turbines and associated infrastructure developments continue to be tested at the Falls of Warness site near Eday. Additional nursery or secondary test sites have also been developed in Orkney at St Margaret's Hope, Scapa Flow and off Westray, for wave and tidal devices respectively.

5. 2019 SEAWARD INSPECTION OF OFFSHORE STRUCTURES

5.1 Inspection Procedure

- 5.1.1 In order to discharge its statutory duty as a General Lighthouse Authority in respect of offshore AtoN, NLB undertakes an annual inspection voyage to ensure that Offshore Oil & Gas operators are maintaining the AtoN for which they are responsible, to meet the agreed international standards, specifically the Standard Marking Schedule for Offshore Installations.
- 5.1.2 While the inspection provides a snapshot of the standard of provision on a particular day, the combination of historical inspection records and additional reports from any operator, owner or standby/rescue vessel (ERRV) on any outage, defect or omission, gives a condition trend reflecting the response to the annual inspection and report.
- 5.1.3 Prior to the annual inspection, the operating companies are contacted and requested to supply information on all offshore units owned or on contract to them, they are likewise given prior warning of the inspection and a copy of the inspection details request is forwarded to them.
- 5.1.4 The Inspection of each Offshore Oil Installation follows the procedure below:

(a) Physical Inspection.

This inspection is carried out from on board the 'NLV Pharos'. The inspection is carried out during the hours of darkness, initially with regard to the conspicuity of the Main White morse 'Uniform' lights, with the number, range of observation and effectiveness of synchronisation being recorded. A similar inspection is made of the Subsidiary Red morse 'Uniform' lights, the installation sound signal and the number and clarity of the platform Name Boards or Identification Panels. Any navigation, weather data or mooring buoys deployed in the proximity of the field will also be inspected,

(b) Inspection Records

The results of each inspection are recorded on a report sheet containing the latest details specific to each platform, MODU or FPSO/FSU at the time of inspection; these results are then compiled to produce a summary report.

(c) Defects or Faults

Any fault or defect found during the inspection will be reported directly to the Radio/Control room operator prior to the 'NLV Pharos' leaving the location. For unmanned installations, the results are passed to Standby or ERRV vessels with a request to confirm the repair and report the correct operation to NLB. Since 2013 OPRED have required the owners/operators of Offshore Installations to record any defect of Aids to Navigation via a PON-10 notification.

(d) Corrections and Additions

During the course of the inspection any changes to the information held on record with respect to the owners/operators of the installation or their contact details will be discussed when in radio contact with the personnel on board. Similarly, any additions, removal or repositioning changes to the number and/or type of AtoN used to identify and safely mark the installation will be noted at the time of inspection and transferred to the NLB's AtonRep data system.

5.2 Results of the 2019 Inspection Voyage

- 5.2.1 The 2019 Northern Lighthouse Board Annual Seaward Inspection of Offshore Installations was planned to be undertaken by NLV PHAROS in late November/early December 2019.
- 5.2.2 The 2018 inspection voyage had been negatively impacted by bad weather, and installations in the West of Shetland and Northern North Sea were not inspected. These installations were to be prioritised in the 2019 voyage.
- 5.2.3 NLV Pharos departed Kirkwall on 29th November 2019, and repositioned in Scrabster, with a view to inspecting the West of Shetland installations in a weather window between low pressure weather systems.
- 5.2.4 The weather window did not provide sufficient time for the inspections to be safely carried out, and NLV Pharos then repositioned to Scalloway, to wait for a further opportunity to inspect either the West of Shetland or Northern North Sea platforms.
- 5.2.5 Again, a sufficient weather window for safe inspections did not open up, and the vessel then proceeded to Invergordon. Inspections were conducted on passage of the Beatrice A, B, and C, and Jacky platforms, in the Inner Moray Firth.
- 5.2.6 All four of these platforms are Not Normally Attended, and decommissioning plans are at various stages for each platform. The installations have various dispensations from the SMS that reflect the NNA status, and all four were complying with these requirements.
- 5.2.7 Attempts were then made to re-schedule inspections of the various North Sea and West of Shetland areas. However, due to operational demands on the two NLB vessels, and then the COVID-19 restrictions, this has not been possible.
- 5.2.8 Noting that several operators use the NLB inspection reports as an input to their internal auditing regimes, some operators have been arranging their own inspections using infield Emergency Response and Rescue Vessels (EERV) and forwarding the results to NLB.

6. THE AQUACULTURE INSPECTION PROCESS

6.1 Introduction

From small beginnings in the 1960s, marine fish and shellfish farming, mainly for salmon and mussels, has grown into a significant Scottish industry helping to underpin sustainable economic growth in Scotland's rural and coastal communities.

The industry is mainly based on the Scottish Islands (Western Isles, Orkney and Shetland) and the West coast of the mainland where it employs around 2,100 people (full-time equivalent) in rural communities. The industry as a whole employs roughly up to 12,000 people either directly or in support services. There is no aquaculture in the Isle of Man.

The industry is heavily regulated and, under the Marine (Scotland) Act 2010 Part 4, the Scottish Government is responsible for licensing activities carried out in the Scottish inshore region. Through the process of marine licensing, and the conditions placed on licences, economically and socially beneficial activities are promoted while minimising adverse effects on the environment, human health and users of the sea. Where obstruction or danger to navigation is caused or is likely to result from the development of aquaculture farms, a Marine Licence is required and, through statutory consultation with NLB and the Maritime and Coastguard Agency, safety of navigation issues are taken into account. Crown Estate Scotland also has a role as a pro-active landlord and Local Authorities are responsible for granting the necessary planning permissions.

6.2 Hazards to Navigation

Fish farms often encroach on charted anchorage areas and areas frequented by smaller fishing vessels and leisure craft, as well as lying adjacent to larger vessel routes. Growth of the industry has also resulted in live fish carriers and other vessels navigating much closer inshore than large vessels would traditionally venture.

Finfish plastic ring cages present a collision hazard, and are often accompanied by sizeable steel or concrete feed barges. Mussel lines are perceived to offer a particular hazard, due to their low visual conspicuity and potential to foul propellers. Oyster beds are sited in shallow water but may project steelwork constructions with the ability to damage vessels or foul anchors. Most sites have significant mooring arrangements, often with outlying buoys and trailing lines, with the capacity to foul propellers or anchors. This practice is strongly discouraged by NLB in responses to licence applications and during site inspections.

6.3 Hazard Mitigation

Hazard mitigation is provided by ensuring that aquaculture sites are marked as accurately as possible on charts and by requiring the site operator to provide aids to navigation. These are usually in the form of yellow Special Mark poles or buoys, with or without short range navigation lights. These are generally sited on the seaward side of the farm, or to mark the navigable route through a channel.

6.4 The Aquaculture Inspection Process

Operators' contact details are gathered from NLB records, application information, The Crown Estate Scotland database and word of mouth.

The initial stage of a site inspection involves an examination of the site's Marine Licence, to establish that the NLB's marking and lighting recommendations are present and correctly correspond to NLB records. The site manager is requested to produce any further documentation appertaining to all on site AtoN inspection and maintenance activities.

A boat visit to the site (s) is requested, and the following procedures carried out:

- GPS co-ordinates (set to WGS 84 datum) of the site extremities and navigational markers are recorded.
- Any navigational lights are tested to check they are operating properly and display the correct lighting characteristic.
- All navigational markers are inspected to ensure they are in a suitable condition.

The inspection concludes with a discussion with the site manager. The CI provides a brief summary of their findings and what actions the stakeholder is required to take. Where necessary, the CI will also highlight the importance of ensuring sites are correctly marked for the safety of the mariner, and that correct navigational marking is part of the organisations lease agreement, Planning Permission and Marine Licence and that repeated failures may result in revocation of any of these.

Subsequent to the inspection, a detailed written report is forwarded to the site operator.

6.5 2019/20 Inspections

During 2019/20, 169 aquaculture site inspections were carried out.

Site Type	Number Inspected	Correctly Marked as per Marine Licence	Partially Marked	Percentage Marked Correctly
Shellfish	47	40	2	85.1%
Finfish	122	76	34	62.3%
Combined	169	116	36	68.6%

These figures suggest a consolidation of improvements in the marking of both shellfish and finfish sites. However, there are significant differences between operating companies, and between areas operated by the same company, reflecting different degrees of understanding of hazard mitigation.

6.6 Promotion of safe working practices

In keeping with NLB's motto of 'For the Safety of All', an NLB Coastal Inspector chairs a working group of the Scottish Aquaculture Safety Group, which is responsible for planning, organising and running an annual Safety and Health Awareness Day (AquaSHAD) for the aquaculture industry. The event is designed to bring delegates from all sectors of the aquaculture industry together and provide them with up to date knowledge to reduce risk and improve their safety at work. Additionally the day serves as a means of promoting intercompany and inter-sector communication, aiming to forge stronger relationships between the industry and regulators



The 2019 event built on the momentum gained in 2018 and saw a significant expansion; with increased financial backing securing a larger venue and increased publicity. The event was held at the North Atlantic Fisheries College in Scalloway, Shetland on 12 June 2019, and was attended by 105 delegates, who observed and participated in demonstrations delivered by the Health and Safety Executive, MCA, RNLI and industry experts. The event generated significant interest and due to venue capacity and ensuring training quality, delegate number were capped at 105, otherwise this figure could have been upwards of 130. Industry and delegate feedback requested that future events held in Shetland are extended to two days.