Northern Lighthouse Board

NORTHERN LIGHTHOUSE BOARD

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

2024/25 REPORT

Fraserburgh Harbour

INSPECTION/AUDIT OF LOCAL AIDS TO NAVIGATION, OFFSHORE STRUCTURES & AQUACULTURE SITES – 2024/25 REPORT

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

This report covers the period April 2024 to March 2025 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 Within the territorial waters of the Isle of Man, the Harbours Act 2010 s.70 defines the Harbours Division of the Department of Infrastructure as the Local Lighthouse Authority for the Island.

1.5 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.

1.6 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.

1.7 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 the Marine Directorate of the Scottish Government, who are responsible for the issue of marine licences under the Marine (Scotland) Act 2010; by Transport Scotland, who are responsible for granting Harbour Empowerment and Harbour Revision Orders under the Harbours Act 1964; by the Department for Energy Security and Net Zero, who are responsible for oil and gas licensing under the Energy Act 2008; and by the Isle of Man Harbours Division.

2.2 Site visits by NLB staff 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 and Marine Facilities 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.

2.6 The General Lighthouse Authorities have very limited powers to follow up on deficiencies in the provision of AtoN by LLAs or other bodies; it is intended to seek clarification of these powers in any revision of the Merchant Shipping Act.

Cromarty Firth

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 geographical position. Automatic Identification Systems (AIS) and radar 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.

3.1.2 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.

3.1.3 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.

Wick Harbour

3.2 Results of 2024/25 Local Lighthouse Authority AtoN Inspections

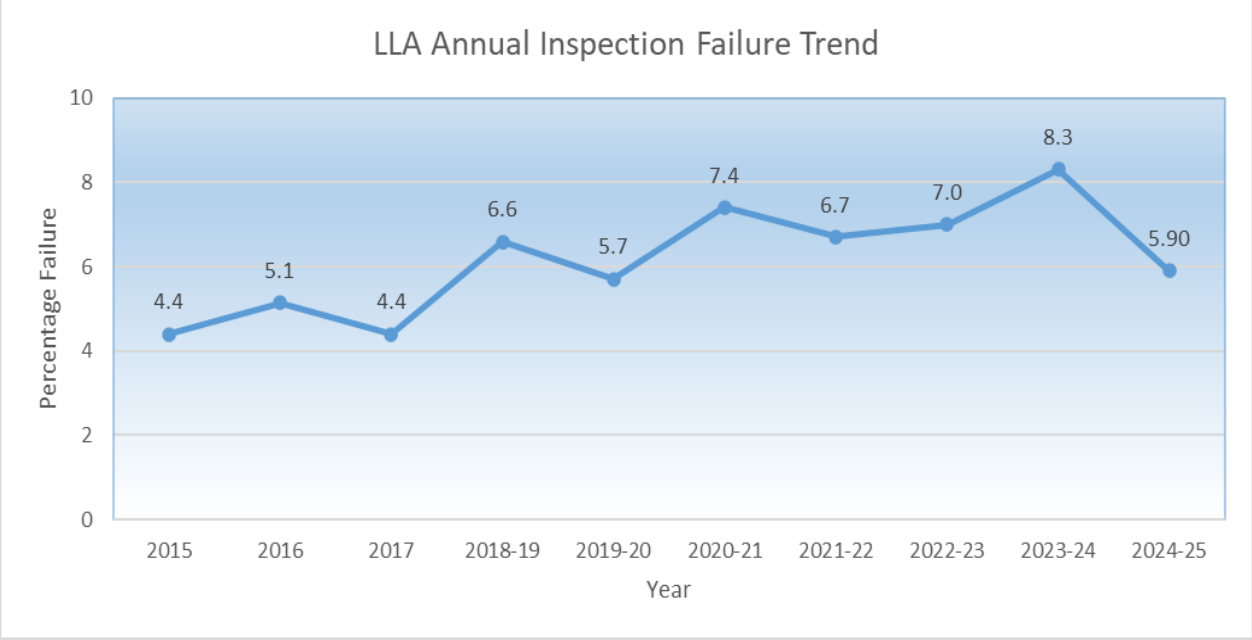
3.2.1 There are currently 237 authorities registered in the *AtonRep* database with responsibility for marine Aids to Navigation within NLB's area of jurisdiction.

3.2.2 At 31 March 2025 there were 2409 active LLA Aids to Navigation registered on the *AtonRep* database. The number of Aids to Navigation continues to rise steadily year on year; these figures exclude aquaculture and offshore oil and gas sites in Scottish waters.

3.2.3 1733 of the 2409 LLA AtoN (71.9%) were inspected in 2024/25. Of these, 102 were found to be defective representing a deficiency rate of 5.9%. This represents a significant and welcome reduction in failure rates compared to recent years.

LLA Annual Inspection Failure Trend										
Inspection Year	**2015**	**2016**	**2017**	**2018 /19**	**2019 /20**	**2020 /21**	**2021 /22**	**2022 /23**	**2023 /24**	**2024 /25**
No. of AtoN	**2034**	**2043**	**2074**	**2127**	**2238**	**2252**	**2289**	**2357**	**2377**	**2409**
No. of Inspections	**1443**	**1710**	**1614**	**1730**	**1867**	**1823**	**1667**	**2106**	**2118**	**1733**
No. of Failures	**64**	**88**	**71**	**114**	**107**	**134**	**111**	**147**	**176**	**102**
Percentage Failure	**4.4**	**5.1**	**4.4**	**6.6**	**5.7**	**7.4**	**6.7**	**7.0**	**8.3**	**5.9**

LLA Annual Inspection Results



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. 253 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. There are a further 8 ports within the Isle of Man. NLB undertakes an audit cycle under the Port and Marine Facilities 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.

3.3.3 Compliance with the Port and Marine Facilities Safety Code (PMSC) 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.

3.3.4 Nine harbour authorities were re-audited in 2024/25; all nine were found to be compliant (with respect to provision and maintenance of marine aids to navigation) with the Port and Marine Facilities Safety Code.

Stromness Harbour

Fraserburgh Harbour

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 via access to the *Aton Reporting Online* web based database provided by the Northern Lighthouse Board. The *Aton Reporting online* system enables an electronically generated return of their achieved availability statistics to be submitted to the Northern Lighthouse Board for review.

3.5 2024/25 Local AtoN Availability Returns

3.5.1 Of the 35 Local Lighthouse Authorities from whom Annual Returns were requested, three failed to comply within the required timescale.

Ullapool Marina

3.5.2 For the three year rolling period ending 31 March 2025, seven of these authorities failed to meet the IALA standard for Category 1 AtoN; seven failed to meet the IALA standard for Category 2 AtoN and four failed to meet the IALA standard for Category 3 AtoN. In summary, 14 authorities have failed to meet the required standard of availability for a particular category of AtoN.

3.5.3 In general, when LLAs fail to meet the target availability, this is a result of difficulties in accessing more remote aids to navigation, this is sometimes compounded by limited resources, and increased severity of storms impacting response times. This year has again been challenging as many LLAs have had difficulty in sourcing contractors to undertake AtoN maintenance/fault repair, long lead times for replacement equipment along with difficulties accessing (and staying at) remote locations.

3.6 Overview of Local Aids to Navigation

3.6.1 2024/25 saw a steady flow of Statutory *Sa*nction applications from port and harbour authorities, utility companies, private industry, renewable energy and aquaculture operators to alter, discontinue or exhibit marine aids to navigation.

3.6.2 Applications to establish new aids to navigation were received for the deployment of 44 lit buoys (including 31 special mark buoys; mostly data gathering or construction buoyage associated with offshore renewable projects); one unlit buoy; one Virtual Automatic Identification System (VAIS) AtoN site with an additional seventeen AIS AtoN and 15 fog signals associated with data gathering and operational phase of renewable energy sites; and the establishment of 47 lights. These were primarily to improve the marking of navigable channels, harbour/marina infrastructure, a new opening bridge and multiple renewable energy developments.

3.6.3 Applications to alter existing aids to navigation were received for five lights, 17 lit buoys, one alteration from a lit beacon to a lit buoy and 10 VAIS AtoN; all associated with harbour improvements.

3.6.4 Applications to discontinue existing aids to navigation were received and approved for 37 lit buoys, which were mainly associated with wind farm construction/data gathering buoyage, aquaculture data gathering, temporary harbour development construction buoyage and ongoing reviews of aids to navigation.

3.6.5 NLB is a statutory consultee for all Marine Licence applications under The Marine Licensing (Consultees) (Scotland) Order 2011. For the period April 2024 to March 2025, Northern Lighthouse Board responded to some 154 applications (including 18 marine licence variations), 11 Pre-Application Consultations and 63 exempted activities requests, as well as 13 Council planning permission applications.

3.6.6 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, revised harbour limits and marine construction to develop existing harbours in support of offshore renewables and new inter-island larger ferries, along with port and harbour infrastructure upgrades.

3.6.7 NLB have given marking and lighting advice regarding multiple proposed harbour developments including the ferry infrastructure projects at Corran Narrows, Port Ellen, Craignure, Cumbrae, Gigha, Tayinloan and Grutness/North Haven (Fair Isle), and harbour expansion proposals at Kirkwall, Scapa Flow, Stornoway, Hunterston and Ardersier. Other notable projects include the proposed Eastern Green Link cables (now 4 off); harbour development proposals at Dales Voe, Shetland, Kishorn Port, Port of Cromarty Firth and Fraserburgh Harbour, and continued oversight of rocket launch proposals from Saxavord Space Centre as the space industry develops.

Ardersier Port Construction Activities November 2024

4. OFFSHORE RENEWABLE ENERGY DEVELOPMENTS

4.1 Licensing

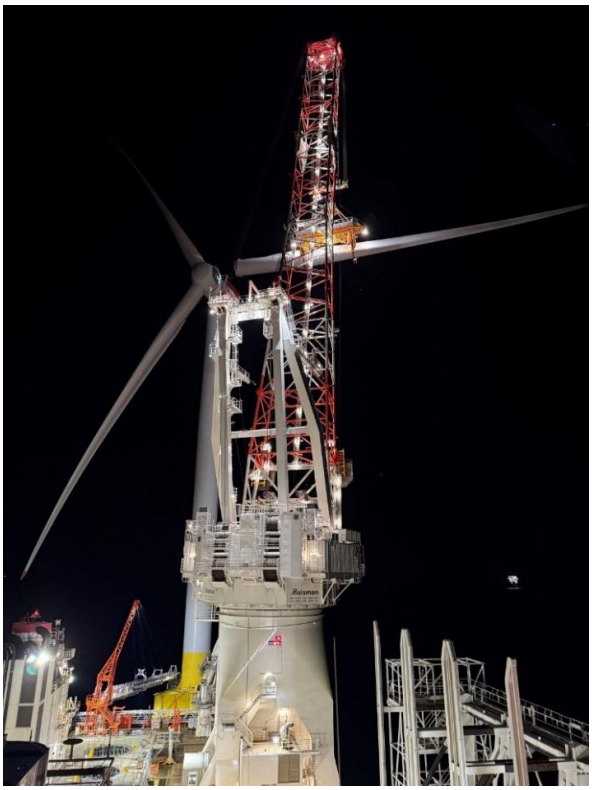
4.1.1 The offshore wind energy sector continues to expand steadily within Scottish waters, with nine operational wind farms and demonstrator sites, including the recently commissioned Moray West Offshore Wind Farm (OWF). This equates a total installed capacity of around 3.8GW.

4.1.2 NLB have been involved with all developments in Scottish waters, both prior to and during the Marine Licensing process, providing recommendations during government level spatial planning exercises, and taking an active role in a number of workshops for the development of OREI across both Scotland and the UK. NLB continues to work closely with developers to across all phases of their projects, from consenting and pre-construction surveys, construction, operation and maintenance, all the way through to decommissioning of the site.

4.1.3 NLV Pharos undertook two Offshore Windfarm Aids to Navigation Commissioning Inspections during the year. The first of these was the Seagreen OWF in September 2024, and the second the Moray West OWF in March 2025. Following minor remedial actions for faults identified by the inspections, both OWF were provided with a letter authorising the transition to Operational phase lighting and marking, and the removal of the construction phase buoyage.

4.2 Offshore Wind

4.2.1 The Outer Firth of Forth/Tay region remains an area of significant activity for the offshore wind sector, with developments progressing across all phases of the consenting and construction process. The 54th and final Wind Turbine Generator at the Neart na Gaoithe (NnG) OWF (448MW) was installed in April 2025, with final commissioning activities ongoing.



Final WTG Installation at NnG OWF
(NnG Offshore Wind)

4.2.2 The Inch Cape OWF project (1.1GW), also located within the Outer Firth of Forth, has commenced construction activities at both the landfall site at Cockenzie, East Lothian, and within the array area, with the Offshore Substation Platform (OSP) to be installed mid-2025. Monopile foundations are scheduled to start arriving at the Port of Leith later in 2025.

4.2.3 The Berwick Bank OWF (4.1GW) is continuing to progress through the Scottish Government consenting process, with the S36 and Marine Licence applications submitted at the start of 2023.

4.2.4 The Seagreen 1A (576MW) extension project to the existing Seagreen OWF (1.1GW) windfarm has been granted consent, however, construction is not expected to take place until 2029 due to an unsuccessful Contract for Difference (CfD) Allocation Round (AR6) bid.

4.2.5 Consent has also been granted for a demonstrator turbine and accompanying Meteorological Mast for the Forthwind Offshore Wind Demonstrator project (12MW), 1.5 km from the coast of Methil, on the inner Firth of Forth. However, no timeline for construction has been offered for this project.

4.2.6 The Moray Firth now has three operation commercial-scale arrays; Beatrice OWF (588MW), Moray East OWF (950MW) and Moray West OWF (850MW). These three windfarms are subject to ongoing routine maintenance activities, and NLB engage regularly with both Marine Control Centres and Consenting teams.

4.2.7 Pentland Floating OWF, located approximately 6.5km off the coast of Dounreay, Caithness has also been granted consent, and looks to deploy six floating wind turbines with an installed capacity of up to 100 MW. There is no current timeline for construction for this project following an unsuccessful Contract for Difference (CfD) Allocation Round (AR6) bid.

4.2.8 One additional project of note was the major maintenance and overhaul of all five floating turbines at the Hywind Scotland array, 15nM east of Peterhead. This project saw the towage of each turbine from the array to Wergeland Base in Gulen, Norway, and subsequent return to site following maintenance within a controlled, sheltered environment.

Hywind Scotland Floating WTG Under Tow
(Equinor)

4.2.9 Progress across the 19 ScotWind projects announced in 2022 has continued at pace, with NLB engaging with the majority of announced projects with regard to Marine Licence exemption requests and Scoping Report consultations. NLB have also attended eight Shipping and Navigation Hazard Identification Workshops in the year April 2024 to April 2025. The most advanced of these ScotWind projects have submitted Section 36 and Marine Licence applications, and are proposed to become operational around 2030.

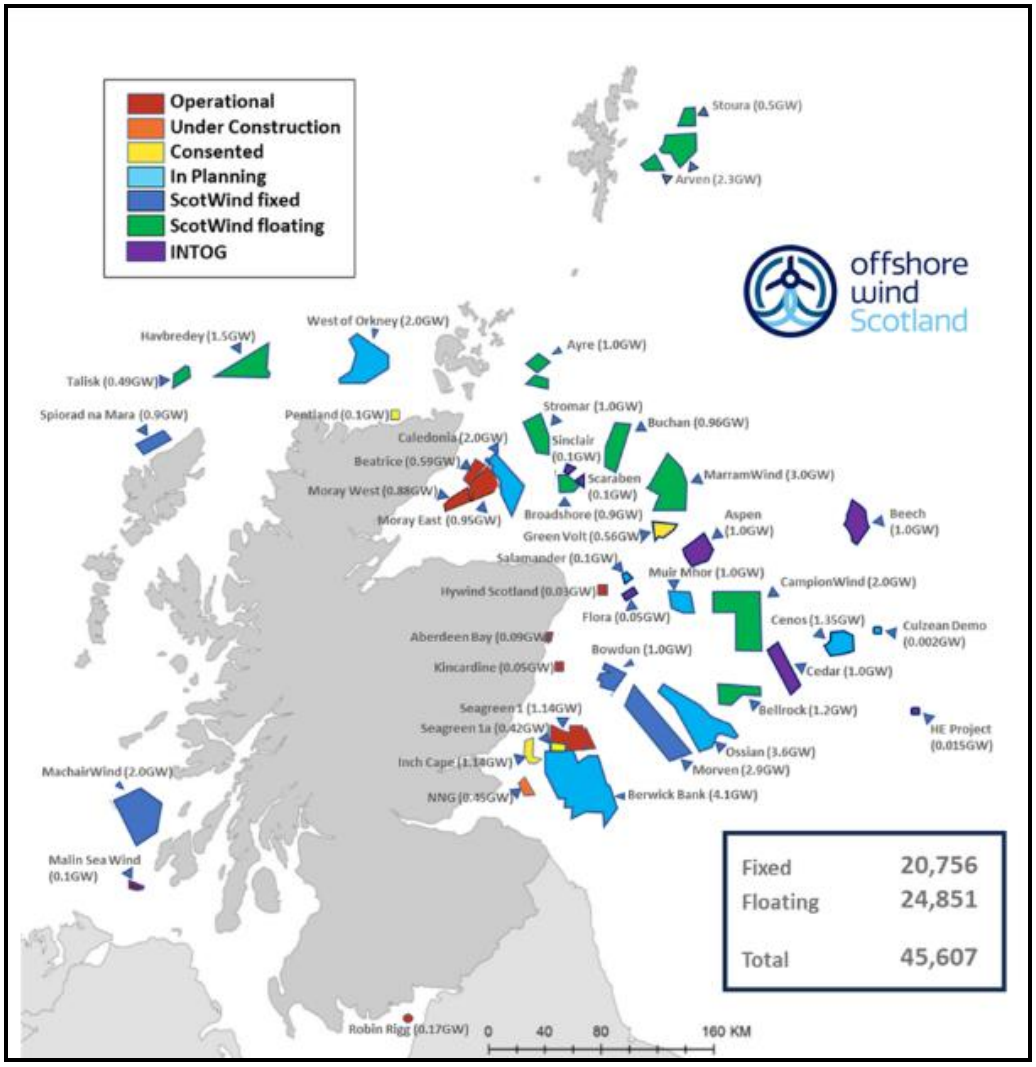
4.2.10 The combined ScotWind projects will add around 30GW of installed offshore wind capacity, with approximately 19GW being generated from floating wind sites.

4.2.11 In March 2023, Crown Estate Scotland announced 13 successful bidders for the 'Innovation and Targeted Oil and Gas' (INTOG) leasing round. This will allow developers to apply to build offshore wind farms specifically for the purpose of providing low carbon electricity to power oil and gas installations and help to decarbonise the sector. It also provides an opportunity to enable small scale (less than 100 MW) innovation projects, including alternative outputs such as hydrogen, or shore electrical grid connections. The INTOG leasing round is expected to provide an additional 5.5GW of generating capacity.

3MW floating wind turbine to be situated 2km west of the Culzean platform (TotalEnergies)

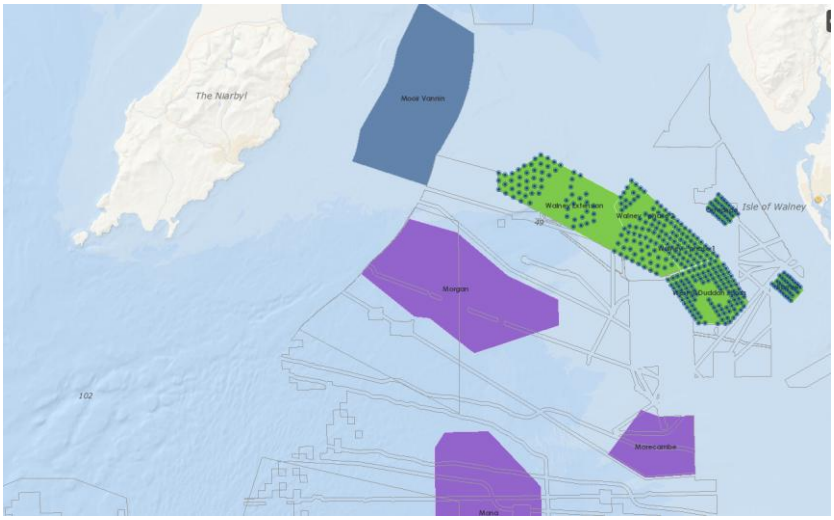
4.2.12 NLB continues to engage with a number of the INTOG projects, with regard to navigational safety and Marine Licence exemption requests. A number of the INTOG projects have already started the consenting process with Marine Directorate, with two being granted consent. The Culzean Floating Offshore Wind Pilot Project is planned to be online before the end of 2025.

4.2.13 When existing and proposed project capacities are combined, the total generating capacity for offshore wind in Scottish waters is in excess of 45 GW, with potential for in excess of 1500 turbines to be installed across around 10,000km² of seabed.



Scottish Offshore Windfarm Sites (April 2025)
(offshorewindscotland.org.uk)

4.2.14 In Manx waters, Orsted have announced plans to develop the Mooir Vannin OWF to the East of the island, with up to 100 turbines and a capacity in the region of 1.4GW. In combination with the proposed Morgan, Mona and Morecambe wind farms, this will have significant impact on traffic to and around the Isle of Man.



Irish Sea planned wind farms (4coffshore.com)

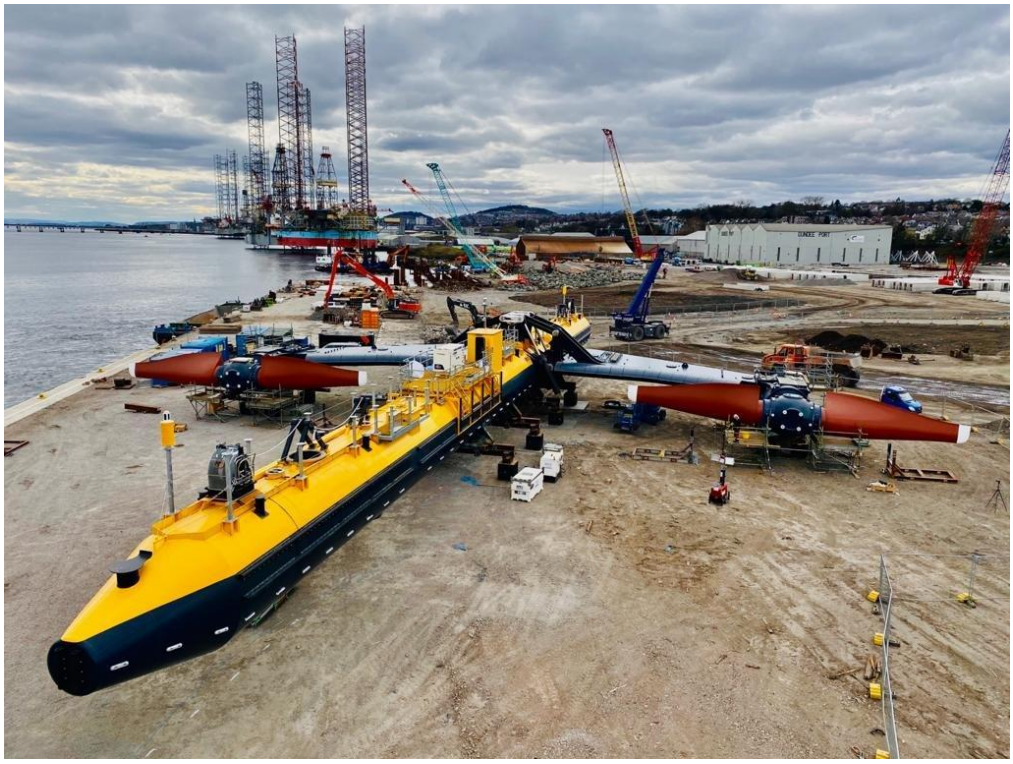
4.3 Wave & Tidal Energy

4.3.1 Although there is significant interest in the deployment of wave & tidal renewable energy devices around the coast of Scotland, there are no large-scale developments in operation, and a only a very small number of new devices proposed for trials at time of writing. However, a number of commercial scale proposals are currently at various stages of the Marine Directorate consenting process.

4.3.2 The Meygen tidal energy site, south of Stroma in the Pentland Firth Inner Sound, started generating power to grid in December 2016, with four 1.5 MW turbines installed by February 2017. A further 80MW of capacity has been consented, with 50MW of this having been awarded a Contract For Difference (CFD). An expansion to fulfil this 50MW is planned to come online by the end of decade. NLB have engaged closely with MeyGen with regard to this expansion, and the potential deployment of virtual AtoN to support the development.

4.3.3 NOVA Innovation have operated a number of 100kw tidal devices in Bluemull Sound since 2016, with three devices currently in operation at the site. NOVA are also currently progressing an application through the consenting process for the potential installation of up to 30 tidal devices within the Sound of Islay.

4.3.4 Tidal energy developer Orbital Marine Power are also progressing through the Marine Directorate consenting process for the installation of around 12 floating tidal devices with a total generating capacity of 30MW at Westray Firth, Orkney.



O2 Tidal Energy Device (Orbital Marine Power)

4.3.5 A single 50 kW tidal energy device proposed by Flex Marine Power for deployment within the Sound of Islay received consent in 2024, and is proposed to be installed in 2025.

4.3.6 There are currently no commercial wave energy devices in Scottish waters.

4.4 Test & Development

4.4.1 The European Marine Energy Centre (EMEC) test sites across Orkney continue to attract both wave and tidal energy developers wishing to take advantage of well-proven infrastructure at high energy sites.

4.4.2 A variety of wave energy devices have been trialled at the Billia Croo (Hoy Mouth) site with varying degrees of success, and tidal turbines and associated infrastructure developments continue to be tested at the Falls of Warness site near Eday. Additional nursery or secondary test sites are well established at St Margaret's Hope, Scapa Flow and off Westray, for the testing of scale wave and tidal devices respectively.

4.4.3 NLB have been involved in discussions for the potential future deployment of additional and larger iterations of the both the Orbital and Magallanes devices at the Fall of Warness site. NOVA Innovation have also lodged Marine Licence applications for large scale arrays within the FoW site to prove the viability of commercial scale tidal projects.

4.4.4 NLB have also consulted on the potential deployment by Endeavour Wave Ltd for an array of five CorPower Wave Energy Converter (WEC) devices at the Billia Croo test site later in the decade.

Single CorPower Wave Energy Converter (CorPower Ocean)

4.4.5 NLB engage regularly with both EMEC and developers with regard to AtoN provision for tidal and wave energy installations, emphasising the vital importance of lighting and marking these devices in a challenging, high energy marine environment.

5. 2024/25 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 AtoN 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 NLV Pharos 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 also being recorded. A similar inspection is made of the Subsidiary Red morse 'Uniform' lights, the installation sound signal(s), electronic aids to navigation such as RACONs and AIS where fitted, 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 un-manned 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 2024/25 Inspection Voyages

5.2.1 The 2024 inspection voyage was scheduled to depart Oban on 21st November 2024 for two weeks. Due to the passage of named storms ‘Bert’ and ‘Conall’ during this time, and the operational demands on the Pharos following these storms, the window of opportunity to conduct any offshore inspections was considerably reduced.

5.2.2 NLV Pharos departed Oban bound for Shetland in a brief weather window following these named storms, and undertook inspections of the installations located in the West of Shetland basin. Five installations and one Mobile Offshore Drilling Unit (MODU) were inspected on this passage.

5.2.3 Additional time was scheduled to attempt to capture the remaining platforms in the Northern and Central North Sea regions following Pharos’ drydocking in January 2025. However, operational demands on the vessel prevented these inspections from taking place. Additional inspections were achieved between 3rd and 5th March 2025, with a further eight installations being inspected.

5.2.4 At the time of the inspection, Northern Lighthouse Board’s area of jurisdiction within the UK sector contained 95 fixed or floating platforms and 12 Mobile Offshore Drilling Units (MODU) or Floating Accommodation Units. It should be noted that the total number of installations will fluctuate year on year depending upon ongoing commissioning/decommissioning projects, and also the location of the MODUs.

5.2.5 A total of 14 installations were inspected across the two voyages representing an inspection rate of 13%. Of these 14 inspections, 6 platform failures were noted as below. This represents a failure rate of 43%, although the small number of inspections undertaken does not allow valis statistical comparison. There were no instances of blacked-out platforms observed.

- 3 platform failures were noted for insufficient range of primary white lights (15nM nominal range)
- 1 platform failure was noted for insufficient range of primary white lights (15nM nominal range) along with an insufficient fog signal range (2nM).
- 1 platform failure was noted for insufficient range of primary white lights (15nM nominal range) along with an insufficient range of subsidiary red lights (3nM).
- 1 platform failure was recorded for insufficient fog signal range (2nM)

5.2.6 All failures were subsequently reported to the Business Support Team at OPRED, and investigations undertaken. Either justification or proof of correction for the failures were then provided by the operators to OPRED, and subsequently passed to NLB.

5.3 Offshore Oil & Gas Development and Decommissioning

5.3.1 Decommissioning activity across the Scottish sector of the North Sea and West of Shetland region continues to expand, with a large number of fields ceasing production ahead of the removal of infrastructure. Northern Lighthouse Board have continued to engage with a number of operators with regard to Aid to Navigation provision on a range of different types of platforms, ranging from cold-stacked installations, FPSOs, jacket-only structures and legacy gravity base structures following topside removal operations.

5.3.2 Of particular note from these consultations was engagement with Harbour Energy regarding the upcoming decommissioning of the Solan platform. Following advice from NLB regarding the resilience and capacity of the planned Aids to Navigation ahead of topside removal, Harbour Energy undertook a comprehensive field test of

their system, and found that it did not meet the requirements of the Standard Marking Schedule. A comprehensive re-design was undertaken, with additional solar panels and batteries added to the system, and another field test undertaken, with the system showing considerable improvement. Following feedback from NLB, Harbour Energy have agreed to make data from these trials available to other operators looking at decommissioning operations in the near future.

5.3.3 Decommissioning projects of note that have taken place over the year April 2024 to April 2025 include the removal of the Brent C topside and the Western Isles FPSO, both from the Northern North Sea. The Western Isles FPSO was towed off location to Scapa Flow for engineering works ahead of a potential redeployment. The Brent C topside was taken to the Able Seaton port in Hartlepool for recycling following a Single Lift operation by the vessel 'Pioneering Spirit'.

Brent C Topside Removal by Pioneering Spirit (Shell UK)

5.3.4 Despite the increase in decommissioning, new developments are occurring on the UK Continental Shelf, along with the installation of new surface infrastructure. Of note over the last year is the deployment of the Penguins FPSO, and the installation of the jacket structure for the new Jackdaw development. The topside for Jackdaw is due to be installed over Q2/3 2025. Preparations for the arrival of the Rosebank field FPSO, West of Shetland, are also ongoing, with the FPSO expected in field 2026. NLB have provided lighting, marking and navigational safety recommendations for both of these developments.

Rosebank Jacket Installation (Shell UK)

6. THE AQUACULTURE INSPECTION PROCESS

6.1 Introduction

6.1.1 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.

6.1.2 The industry is largely concentrated in the Scottish Islands (Western Isles, Orkney and Shetland) and the West coast of the mainland where it employs around 2,500 people (full-time equivalent) in rural communities. The industry employs roughly up to 12,000 people either directly or in support services. The industry released their 'Aquaculture Growth to 2030' strategy document, which has set out ambitious targets to double the economic value from the current £1.8 Billion to £3.6 Billion with the jobs linked to the sector forecast to reach 18,000. In 2024, Scottish farmed salmon exports totalled £844 million a 45% increase over the previous year.

6.1.3 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.

6.1.4 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 (CES) also has a role as a pro-active landlord and Local Authorities are responsible for granting the necessary planning permissions.

6.1.5 During the period April 2024 to March 2025 the Navigation team reviewed and responded to 122 aquaculture requests for formal response. The majority of these related to Regional Council and Marine Directorate (MD-LOT) applications, however there were also contacts from private individuals and companies representing the aquaculture industry.

6.2 Hazards to Navigation

6.2.1 Fish farms often encroach on charted anchorages and areas frequented by smaller fishing vessels and leisure craft, as well as lying adjacent to large 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.

6.2.2 Finfish cages present a collision hazard and are often accompanied by sizeable steel or concrete feed barges. Mussel lines are considered 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, both in responses to licence applications and during site inspections.

Recovery of fish farm support vessel Julie Anne which sank on 4 July 2024

6.2.3 As the finfish sector continues to develop there are a growing number of proposed sites of a larger nature, in more exposed positions with recent examples of farms being considered further from shore in areas like the Minch. These sites can have up to 200 metre circumference ring cages and are being designed to survive in 'High Energy' locations. Engineers have modelled the design of anchor systems to cope and experience from certain overseas locations is used to inform these plans.

6.2.4 Fallow sites can pose a challenge, when sites are not actively farming this can often result in the AtoN either being removed or losing power leading to unlit equipment that can be hazardous. In some extreme cases we also come across abandoned sites, more commonly shellfish equipment. Abandoned sites often require protracted multi-agency efforts to tackle.

6.2.5 The algal sector has seen much recent interest, fuelled partly by the launch of the Seaweed Academy at SAMS (Scottish Association for Marine Science), which is resulting in a growing number of sites being considered, which pose similar navigational risk to that of mussel farms. We are also seeing multitrophic sites with a mixture of Seaweed and Shellfish, such as algal farms which also grow Oysters.

6.2.6 Discussions are still progressing regarding the possibility of growing seaweed within wind farms to make broad use of the seaspace. However this development would require careful planning as the areas between turbines in the UK (unlike many European neighbours) remain open for surface navigation.

6.3 Hazard Mitigation

6.3.1 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. Where sites are connected to on shore feed facilities the associated surface supply pipework is requested to be marked with yellow hi-vis buoys at regular intervals.

6.3.2 Where any significant work is taking place during the introduction, modification or removal of a site, operators are requested to promulgate notices to mariners to ensure those in the area are aware of the additional activity and the vessels involved.

6.4 The Aquaculture Inspection Process

6.4.1 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.

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

- GPS co-ordinates (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. Local triggering of lanterns is increasingly utilised via using secure lighting control apps, however where older technology doesn't allow this, physical access is required to site to test lanterns.
- All navigational marks are inspected to ensure they are in a suitable condition.

6.4.3 The inspection concludes with a discussion with the site staff. The Coastal Inspector provides a brief summary of their findings and what actions the operator is required to take. Where necessary, the Coastal Inspector 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.

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

Example of Special Mark Pole that failed test due to lack of yellow day mark colouration

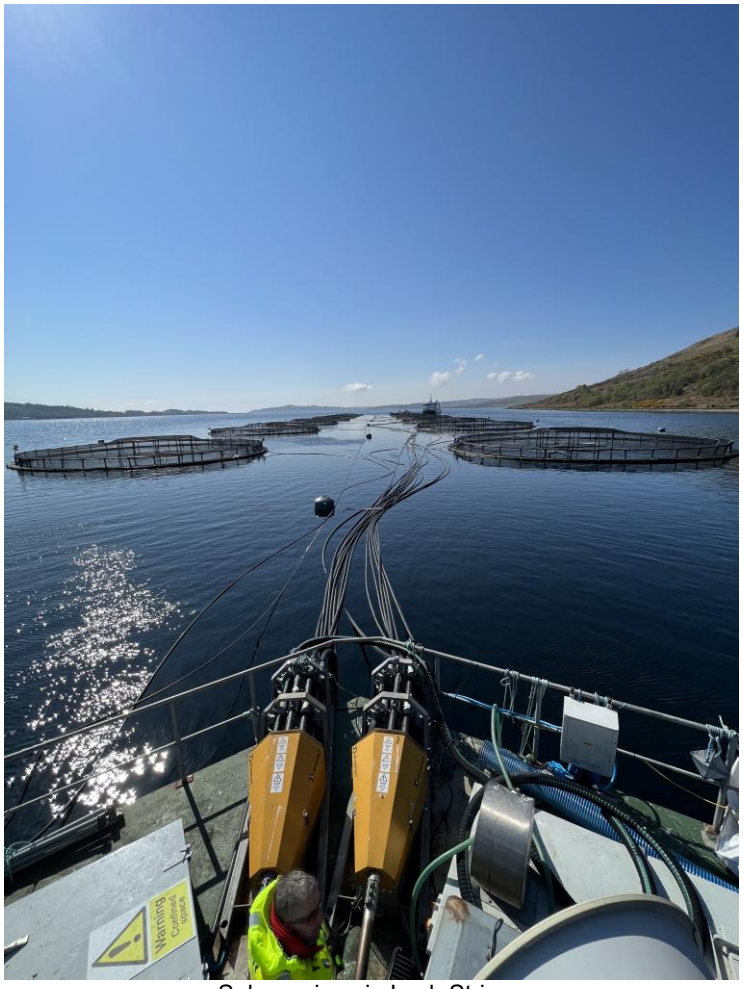
6.5 2024/25 Inspections

6.5.1 NLB's regular inspections is resulting in continued improvement and older legacy lanterns are increasingly being replaced with more modern equipment with Bluetooth capability, which in turn results in test method improvements for both NLB inspectors and marine farm operators.

6.5.2 2024/25 saw the inspection of one hundred and fifty nine aquaculture sites. Each of these commonly featuring 3 AtoN per site, each being tested and the position recorded, with the following results observed:

Site Type	Number Inspected	Correctly Marked as per Marine Licence	Partially Marked	Fail (no operating lights)	Percentage Marked Correctly 2024/25	*2023/24*
Shellfish	66	56	5	5	**84.8%**	*68.2%*
Finfish	92	59	30	3	**64.1%**	*46.7%*
Algal	1	1	0	0	**100%**	*100%*
Combined	159	116	35	8	**73%**	*52%*

Aquaculture Inspection Results



Salmon rings in Loch Striven

6.6 Finfish Compliance Follow-up

6.6.1 Following inspection any immediate actions are agreed with site staff and written reports are then finalised and returned to either the site managers or (more often) to the area managers (*photographic evidence is requested to confirm any remedial actions agreed*).

Image on left shows a replacement fixed white improperly mounted (previous failed unit can be seen above). This resulted in the new solar unit being partially obscured. The operator was advised of a more appropriate location to ensure that the light was visible on all approaches and the image on the right confirms that this had been actioned.

6.7 Collaboration with Other Agencies

6.7.1 The NLB, MCA, CES and MD-LOT continue to work collaboratively to address issues and seek improvements to the Scottish aquaculture regulatory regime, to ensure the industry operates under best practice for the safety of both itself and that of other marine users.

6.8 Working with the industry towards improvement

6.8.1 NLB has continued working with operators to support the development of solutions for site specific issues. One such example is where some locations for mussel and seaweed farms can have difficulty in keeping their separate Special Mark Buoys on station, with a number of instances of these breaking free during storm conditions. One solution that has emerged saw local fabricators being engaged to make up mounting brackets, which are then attached to a yellow version of the inline mussel float. This results in marks that can be mounted at the relevant point in a farms seaward line to meet conditions. These are found to survive much better and are now another option for operators which we are happy to support.

Example of integrated Lit Special Mark Buoy