

Coastal Zone Assessment Survey

Moray: Culbin to Cullen



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The SCAPE Trust and University of St Andrews
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Key Findings

The Moray coastline is predominantly soft and low-lying, characterised by long sandy bays backed with dunes and raised beaches such as at Culbin, Burghead Bay and Lossiemouth. The long stretch of Spey Bay is dominated by a shingle storm beach. The sections of hard, rocky coastlines include the high sandstone cliffs at Covesea and east of Portgordon. Much of the coastline was targeted for the coastal surveys.

The sweeping soft sediment bays experience both seasonal and long-term erosion and accretion. Notable areas of rapid erosion include Kingston at the mouth of the river Spey and the undermining of the railway embankment at Burghead, both of which have seen significant erosion in recent years. Soft coast immediately adjacent to hard coastal defences in Burghead Bay and Portgordon display concentrated erosion and failed coastal defences are noted at Cummingstown and Lossiemouth West Beach. The hard sandstone cliffs at Covesea are more resilient however experience occasional cliff fall.

The largest individual category of sites recorded along this stretch of coastline reflects the significant military presence along these coasts during World War 2, with 34% of records being from this period. Sites relating to maritime infrastructure and fishing activity make up 35% of all of the sites surveyed with 15% being directly related to fishing and 10% related to harbours.

Twenty one of the surveyed sites have been identified as a priority for monitoring and in some cases further investigation and recording, due to a combination of their vulnerability to coastal erosion and their archaeological significance. Twenty of the sites have been assigned a priority 3 status and one site, the Findhorn fishing boat graveyard, has a priority 2 status. The majority of the sites are located along the coastal stretch from Findhorn to Covesea. The site types are varied and include:

- Five sites relating to maritime crafts and fishing structures (Fishing structures and Zulu remains within Findhorn Bay and an additional craft site within Burghead Bay);
- Five caves sites situated amongst the high sandstone cliffs of Covesea;
- Three military sites, including the landscape of World War 2 anti-glider coastal defences along Burghead Bay, the recently revealed remains of a target platform at Hopeman East Beach and an intertidal landscape of military runway lighting within Findhorn Bay;
- Two sites related to quarrying and the extractive industry at Covesea;
- Two unidentified buildings situated on the coast edge at Hopeman East Beach and Portknockie;
- Two natural peat deposits within Burghead Bay;
- One infrastructure site of the old Burghead Railway embankment which is experiencing high levels of erosion;
- An old ground surface within the Findhorn dunes, east of the village, containing multi-period artefact scatters and archaeological features.

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1. Introduction

This report presents the results of a Community Coastal Zone Assessment Survey (CCZAS) of the Moray coast, from Culbin at the Highland-Moray council boundary to Cullen at the Moray-Aberdeenshire council boundary (Figure 1). This stretch of coastline is predominantly soft and low-lying with some sections of hard rocky coastline, such as high sandstone cliffs at Covesea and east of Portgordon. This area had not previously been covered by a CCZAS. The aim of the survey was to characterise and assess the condition and vulnerability of the coastal archaeological resource along stretches of coastline identified as being at moderate to high risk of erosion by 2030. The surveys were designed to involve volunteers and most of the accessible coastline was walked by SCAPE officers and volunteers from June to September 2022. The surveys benefited from information from volunteers about local heritage and recent coastline change.

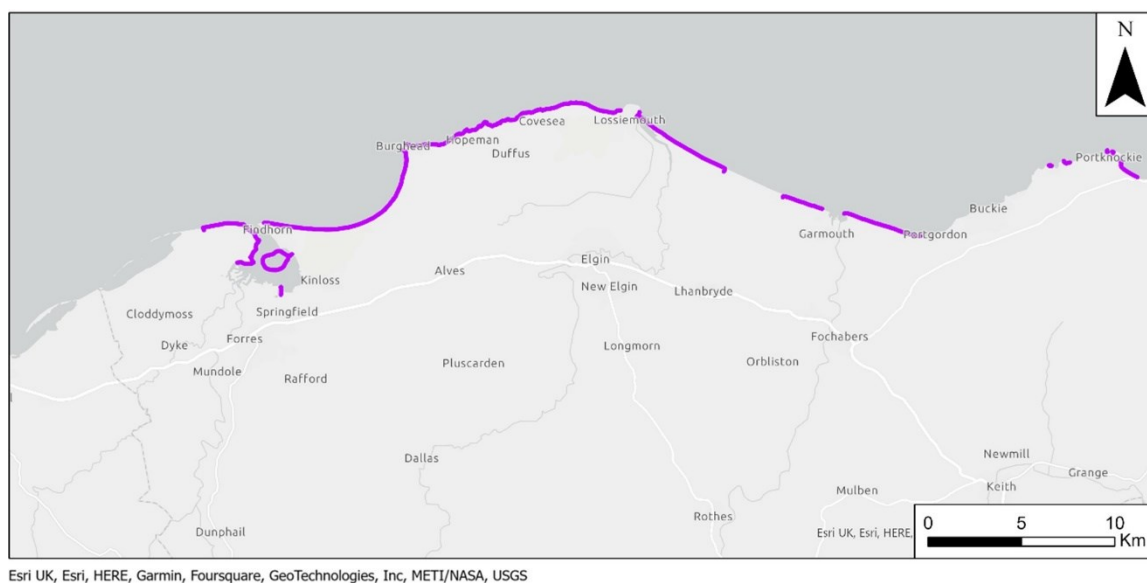


Figure 1. Survey area with stretches walked highlighted in purple

2. Project aims and objectives

The overarching aim of the survey was to identify and characterise archaeological sites and areas that are likely to be impacted by coastal erosion and other threats in the short to medium term.

Survey objectives were to:

- Identify the most vulnerable sections of coastline through desk-based assessment to target fieldwork to coastlines experiencing erosion,
- Involve volunteers from local communities and societies in the field surveys,
- Locate and record archaeological sites at the coast edge and intertidal zone,
- Assess the condition and vulnerability of the sites,
- Assess the field evidence for coastline change during the walkover survey,
- Share results with Aberdeenshire Council and Historic Environment Scotland.

3. Methodology

3.1. Prioritisation of field walkover survey areas

In advance of the walkover surveys, desk-based analysis of models of national coastal susceptibility and national coastal change were undertaken to understand the vulnerability of the coastline and target areas for walkover survey. Two models were combined; a coastal erosion susceptibility model (Fitton et al. 2016) and a model of projected coastal erosion rates by 2030 (Dynamic Coast, Hurst et al. 2021). The coastline was divided into 0.5 km² grid cells and each cell assigned a score based on the combined results from each model. Grid cells coloured yellow, orange and red contain coast which will experience erosion by 2030, with red cells having the highest score from both underlying models. The methodology used to combine the models is outlined in a short methodology report, available at: <https://scapetrust.org/wp-content/uploads/2023/02/CCZAS-prioritisation-methodology.pdf>.

The resolution of 0.5 km² grid cells was chosen to give a broad overview of the nature of the coastline for walkover planning purposes (Figure 2). Within a red or orange grid cell there may be areas of accretion or no erosion, however the cell will also contain coastline with moderate to high susceptibility of erosion by 2030.

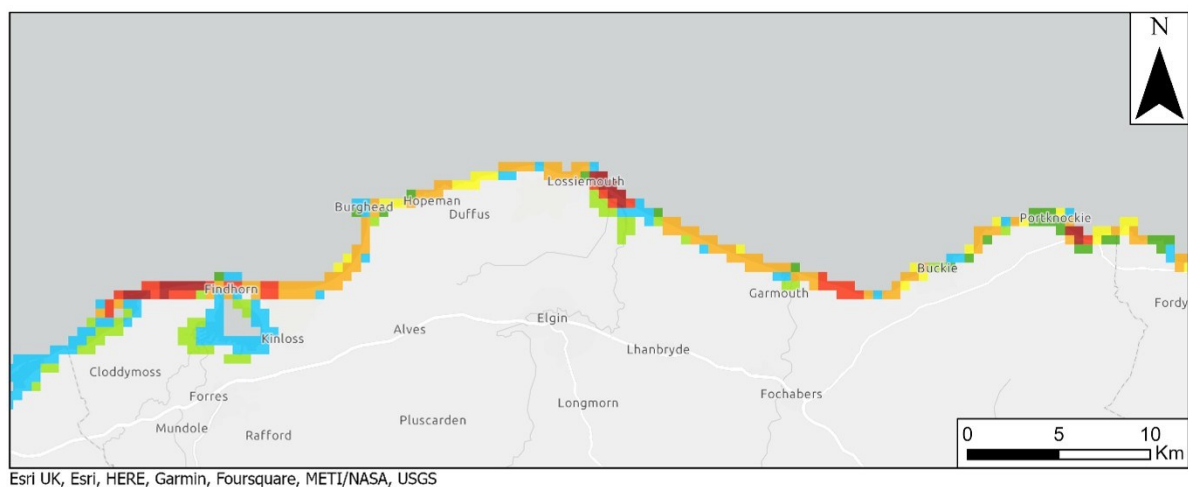


Figure 2. Modelled vulnerability of the Moray coastline. Red, orange and yellow cells denote coast which is experiencing erosion and therefore targeted during the 2022 CCZAS survey. Green cells denote coast that is not experiencing erosion and blue cells denote areas where there is a conflict between the models, or which are only included by one model.

3.2. Preparation of coastal heritage baseline

Aberdeenshire Council and Historic Environment Scotland provided information and point data of all existing known heritage sites within a coastal strip extending 500m either side of the mean high-water springs. This data was integrated into a single database and imported into ArcGIS 10.7. The point data was buffered by 25 m and sites falling within 100m landward and 500m seaward of the mean high-water springs were selected except where Dynamic Coast 2100 erosion projections extend landward greater than 100m, in which case the zone was widened.

The selected sites were then refined to screen out sites not relevant to the surveys. Table 1 presents information on main categories of sites removed from the coastal heritage baseline.

Site Category	Reasoning
Shipwrecks and other poorly located sites	<p>Site records with only approximate coordinates (e.g. bottom left corner of a km grid square) were removed from the database due to the inability to accurately locate during fieldwork.</p> <p>Shipwreck records are often poorly located with multiple wrecks plotted in the same grid square corner.</p> <p>When wrecks were noted on our surveys, these were checked against the shipwreck database and linked to the correct record where identifiable.</p>
Urban records	Records which are not at threat from coastal processes in urban coastal areas. This includes listed buildings, market squares, plaques, and memorials.
Findspots and relocated heritage	Site records where finds were discovered and are no longer there or sites recording the original locations of objects which are now held in museums.
Miscellaneous	Golf courses and general location records e.g. General Views

Table 1. Categories of sites removed from database.

The resulting sites were uploaded to SCAPE's interactive Sites at Risk web map and published to the linked SCAPE Coastal Archaeology Recording App (Figure 3). This app was developed for the project. It allows users to access the location and summary information about known sites, update existing site information and create new site records, including photographs and point and polygon location information. Satellite imagery and historic map layers provide additional information for users in the field. All features of the app are fully functional offline.

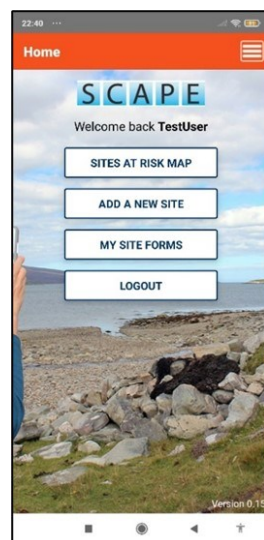


Figure 3A. App Home Screen

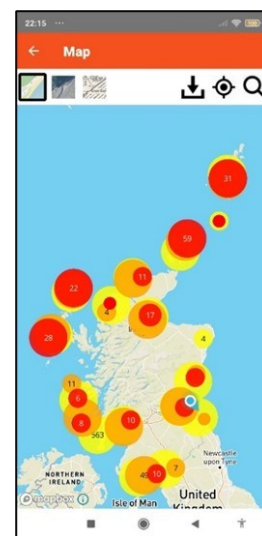


Figure 3B. Interactive Sites at Risk Map

Site markers are initially coloured green to indicate that they have not yet been visited and updated during the CCZA survey. Once visited and moderated, a colour code is assigned to each marker to reflect the priority status of the site based on archaeological significance and physical vulnerability (see section 3.4).

3.3. Field survey

The majority of the survey area was selected for walkover survey due to the soft nature of the coastline and its susceptibility to erosion. Most areas of high rocky cliff lines were not walked, except for the Covesea coastline which was traversed by SCAPE officers. Surveys were timetabled during periods of each month with the lowest tides and each walk was undertaken three hours either side of that day's low tide to gain the most visible exposure of the intertidal zone. SCAPE officers and volunteers generally walked along the coast edge with good views over the intertidal zone and hinterland, deviating to visit known sites and to check features and anomalies. Drone aerial photography was taken of the fish traps in Findhorn Bay.

3.4. Moderation of records

After each walkover, the data collected using the app was submitted to the website and moderated by SCAPE officers. Moderation ensures that data is consistent and meets the standard required by Canmore and Aberdeenshire HER. During moderation, the significance, condition, and vulnerability of each site was also assessed, and a priority based upon site significance and threat from erosion assigned. SCAPE applies a colour code to denote priority for action. Yellow indicates no action and is applied to sites of either low archaeological significance, and/or sites generally not threatened by erosion. Orange indicates monitor and is applied to sites of medium to high significance, or potential significance, under potential threat from coastal erosion. Red denotes action required and is applied to sites of high archaeological significance or potential significance which are observed as being impacted by coastal erosion (Hambly 2017, p. 11). These categories are not fixed and updated information, either not available during the survey, or as a result of monitoring or further investigation may result in the priority status of a site changing. Moderated sites are then published and information publicly available on the SCAPE coastal heritage Sites at Risk web map. Sites not visited in the surveys retain their green marker and are visible only to registered users.

4. Results

4.1. RESULTS: Coastal Change

4.1.1. Summary of coastal change

The desk-based analysis identified much of the Moray coastline as being a priority for survey due to its susceptibility to erosion and projected erosion models. The coastline is characterised by its sweeping, mostly sandy, bays backed by sand dune links. The exception is Spey Bay, where the mighty river Spey flows into the sea at the centre of the bay at Kingston, discharging vast quantities of gravel to be reworked into the shingle beach to its west by longshore drift. More resistant rocky shorelines with pockets of erosion occur east of Burghead before reaching the vertiginous cliffs of Covesea. Although these are not affected by the dynamism experienced by the soft and low-lying stretches, the sandstone cliffs are subject to occasional failure resulting in dramatic cliff falls (Figure 4). From Portgordon to Portknockie, the coast is largely resistant and home to large settlement-scale harbours and built-up areas which are defended.



Figure 4A. Major cliff collapse, Covesea. This looks like it occurred some time ago.



B. fresh cliff collapse around two of the Covesea Caves [[SCAPE ID 14280](#) and [14220](#)]

The continuous supply and movement of sediment along the bays results in both seasonal and long-term trends of erosion and accretion. Sometimes these balance each other out resulting in stability. Sometimes parts of the bay experience a net loss of sediment and other parts gain. The overall movement of sediment along the Moray coastline is in an east to west direction. At a coastline scale, this can be seen in the evolution of the Culbin and Findhorn sandbars as they grow westwards. At a local scale, a sewage pipe close to Portgordon provides a good example of the direction of longshore drift, where shingle has accumulated on the east side of the pipe. It is also demonstrated in the westward migration of where the shingle beach of Spey Bay gives way to sand towards Lossiemouth. The position of the transition has moved by over 2.9 km westwards since the second edition Ordnance Survey of 1903 (Figure 5).



Figure 5. (A) Sewage pipe demonstrating westerly direction of longshore drift (LSD) of sand and shingle towards Spey Bay with a larger quantity and higher level of gravel on the eastern side of the pipe than on the western side. The pipe is defended using rock armour and gabions; (B) Transition between shingle and sand just east of Lossiemouth. Direction of LSD from east to west. At the time of the CCZAS in August 2022, the transition from the shingle dominated sediment originating from the Spey to the predominantly sandy beaches to the west, occurs at BNG 325270 869580.

Concrete WW2 structures built to defend Britain from invasion by sea are very good markers of coastal change within the bays where they occur. In Burghead Bay these show a general trend of net erosion in the western half of the Bay towards Findhorn and a generally more stable picture towards Burghead. Lossiemouth West Beach is suffering erosion at either end but has a stable stretch along the centre. The Lossie Forest end of Spey Bay west of Kingston is largely stable or accreting (Figure 6), except for the kilometre west of Kingston. East of Kingston is largely stable up to the end of the golf course, from where erosion starts to dominate. The stretch at Tannachy Sands west of Portgordon is suffering severe erosion.

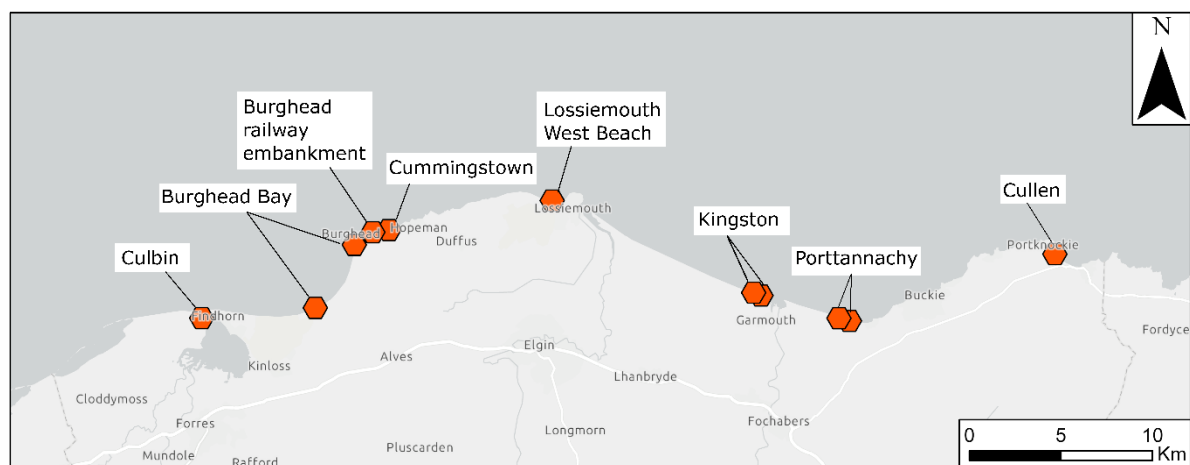
There is good agreement with our observations of areas experiencing high rates of erosion along the bays with the trends modelled by Dynamic Coast. Our fieldwork recorded pockets of quite severe erosion between Burghead and Hopeman.



Figure 6. High shingle storm beaches have built up seaward of the anti-tank cubes and pillboxes running along the coast edge of Lossie Forest, in Spey Bay.

4.1.2. Highlighted areas of erosion

Sections of coastline where notable erosion was observed during the Moray CCZAS are briefly described in this section of the report (Figure 7).



Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Figure 7. Highlighted areas of erosion observed during the Moray CCZAS

Culbin

The eastern end of Culbin Sands coastline on the approach to Findhorn Bay is modelled to be eroding by 2030. The sand beach itself is very dynamic, with a number of shipwreck records that have previously been noted along this coast no longer visible, possibly now buried in the shifting sands. Long stretches of the high dune coast edge show recent erosion and sand slip. This erosion continues around the northwestern edge of Findhorn Bay and evidence of trees becoming unstable and sliding down the dune slopes is evident (Figure 8).



Figure 8. Recent erosion of high sand dune coast edge at Culbin Forest, on the west side of the mouth of Findhorn Bay.

Burghead Bay

Generally, the western half of Burghead Bay is suffering net erosion, with fresh exposure of the spectacular raised beach deposits underlying Roseisle Forest visible (Figure 9). These sections of coast edge are very vulnerable to high tide and stormy conditions. The area of net erosion coincides broadly with the parish of Findhorn. At the parish boundary with Burghead towards the centre of the bay, the beach moves into a more stable sediment regime. The exception is the north end of the Bay at Burghead where a chalet park on the sand dune coast edge is defended by rock armour. Where the rock armour ends, a ‘bite’ has been taken out of the sand dunes as a result of the wave energy being deflected to the edge of the defence (Figure 10).



Figure 9. Freshly exposed cross section through the layered raised beach deposits at Burghead Bay



Figure 10. Erosion of sand dune coast edge at chalet part to the east of Burghead Bay. Eroding 'bite' at the end of the rock armour.

Burghead railway embankment

The Burghead and Hopeman Branch railway provided an extension of the main Highland railway, connecting Burghead to east Hopeman. The railway was built in 1892 and closed to passenger trains in 1931. The railway embankment hugged the coastline, and its footprint is now followed as a pedestrian and cycle path connecting the two settlements. Immediately east of Burghead, parts of the embankment are being undermined by coastal erosion. Local information suggests that the area has experienced accelerated erosion over the last 10 years (Figure 11).



Figure 11. Eroded embankment of Burghead Railway in foreground and background

Cummingstown

Cobble filled gabion baskets to protect the coastal path have failed at this location, (Figure 12).



Figure 12. Example of coastal defence which has failed, Cummingstown.

Lossiemouth West Beach

The position of the almost unbroken line of anti-tank cubes along Lossiemouth West Beach shows that the eastern and western ends of the sandy bay have experienced net erosion since 1940 and the central part of the bay is stable or slightly accreting. On a chance meeting with a coastal engineer who was monitoring trial soft engineering defences along the worst affected parts of the Moray Golf Course, we learnt that 1-1.5 m of coast edge was lost here over the previous 18 months (Figure 13).



Figure 13. The edge of the golf course was re-profiled in November 2021 and wooden fencing anchored to the base of the section. There are also the remains of failed gabions and tumbled anti-tank cubes.

Kingston

The coastline surrounding the mouth of the river Spey is experiencing rapid change and the west part of Kingston and first kilometre of the shingle beach west of Kingston is experiencing significant erosion. This erosion is clearly noted in relation to a park bench which is being undermined as the sediment beneath it is being eroded away and the position of pill boxes and anti-tank cubes in the wave zone (Figure 14). Beyond the first kilometre westwards, the beach is generally stable.



Figure 14. (A) Eroding coastline at Kingston; (B) Pillbox and anti-tank cubes within shingle beach in the wave zone, Kingston.

Porttannachy

The coastline of Porttannachy, between Spey Bay and Portgordon has seen significant landward retreat over the last century. Figure 15 compares modern aerial photography of this stretch of coast to historic mapping from almost a century ago to show the extent of the change over this time. Two roofed buildings which are marked on the historic mapping are no longer visible and are now located under shingle storm beach ([SCAPE ID: 15647](#)) and in the wave zone ([SCAPE ID: 15536](#)). The coast edge at these two locations has retreated over the last 100 years by ~78 and ~85m, respectively and was the most severely eroded stretch of coastline recorded in the survey.

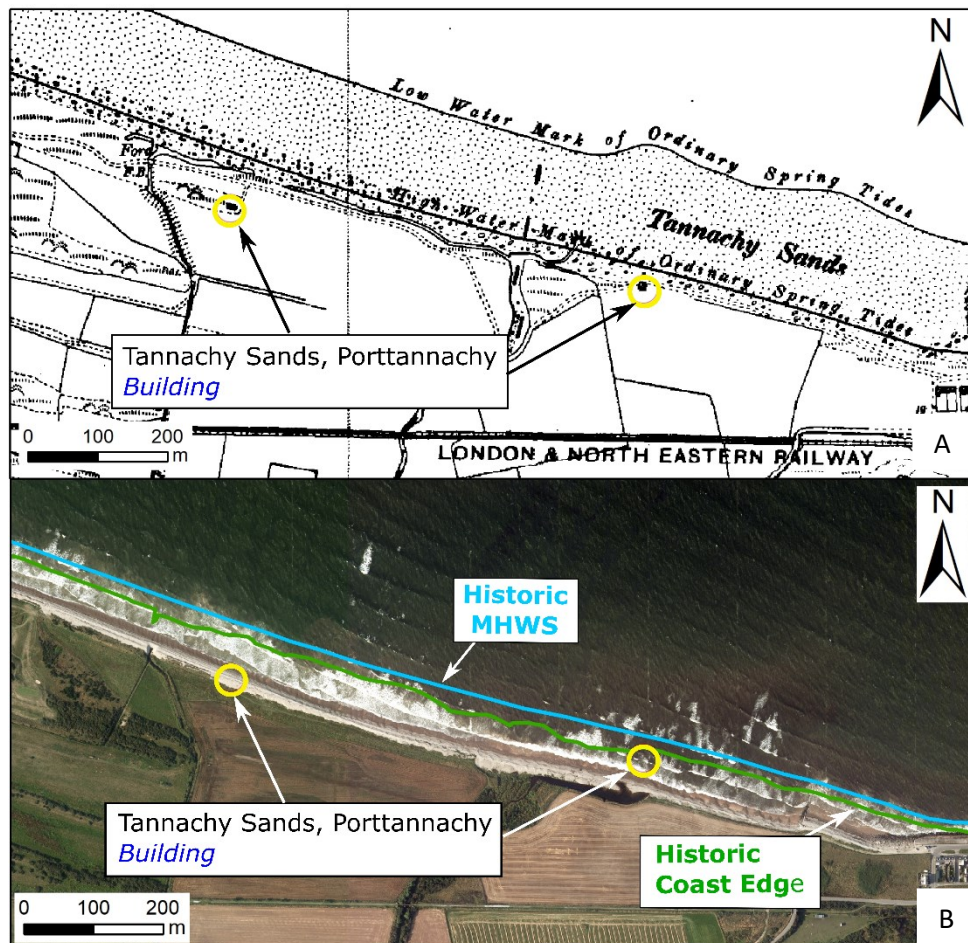


Figure 15. (A) Historic mapping of Porttannachy coast showing the position of two buildings, circled in yellow, © Crown Copyright and Landmark Information Group Limited (2023). All rights reserved. (1:10 560 County Series 2nd Revision, Banffshire, 1928-29); (B) Modern aerial photography of the same coastline, with digitised positions of the historic MHWS and coast edge as depicted in A. Both buildings are no longer visible due to the retreating coast edge. © Getmapping Plc, 2023.

Portgordon itself is defended by hard concrete sea defences and rock armour. However, there is an erosion 'bite' at the edge of rock armour at the western end of Stewart Street carpark where the rock armour ends.

Cullen

Erosion is clearly an issue along Cullen Bay which has been defended by a number of different ad-hoc coastal defences along almost the entire length of the soft coast of the bay including boulder defence and cobble filled metal gabions as well as sea banks along the length of the coast edge bordering the golf course. Tumbled large fragments of mortared stone and concrete, most likely the remains of a second world war structure, are eroding out of the sea bank towards the eastern end of the bay ([SCAPE ID: 14396](#)) and recent erosion of the coast edge is also visible towards the western end of the bay.

4.2. RESULTS: Built heritage and archaeology

Sites were categorised into broad site types to aid discussion (Table 2) and a breakdown of the percentage of each site type recorded during the survey is provided (Figure 16). An overview of the main findings is given below followed by a short section highlighting notable sites and examples.

Site Type	Definition
Maritime Fishing	Fixed sites or objects with a direct link to fishing industry e.g. fish traps, fishing stations, bothies, boat houses, icehouses, winches.
Maritime Craft	Craft, ballast mounds, components of crafts such as timbers, boilers, capstans.
Maritime Harbours	Formal harbour structures associated with and serving settlements, e.g., built harbours, piers, jetties, breakwaters, docks.
Maritime Landing Places	Informal and small-scale, landing areas or structures, e.g. cleared slipways, piers, jetties, breakwaters.
Maritime Navigation	Infrastructure related to navigation e.g. lighthouses, beacons.
Industry Factories and Works	Industry not directly related to fishing, e.g. rope works, brick works, tide mills, lime kilns, salt pans.
Industry Extractive	Extractive industries, e.g. coal mining, quarrying.
Infrastructure & Engineering	Railways, tracks, bridges, embankments, drainage.
Settlement & Agriculture Buildings	Buildings related to settlements and agriculture.
Settlement & Agriculture Boundaries	Boundary stones, fences and walls demarking property or land boundaries.
Landscapes of resource exploitation & repeated human activity	Middens, shell middens, artefact scatters, lithic scatters, burnt stone, buried anthropogenic soils/ ground surfaces
Castles and Forts	Remains of castles and promontory forts.
Religious	Churches, burial sites, holy wells, crosses.
Military WW2	Military sites constructed as part of Second World War coastal defences e.g. pillboxes, observation posts, gun emplacements, anti-tank cubes, anti-glider posts or roadblocks.
Military Other	Military sites which are not solely Second World War, e.g. Napoleonic or WW1 targets and rifle ranges or military bases and airfields.
Natural Features	Geologic or geomorphologic features e.g. sea stacks, mounds, intertidal peat, unmodified caves, unmodified springs.
Miscellaneous	Sites out with the outlined site types.

Table 2. Site type categories and definitions

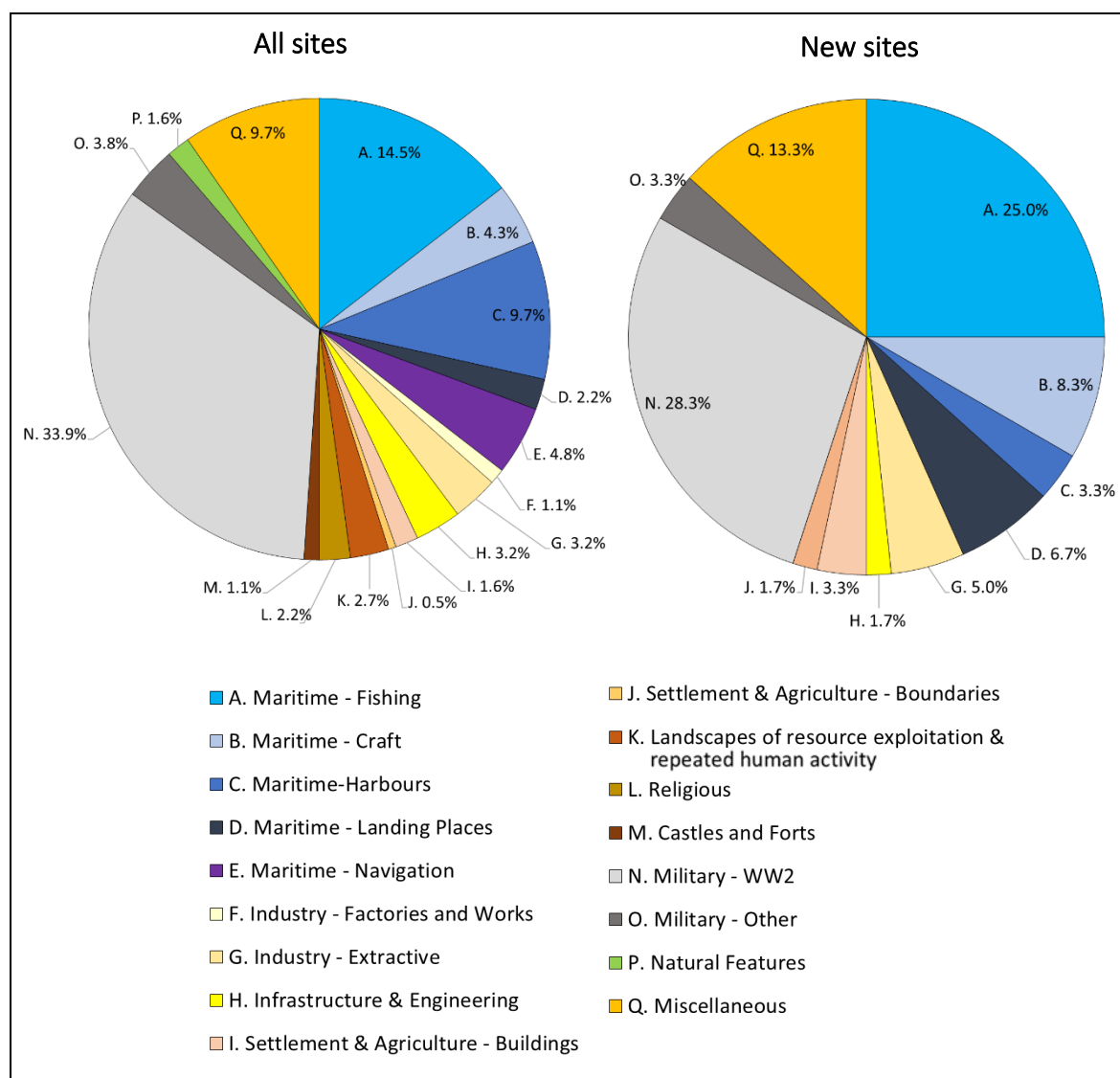


Figure 16. (A) All sites updated during survey, arranged by category (n=186). One master record for the scheduled Findhorn Boat Graveyard is included in this pie chart, which represents 32 individual boat and ballast mound records. The full list of individual records for Findhorn Boat Graveyard are listed in the Appendix; (B) New sites recorded during survey, arranged by category (n=60).

4.2.1. Military

Military – WW2

Second World War sites related to the coastal anti-invasion defences of Britain make up the largest category of site types that were visited in the Moray CCZAS, with over 30% of all sites being of WW2 date. The main site types are anti-tank cubes, pill boxes and anti-landing defences. These modern heritage sites are a common occurrence and characteristic aspect of the Moray coastline. They emphasise the important role this coastline had during the war years, from the secret D-Day practices at Burghead Bay to the thousands of anti-tank cubes cast in situ by soldiers along miles of vulnerable soft beaches from Findhorn to Cullen, and beyond.

Along the Moray coastline, anti-landing posts are best preserved at Burghead Bay and Lossiemouth West Beach where numerous examples can be found in the intertidal zone. These posts are mostly wooden and in many cases, it is difficult to differentiate between them and wooden stakes associated with fixed fishing nets. At Burghead Bay, some posts are set into wooden barrels which is unusual, and the only example of barrels being used to secure anti-landing posts that we came across in the surveys (Figure 17).



Figure 17. Example of an anti-glider post within a wooden barrel. A line of anti-tank cubes and a Type 24 pillbox can be seen in the background (<https://scapetrust.org/sites-at-risk/site/15557>).

Anti-tank cubes and their associated pill boxes line the long beach stretches of Burghead Bay, Lossiemouth West Beach and Spey Bay, Innes Links between Lossiemouth and Kingston. These anti-tank cubes were cast in situ during 1940-41 by Polish and Welsh soldiers based in the area. Several tank cubes bear inscriptions, such as initials and names of individual soldiers or memorials to fallen comrades (Figure 18 B, C). A rare, if not unique, example of an eagle cap badge (the Polish army emblem) pressed into the surface of an anti-tank cube was spotted by a volunteer on Lossiemouth West Beach (Figure 18, D).



Figure 18. Examples of anti-tank cubes on Lossiemouth west beach (A) partially buried anti-tank cubes (<https://scapetrust.org/sites-at-risk/site/14376>); (B) inscribed WELSH Co AM. PO IN LOVING MEMORY, (C) inscribed IN REMEMBRANCE OF 150 COMMANDO, (D) Polish cap badge pushed into the surface of an anti-tank cube (<https://scapetrust.org/sites-at-risk/site/14208>).

The majority of the pillbox records are of either Type 24 six-sided design, or rectangular medium machine gun type. Along the Spey Bay golf course are three examples of much smaller, round pillboxes. These are known as Norcon pillboxes and are simple constructions, made from concrete sewage pipe (Figure 19), (Barclay, 2013).



Figure 19. Examples of pillbox styles along the Moray coastline. (A) Type 24 six-sided pillbox, Burghead Bay (<https://scapetrust.org/sites-at-risk/site/14342>); (B) Round Norcon style pillbox, Spey Bay (<https://scapetrust.org/sites-at-risk/site/15650>); (C) Medium machine gun rectangular pillbox, Innes Links (<https://scapetrust.org/sites-at-risk/site/14259>); (D) Type 24 pillbox camouflaged with added stone cladding, Covesea Links (<https://scapetrust.org/sites-at-risk/site/14294>).

Occasional survivals of other types of concrete defences include a 'roadblock', a pair of larger than usual cubes with opposing slots for wooden bars and the tumbled remains of an anti-tank wall constructed as part of the D-Day landing rehearsals. Some of the wall sections have boot prints impressed into the concrete. Both sites can be found in Burghead Bay (Figures 20 and 21).



Figure 20. Roadblock in Burghead Bay (<https://scapetrust.org/sites-at-risk/site/15560/>)



Figure 21. Fallen anti-tank wall, part of the D-Day rehearsals in Burghead Bay
(<https://scapetrust.org/sites-at-risk/site/15570/>)

Military – Other

Military sites that are not related to World War 2 coastal anti-invasion defences include rifle ranges and targets at Findhorn, Hopeman and Innes Links, a magazine store at Cullen and the remains of military airfield runway lighting for Kinloss airfield.

The remains of at least thirteen Drem lights survive within the mudflats of Findhorn Bay. The Drem lighting system, named after RAF Drem in East Lothian where they were invented in 1940, was developed to overcome difficulties caused by restricted forward and downwards vision by pilots flying long-nosed aircraft (especially Spitfires) as they came into land. The Drem system used a circular array of lights mounted on angled 10-foot poles which could be seen from different angles by pilots as they flew around their landing circuit, directing them towards the runway. The triangular metal tripod poles and some elements of the light fittings are still visible in Findhorn Bay (Figure 22). As far as we know, these are the only surviving *in situ* partial array of Drem lights. They are slowly deteriorating within the estuarine muds and vulnerable to eventual loss in the near future.



Figure 22. (A) Remains of DREM lighting pole related to Kinloss military airfield. (B) A close up of the remains of DREM light with electric bulb fittings visible (master record <https://scapetrust.org/sites-at-risk/site/15770>).

Sites of rifle ranges are a feature of the east coast of Scotland, marked in the vicinity of a great many coastal settlements on the first and second editions of the Ordnance Survey. They originated during a national panic of an invasion threat by the French Emperor Napoleon III in the 1860s, which never materialised. Many were re-used as practise ranges in the First World War. There is a well-preserved Napoleonic example at the head of Findhorn Bay (Figure 23A), and three separate examples at Innes Links dating from the 1860s, First World War and Second World War. A stone target from the Hopeman rifle range is eroding out of the sand dunes at the end of Hopeman East beach (Figure 23B).



Figure 23. (A) Napoleonic period rifle range and targets, Findhorn (<https://scapetrust.org/sites-at-risk/site/14247>); (B) remains of Napoleonic target platform eroding out of dunes, Hopeman East Beach (<https://scapetrust.org/sites-at-risk/site/15643>).

4.2.2. Maritime

Maritime – Fishing

Most of the new fishing sites recorded during the CCZAS are the remnants of posts and stakes from fixed fishing nets. Of great assistance to the identification of the numerous posts spotted in the intertidal zone was the records of the Moray Firth Salmon Fishing Co. (1908-1987) held in the Findhorn Heritage Centre. A series of maps show the position of every fly and bag net belonging to the Company along the Moray coast (Figure 24).



Figure 24. An example from Burghead Bay of the Moray Firth Salmon Fishing Co. maps that locate the positions of fixed nets under their ownership in the Moray Firth

Several new records of stone fishtraps, or yairs, were made within Findhorn Bay. These include at least one V-shaped fish trap, and three further stone and timber features as well as an extensive mussel scalp (Figures 25-27). The traps are constructed with driven posts and stakes against which lines of stone have been laid. Much of the stone is moulded and clearly re-used. Local information suggests it is from Kinloss Abbey. The mussel scalp is constructed with a grid of driven round posts, over which wood and stone has been laid. The fishing history within Findhorn Bay spans centuries, with a number of yairs marked onto the Phinn (1758) map 'A survey of the River Findhorn with the fishing places', some of which may date back to the medieval period.

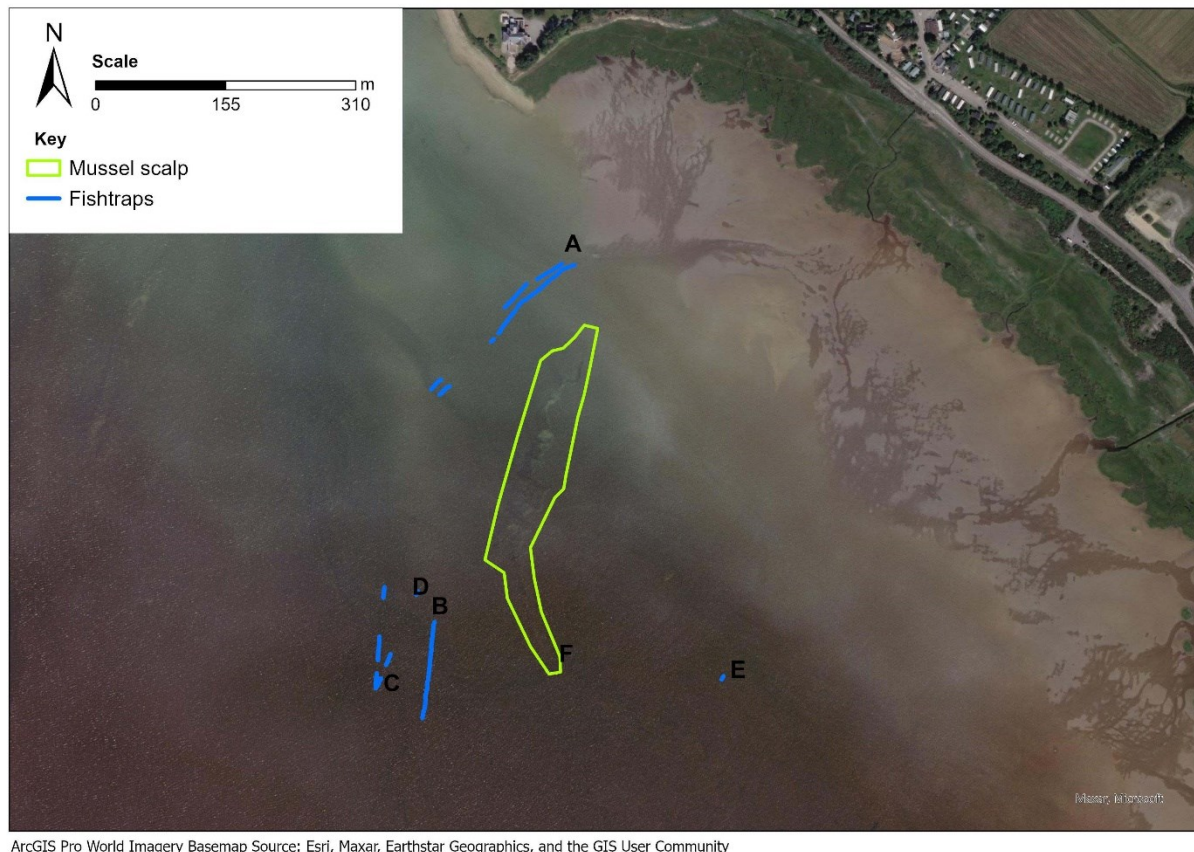


Figure 25. Rapid survey of fish traps and mussel scalp identified in Findhorn Bay. A-curvilinear fishtrap; B-linear fishtrap; C, D-V-shaped fishtrap; E-location of potential fishtrap; F-mussel scalp. Based on site visit and previous surveys by Michael Sharpe and Richard Somers Cocks. SCAPE master record <https://scapetrust.org/sites-at-risk/site/15768>.



Figure 26A. Volunteers standing along V-shaped stakes of fishtrap.



Figure 26B. Moulded stone and stakes typical of fishtrap structures.



Figure 27A. General view of mussel scalp, looking north.



Figure 27B. Detail of grid round wood stakes forming framework of mussel scalp.

A shingle bar, also a natural mussel scalp, located at the mouth of the river Findhorn is the probable location of Old Findhorn, gradually inundated throughout the 17th century and washed away in a great flood on October 11, 1702. Nothing now remains of Old Findhorn, however in 2003 and subsequent years, Tim Negus and Findhorn Heritage surveyed stonework visible on the shingle ridge and plotted concentrations of larger and moulded stone as a proxy for the possible location of this part of the former village (Figure 28). Some of the moulded stone can be seen in Findhorn Heritage Centre.



Figure 28. Map showing extent of the Old Findhorn survey carried out in 2003. (a) Location of survey in relation to Culbin Forest and Findhorn; (b) heatmap showing the number of stones recorded within each grid square along with the location of moulded stone identified during the survey. Created by Sarah Boyd using data from Tim Negus.

Maritime - Craft

The survey updated two existing shipwreck sites at Culbin sands and Burghead Bay. Research carried out by Tim Negus has tentatively identified the wreck at Culbin sands (SCAPE ID:12890) as the Nairnshire, a schooner built in 1875 and wrecked in 1910. The second existing wreck record is that of the Olive, a vessel originating from Banff which became stranded in January 1865 (Figure 29A). The wreck location has been updated.

Findhorn Bay fishing boat graveyard, on the western edge of the bay is the only priority 2 site in the survey area. The site was first brought to the attention of SCAPE by Michael Sharpe and Tim Negus, and was subsequently recorded by SCAPE and volunteers in 2017 (SCHARP report, 2017). The site is now scheduled ([SM 13730](#)). This site was revisited in August 2022 during the CCZAS and the records of individual vessels and ballast mounds were updated with photographs.

Two previously unrecorded Zulu craft were added to the record, one close to the centre and one east of Findhorn Bay respectively (Figure 29B, C). These may have become detached from the main concentration of wrecks in the boat graveyard. A large piece of the hull of a further previously unrecorded wreck at Culbin Sands (Figure 29D) has been tentatively identified by Tim Negus as the Zulu fishing vessel, The War Sprite, which was wrecked in a storm in November 1893.



Figure 29A. Remains of the Olive, Burghead (<https://scapetrust.org/sites-at-risk/site/15550>)



B. Remains of Zulu in the centre of Findhorn Bay (<https://scapetrust.org/sites-at-risk/site/15620>)



C. Mostly buried remains of Zulu to the east of Findhorn Bay (<https://scapetrust.org/sites-at-risk/site/15618>)



D. Fragmentary remains of Zulu 'The War Sprite' on Culbin Sands (<https://scapetrust.org/sites-at-risk/site/15516>)

Intertidal wrecks are under recorded in Historic Environment Records. Their location in the intertidal zone and sensitivity of the heritage assets, mostly dating from the late 19th and early 20th centuries, and constructed from perishable wood and metal, makes them a vulnerable site type and increasingly rare feature of Scotland's coastline. The significance of the collection of vessels in the Findhorn boat graveyard is reflected in its designation as a scheduled monument.

Maritime – Landing places

Another under-recorded feature of the whole of the Scottish coastline are informal and small-scale boat landing places. Four new records of informal landing places were recorded during the survey. These included the remains of two small wooden piers at Culbin, Findhorn Bay ([SCAPE ID: 15580](#)) and Binsness ([SCAPE ID: 15581](#)), a potential landing structure in Findhorn Bay ([SCAPE ID: 15619](#)) and a possible naust at Clashach Port, Hopeman ([SCAPE ID: 15636](#)). There is also an existing record of a boathouse which has a pier associated with it at Binsness ([SCAPE ID: 14210](#)).

Maritime – Harbours

There are numerous large settlement scale harbours around the Moray coast. These working harbours were not recorded in detail during our survey however we did add photographs to the records when deemed useful. All navigation records updated during the survey were related to beacons within harbours.

4.2.3. Industry

Industry – Extractive

Quarries are a feature of the rocky coastline between Hopeman and Covesea. Covesea Quarry is lying disused but has a substantial spoil heap over the cliff. Clashach Quarry is periodically active. The quarry has high geological interest due to the footprints and moulds of ancient reptiles, commonly referred to as the Elgin Reptiles, which have been preserved within the Late Permian age sandstone (Hopeman Sandstone Formation) quarried at Clashach. Examples of the Elgin Reptiles, which are recognised as being of national importance, are on display within the [Elgin Museum](#). The quarried sandstone has also been used locally, such as for the construction of Duffus Castle.

The Clashach Quarry site record is composed of the quarry and spoil heap the remnants of a smithy and disused harbour (Figure 30A). An example of an unfinished millstone is located within the harbour site (Figure 30B).

A further four examples of unfinished millstones were recorded at the base of the cliffs at Covesea, evidence of millstone quarrying in the area in the past (master record <https://scapetrust.org/sites-at-risk/site/14233/>).



Figure 30. (A) Remains of Clashach Quarry harbour wall in the foreground, looking towards the quarry. The Quarrymen's Cave is visible in the sandstone cliffs; (B) A close-up of the millstone found within the remains of the harbour (<https://scapetrust.org/sites-at-risk/site/14279>).

The Quarrymen's Cave, located in the sandstone cliffs at the edge of the quarry overlooking the harbour is an interesting cave containing internal walls and a fireplace and home to numerous masons' marks, mostly carved into the roof and walls at the entrance. Outside the cave, either side of the entrance, are three carvings of ships (Figure 31), (<https://scapetrust.org/sites-at-risk/site/14305/>).



Figure 31 A. Location of ship graffiti outside Quarrymen's Cave



B. Two rigged sailing ships (schooners?) on the left



C. Unrigged small sailing ship on the right.



D. One of the numerous masons marks carved into the roof entrance overhang.

4.2.4. Landscapes of resource exploitation and repeated human activity

The dunes to the east of Findhorn village contain expansive areas of sand blow outs which have revealed an old ground surface, intermittently exposed over a wide area throughout the dunes. At the coast edge this old ground surface layer, which is rich in charcoal and fire-cracked stone can be traced for at least 60 metres (Figure 32). A summary of past investigations is available on the North of Scotland Archaeology Society (NOSAS) [blog](#) (Sharpe, 2020). Within the dune blow outs, Michael Sharpe has identified a debitage mound of deliberately struck quartz cobbles and a possible burnt mound. Thousands of lithics, as well as occasional pottery, beads and cremated bone have been recovered by surface collection over many years. Examples of flint arrowheads and tools from the area are displayed in Findhorn Heritage Centre. This is a very interesting landscape, extremely vulnerable to aeolian and coastal erosion as well as damage from vehicles and people. It would benefit from systematic survey.

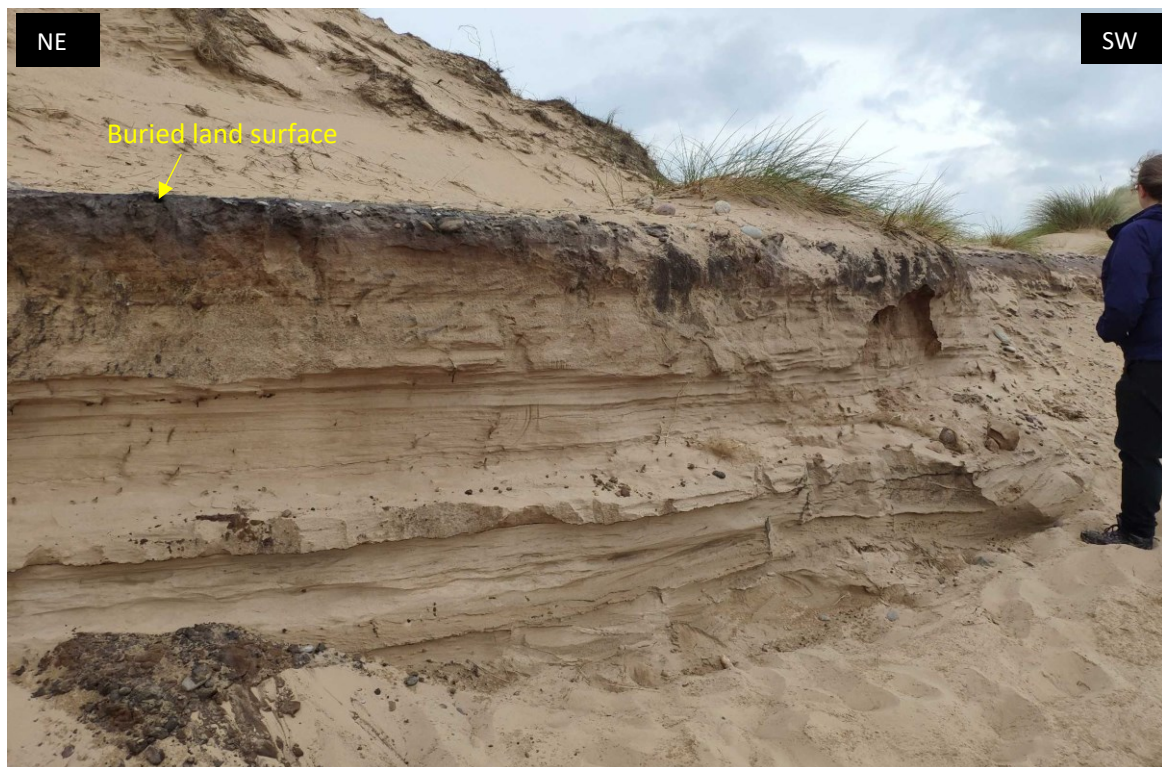


Figure 32. Fresh vertical section revealing old ground surface layer buried within the sand dunes. Note the burnt appearance and abundance of fire-cracked stone incorporated into the deposit. (<https://scapetrust.org/sites-at-risk/site/14217>).

4.2.5. Miscellaneous

The sandstone cliffs between Hopeman and Covesea are home to the archaeologically famous Covesea Caves, including Sculptors Cave and Deer Cave. At the time of the survey, the caves are under an active programme of research led by Ian Armit.

5. Priority sites and recommendations

Twenty sites have been assigned a priority 3 status based upon their vulnerability to coastal erosion and archaeological significance. Twelve of these have existing Canmore or HER records associated with them. Eight, are new sites. Findhorn fishing boat graveyard has an existing priority 2 status.

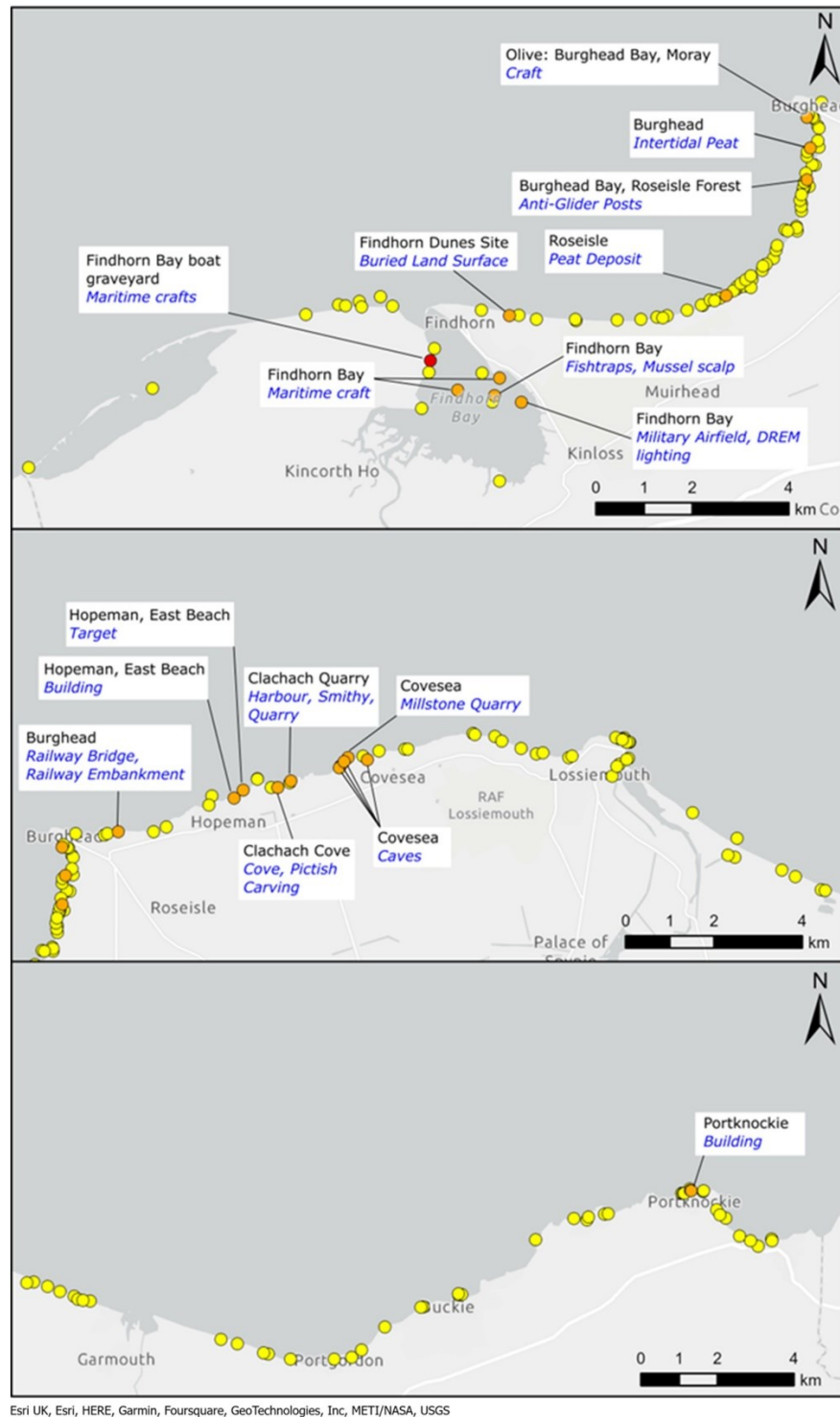


Figure 33. All updated sites within the survey area. Orange sites are priority 3 sites. The master record for Findhorn Bay fishing boat graveyard has a priority 2 status.

It is recommended that all sites are regularly monitored at three-to-five-year intervals or following an extreme weather event.

All intertidal wrecks, the Findhorn Bay boat graveyard, outlying Zulu vessels, and the Drem lights associated with Kinloss airfield are particularly sensitive to decay because of their location in the intertidal zone and composition from wood and metal materials. These are a priority for regular monitoring. Periodic drone survey of the Findhorn Bay vessels would be useful as there is existing drone photography to which future surveys can be compared.

The fishtraps in Findhorn Bay are of great interest. They take several forms and contain wooden elements that could provide dating evidence for the identification of early yairs with historical associations with Kinloss Abbey, and the evolution of fishtraps following the reformation. The fishtraps and mussel scalp would benefit from a more detailed survey and a programme of dating. They would also benefit from periodic drone surveys to monitor the extent of the traps in different states of sedimentation in the bay.

Also of great interest in Findhorn is the buried ground surface, artefact scatters and archaeological features exposed in dunes to the east of the village. These would benefit from a systematic survey.

Both Findhorn sites would be good candidates for supported community-led investigation, as much of the research and survey to date has been carried out locally and there is a great deal of existing information held in the community.

Caves at Covesea are a significant national heritage asset on the Moray coastline. These are under active investigation in a wider academic research project, however, occasional condition monitoring in the face of periodic cliff erosion and collapse would be useful.

A systematic survey to identify any further millstones along the Clashach to Covesea stretch of coast, combined with historical research would make an interesting project.

A summary of vulnerability and recommended action for each site is given in Table 4.

Scape ID	Canmore ID	HER ID	Site Name	Site Type	Summary of vulnerability	Recommended Action
<i>Maritime - Fishing</i>						
15768	-	-	Findhorn Bay	Fishtraps, Mussel Scalp	Intertidal	Monitor, survey, investigation
<i>Maritime - Craft</i>						
12824		NJ06SW0125	Findhorn Bay boat graveyard	Maritime craft	Intertidal	Monitor regularly
15550	285397	-	Olive: Burghead Bay, Moray	Craft	Intertidal	Monitor regularly
15618	-	-	Findhorn Bay	Maritime Craft	Intertidal	Monitor regularly
15620	-	-	Findhorn Bay	Maritime Craft	Intertidal	Monitor regularly
<i>Industry – Extractive</i>						
14233	16283	NJ17SE0005	Covesea	Millstone Quarry	Intertidal	Survey coast for further examples

Scape ID	Canmore ID	HER ID	Site Name	Site Type	Summary of vulnerability	Recommended Action
14278	358006	NJ17SE0028	Clashach Quarry	Harbour, Quarry, Smithy	Intertidal	Monitor, 5-year intervals
<i>Infrastructure & Engineering</i>						
15638	-	NJ16NW0113	Burghead	Railway Bridge, Railway Embankment	Coast edge	Monitor for further deterioration of embankment
<i>Settlement & Agriculture - Buildings</i>						
15631	-	-	Hopeman, East Beach	Building	Coast edge	Monitor, historical research
15651	-	-	Portknockie	Building	Coast edge	Monitor, historical research
<i>Landscapes of resource exploitation and repeated human activity</i>						
14217	369023	NJ06SE0010	Findhorn Dunes Site	Buried Land Surface	Coast edge, dune system	Monitor, survey
<i>Military – WW2</i>						
15599	-	-	Burghead Bay, Roseisle Forest	Anti Glider Posts	Intertidal	Monitor
<i>Military – Other</i>						
15643	-	-	Hopeman, East Beach	Target	Coast edge	Monitor
15770	-	-	Findhorn Bay	Military Airfield, Light	Intertidal	Monitor regularly
<i>Natural Features</i>						
12863	349535	-	Roseisle Peat Deposit	Intertidal Peat, Submerged Forest	Intertidal, coast edge	Monitor for archaeological material
12864	349536		Burghead Peat Deposit	Intertidal Peat, Submerged Forest, Anti-Glider Posts	Intertidal	Monitor for archaeological material
<i>Miscellaneous</i>						
14209	88689	NJ17SE0006	Clashach Cove	Cave, Pictish Symbol	Coast edge	Monitor, 5-year intervals
14220	16280	NJ17SE0003	Covesea	Cave(s), Human Remains, Stake Hole(s), Animal Remains, Blade (Flint), Crucible, Leaf Arrowhead, Organic Material (Wood), Slag, Unidentified Pottery(s)	Coast edge	Monitor, 5-year intervals
14280	365492		Covesea Cave 2	Cave, Funerary Site, Human Remains, Midden, Pit(s), Stake Hole(s), Animal Remains, Worked Object (Bone)	Coast edge	Monitor, 5-year intervals
14307	16278	NJ17SE0001	Sculptor's Cave, Covesea	Cave, Human Remains, Pictish Symbols	Coast edge	Monitor, 5-year intervals

Scape ID	Canmore ID	HER ID	Site Name	Site Type	Summary of vulnerability	Recommended Action
14360	365498	NJ17SE0025	The Laird's Stable	Cave, Animal Remains	Coast edge	Monitor, 5-year intervals

Table 4. Summary of priority sites.

6. Acknowledgements

Special thanks to all our volunteers and to the North of Scotland Archaeology Society (NOSAS). Thanks to Janet Trythall and Dave Longstaff for their time and expertise both in the field and when visiting the Elgin Museum and to Tim Negus for generously sharing his research with us and providing access to the Findhorn Heritage Centre. Thanks to Richard Somers Cocks, Michael Sharpe and Timothy Finnegan for their knowledge and guidance for our walk around Findhorn Bay. Michael Sharpe generously shared findings of his long-standing research interest in the Findhorn Dunes with us. We also appreciate information on the Spey Bay area from Rob Wallen, James Mackie and David Mackay. Ray Lawrenson of Siskin Asset Management kindly talked to us about the Moray Golf Club trial coastal defences.

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Appendix 1. Known sites visited on 2022 survey

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
<i>Maritime - Fishing</i>							
14210	Binsness, Boathouse and Pier	Boathouse, Pier	Post-Medieval, Modern	303270	863510	243203	
14222	Burghead Bay, Mid Fishing Station	Fishing Station	Modern	306319	864570	107614	
14225	Gollachy, Ice House	Icehouse	Post-Medieval	340260	864565	167224	NJ46SW0110
14234	Farskane's Cave	Platform(s)	Post-Medieval	349200	868700	17397	NJ46NE0021
14330	Bessie Burn, Ice-house	Icehouse	Post-Medieval	309842	865291	107615	NJ06SE0072
14364	Bessie Burn	Ice-houses	Post-Medieval	309950	865264		NJ06SE0079
14367	Millie Bothy	Bothies, Buildings, Stations	Post-Medieval	310903	866431		NJ16NW0091
14368	Burghead	Ice-houses	Post-Medieval	311360	868551		NJ16NW0143
14374	Arthur's Point	Bothies, Ice-houses	Post-Medieval	340875	865163		NJ46NW0023
14382	Millie Burn	Flagstaffs	Post-Medieval	310902	866488		NJ16NW0090
14385	Covesea	Bothies, Fishing-stations	Post-Medieval	318947	871001		NJ17SE0026
14386	Hopeman	Yards	Post-Medieval, Modern	314440	869735		NJ16NW0199
<i>Maritime - Craft</i>							
12824	Findhorn Bay boat graveyard	Maritime craft					NJ06SW0125
12890	Shipwreck, Culbin Sands	Craft	Post-Medieval	301826	864972	290582	
15550	Olive: Burghead Bay, Moray	Craft	Post-Medieval	311107	868783	285397	
<i>Maritime - Harbours</i>							
14227	Lossiemouth, Lossiemouth Harbour, old pier and breakwater	Breakwater, Pier	Post-Medieval	323951	870790	310058	

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
14231	Hopeman Harbour, Moray Firth	Harbour	Post-Medieval	314500	869940	16202	NJ16NW0043
14268	Lossiemouth, Branderburgh Harbour, New Basin	Dock Basin	Post-Medieval	323742	871230	280248	
14273	Lossiemouth, Branderburgh Harbour, South Pier	Pier	Post-Medieval	323958	871163	310154	
14314	Lossiemouth, Branderburgh Harbour, New Basin, Slipway	Slipway		323659	871260	280251	
14318	Lossiemouth, Lossiemouth Harbour, Quay	Quay		323740	870660	310059	
14341	Portknockie Harbour, Outer Harbour	Harbour	Modern	348671	868653	310572	
14359	Lossiemouth, Lossiemouth Harbour, west pier	Pier		323908	870765	310057	
15537	Lossiemouth, Lossiemouth Harbour	Harbour	Post-Medieval	323680	870610	16729	NJ27SW0011
15538	Findochty Harbour	Harbour	Post-Medieval	346158	867952	17401	NJ46NE0025
15539	Cullen Harbour, Moray Firth	Harbour	Post-Medieval	351001	867408	17961	NJ56NW0018
15540	Buckie, Buckpool Harbour	Harbour	Post-Medieval	341812	865677	17417	NJ46NW0010
15541	Portknockie Harbour, Moray Firth	Harbour	Post-Medieval	348700	868650	17399	NJ46NE0026
15542	Lossiemouth, Branderburgh Harbour	Harbour	Post-Medieval	323808	871209	16727	NJ27SW0009
15544	Portgordon Harbour	Harbour	Post-Medieval	339550	864330	80404	NJ36SE0013
15545	Buckie, Harbour	Harbour	Post-Medieval	342883	866017	133251	NJ46NW0006
<i>Maritime - Navigation</i>							
14224	Lossiemouth, Branderburgh Harbour, Beacon	Beacon	Post-Medieval	323974	871151	280250	

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
14285	Portknockie Harbour, South Breakwater, Leading Light	Beacon	Post-Medieval	348637	868648	17400	
14286	Cullen Harbour, Harbour Light	Beacon	Post-Medieval	350987	867459	17962	
14302	Lossiemouth, Branderburgh Harbour, Pilot Beacon	Beacon	Period Unknown	323809	871230	310155	
14319	Lossiemouth, Branderburgh Harbour, Pilot Beacon	Beacon		323848	871216	310156	
14337	Buckie Harbour, West Pier, Tide Lamps	Beacon	Modern	342805	865997	280613	
14348	Buckie, Buckpool Harbour, Lighthouse	Beacon		341870	865690	17418	
15546	Findochty Harbour, West Breakwater, Lighthouse	Beacon	Post-Medieval	346197	868036	17402	
15547	Buckie Harbour, East Pier, Lighthouse	Beacon	Post-Medieval	342801	866035	133252	NJ46NW0052
<i>Industry – Factories and Works</i>							
14321	Burghead, Rope Walk	Ropewalk	Post-Medieval, Modern	311416	869087	319853	NJ16NW0200
14401	Portgordon	Boilers	Post-Medieval	340007	864379		NJ46SW0130
<i>Industry - Extractive</i>							
14233	Covesea	Millstone Quarry	Period Unknown	317590	870810	16283	NJ17SE0005
14279	Clashach Quarry	Harbour, Quarry, Smithy	Post-Medieval	316296	870278	358006	NJ17SE0028
14305	Clashach Quarry	Building(s), Cave, Graffiti(s)	Post-Medieval	316270	870240	318072	NJ17SE0016
<i>Infrastructure & Engineering</i>							
14215	Covesea Quarry	Quarry	Post-Medieval, Modern	316920	870379	310206	
14387	Innes Links	Gates	Post-Medieval	326410	868979		NJ26NE0049

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
15638	Burghead	Railway Bridge, Railway Embankment	Modern	312379	869129		NJ16NW0113
15646	Innes Links, Lossie Forest	Building	Post-Medieval	326356	868550		NJ26NE0048
15653	Innes Links, Lossie Forest	Sluice (House)	Post-Medieval	326199	868601		NJ26NE0047
<i>Settlement & Agriculture - Buildings</i>							
15205	Old Findhorn	Stones, Villages	Post-Medieval	302266	865075	15876	NJ06NW0001
<i>Landscapes of resource exploitation and repeated human activity</i>							
14217	Findhorn Dunes Site	Buried Land Surface	Prehistoric	304943	864677	369023	NJ06SE0010
14251	Findhorn	Flake(s) (Flint)	Prehistoric	305500	864600	15880	NJ06SE0010
14378	Culbin Sands	Bones, Middens, Pottery, Shells	Medieval	301870	864860		NJ06SW0102
14395	Findochty	Middens	Post-Medieval, Modern	346711	868115		NJ46NE0072
15214	Mount Lebanon, Lossiemouth	Middens, Mounds, Pins, Pottery	Multi-Period	322664	870837	16738	NJ27SW0006
<i>Religious</i>							
14232	St Aethan's Well, Burghead	Holy Well, Spring	Medieval	312070	869060	16210	NJ16NW0063
14253	Bennet Hill	Cairn, Cist(s), Midden	Medieval	311000	867000	16167	NJ16NW0020
14256	Janet's Well	Well	Post-Medieval	349550	868220	17386	NJ46NE0032
15210	Market Cross, Gregory Place, Seatown, Lossiemouth	Bases, Crosses, Shafts	Post-Medieval	323576	870383	16737	NJ27SW0005
<i>Castles and Forts</i>							
14257	Portknockie, Green Castle	Promontory Fort	Iron Age	348850	868770	17408	NJ46NE0018
14346	Inverugie Castle	Castle	Medieval	315850	870130	16279	NJ17SE0002
<i>Military – WW2</i>							
14208	Lossiemouth, Stotfield Hithe	Anti Glider Posts, Anti Tank Blocks	Second World War	321508	871014	81611	NJ27SW0021

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
14219	Findhorn	Anti Tank Blocks, Pillbox	Second World War	304360	864790	202781	NJ06SW0104
14221	Cullen, Seatown	Anti Tank Blocks	Second World War	350636	867274	81550	NJ56NW0051
14228	Innes Links	Anti Glider Posts	Second World War	325400	869560	367306	
14237	Kingston, Innes Links	Anti Tank Blocks, Pillbox	Second World War	332377	866084	226143	
14246	Lossiemouth, Lossiemouth Harbour, Outer Basin, Pillbox	Pillbox	Second World War	323847	871250	299488	
14248	Burghead Bay	Anti Tank Blocks, Pillbox	Second World War	311360	868160	320123	NJ16NW0075
14250	Lossiemouth, Stotfield Hithe	Coastal Defence Site, Pillbox	Second World War	322591	870804	367475	
14258	Kingston, Innes Links	Pillbox	Second World War	332747	865969	226141	NJ36NW0007
14259	Kingston, Innes Links	Pillbox	Second World War	332057	866225	226144	
14264	Burghead Bay, Bessie Burn	Pillbox	Second World War	309972	865431	249739	
14270	Innes Links, Emergency Coast Battery, Searchlight Emplacement (East)	Searchlight Emplacement	Second World War	328315	867817	293098	
14281	Covesea Skerries	Pillbox, Slit Trench(s)	Second World War	320916	871283	367471	
14291	Kingston, Innes Links	Pillbox	Second World War	333170	865840	226138	
14294	Covesea Links	Anti Tank Blocks, Pillbox	Second World War	320424	871352	81612	NJ27SW0022
14295	Burghead Bay, Roseisle Forest	Anti Tank Blocks, Military Installation(s)	Second World War	311000	866850	81613	NJ16NW0075
14296	Burghead Bay, Roseisle Forest	Pillbox	Second World War	310890	866520	249784	
14297	Burghead Bay, Roseisle Forest	Pillbox	Second World War	311154	867354	249788	
14298	Burghead Bay, Burghead, Cable Cottage	Pillbox	Second World War	311335	868597	249789	NJ16NW0075

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
14308	Innes Links	Anti Tank Blocks, Pillbox	Second World War	327725	868117	225973	
14312	Burghead Bay	Observation Post	Second World War	307665	864605	249754	NJ16NW0075
14313	Burghead Bay	Pillbox	Second World War	308629	864790	249755	NJ16NW0075
14322	Burghead Bay	Anti Glider Post(s)	Second World War	310660	866450	346376	
14327	Innes Links	Pillbox	Second World War	328406	867805	225971	NJ26NE0017
14333	Burghead Bay, Bessie Burn	Pillbox	Second World War	309652	865229	249743	
14334	Burghead Bay	Observation Post	Second World War	307174	864587	249753	NJ16NW0075
14335	Burghead Bay	Pillbox	Second World War	308951	864889	249756	NJ16NW0075
14336	Burghead Bay, Roseisle Forest	Anti Tank Blocks, Pillbox	Second World War	310182	865613	249778	
14340	Lossiemouth, Lossiemouth Harbour, Pitgaveny Street, Pillbox	Pillbox	Second World War	323904	871157	299487	
14342	Burghead Bay	Anti Tank Blocks, Pillbox	Second World War	311280	867790	320126	
14351	Innes Links	Anti Tank Blocks, Pillbox	Second World War	327425	868262	225974	
14352	Kingston, Innes Links	Pillbox	Second World War	331687	866334	226146	
14356	Burghead Bay	Pillbox	Second World War	309304	865041	249744	NJ16NW0075
14358	Culbin Sands	Anti Glider Post(s)	Second World War	297541	863177	302348	NH96SE0006
14361	Stotfield Links, Moray Golf Course	Pillbox	Second World War	321862	870891	367481	
14362	Bessie Burn	Flagstaffs	Post-Medieval	309766	865285		NJ06SE0073
14376	Stotfield Links	Blocks, Defences, Pill-boxes	Second World War	321072	871180	81612	NJ27SW0023
15450	Obstruction	Tank Traps(s), Obstruction	Second World War	311255	868759	323992	
15451	Obstruction	Tank Traps(s), Obstruction	Second World War	311225	868777	321868	

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
15570	Burghead Bay	Anti Tank Wall	Second World War	309193	864987		NJ16NW0075
15574	Burghead Bay	Pillbox	Second World War	308208	864681		NJ16NW0075
15576	Burghead Bay	Pillbox	Second World War	306304	864606	249754	NJ16NW0075
15596	Burghead Bay, Roseisle Forest	Anti Tank Trap	Second World War	311038	867329		NJ16NW0075
15648	Spey Bay Golf Course	Pillbox	Second World War	337699	864492		NJ36SE0140
15649	Spey Bay Golf Course	Pillbox	Second World War	337014	864730		NJ36SE0140
15650	Spey Bay Golf Course	Pillbox	Second World War	336585	864842		NJ36SE0140
<i>Military - Other</i>							
14247	Findhorn Bay, Volunteers Rifle Range	Firing range	Post-Medieval	304737	861261	299995	NJ06SW0101
14338	Kingston, Innes Links, Rifle Range (old)	Firing range	Modern	332841	865892	290541	NJ36NW0006
14344	KINGSTON, INNES LINKS, RIFLE RANGE (ORIGINAL)	Firing range	Post-Medieval	332978	865856	370626	
14396	Cullen Links	Batteries, Stores	Post-Medieval	350148	867537		NJ56NW0074
15641	Kingston, Innes Links	Firing range	Modern	331506	866317	226153	NJ36NW0016
<i>Natural Features</i>							
12863	Roseisle Peat Deposit	Intertidal Peat, Submerged Forest	Nil Antiquity	309436	865095	349535	
12864	Burghead Peat Deposit	Intertidal Peat, Submerged Forest, Anti-Glider Posts	Nil Antiquity	311182	868143	349535	
14373	Three Kings	Rockstacks	Nil Antiquity	350440	867410		NJ56NW0032
<i>Miscellaneous</i>							
14204	Findochty Harbour	Cave, Armlet (Jet), Needle(s) (Bone)	Multi-Period	345820	867990	17385	NJ46NE0010
14209	Clashach Cove	Cave, Pictish Symbol Rock Carving	Pictish	316000	870130	88689	NJ17SE0006

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
14220	Covesea	Cave(s), Human Remains, Stake Hole(s), Animal Remains, Blade (Flint), Crucible, Leaf Arrowhead (Flint), Organic Material (Wood), Slag, Unidentified Pottery(s)		317420	870620	16280	NJ17SE0003
14280	Covesea Cave 2	Cave, Funerary Site, Human Remains, Midden, Pit(s), Stake Hole(s), Animal Remains, Worked Object (Bone)		317390	870580	365492	
14293	Sandy Creek, Findochty	Inhumation	Post-Medieval	346620	868110	70080	NJ46NE0030
14307	Sculptor's Cave, Covesea	Cave, Human Remains, Pictish Symbol Rock Carving(s), Bead(s) (Amber), Bead(s), Brooch(s), Coin(s) (Roman), Needle(s), Pin(s)		317500	870720	16278	NJ17SE0001
14360	The Laird's Stable	Cave, Animal Remains		318030	870760	365498	NJ17SE0025
14363	Covesea	Buildings, Caves		318877	871001		NJ17SE0027
14390	Strathlene	Pools	Modern	344821	867443		NJ46NW0066
14392	Cullen Beach	Defences, Objects	Post-Medieval, Modern	349790	868000		NJ46NE0057
<i>Findhorn Bay Boat Graveyard (Scheduled Monument SM13730)</i>							
13574	Findhorn Bay boat AA	Maritime craft	Modern	303411	863880		NJ06SW0125*

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
13575	Findhorn Bay Boat AAA	Maritime craft	Modern	303285	863560		NJ06SW0125*
13576	Findhorn Bay boat BB	Maritime craft	Modern	303418	863861		NJ06SW0125*
13577	Findhorn Bay boat BBB	Maritime craft	Modern	303300	863551		NJ06SW0125*
13578	Findhorn Bay boat CC	Maritime craft	Modern	303390	863870		NJ06SW0125*
13579	Findhorn Bay boat CCC	Maritime craft	Modern	303293	863541		NJ06SW0125*
13580	Findhorn Bay boat DDD	Maritime craft	Modern	303298	863527		NJ06SW0125*
13581	Findhorn Bay boat FF	Maritime craft	Modern	303370	863851		NJ06SW0125*
13582	Findhorn Bay boat GG	Maritime craft	Modern	303367	863820		NJ06SW0125*
13584	Findhorn Bay boat HH	Maritime craft	Modern	303346	863798		NJ06SW0125*
13585	Findhorn Bay boat II	Maritime craft	Modern	303335	863788		NJ06SW0125*
13586	Findhorn Bay timber III	Maritime craft	Modern	303247	863339		NJ06SW0125*
13587	Findhorn Bay boat JJ	Maritime craft	Modern	303347	863755		NJ06SW0125*
13588	Findhorn Bay boat JJJ	Maritime craft	Modern	303225	863316		NJ06SW0125*
13589	Findhorn Bay boat KK	Maritime craft	Modern	303351	863748		NJ06SW0125*
13591	Findhorn Bay boat MM	Maritime craft	Modern	303311	863752		NJ06SW0125*
13592	Findhorn Bay boat NN	Maritime craft	Modern	303304	863745		NJ06SW0125*
13593	Findhorn Bay boiler OO	Maritime craft	Modern	303303	863730		NJ06SW0125*
13594	Findhorn Bay boat PP	Maritime craft	Modern	303299	863717		NJ06SW0125*
13595	Findhorn Bay boat QQ	Maritime craft	Modern	303313	863719		NJ06SW0125*
13596	Findhorn Bay timber RR	Maritime craft	Modern	303283	863697		NJ06SW0125*
13597	Findhorn Bay boat SS	Maritime craft	Modern	303296	863690		NJ06SW0125*
13598	Findhorn Bay boat TT	Maritime craft	Modern	303287	863685		NJ06SW0125*

SCAPE ID	Site name	Site type	Periods	Easting	Northing	Canmore ID	HER ID
13599	Findhorn Bay boat UU	Maritime craft	Modern	303290	863654		NJ06SW0125*
13600	Findhorn Bay boat VV	Maritime craft	Modern	303277	863646		NJ06SW0125*
13601	Findhorn Bay boat WW	Maritime craft	Modern	303284	863624		NJ06SW0125*
13602	Findhorn Bay boat XX	Maritime craft	Modern	303286	863608		NJ06SW0125*
13603	Findhorn Bay boat YY	Maritime craft	Modern	303280	863587		NJ06SW0125*
13604	Findhorn Bay boat ZZ	Maritime craft	Modern	303288	863575		NJ06SW0125*
15582	Findhorn Bay	Ballast mound	Modern	303297	863487		NJ06SW0125*
15583	Findhorn Bay (GGG)	Craft, Scattered remains of craft	Modern	303243	863421		NJ06SW0125*
15589	Findhorn Bay	Craft	Modern	303296	863730		NJ06SW0125*

*Thirty two individual records for wooden crafts and ballast mounds relate to the Findhorn Bay boat graveyard. MASTER RECORD 12824. The boat graveyard is a scheduled monument (SM13730) and the master record has an existing HER reference: NJ06SW0125. Individual site records which make up the scheduled monument were updated with new photographs during the June 2022 CCZAS of Findhorn Bay. These individual records have been removed from the overall analysis of site type as they all relate to the one scheduled site, but they are listed here for completeness. More information about the site can be found in the SCAPE [project report](#).

Appendix 2. New sites

SCAPE ID	Site name	Site type	Periods	Easting	Northing
<i>Maritime - Fishing</i>					
15558	Burghead Bay, Roseisle Forest	Posts	Period Unknown	309661	865272
15559	Burghead Bay	Posts	Post-Medieval	311137	868842
15561	Burghead Bay, Roseisle Forest	Posts, stakes	Period Unknown	307996	864651
15562	Burghead Bay	Posts	Period Unknown	310707	866429
15569	Burghead Bay, Roseisle Forest	Posts, stakes	Period Unknown	309738	865347
15571	Burghead Bay, Roseisle Forest	Post	Period Unknown	309840	865416
15573	Burghead Bay, Roseisle Forest	Posts	Period Unknown	311334	868294
15585	Findhorn	Winch	Modern	305136	864684
15593	Burghead Bay, Roseisle Forest	Posts	Period Unknown	310969	867066
15595	Burghead Bay, Roseisle Forest	Posts	Period Unknown	311025	867270
15597	Burghead Bay, Roseisle Forest	Posts	Period Unknown	311060	867432
15598	Burghead Bay, Roseisle Forest	Posts	Period Unknown	310998	867181
15601	Burghead Bay, Roseisle Forest	Post	Period Unknown	310262	865747
15607	Culbin Sands	Winch, Fishing Station	Post-Medieval	300720	864702
15768	Findhorn Bay	Fishtraps, Mussel Scalp	Multi-Period	304632	863021
<i>Maritime – Craft</i>					
12893	Culbin sands, capstan	Capstan	Post-Medieval	301400	864903
12894	Findhorn Narrows Wreck	Craft	Post-Medieval	302516	864878
15516	Culbin Sands, The Bar	Craft	Post-Medieval	294967	861537
15618	Findhorn Bay	Maritime Craft	Modern	304733	863390
15620	Findhorn Bay	Maritime Craft	Modern	303866	863137

SCAPE ID	Site name	Site type	Periods	Easting	Northing
<i>Maritime – Harbours</i>					
15651	Portknockie	Building	Post-Medieval	348882	868719
15652	Portknockie	Building	Post-Medieval	348869	868724
<i>Maritime – Landing Places</i>					
15580	Culbin, Findhorn Bay	Pier	Modern	303386	864002
15581	Binsness	Pier	Period Unknown	303117	862764
15619	Findhorn Bay	Posts, wooden	Period Unknown	304371	863491
15636	Clashach Port, Hopeman	Naust?	Post-Medieval	315539	870323
<i>Industry - Extractive</i>					
15532	Covesea	Millstone Quarry	Period Unknown	318291	870952
15633	Clachach	Millstone	Post-Medieval	315534	870326
15774	Covesea	Millstone	Period Unknown	317926	870842
<i>Infrastructure & Engineering</i>					
15637	Burghead	Railway, Gates, Pedestrian Railway Crossing	Modern	312134	869092
<i>Settlement & Agriculture - Buildings</i>					
15536	Tannachy Sands, Porttannachy	Building	Post-Medieval	338403	864330
15647	Tannachy Sands, Porttannachy	Building	Post-Medieval	337821	864458
<i>Settlement & Agriculture - Boundaries</i>					
15624	Findhorn Bay	Boundary stone?	Period Unknown	304582	862897
<i>Military – WW2</i>					
15556	Burghead Bay	Pillbox	Second World War	310419	865866
15557	Burghead Bay, Roseisle Forest	Anti glider posts	Second World War	311222	867801
15560	Burghead Bay	Road Block	Second World War	309588	865193
15563	Burghead Bay, Roseisle Forest	Posts	Second World War?, Period Unknown	310987	866937
15565	Burghead Bay, Roseisle Forest	Posts	Second World War?, Period Unknown	311064	867352

SCAPE ID	Site name	Site type	Periods	Easting	Northing
15566	Burghead Bay, Roseisle Forest	Anti Glider Posts, Stakes?	Second World War?, Period Unknown	311108	867971
15567	Burghead Bay, Roseisle Forest	Posts, Stakes, Anti Glider Posts?	Second World War?, Period Unknown	308918	864898
15568	Burghead Bay, Roseisle Forest	Posts	Second World War?, Period Unknown	309104	865000
15572	Burghead Bay, Roseisle Forest	Posts	Second World War?, Period Unknown	309951	865500
15579	Burghead Bay	Posts, Anti Glider Posts, Stakes	Second World War?, Period Unknown	311118	868073
15591	Burghead Bay, Roseisle Forest	Post, Anti Glider Post?, Stake?	Second World War?, Period Unknown	310469	866032
15592	Burghead Bay, Roseisle Forest	Post, Anti Glider Post	Second World War	310489	866126
15599	Burghead Bay, Roseisle Forest	Anti Glider Posts	Second World War	311112	867492
15600	Burghead Bay	Anti Glider Posts	Second World War	311088	867626
15602	Burghead Bay, Roseisle Forest	Anti Glider Posts	Second World War	310200	865704
15645	Lossiemouth West Beach	Anti Glider Posts	Second World War	322010	870918
15668	Portknockie Fiddlers Rock	Anti Tank Blocks	Second World War	349203	868714
<i>Military – Other</i>					
15643	Hopeman, East Beach	Target	Post-Medieval	315210	870074
15770	Findhorn Bay	Military Airfield, Light, Lighting Object, DREM Lighting	Modern, Second World War	305188	862887
<i>Miscellaneous</i>					
15575	Burghead Bay	Ditch	Period Unknown	308122	864632
15584	Culbin Forest	Groynes	Modern	301544	864879
15631	Hopeman, East Beach	Building	Post-Medieval	315009	869890
15634	Cummingstown	Cave	Post-Medieval	313467	869237

SCAPE ID	Site name	Site type	Periods	Easting	Northing
15635	Roddoch Wells, Cunningtown	WELLS	Post-Medieval	313179	869130
15640	Covelea skerries lighthouse	Cave	Nil Antiquity	320462	871329
15669	Culbin Forest	Groynes	Modern	349633	868092
15778	Covelea Unnamed Cave	Cave	Modern, Nil Antiquity	317479	870715