

SEAWILDING

Community-led Marine Habitat Restoration

Scottish Charity No: SC050126

Native Oyster Report 2024



Summary

It's been a frustrating year for our native oyster restoration efforts due to a lack of supply of new stock from the two UK hatcheries. Native oysters are notoriously difficult to breed and our aim to restore 1 million native oysters to Loch Craginish has been hampered by the fact we have been unable to get new stock for nearly two years. That said, having restored tens of thousands of oysters to the seabed already in 2024, there's been plenty to do and lots to report.

Let's remind ourselves why native oysters are so important to marine biodiversity and to ocean health: native oysters filtering and cleaning the water, removing nitrates and phosphates, and their complex 3 dimensional reefs provide vital breeding and spawning grounds for multiple fish species. They once existed in giant reefs that covered 1.7 million hectares in Europe, but now they're so rare that scientists have declared the native oyster reef system "collapsed" and "functionally extinct".

At Loch Craginish we know from historical accounts, and the large quantity of old shell littering the beaches, they were once abundant, yet our baseline surveys have found only a relic population, around 200 oysters, and most of these are old and of a non-breeding age.

Our ambition is still to restore 1 million native oysters to Loch Craginish to boost ecosystem health and since 2020 we have put down approx. 350,000. However, owing to predation by crabs and starfish and the high mortality typical of this species, approx. 20,000 (around 8%) of these survive on Loch Craginish's seabed and most are now of a mature, breeding age. The project aims to create a population at Loch Craginish which can be self-sustaining in the long-term and excitingly, this year for the first time, we are seeing clear signs of breeding success (recruitment) - juvenile oysters appearing in significant numbers.



However, if we are to fulfil our ambition to restore this critical key-stone species to the degraded marine habitat of Loch Craginish and to many other Scottish sea-lochs, it's imperative that we resolve the lack of supply of native oysters quickly. There is much talk, as well as targets, from policy-makers about turning the tide on diminishing marine biodiversity and restoring marine habitats, so investment in the production of sustainable native oyster spat needs to become a priority.

In this short report you will be able to read about all aspects of our Native Oyster Restoration Project in 2024 with an outline of what we would like to do in 2025.

Native oyster supply and hatchery plans

Normally we would take in approx. 200,000 native oysters a year at a juvenile size to grow on in our nursery but this year we've secured only 25,000, not much over 10% of what we need. This is the second year running that we haven't been able to procure satisfactory quantities of oysters and this continued uncertainty over supply now threatens all eighteen of the native oyster restoration projects around the UK.



Native oyster stock being introduced to our floating nursery, Loch Craignish 2024

In 2025, Seawilding will focus attention on resolving the supply issue and working with others affected by the shortage towards improving the situation with existing hatcheries or else to invest in a new hatchery that can meet restoration needs.



The Seawilding team visits The Oyster Restoration Company Hatchery and Seasalter Morecambe Bay Hatchery to discuss supply bottlenecks problems

Spat collectors

With the lack of native oysters available from the hatcheries in 2024, our focus has been to capture the wild spat to grow on in our nursery cages. The idea is to raise them in this controlled environment which protects them from predators and then to release them on the seabed when they have reached a more robust size.

In June, guided by hydro-dynamic modelling, we suspended 150 “spat collectors” filled with lime-covered mussel and scallop shell around Loch Craignish. To test different methodologies and variables, different types of spat collectors - floating baskets, coupelles and chicken-wire cages – were suspended at different heights and locations to capture free-floating oyster larvae. Adult oysters were added to each cage to release chemical cues to encourage larvae to settle.

The spat collectors were monitored and kept clean of sea-squirts throughout the summer, and in the Spring 2025, if newly-recruited oysters are present, they’ll be stripped off and placed in the floating nursery. However, oysters don’t spat every year and because 2024 summer sea temperatures were lower than normal – oysters need water temperature above 16C to breed – we’re not hopeful this has been a good spating year. In 2025, guided by the results, we will deploy the spat collectors again.



The Seawilding team with our three wonderful summer interns deploying spat collectors



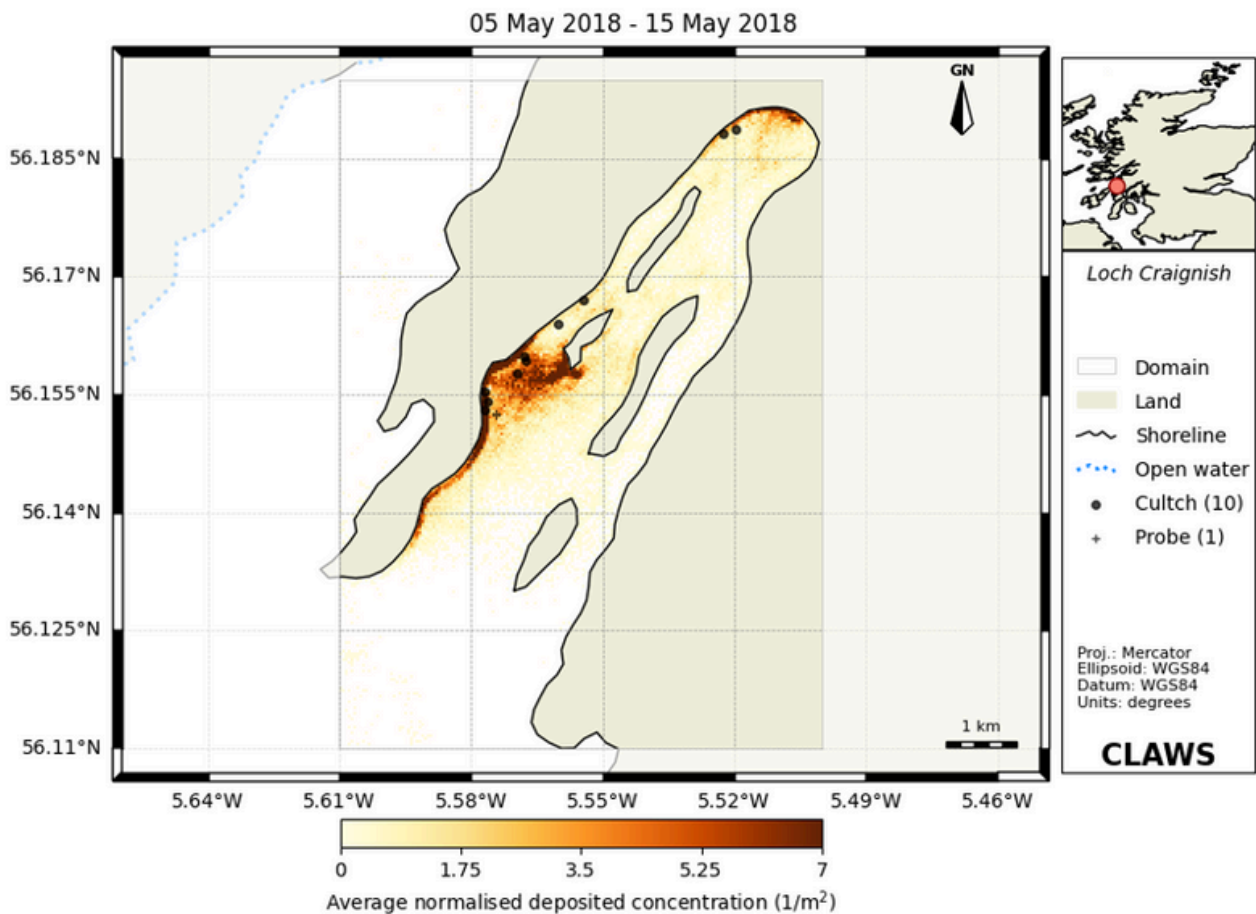
Spat collectors showing diversity of type and deployment depths

Hydrodynamic modelling

Seawilding commissioned hydro-dynamic modelling to see how the tidal exchange in Loch Craignish affects the movement of native oyster spat. Mature native oysters reproduce in the summer months and the released spat is water-borne for up to 14 days prior to settling on a suitable object. The hydro-dynamic model predicts the movement of spat from the current release sites and where it is likely to settle.

The model indicates that while some spat is flushed out of the loch at spring tides, the bulk stays within the loch, with a heavy presence remaining in the west of the Loch (the lagoon) and at the head of the loch, at Kintraw. This is reassuring to see.

We are using new oyster survey methodology (more detail below) to verify the hydro-dynamic model and, as the model predicts, we've found newly recruited oysters at the head of Loch Craignish at Kintraw. This is exciting. In 2025, we will continue to survey other areas in the loch where the hydro-dynamic model suggests spatfall.



Surveying

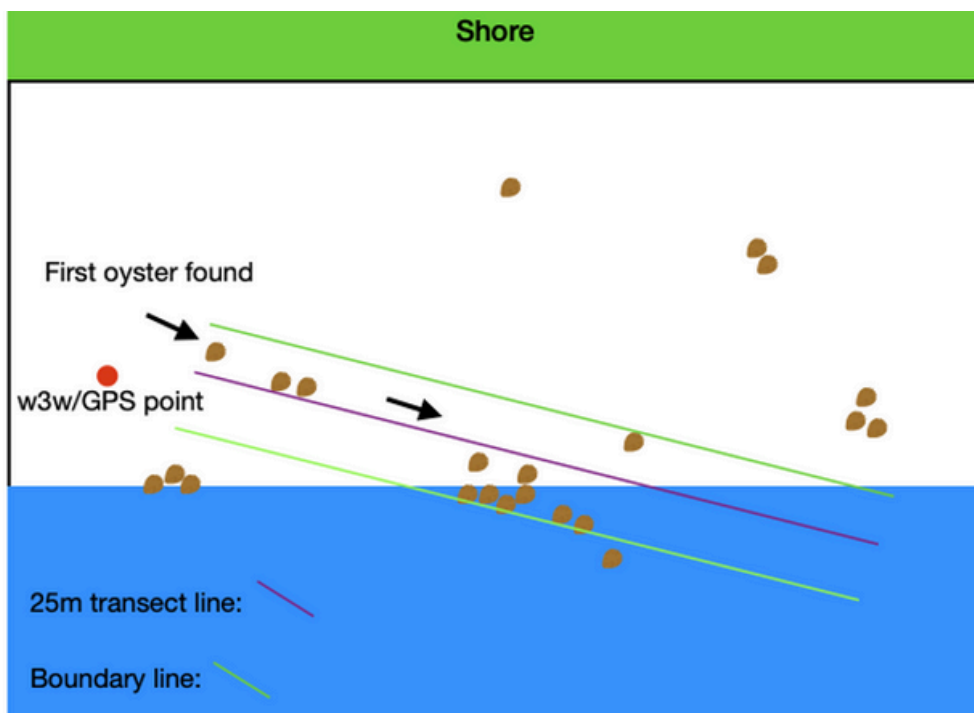
In previous years at each release site we've undertaken a fixed-point quadrat survey with random quadrat surveys alongside to measure oyster survival and growth and other environmental factors. However, because oysters move on the seabed and sometimes congregate (owing to wave action and predators), this methodology does not sufficiently capture the reality on the ground.

New survey methodology

In 2024, we adapted our survey methodology to reflect better the presence, number and density of oysters in locations where they're found to be present. The new methodology captures their distribution over a wider area in the following ways:

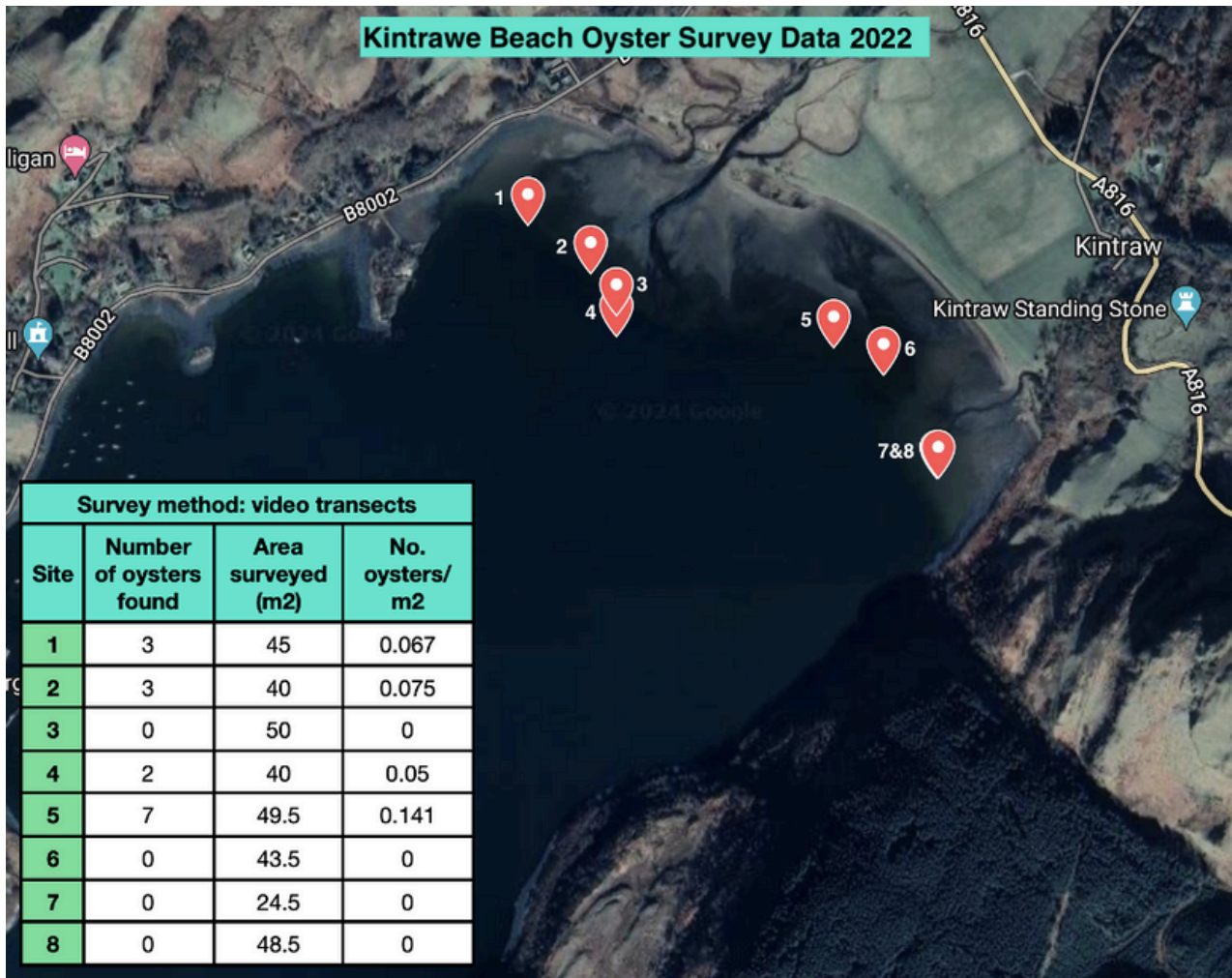
1. Monitors the survival rate of restored oysters
2. Determines growth rates and the number of reproductive oysters at a given site
3. Establishes the density of oysters across a site
4. Records the number of recruited oysters at a site
5. Provides a simple way for volunteers to collect data and meaningfully contribute to the native oyster restoration project

In brief, the surveyors walk over a site for 5 minutes to get an idea of the distribution of oysters. They identify the nearest oyster, take a GPS reading, and use this as a starting point for laying out a 25m transect line which runs through the middle of the area where most oysters are present. A boundary line of 2 metres is placed either side of this transect line, and all the native oysters inside this 100m² area are counted, measured, and graded according to breeding age and whether they're newly recruited, ie. wild offspring.



Native Oyster intertidal survey methodology, October 2024

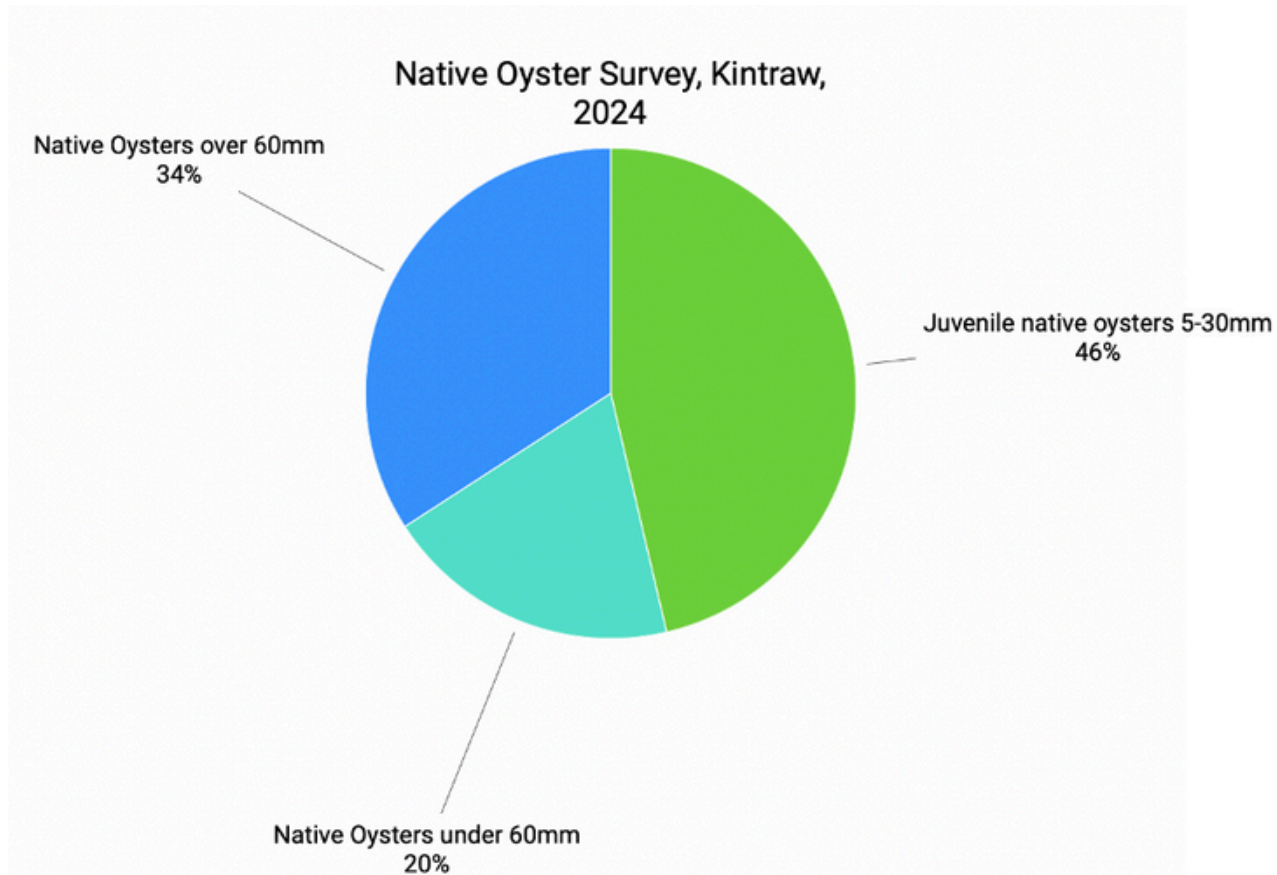
By way of background, in 2022, the Seawilding team conducted underwater video surveys off Kintraw beach to ascertain native oyster presence. To date, Kintraw has not been one of the project's oyster release sites, but owing to the large amount of cultch present (shingle, pea-gravel and old oyster shell) it is, perhaps, the most promising site for oyster restoration in Loch Craignish. The 2022 survey using random transects at eight points, recorded a total of 15 native oysters. These were large oysters, widely scattered and owing to no young oysters being present, the population was deemed not to be self-sustaining.



Underwater video transect survey, Kintraw beach 2022

Community Volunteer Survey of Kintraw, October 2024

At a low spring-tide in October, approximately 20 community volunteers gathered at Kintraw beach at the head of Loch Craignish to carry out the new oyster survey. Two transect surveys were undertaken, each covering an area of 100 m², following the new survey methodology outlined above. The first survey revealed 2 native oysters, the second 39 native oysters. 66% of these oysters were under 60mm (under a breeding size) and 46% were stuck to shell or rock, meaning they were wild-recruited and under 30mm in size indicating they were likely to be under two years old.



The presence of a significant number of wild-recruited juvenile oysters suggests there has been a significant spat-fall in the Loch in the last couple of years. Only a genetic study can prove whether these are the offspring of the native oyster stock introduced by Seawilding, but certainly, all our survey data suggests this is a strong likelihood.

Subtidal Oyster Survey, October 2024

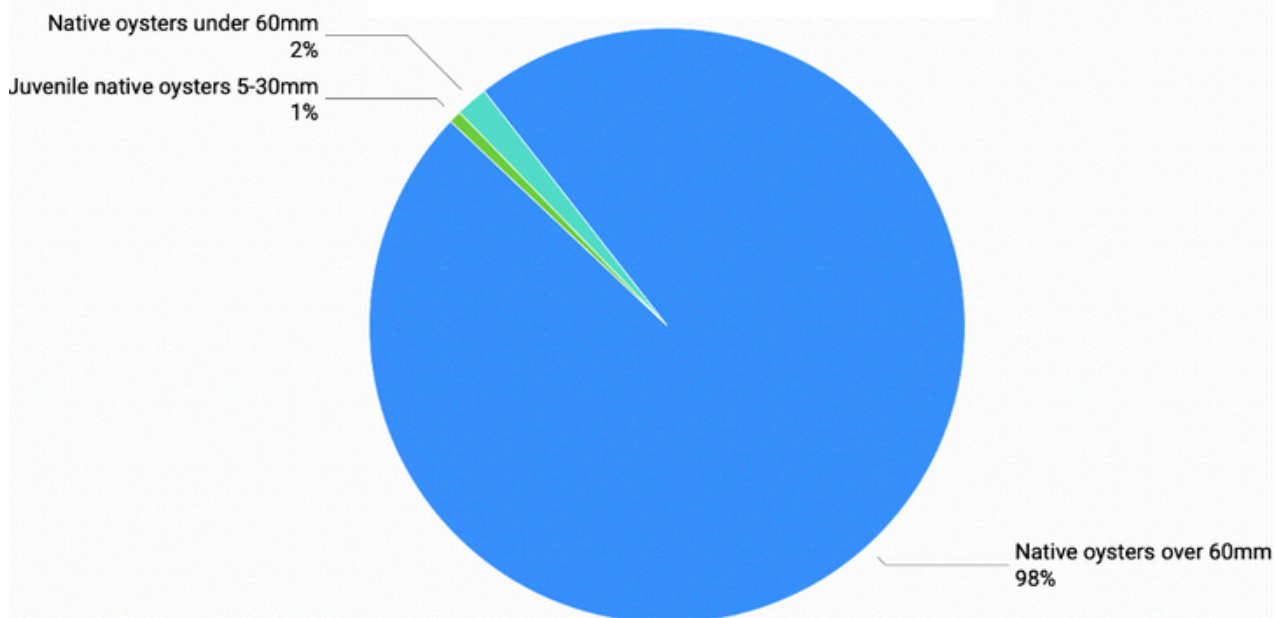
In 2024, the team conducted a snorkel survey of all the 8 release sites around the Loch.

Methodology:

- Two snorkelers swam over the site to establish the outer limits of the area where oysters were present
- A transect line was laid down the centre of the area, dividing it in two, to make counting more manageable
- The snorkelers swam down either side of the transect line, counting all live native oysters and dividing them into three categories: recently recruited (under 30mm and fused to another object), below reproductive size (under 60mm) and reproductive size and above (over 60mm)
- Quadrats were laid randomly to establish the density of the oysters



Sub-tidal survey results across all native oyster release sites
Loch Craignish, October 2024



Observations made across the sites:

- There has been high mortality since the oyster releases between 2020-23. It's estimated that approximately 350,000 native oysters were released between all these sites, but now approximately 20,000 survive from this original population
- It's believed most of the mortality is due to high predation, mainly by green crab and starfish. When the native oysters are released from the nursery cages onto the seabed, they measure approximately 30mm (12 grammes), and being small and thin, are easily broken and vulnerable. Snorkel observations show that within the first few days of a release, numerous green crabs appear on the site and can be seen eating oysters. Additionally, some of the sites have large numbers of starfish predators.
- On average, oysters at the most promising release sites, where the clutch is best, could be found at a density of approx. 10/m² and at best, they occurred at 34 oysters/m². In other sites where the firm substrate quickly gives way to mud the potential for oyster reef formation looks less promising. Here oysters were found to be smothered by silt/mud.
- Across all the sub-tidal release sites, 142 juvenile newly-recruited native oysters were recorded under 30mm of size. These young oysters were fused to objects on the seabed such as stones and shells, indicating they're not oysters released by the restoration project. Their size suggests they're approximately two years old, and there's every possibility they represent the offspring of the released oysters.
- The majority of all the other oysters were over 60mm, suggesting they are at least 3 years old, and of a breeding age



Oysters on Loch Craignish seabed

Native Oyster Restoration Plans 2025

In 2025, we plan to build on our efforts so far, introducing more native oyster stock to Loch Craignish, to improve our data collection and survey methodologies and to explore new opportunities for native oyster restoration in the surrounding area. Specifically we will focus on the following:

- **Native oyster hatchery:** Owing to ongoing native oyster supply issues, we are exploring with various parties the possibility of a dedicated native oyster hatchery at Loch Craignish
- **New native oyster stock:** The project will continue to source native oyster stock whenever possible from existing hatcheries. The target is a minimum of 200,000 annually
- **Predator control:** Owing to high predator numbers – starfish and green crab – at some release sites, we plan to lay baited lobster creels to translocate starfish if we discover them in abundance to different areas of the Loch
- **Spat Collection:** The project will continue to deploy spat collectors around the loch in the hope that we can attract wild spat to settle. If this happens, the spat will be transferred to the nursery for growing on
- **Surveys:** The project will continue sub-tidal surveying at the release sites and expand inter-tidal surveying at Kintraw
- **Volunteers:** Community volunteers will be trained to advanced snorkel level in order to carry-out sub-tidal surveys
- **The native oyster restoration community:** The project will continue to engage with other neighbouring native oyster restoration projects to train, engage and compare data
- **Scientific Output:** The Seawilding team intend to collate their years of data collection and analysis into a number of peer-reviewed scientific publications. Allowing our work to reach the broader scientific community and increasing the opportunities for wider collaborative ventures



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