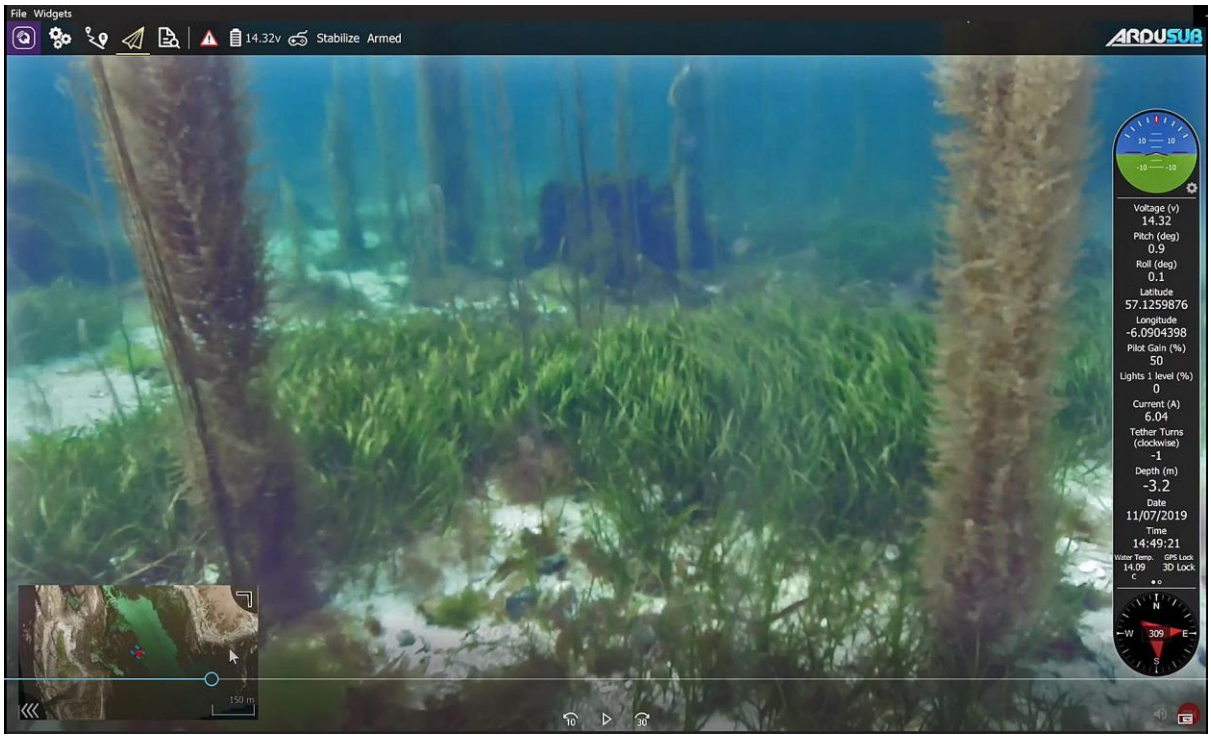
SKYE & LOCHALSH ENVIRONMENT FORUM

a Bridge to Biodiversity

Drochaid gu Iomadachd Nàdair

South Skye Seas Initiative

Underwater & Shoreline Monitoring Project Update 2019

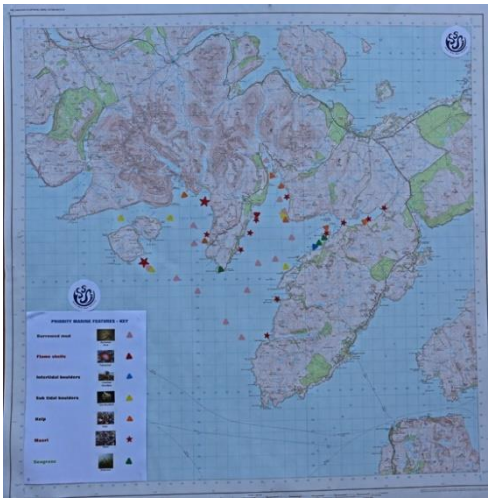


Seagrass *Zostera marina* in a challenging habitat.

BACKGROUND

Project location:

The whole of the marine environment South East from Rubha an Dùnain to Point of Sleat, to include Loch Eishort, Loch Slapin and Loch Scavaig, shown below with species and habitats identified with symbols.



Historical information:

Between 2012 and 2015 four industrial sized fish farm planning applications, two in Loch Slapin and two in Loch Eishort were either withdrawn or rejected following a concerted local community effort to prevent fish farm marine pollution in all its forms. The science led objections were driven by Scottish Salmon Think Tank (SST-T) incorporated into Skye & Lochalsh Environment Forum (SLEF) in 2016. The data collected convinced members and local communities, the rich biodiversity found needed to be protected from industrial development and as a consequence South Skye Seas Initiative (SSSi) was formed and incorporated into SLEF during 2016.

Project aspirations:

To continue the recording of marine species and habitats in order to advise authorities should any applications for development, which might threaten the rich biodiversity found and that yet to be discovered. Scottish Natural Heritage (SNH) would be informed of significant records to inform future protection. The ambitions required funding to enable underwater exploration to complement the shoreline element of the survey.

Rationale:

Improve biodiversity recording, which will inform local biologists, community organisations, and national authorities of the richness of the marine environment to help prevent inappropriate development from damaging ecologically important habitats and species. Certain adjacent rivers and burns may also benefit from our ecological studies, enhancing the opportunity to revitalise certain threatened species, typically freshwater pearl mussels and sea trout. This project will enhance the status of the whole region by complementing the adjacent revised Small Isles Marine Protected Area (MPA) and leave a lasting legacy for the south Skye lochs environment and local communities.

Historical data:

SNH undertook underwater surveys targetting Priority Marine Features, which are habitats and species considered to be marine nature conservation priorities in Scottish waters (PMFs) in May 2014 and August 2016 covering most of our survey area (see map on page 2). Our project is designed to complement the data collected during these surveys.

Project Seagrass. During 2017 as part of the Year in Industry Project, Project Seagrass undertook a brief preliminary assessment of South Skye's seagrass meadows between 25th April and 1st May. Loch Eishort, and Loch Scavaig at Camasunary were part of the survey. Data from the survey report was made available to the SSSi project. The report identified seagrass being washed onshore, this led to two seagrass beds being subsequently discovered by the SSSI project.

Project development and lessons learnt:

During 2018 funds became available from the Scottish Wildlife Trust Skye Region Group, William Grant Foundation, Scottish Natural Heritage and sundry donations. This enabled a survey equipment list to be compiled and in early 2019 an underwater BlueRov2 Remotely Operated Vehicle (ROV), a 150m Kevlar coated tether, a dedicated Global Positioning System (GPS) and laptop and Xbox controller were purchased. The ROV was modified by the supplier to incorporate two additional thrusters either side to increase power output. This was followed by another generous local donation to assist with the purchase of additional equipment as required. During April 2019 after familiarising the survey team with the equipment set-up, the ROV was launched in a swimming pool to test the operation of the ROV controlled by the Xbox controller; this was successful. A member of the team offered his boat and fuel for the project. Our first sea trial was during early May, when the equipment was successfully commissioned from the boats mooring, quickly followed by a first flight in an area where onshore a few years previously seagrass *Zostera marina* had been found on an adjacent beach.

Team members, ROV, GPS & tether

Flying ROV.
Note GPS transponder
outrigger through window

Within minutes of flying the ROV a seagrass bed, previously unrecorded, was detected, ending a memorable first day for the project. An important element of equipment maintenance required the whole of the ROV to be washed in fresh water to remove any salt, which could affect the units' operation then followed by battery charging. The second outing returned to

the previous site in order to video record the size of the seagrass area, which was found to be approximately 80m x 25m. In addition to the boat captain it was decided as a minimum to have a three-man team, one person to fly the ROV, one to pay out or retrieve the tether and one to assist. Practice flying in a controlled environment (possibly a swimming pool) before deployment for recording would help with variable depth changes and handling for strong currents. This would assist in preventing getting tangled, crashing and creating cloudy water. Ideally have a marine biologist on board to advise about where to concentrate appropriate flying to aid identification. In the absence of a marine biologist a ROV flying instruction for pilots to aid identification has been produced augmented with images of common species. Some people feel queasy when flying the ROV, especially in the boats' cabin. However the benefits of being able to see the laptop screen in a cabin is not to be underestimated, almost all glare can be eliminated. Cleaning the camera dome helps to prevent bubbles forming, which can reduce picture quality. Consideration is being given to adding two GoPro cameras to improve the angular capture of video to increase species/habitat identification.

Weather conditions were an important element in deciding whether or not to undertake a boat survey with a 15MPH wind speed and rain, other than light drizzle being too much for safe operation.

The deployment of the GPS system has proved an invaluable asset for recording and repeatability, which would allow a site to be monitored for any changes over time. However, it proved problematic in certain circumstances. Four transponders are deployed at set distances apart, two on the port side and two on the starboard side opposite to each other with the GPS unit mounted nominally central. Two transponders were set to 3m deep diagonally opposite and 2m deep respectively also diagonally opposed. A receive transponder was secured to the ROV frame to give an accurate postion. The QGroundControl software installed on the laptop to drive the ROV was used to configure the transponders to maximise accuracy, however errors became apparent when the ROV was in very shallow water, which disrupted the line of sight between boat mounted transponders and the ROV transponder. Similarly when a reef cut transponders line of sight. To overcome this issue a GPS reading was taken at the boats moored location then, when a site needed to be identified the ROV was surfaced to show its location and its position was estimated from the boat. When the ROV has identified PMFs and the GPS location is lost we intend to use GoPro cameras to provide images/videos with an embedded GPS location in suitable shallow water accessed by either the dinghy or kayak.

Sunlight was identified as being possibly problematic to the camera lens. When the ROV was out of the water in sunny conditions a cover was required to be placed over the lens.

Certain seaweeds, especially Mermaid's tresses *Chorda filum* (dead man's rope (aptly named)) proved problematic. The ROV propellers became entangled at the thruster unit spindles, being drawn in through the gap between the propeller and the thruster body. With the battery power being severely reduced the seaweed needed to be removed after each flight. This was time consuming and fiddly. Occasionally the ROV needed to be manually hauled back to the boat as the thrusters were no longer effective. Later servicing of the propeller units revealed the seaweed still wrapped around the spindles, this could not be seen under working conditions. A mitigation design is being developed. Servicing is time consuming particularly related to the thruster/propeller units mounting in the frame, this would benefit from a redesign. The kayak can be attached to and operated from the boat, which will have benefits in remote locations by increasing the survey effort and assistance in ROV retrieval if required.

In addition to the boat trips a kayak was deployed with a GoPro camera, incorporating GPS, mounted on an extending pole, which was able to survey in areas where the boat deployed ROV would be precluded. The kayaker also proved an invaluable asset when the ROV became weed locked and the kayaker was able to assist (see below). In this instance the kayaker was able to deploy the GoPro with GPS location and record a seagrass bed initially identified by the ROV.

Shoreline launches were problematic. The heavy equipment needed to be hauled some distance and then dense seaweed often prevented sustained flying. Only favourable shore launches will be considered in future unless a dinghy is available to transport the ROV over difficult seaweed beds. Difficulty in seeing any detail on the laptop screen in bright light needed to be overcome by deploying a towel over the operator to create an impromptu darkroom.

A bathyscope was purchased to augment the survey techniques. This can be used from the shore or deployed from the boat in a dinghy in areas where the survey boat was unable to access, especially in remote areas with patches of dense seaweed. Additional GoPro cameras and extending poles are being sourced to allow recording in such situations.

11 boat trips were undertaken in Loch Slapin, Loch Eishort and Loch Scavaig, with only one trip where seagrass wasn't recorded. Eight previously unrecorded seagrass beds were identified and maerl was seen at all stages from live to gravel. Video and still image analysis was undertaken by two people, one of which was a marine biologist to verify species and habitats found and subsequently the data was submitted to SNH. Further video analysis will be undertaken in early 2020.

The shoreline element of the project unavoidably stalled with our marine biologist being unavailable for the main months of the survey effort. However, previously recorded data within the survey area was collated and an extensive list of species and habitats including PMFs has been passed to SNH. Plans are being forged to augment the historical data and shoreline monitoring equipment is being sourced for the 2020 survey period.

Community Engagement:

On 28th February the SSSi Project was launched and well received at an open meeting hosted by Sleat Community Trust Environment Advisory Group at the new community centre, An Crùbh in Sleat. The ROV featured and the evening was recorded by BBC Alba.

At the Skye & Lochalsh Environment Forum's Annual Members Meeting (AMM) on 10th September 2019 at the same location as the February launch, a brief update on the SSSi project was again well received. Kerri Whiteside, Fauna & Flora International was the guest speaker, she extolled the virtues of the Coastal Communities Network and illustrated the benefits of being part of a well coordinated group, which has enabled positive pressure on Government to respect the marine natural environment.

Survey Ideas - 2020.

We intend to concentrate mainly but not exclusively on PMFs outwith the already designated (SNH map) areas while recording species and habitats found. Videos will be archived to allow future analysis.

Point of Sleat. Seagrass fronds have been found on the sandy beach at Camas Daraich. Google Earth maps show suitable habitat. Point of Sleat to Inver Dalavil.

Loch Scavaig. An area of the loch has been identified where flapper skate *Dipturus intermedia* or possibly blue skate *Dipturus flossada* have previously been caught in large numbers ranging from very large to small. This may indicate a breeding population, which we consider to be important in view of their current status.
South west coast of Soay.

Head of Loch Eishort from Heaste.

SNH Research Report No. 1048. Connectivity of selected Priority Marine Features within and outwith the Scottish MPA network. Page 32 of the report indicates a 30 – 40% probability of suitable habitat for horse mussels in Loch Eishort, Loch Slapin and loch Scavaig, similarly on page 35 for flame shell beds. Given that there are records for flame shells off the east coast of the Strathaird peninsula, some survey effort will be worthwhile.

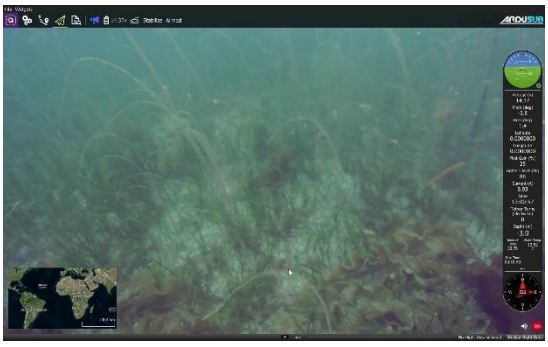
Local communities and visitors alike will be encouraged to participate in shoreline monitoring with onsite courses to instruct on basic techniques to map and identify species and habitats.

In conclusion:

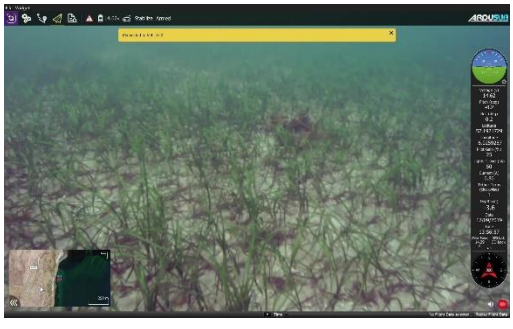
During 2019, SSSi developed a small team of dedicated volunteers who came together to gather significant data, which was shared with SNH Marine Team enabling future conservation within our survey area of PMFs. Generous funders committed to marine conservation enabled cutting-edge equipment to be purchased, which facilitated accurate, repeatable and verifiable data to be collected. In order to continue the important research we would encourage like minded people to become involved and experience the comradery as we develop and undertake next years survey.

Additional images from survey:

Seaweed problem.

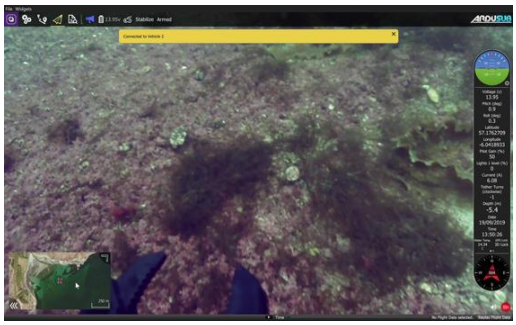


GPS location lost over seagrass bed.



Seagrass bed.
(note Google Maps insert)

Live Maerl (note ROV grasper).

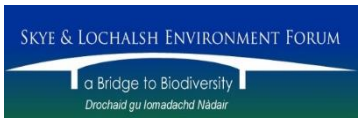


Live maerl and maerl gravel

Seagrass bed
(note tether to be followed back to boat)

Survey boat Orion

Some team members



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with special mention to our funders
including generous local donations.

Web: www.slef.org.uk/

www.southskyeseas.org.uk/

www.scottishsalmonthinktank.net/

Skye and Lochalsh Environment Forum is a Scottish Charitable Incorporated Organisation (SC040820) having its Principal Office at The Old Police Station, Isleornsay, Sleat, Isle of Skye IV43 8QR.