

Scottish Sea Angling Conservation Network

Loch Sunart, Argyll Nature Conservation MPA Proposal based on the Priority Marine Features Common Skate *Dipturus batis* and Spurdog *Squalus acanthias*.





Executive Summary

The Scottish Sea Angling Conservation Network (SSACN) welcomes the opportunity to submit a 3rd party Nature Conservation Marine Protected Area as part of the Scottish MPA Project.

We propose the designation of a Nature Conservation MPA in Loch Sunart, Lochaber situated between the Ardnamurchan and Morvern peninsulas. The MPA is part of a coherent ecological network of protected areas proposed by SSACN that runs northwards from the Sound of Jura, through the Firth of Lorn and Sound of Mull to Loch Sunart.

SSACN believe Loch Sunart should be afforded MPA status on the basis of populations of critically endangered Spurdog and Common skate that inhabit the area.

The west coast of Scotland is one of few coastal regions where Common Skate remain in relatively high numbers. Tagging data collected by the Scottish Shark Tagging Programme identifies Loch Sunart as an extremely important area for Spurdog and Common Skate with a recapture rate of ~54%, and 44%, respectively within Loch Sunart for these species. It is evident that Spurdog and Common Skate in this area are displaying a high level of site fidelity. Recaptures occur throughout the year in the loch and there have been several short migrations to neighbouring areas observed - emphasizing the need for the spatial protection of ecological pathways to ensure that populations of endangered elasmobranchs do not become fragmented and areas isolated.

The Argyll area is widely regarded as one of Scotland's most valuable recreational sea angling destinations with many safe, easily accessible shore marks, boat launch sites and a number of charter boats. Each year over 250,000 angling days are spent in the region generating an estimated £22,500,000 for Argyll and Lochaber. Loch Sunart is the second most popular launch site in the Argyll and Lochaber region, accounting for around 14% of the boat activity, and approximately £3.18m annually.

Allowing recreational sea angling in protected areas has consistently been shown to generate sustainable income to rural areas and increase public support and acceptance of MPAs. In addition to the direct benefits of such a designation to both the local communities and native marine life a host of indirect benefits exist: indirect benefits include the overspill of commercially important species and preservation of genetic diversity in marine organisms.

Other recreational activities include SCUBA diving and sight-seeing, it is expected that such activities would also benefit from the designation of a Nature Conservation MPA.

Complex migratory life strategies like those seen in both Spurdog and Common Skate may require a combination of fisheries management (with statutory instruments) and spatial management (through the identification and designation of MPA's to protect the species and critical habitats). It has previously been supported that additional spatial protection such as MPA's can be beneficial to many mobile species such as Spurdog and Common Skate, particularly in cases where populations show a high degree of site fidelity.

SSACN believe it is essential for the protection of Scottish Spurdog and Common Skate populations that Loch Sunart is considered for MPA designation and included in the MPA search locations. The presence of multiple search features makes the site a particularly strong candidate for designation as a Nature Conservation MPA.

Loch Sunart, Argyll, MPA Proposal Based on the Priority Marine Features Common Skate *Dipturus batis* and Spurdog *Squalus acanthias*.

1.1 Proposal

The Scottish Sea Angling Conservation Network welcomes the opportunity to submit a 3rd party marine protected area proposal and would like to propose the designation of a Nature Conservation MPA in Loch Sunart, Argyll as shown in figure 1. It is proposed that Loch Sunart is designated as a Nature Conservation MPA in order to protect populations of critically endangered Common skate *Dipturus batis* and vulnerable Spurdog *Squalus acanthias* and their habitats.

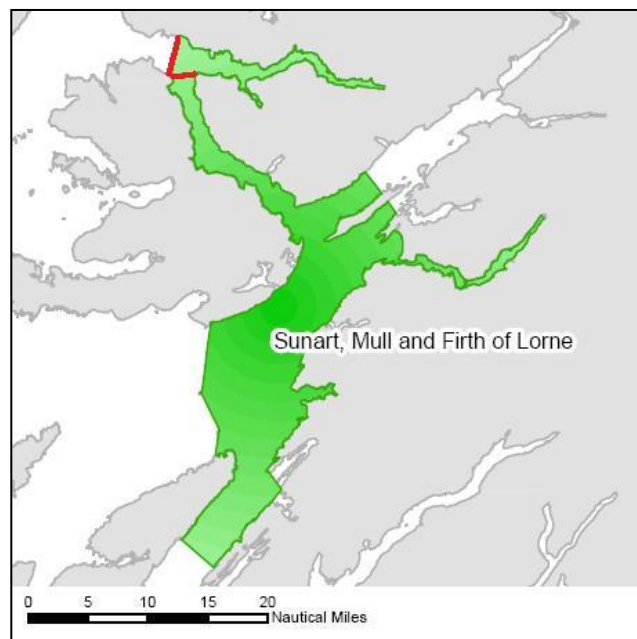


Figure 1: Nature Conservation MPA network proposed by SSACN based on priority marine features (Common Skate *Dipturus batis* and Spurdog *Squalus acanthias*). Boundary lines at the mouth of Loch Sunart are marked in red.

Any ecological corridors linked to the population within Loch Sunart should also be searched and suitably protected in order to ensure that populations do not become fragmented and that the area does not become an isolated hotspot for Spurdog or Common skate. This will allow sufficient migration to take place ensuring the long term viability of these mobile species.

Data available from SSACN and the Scottish Shark Tagging Programme (SSTP) also suggests there may be a resident population of Spurdog present within Loch Sunart. Recaptures of tagged fish are recorded throughout the year. Spurdog are generally considered a highly migratory species though Spurdog tagged in Loch Sunart have not been recaptured outside of the Loch. This may be part of a complex migratory life strategy of Spurdog which requires further research to conclude what determines site fidelity or when migration takes place.

2. Loch Sunart

2.1 Site Description

Loch Sunart is the longest sea loch in the highlands, situated between the Ardnamurchan and Morvern peninsulas, in south-west Lochaber. The Loch stretches for 31km and has six sills dividing the Loch into separate well defined basins, with the second basin providing the maximum depth of 124m. Loch Sunart is considered a spectacular hotspot for recreational sea angling and is viewed by anglers as an area of national importance.

2.2 Important Marine Features

Spurdog are a slow growing shark species with the longest known gestation period of any vertebrate of up to 24 months^{1,2}. Females have a low fecundity producing a small litter of 2-16 fully developed pups³. Females do not mature until around 11 or 12 years old, though they may mature as late as 18-21 years old, with a minimum length of approximately 74-83cm at maturity⁴. The strongly *k*-selected life history of the species accounts for Spurdog having the lowest intrinsic rate of population increase (2.3–7% depending on stock) known in any marine fish⁵. This, coupled with a tendency to aggregate by sex and age, makes them particularly vulnerable to depletion either through targeted fisheries or as by-catch.

Common skate are the largest European batoid reaching lengths of up to 3 metres. They show typical elasmobranch life history characteristics with both females and males maturing late at an average of 11 years old at 180cm and 125cm respectively⁶. Females have a low fecundity laying around 40 eggs every two years⁷. Slow growth rates and low fecundity mean that Common Skate have a low intrinsic rebound potential and populations may suffer significantly from overfishing or habitat degradation: for these reasons it is felt that spatial protection is required, particularly in areas where juveniles reside, to effectively conserve Scottish populations of Common Skate.

The west coast of Scotland is one region where both species can still be found in reasonable abundance with several isolated hotspots: namely the Sound of Jura, Firth of Lorne, Loch Sunart and Loch Etive (Spurdog). It is possible that ecological corridors exist along which skate travel, evidence of this is seen in tag and recapture data from the SSTP.

Spurdog and Common Skate populations have seen drastic declines in the north-east Atlantic with both species listed on the OSPAR list of threatened or declining features⁸. Common Skate considered '*critically endangered*' on the IUCN Red List^{9, 10}. The high site fidelity seen in some regions makes this species particularly suitable for spatial protection in the form of a Nature Conservation MPA.

The Community Plan of Action (CPOA) for the conservation and management of sharks (2009) aims to ensure a greater understanding of sharks and their role in ecosystems and fisheries and identified an urgent need for improved data collection. The work of SSACN through the SSTP plays a vital role in the collection of this essential data for many species found in Scottish waters and it is likely that this research will continue to assist the Scottish Government in achieving their international commitments to protect vulnerable shark species.

SSACN believe that the data collected thus far indicates that spatial protection of Common Skate and Spurdog, and their critical habitats in Scottish waters is required in addition to statutory

instruments that may be put in place. This will allow the Government to effectively manage and conserve these vulnerable species.

2.3 Residency

Historical literature on Spurdog suggests the pupping period is between November and January, and that females migrate to pupping areas every two years to give birth¹¹. Historical tagging programmes conducted off the west coast of Scotland and North Sea suggested that Spurdog have a winter migration northward to Norway from Scottish waters with a return migration in the summer months^{12, 13}. This migratory strategy has been generally accepted as a typical behaviour of the species¹⁴.

Data gathered by the SSTP suggests that Spurdog are present throughout the year in Loch Sunart with a degree of residency detected from the recaptures to date. This supports historical findings that stated that Spurdog were present in ground surveys of Loch Sunart throughout the year¹⁵. Regular migration habits and patterns previously associated with Spurdog are therefore not supported by the SSTP Spurdog recapture data from Loch Sunart as shown in figure 2 and 3, or by historical literature from the region¹⁵.

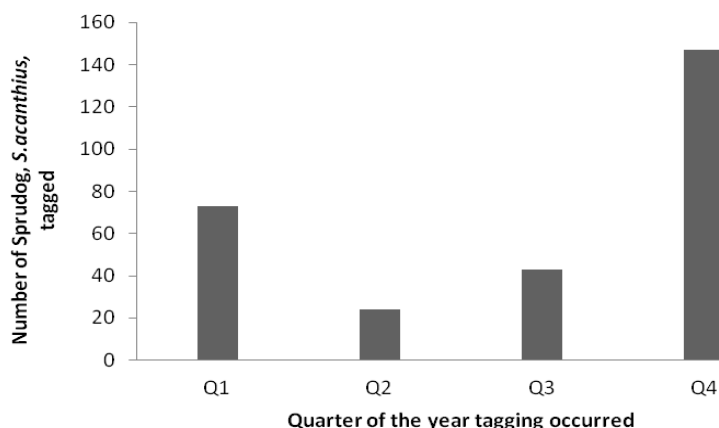


Figure 2: Number of Spurdog tagged in Loch Sunart and the time of year they were tagged.

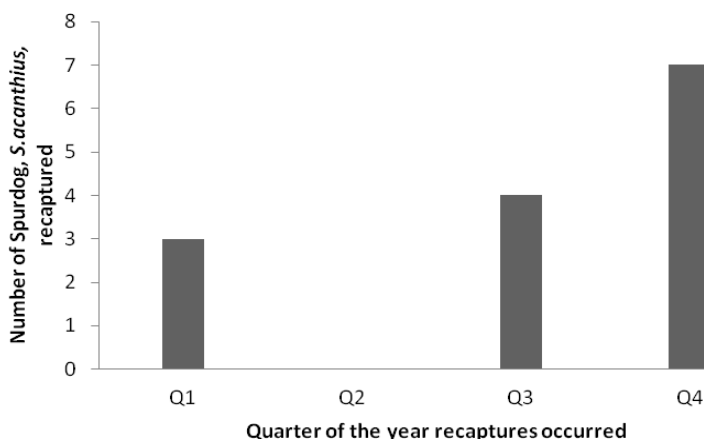


Figure 2: Number of Spurdog recaptured and the time of year they were captured.

SSTP recapture data suggests that Spurdog are present in Loch Sunart throughout the year. Although the majority of captures and recaptures take place in Q4 this is in part an artefact of increased angler effort in the area due to SSACN's annual Spurdog tagging event that attracts anglers from all over the country.

The majority of tagged and recaptured Spurdog were recaptured in a different quarter of the year than they were originally tagged in. Times at liberty for recaptured Spurdog in Loch Sunart have ranged from 15 to 1077 days. The recapture rate for tagged Spurdog inside Loch Sunart is 4.88% (287 tagged, 14 recaptures); in contrast the recapture rate for Spurdog tagged outside of Loch Sunart is 0.81% (248 tagged, 2 recaptures). More information on recaptures is shown in table 1 and 2.

Common Skate captured in Loch Sunart represent a small proportion of the SSTP database (2.24%), however there is a high recapture of 44% inside Loch Sunart. This suggests that the population of skate in the Loch may be relatively small but they appear to display a high degree of site fidelity.

Loch Sunart is therefore an important area for Common skate and spatial protection in the form of Nature Conservation MPA will help conserve this critically endangered species. In order to facilitate this surrounding areas, including the Sound of Mull and Mouth of Loch Sunart, must be suitably searched and protected in order to ensure that Scottish elasmobranch populations do not become fragmented through the isolation of important areas and degradation of ecological corridors.

Table 1: Recaptured Spurdog in Loch Sunart, showing the time of capture and time at liberty.

Tag Number	Quarter Captured		Days at Liberty
	Initially Tagged	Recapture	
326	Q4	Q4	15
695	Q3	Q4	745
1507	Q2	Q3	67
2739	Q4	Q3	327
3453	Q1	Q4	283
4225	Q4	Q3	318
4251	Q3	Q1	184
6038	Q1	Q4	221
7464	Q4	Q1	63
8103	Q3	Q4	69
28905	Q4	Q1	448
29137	Q4	Q4	342
29254	Q4	Q4	1077
29265	Q4	Q3	670

Table 2: Summary of Common skate captures in the main regions with captures in Loch Sunart highlighted.

Summary of captures and recaptures of Common Skate, <i>Dipturus batis</i>						
	Total Captures	Total Tagged	Total Recapt	% of Total Taggings on Database	% of Total Recapt on Database	Recapture rate within area
Sound of Mull	909	556	353	28.54	35.91	63.49
Firth of Lorn	656	446	210	22.90	21.36	47.09
Sound of Jura	570	334	236	17.15	24.01	70.66
Loch Sunart	72	50	22	2.57	2.24	44.00
West of Mull	430	349	81	17.92	8.24	23.21
Other	294	213	81	10.93	8.24	38.03
Total	2931	1948	983			

3. Current Protection & Alternative Management Options

3.1 Legislation

The recent protection order put forward by the Scottish government to protect shark species in Scottish waters will include Spurdog and Common Skate. However, this will not protect the species from any direct or indirect impacts of other activities that are currently permitted in Loch Sunart or that may be permitted the future. Spatial protection to include critical habitat during key life stages of mobile species is required in order for this particular slow growing species to regenerate and has previously been supported¹⁶.

Further research into the population ecology of Spurdog within Loch Sunart, migratory life strategies and genetic mixing will determine the best combination of management options throughout Scotland and Europe. Nature Conservation MPA's are required for key regions such as Loch Sunart where Spurdog may be spending a large proportion of their life. This alongside current tagging programmes will facilitate future research.

3.2 Activities & Management Recommendations

3.2.1 Recreational Sea Angling

Loch Sunart is a well known and important recreational sea angling destination on the west coast of Scotland. Sea angling opportunities are available year round from both boat and shore with accessible launch sites and several hire boats available in the area. This year-round angling opportunity has allowed a constant feedback of anecdotal evidence, and in recent years tagging data, to be collected from anglers.

Many anglers fishing in Loch Sunart now regularly tag Spurdog and Common Skate as part of the SSTP and this is starting to highlight a number of interesting and important patterns in the area. It is hoped that the SSTP will continue to play an important role in future research.

Many countries have already successfully implemented MPAs whilst allowing recreational sea angling as a means of generating income to rural areas and increasing public acceptance and support of MPA designations¹⁷.

3.2.2 Aquaculture

There are several aquaculture facilities in Loch Sunart. Based on the best available evidence SSACN do not believe these facilities have a significant negative impact on Spurdog or Common Skate populations, pupping grounds or nursery habitats. SSACN expect that these activities would continue should Loch Sunart be designated a Nature Conservation MPA.

3.2.3 Creeling & Scallop Divers

Creeling is carried out throughout the Loch and there are two boats currently in use by scallop divers. Based on the best available evidence SSACN do not believe these activities have a significant negative impact on Spurdog, Common Skate or important habitats. SSACN would expect these activities would continue should Loch Sunart be designated a Nature Conservation MPA.

3.2.4 Mobile Fishing Gear & Long Lining

There are currently no restrictions on the use of mobile or static fishing gear within Loch Sunart. Long lining has been carried out in recent years, SSACN believe that such activities or the use of any other destructive mobile fishing gear are not currently undertaken regularly within Loch Sunart. It is expected that any future use of mobile fishing gear or long lines within Loch Sunart would be assessed against the conservation objectives of the MPA designation in order to protect Spurdog and Common Skate populations and vital habitats.

4. Additional Research

A Nature Conservation MPA in Loch Sunart would facilitate further research necessary to ensure the viability of Spurdog and Common Skate stocks. Continued collection of SSTP data by anglers will help determine the migratory life strategy and to what extent Spurdog and Skate show site fidelity in Loch Sunart. The knowledge on Spurdog life history characteristics would also increase, whilst affording an increased level of protection to juvenile Spurdog and pupping females.

The SSTP currently supplies essential data for two PhD projects (based at the University of Aberdeen) investigating the population dynamics of elasmobranchs in Scottish waters.

As the migratory life history of these species is complex, and the recapture data is still deficient and inconclusive, a Nature Conservation MPA would facilitate further research necessary to ensure the viability of the stocks. Continued collection of SSTP data by anglers would help determine the migratory life strategy and to what extent Spurdog show site fidelity.

5. Implications of MPA status

SSACN believe that spatial management is required to ensure long term protection of the habitat and the species should the current legislations or management plans be revised. Any activity returning to the area would need to be assessed against the conservation objectives of the proposed MPA and managed accordingly.

It is likely that the MPA status of Loch Sunart would be met with minimum opposition due to the low level of commercial activity in the Loch. The Loch could also be used as a least damaged/most



natural site due to the current low levels of activities - particularly the use of destructive mobile fishing gear - and could provide a key area for demonstration and research purposes as part of the wider Nature Conservation MPA network.

In the Scottish Government economic study (2009), the Argyll and Lochaber region was found to be one of the top areas for sea angling in Scotland. Loch Sunart is the second most popular launch site in the Argyll and Lochaber region surpassed only by Oban¹⁸. Loch Sunart contributes to over 250,000 sea angling days annually with an estimated annual expenditure of over £22,500,000 for Argyll and Lochaber¹⁸. Loch Sunart accounts for around 14% of the boat angling activity in the region. We can therefore presume that that boat angling in Loch Sunart alone would account for at least £3.18 million annually.

It is expected that not only would recreational sea angling and tagging programmes continue should MPA status be granted, but that the socio-economic benefits to the area would increase through promotion of the sport and an increase in tourism.

In a recent Scottish Study into the social and community benefits of angling in the Assynt region, it was concluded that *“local, regional or national governments, or statutory and regional agencies, should consider investment in angling-based tourism initiatives to increase economic benefits through increased numbers.”*¹⁹

Based on the Scottish economic report on the value of recreational sea angling (detailed above), it is thought that the area would generate a significant income if developed as recreational sea angling centre for Scotland. MPA status and the development of a sea angling centre for Scotland would benefit both elasmobranch species in Loch Sunart and the local economy. In addition, there are many other species found in the Loch which would benefit from the designation of an MPA and would contribute to the reputation of Loch Sunart as one of Scotland’s premier recreational sea angling destinations.

6. Conclusion

Spatial management measures are required in order to protect and allow regeneration of Spurdog and Common Skate in Scotland and throughout Europe. Loch Sunart is believed to be a critical habitat for Spurdog reproduction and development and it has previously been shown that spatial protection in the form of MPAs can be extremely beneficial to mobile species^{16, 20}. Juvenile Spurdog are also believed to spend a large proportion of their immature life stages within the Loch and mature adults have been shown a degree of site fidelity in SSTP tagging data.

Recreational sea angling has a very low impact and generates sustainable income to rural areas of Scotland, whilst providing a low cost method of gathering valuable data through the SSTP. The vast majority of recreational sea anglers already target elasmobranchs in Scotland on a voluntary catch-and-release basis. Promotion of recreational sea angling in Loch Sunart would increase local support and acceptance of the MPA designation in addition to the socio-economic benefits of attracting visiting anglers to the region¹⁷.

The value of this data collected by SSTP volunteers is already apparent and should continue to enhance the research with MPA status in the area. SSACN believe it is essential for the protection of this species, both in Scottish and European waters, that Loch Sunart is considered for MPA designation and included in the MPA search areas.

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