

Scottish Shark Tagging Programme



Progress Report

Date: December 2010





Scottish Shark Tagging Programme Progress Report

Welcome to the December edition of the SSTP's progress report.

First of all, a big thank you to all who have contributed to the programme so far, the number of tag returns so far is impressive and is solely down to you, the anglers, who have contributed your time and effort.

Project Summary

Number of anglers contributing to the SSTP: **192**
Total number of entries: **2390**
Number of recaptures: **241 (~11%)**

Species Tagged:

- Common Skate – 332**
- Spurdog – 433**
- Tope – 1340**
- Thornback Ray – 81**
- Bullhuss – 154**
- Smoothound – 46**
- Blonde Ray – 4**

Species Recaptured:

- Common Skate – 110 (33%)**
- Spurdog – 12 (3%)**
- Tope – 117 (9%)**
- Thornback Ray – 1**
- Bullhuss – 1**

Note :: the figures above relate to the data currently held by the SSTP, this does include some UKSTP and Glasgow museum data, but due to the sheer quantity of data from these programmes, the process of full integrating it all into one master data set is ongoing.

Before we take you through the recaptures and other species related information, we thought we would just quickly give you some information on the SSTP website, the Facebook page and the education events the SSTP have been running over the last few months.

Facebook



The Scottish Shark Tagging Programme's Facebook page is gathering strength with currently 375 supporters. The site is a useful place for anglers to interact with each other, discuss issues and post photos from the weekend's fishing. It is also a useful place for non anglers to learn about the SSTP.

If you are a Facebook user and would like to keep up to date with what's happening with the SSTP then please join the SSTP on Facebook! Just type Scottish Shark Tagging Programme into the search engine on Facebook or follow the link through www.tagsharks.com.

Website

The SSTPs website (www.tagsharks.com) is also gathering momentum with visits steadily rising. These reached a peak during Sharkatag 2010 with a new record of 255 unique visitors in a day with people from all over the world visiting.

This is a huge number of hits for such a specialist website.

What are they looking at when they do visit our site? The most popular articles over the last 3 months were the following :

- #1 = Tagathon 2010
- #2 = Thornback Queen
- #3 = Tagging Programmes
- #4 = Top Taggers
- #5 = Catching Common Skate by Davy Holt

Due to the continuing workload that the SSTP incurs, we would love to hear from anyone who would be interested in contributing to either the Facebook site or the website. There are many ways you can help, writing stories for anglers yarns, creating articles of interest such as exercises in making tackle. We have found that the more regular our websites are updated, the more interest they generate.

Top Ten Taggers

The anglers who have contributed the most data to the SSTP are:

1st Ian Burrett
2nd Dale Robertson
3rd Matthew Burrett
4th Gordon Goldie
5th Stuart Cresswell

6th Alan Hume
7th Willie Kennedy
8th Les McBride
9th David Murray
10th Ashley Ferguson

Many thanks to these and the other dedicated anglers who have contributed a wealth of information to the SSTP!



Recent Cap awards

The SSTP offers a small reward to anyone who reports the details of any initial / recapture tagging data; this is in the form of fishing caps at four different levels, the most recent awards were -

Dale Robertson: Platinum
Matthew Burrett: Gold
Gordon Goldie: Gold
Stuart Cresswell: Gold

Alan Hume: Silver
David Murray: Silver
Liam McBride: Bronze
Darren Sloan: Bronze

Congratulations to all!

Tagger of the month

At the end of each month, the number of entries to the SSTP is counted up and whoever has submitted the most records (recaptures and new tags) is heralded as the 'Tagger of the Month'. So far we have had four top taggers:

- November 2010 Stuart Cresswell
- September 2010 David Murray
- August 2010: Jason Nicol
- July 2010: Dale Robertson
- June 2010: Matthew Burrett
- May 2010: Stuart Cresswell
- April 2010: Dale Robertson
- March 2010: Gordon Goldie

More information on these dedicated taggers can be found at www.tagsharks.com/hall-of-fame.

Largest fish on our records

Heaviest Tope	81lb
Heaviest Spurdog	21lb 4oz
Heaviest Common Skate	225lb
Heaviest Bullhuss	17lb
Heaviest Thornback Ray	13lb 2oz

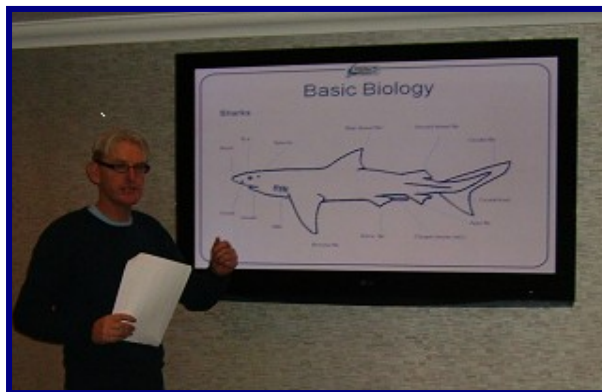
These fish are all females - always the largest of any elasmobranch species.

The common skate weight is an estimated one from one of the weight charts that are now available to download as a pdf through www.tagsharks.com. These charts have proved to be accurate when compared to actual recorded weights.

Training

The first trainers course was run with the Ayr Sea Angling Club in the week during the lead up to the 2010 Tagathon at Lochs Etive and Sunart. David McNair, our Level II coach, ran the session with a few experienced taggers.

The course is aimed at arming experienced taggers with enough information to train others on how to tag. Trainers are run through the taggers course with emphasis on how to get people involved and how to engage them in the training. Explaining why certain things, such as correct handling methods, are important is also key to the course. The emphasis throughout the course is “minimum stress to the fish, if in ANY doubt about the size or the health of the fish, return it to the water as soon as possible untagged.



The taggers course is designed to cover the basics of the tagging process including how to hold the fish, how to insert the tag safely and what data to record. The course also briefly touches on what we hope to use the data for.



As the SSTP will be using a smaller type of tag soon, only those who have attended a certified training course will be allowed access to the smaller tags.

We appreciate there are taggers out there with years of experience, however we feel it is vital that all using the smaller tags go through the course as the health of the fish is paramount.

The course also places emphasis on the scientific nature of the tagging study.

Training courses will be made available at our events, and as we build up a network of trainers, it is hoped that training courses will be available through clubs and public events.

Keep an eye on the website for updates!

Common Skate (*Dipturus batis*)

IUCN Red List: Critically Endangered (CE).



Background:

Common skate have a long, pointed snout and strongly concave wings which give the animal an overall angular shape. The mouth contains 40-56 rows of teeth which are found on the ventral jaw. A line of 12 to 18 thorns is formed on the tail with additional 1 or 2 thorns between the dorsal fins. Colouration on the dorsal surface is highly variable between shades of grey and brown with light spots and darker blotches in variable patterns, whereas the ventral surface varies from a pale grey in adults to almost jet black in juveniles

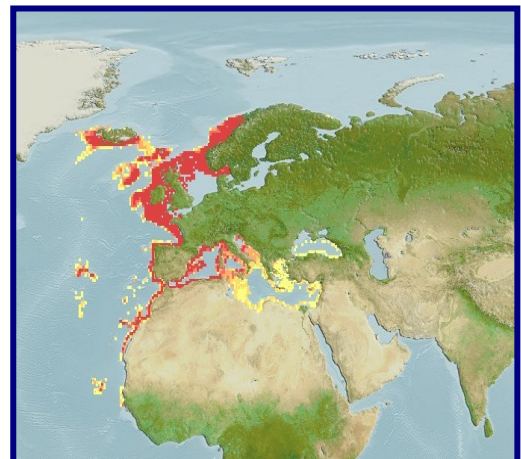


As the largest and heaviest of the skate species in Europe it can grow up to 3 metres long and weigh upwards of 220lb (100kg), with a maximum estimated lifespan of 100 years.

Juveniles hatch from egg cases (~10in/25cm long) which are produced every two years by a mature, over 11 years old, females. A female can produce between 11-100 eggs at one time depending on her size.

Eggcase of Common skate (Image courtesy of J. Beaton)

Distribution of the common skate reaches from the northeast Atlantic to the western Mediterranean Sea. Most commonly it can be found in soft substrates at the depths of ~200m where it feeds on a variety of crustaceans, bottom dwelling fish and other elasmobranchs.



Map of distribution (Image from: www.aquamap.org)

Commercially the common skate is unimportant, but due to its size can get caught in nets. Targeted fisheries are now banned throughout Europe and the retention of this fish when caught through bycatch is not allowed.

The Scottish Shark Tagging Programme (SSTP) data for skate is beginning to give us a good insight into various aspects of their life history. A brief analysis of the data follows. So far we have 248 skate recorded with the SSTP, this is not including skate tagged under the Glasgow Tagging museum, this data is slowly being fed into the SSTP so we will have one master data set for all skate tagged in Scotland.

There are 6 areas we have skate data for: Crinan area, Loch Sunart, Sound of Mull, the Firth of Lorn and West Tarbet. The total number of fish caught and number of recaptures for each site is detailed in figure 1.

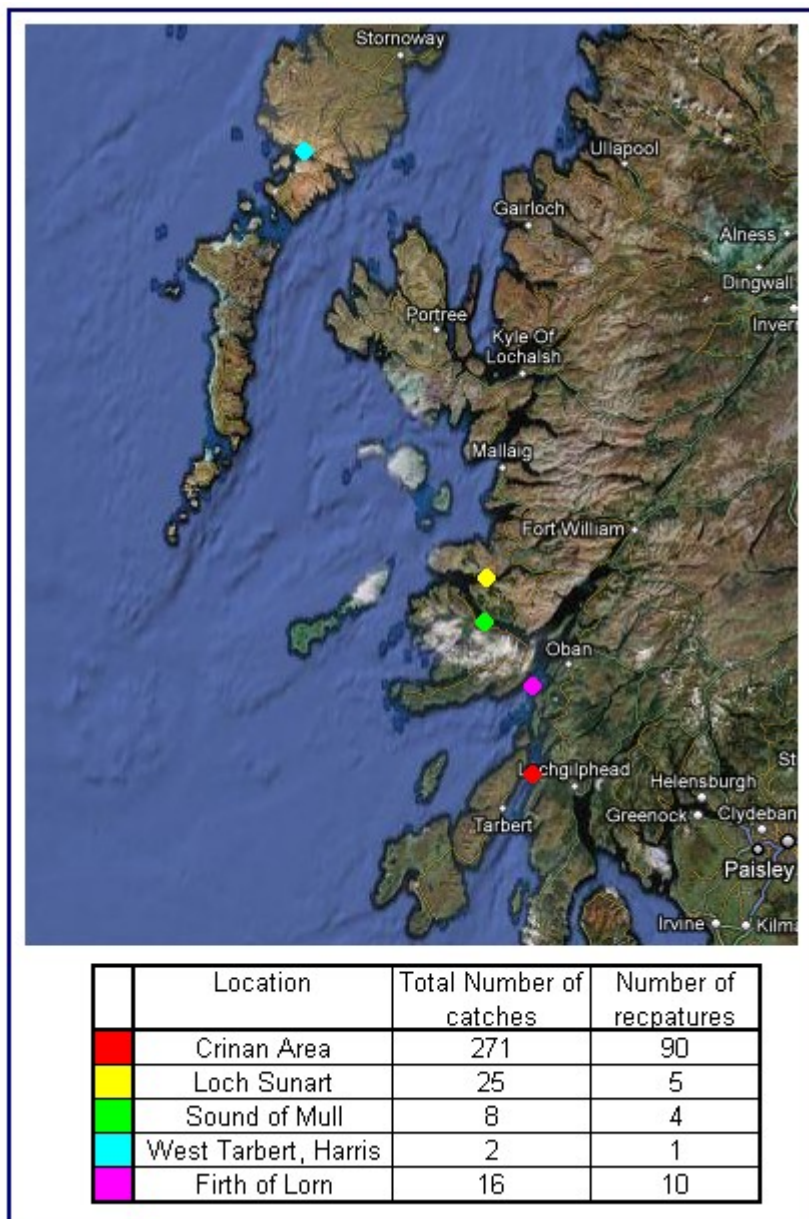


Figure 1: Tagging sites for the SSTP

Approximately two thirds of all SSTP common skate records are females. This suggests a higher population of female fish in the Crinan area (as this is where most of the data held by the SSTP on skate come from). If this is compared to historic data from the Glasgow Museums Tagging Programme, it can be seen similar proportions of males and females were caught in the Sound of Mull while a more equal (~45% male - 65% female) can be found at the passage of Tiree (between Tiree and Mull) and The Firth of Lorne (Figure 2). This suggests that females do congregate in certain areas.

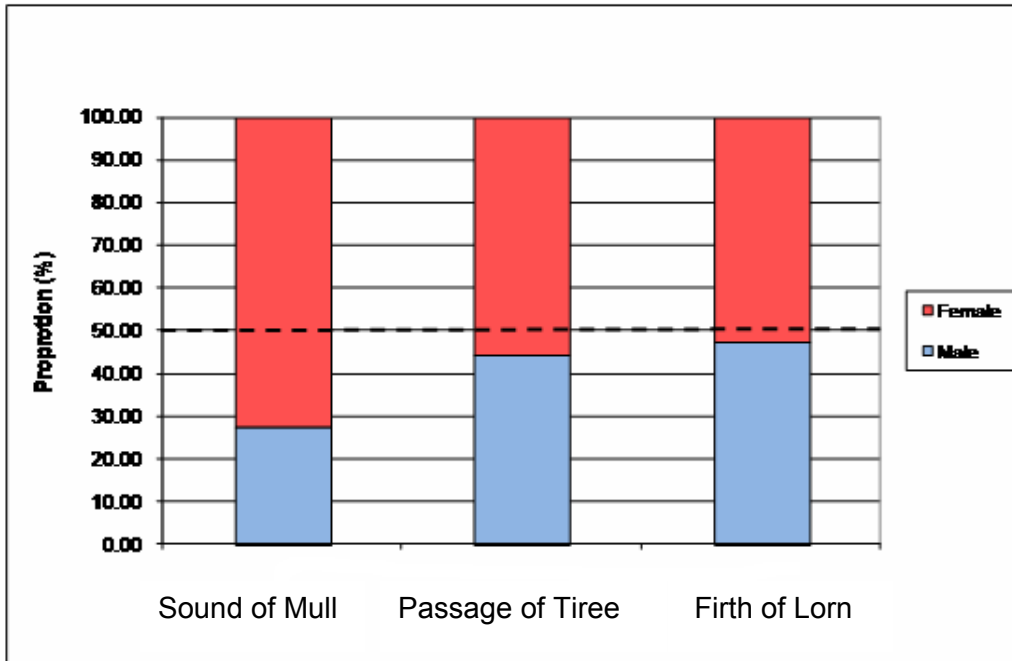


Figure 2: Proportions of males to females at three different sites

Looking at the recaptures within the SSTP, the majority of fish were recaptured at the same geographic location as their original tagging (Figure 3) There was a large proportion of fish that had either no original location or no recapture information.

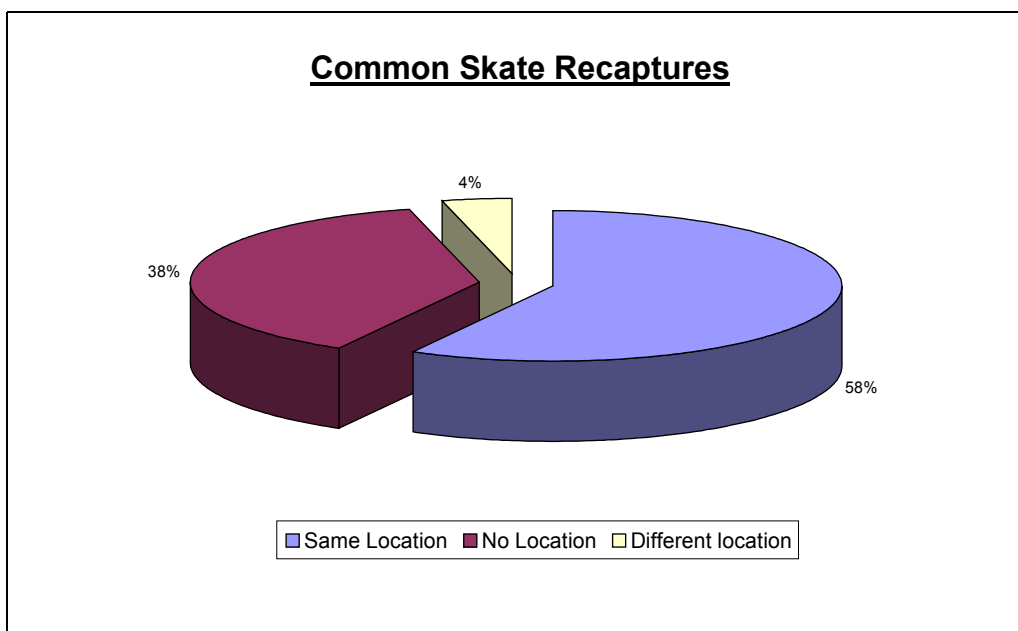


Figure 3: Proportion of commons skate recaptures that occurred at the same site as original tagging.

The time period between recapture varied from a few hours to a few years with skate being caught at all months during the year. The variation in time periods between recapture and the large proportion of fish recaptured within the same area supports the idea of residency.

If fish were migrating into the region and back out, we would expect to see regular patterns in the recaptures, such as Females being recaptured every two years and males every year (due to their breeding cycle) during the same few months.

There are a few exceptions with two female fish being caught at different locations to their original capture. One of these was originally caught off Tobermory and recaptured in Crinan, the second fish was caught (and recaptured twice) in the sound of Mull off Loch Aline, before being recaptured for the third time in Loch Sunart (figure 4)

The argument for a resident population, or at least a partially resident population of common skate presiding around the coastline of Argyll is strengthened by the tag returns, the question remaining is how far does this population extend, the occasional fish that has been caught in a different location does question the range of these animals.

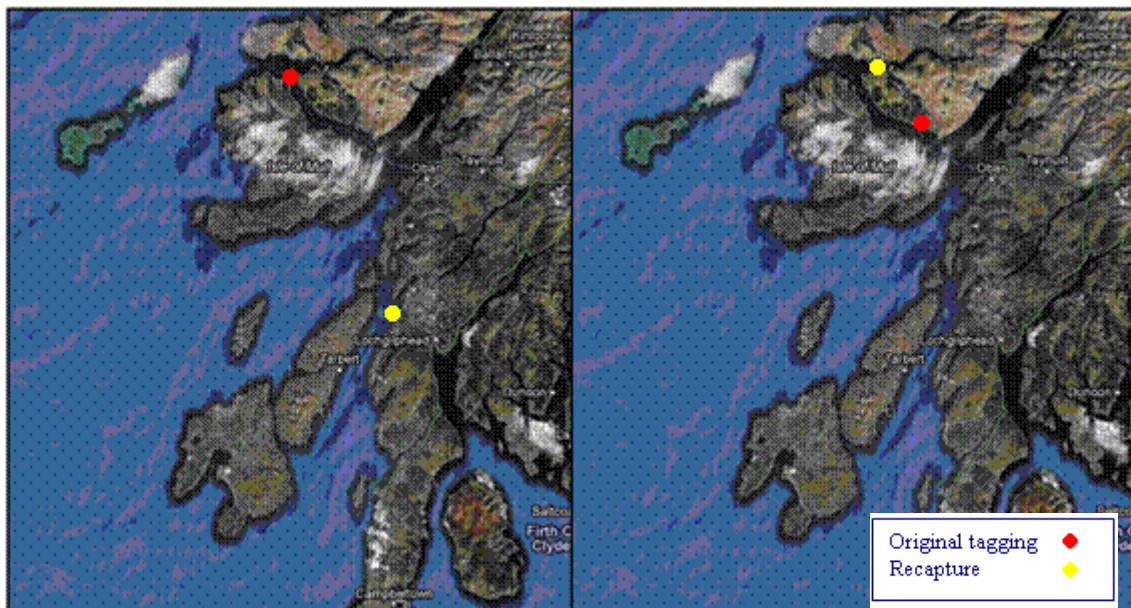


Figure 4: Original tagging site and subsequent recapture site of two common skate

Of the recaptures, two thirds were female, similar to the total number skate caught. This suggests that the population proportion of males to females is not fluctuating much.

The difference in proportions of female skate in some areas compared to others does suggest that areas with a higher proportion of females might be used for egg laying. The recapture of females within these areas shows that they either remain, or regularly visit these areas.

By looking at when most of the recaptures occur (figure 5), we can see a higher proportion of catches being recaptures between April-September (22%). The lowest proportion of recaptures occurs between October-December (13%) between January and March, the proportion of recaptures is 18%. When angling, you are targeting tagged and untagged fish with no bias towards one or the other, so, if the fish are resident all year, this should mean that the proportion of recaptures remains the same throughout the year. The fact that there is a change does suggest some movement of fish as the proportion of tagged to untagged fish being caught is changing throughout the year.

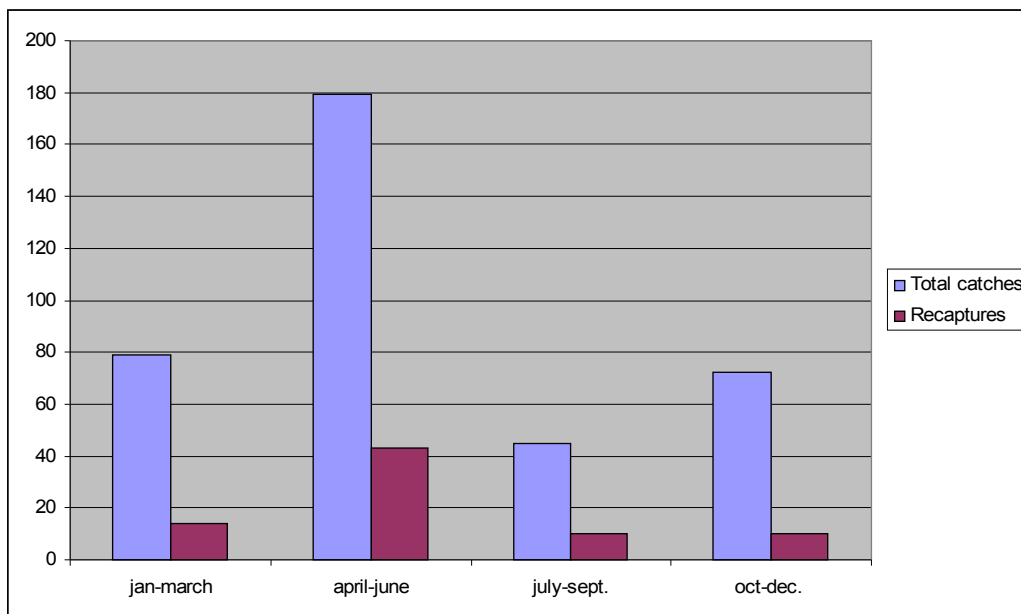


Figure 5: Quarterly total number of animals tagged and number of recaptures

What is clear from the common skate data is that we need more data! We are beginning to get some idea of the behaviour of these animals, but it is obvious that this is not a black and white story, but a complicated pattern of some form of residency or territorial behaviour with some influx of animals during the Spring/summer months.

A likely scenario would be females having preferred egg laying grounds, from the data, this looks likely to be the Sound of Mull and the Crinan area. The females either remain or regularly visit these areas. Males are present in all areas, possibly for breeding or merely passing through on route to other areas. From an analysis on the Glasgow museum data (where more recaptured fish had moved location) we can see that on average, males recapture sites were often much further apart than female recapture sites (on average 7.5km, females only .5km), suggesting males are more migratory.

Spurdog (*Squalus acanthias*)

IUCN Red List: Vulnerable (VU)

Northeast Atlantic status: Critically Endangered (CR)

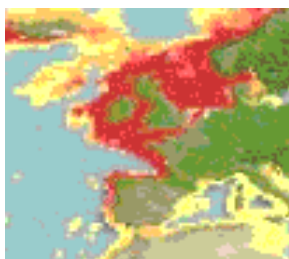


Background:

Spurdog are easily identified by a large protruding spine in front of each dorsal fin. In addition to this other distinctive features are a row of white spots on flanks (may fade with the age), no anal fin, green eyes and scissor sharp teeth with one pointy tip. The colour ranges on dorsal and flank surfaces from slate grey to light brown, and on ventral surface from pale grey to white.

The females are usually larger than the males with their weights reaching over 20lbs. Maturity is generally reached after 10 years. Live (18-30cm long) pups are born after an 18-22 month long gestation period, one of the longest for any animal. The litter may vary from 2 to 21 pups at one time.

The young mostly feed on crustaceans and molluscs. As the fish mature feeding becomes more opportunistic consisting of a mixture of invertebrates and small fish.



Distribution of the spurdog reaches from east Atlantic (Murmansk and Iceland) to Cape Coast of South Africa, including the Mediterranean and Black Sea. In addition to this, the distribution is circumglobal in temperate waters. As a highly valued species, spurdog is over-exploited and targeted by commercial fishing industry. It is caught in bottom trawls, gillnets, line gear, rod and reel.

All spurdog were either recaptured in the same geographic location as their original tagging or no location data was provided. All recaptured spurdog are female. This is not surprising as only 35 of the 433 fish tagged were males. The main reason for this is that male spurdog tend to be smaller than the recommended tagging size, it is only recently, with smaller tags, that male spurdog are being tagged (these have only been tagged by a Home Office licensed researcher). Until more male spurdog are caught, not much useful information can be gained from the sex ratio of recaptured fish.

The combined hypothesis' of residency with some movement again begins to tell us that spurdog life history is very complicated with no set rule applicable to all populations.

What the data, combined with photographic and anecdotal evidence is beginning to suggest is that Loch Eitve is a potential pupping ground. The recaptures within the same location also suggest a degree of site affiliation or even residency. Hopefully a research project SSACN has just initiated in Loch Eitve will give more insight into this. The project is using acoustic tags placed in fish (all fish were anaesthetised and all work carried out under a home office license) and receiver units placed at the mouth of the Loch to look further into the residency of spurdog question. The aim of this project is to test the theory that there is a resident population of spurdog in Loch Eitve, if this hypothesis is strengthened then it means we should re-address the way we view the migratory nature of spurdog. Historically they have been viewed as a highly migratory species, and while we are not disputing that large scale migration does take place, we are suggesting that there might be an element of residency in coastal waters which obviously has implications for the management of this species regarding potential marine development.

In order to do this, we plan on tagging 12 individual fish with VEMCO acoustic tags and put an acoustic 'gateway' at the mouth of Loch Eitve. The gateway will consist of two VEMCO VR2W receiver attached to removable mooring stations which we aim to have in place for one year. At the end of which the moorings will be completely removed from the site.

More detail can be found on the project at www.tagsharks.com.



Tope Shark (*Galeorhinus galeus*)

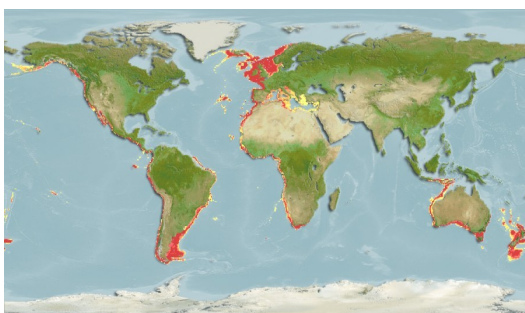
IUCN Red List: Vulnerable (VU)
Northeast Atlantic status: Data Deficient (DD)



Background:

A mature tope varies in colour from dark grey to light brown with some individuals showing darker spots. Juveniles have additional black markings on the tip of their fins and white trailing edges on their pectoral fins. The ventral surface for both mature and juveniles range from pale to white. This slender shark has a long pointed snout and a large mouth with small blade-like teeth. Its most distinctive features are the second dorsal fin which is similar in size to the anal fin and a very large caudal lobe. The average length of tope Shark is ~160cm (max. recorded length ~200cm).

Estimated maximum age for a tope Shark is between 20 to 40 years, however it may grow as old as ~60 yrs. Maturity is reached between 8 to 10 yrs (male) and 10 to 15 (female). After a 12 month gestation period, depending on the size and the age of the female, and average of 30 live pups are born (with a variation of ~6-52). The pups (20-40cm long) stay in a special nursing area during the first year or two where they feed on a high proportion of crustaceans and other prey such as gastropods. Mature tope Shark feeds on bottom-associated fish species; squid and octopus and pelagic species are known to be included in their diet.



Map of distribution (Image from: www.aquamap.org)

Distribution of tope shark ranges from north east Atlantic (Iceland) to South Africa with sightings in the Mediterranean. It can also be found in the West Indian Ocean and the Pacific Ocean. Previous DNA analysis from global stocks suggests that populations are isolated from each other according to wide scale geographic locations¹

The majority of tope in the SSTP data base have were recaptured in the same location as original tagging, however, there are many fish recaptured many miles away from the original tagging site.

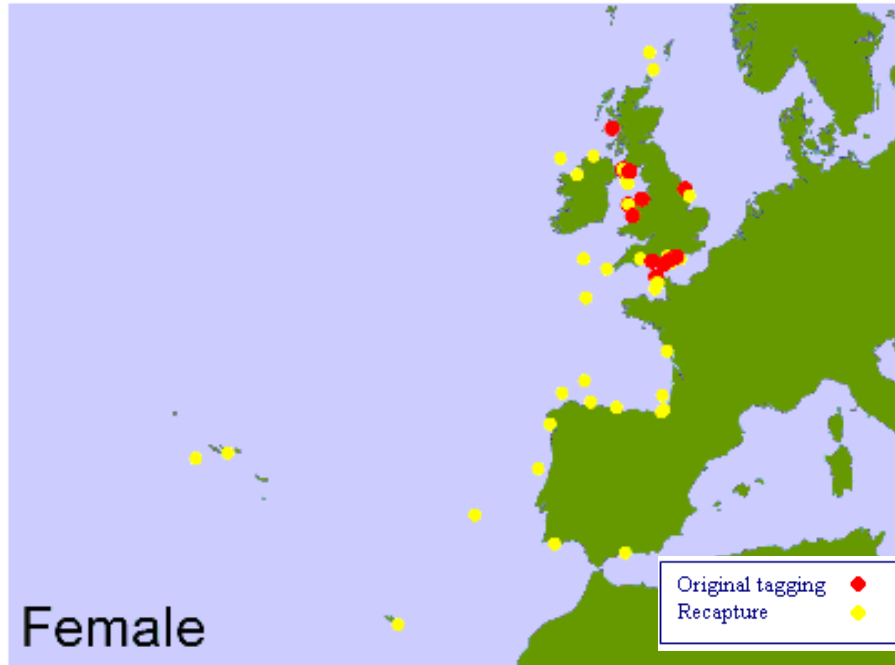


Figure 6: The original tagging locations and recapture sites for female tope

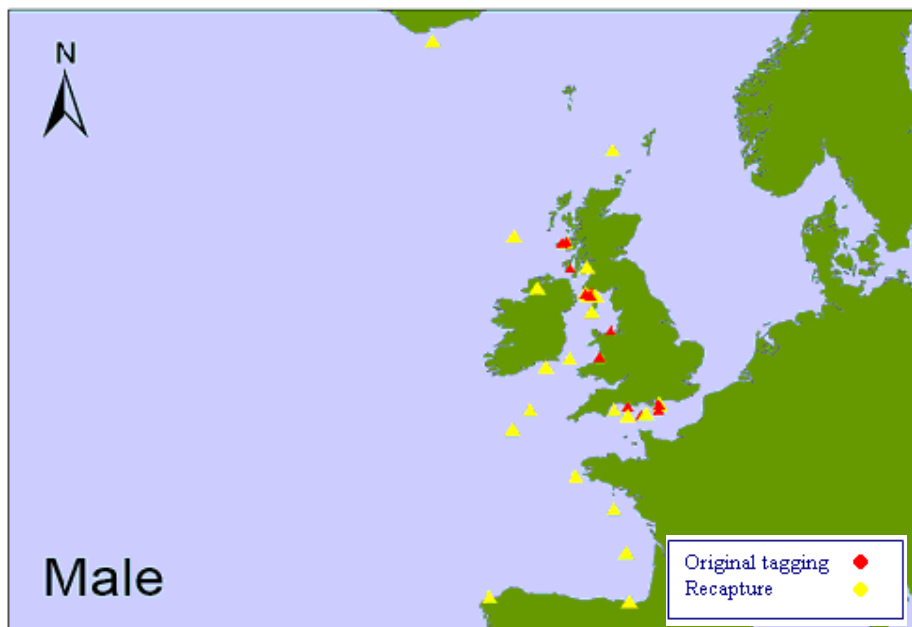


Figure 7: The original tagging locations and recapture sites for male tope

It can be seen that a higher proportion of male fish are recaptured in the same area than female fish. The main area of study that the SSTP has data on is Luce Bay and the surrounding area. In Luce bay there have been 26 female and 28 Male recaptures, all originally tagged in Luce Bay.

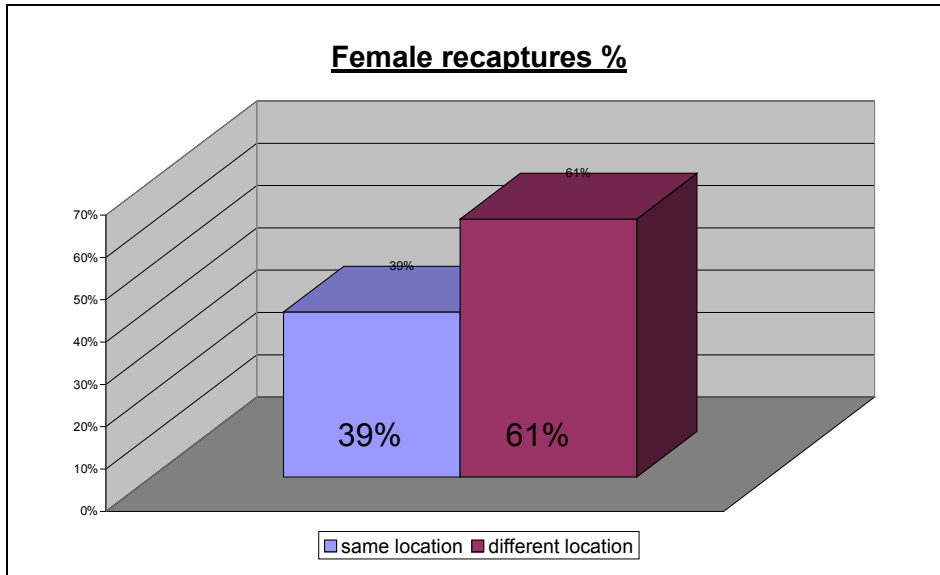


Figure 8: Proportion of female tope recaptured in a different, or the same geographic location

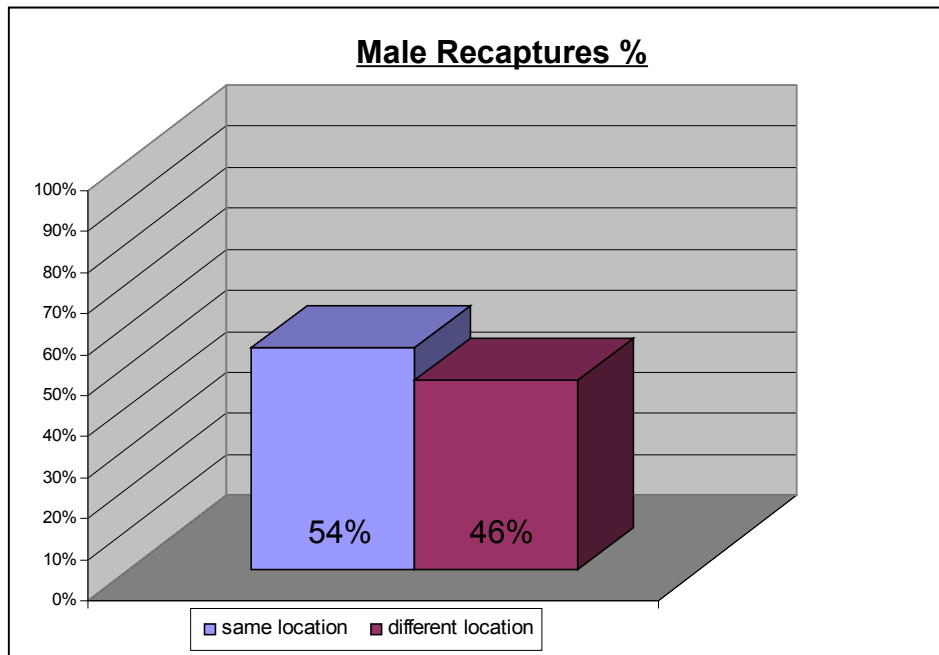


Figure 9: Proportion of male tope recaptured in a different, or the same geographic location

It has been suggested due to males milting on decks, claspers being red and inflamed and males bearing recent battle scars that Luce bay is a breeding ground for tope. The recapture evidence does support this. It is thought that female tope reproduce every 2-3 years, while males are certainly capable of breeding every year.

If this is the case, then males will stay within closer proximity to breeding areas, and return there every year, while females have time to travel further from breeding grounds and return only every 2-3 years. This could explain why female recaptures are found further away than male recaptures from initial tagging, and why the proportion of males recaptured at the same location is higher within Luce bay.

Thornback Ray (*Raja clavata*)

IUCN Red List: Near Threatened (NR)



Background:

Identification of the thornback ray can be difficult due to the variation in colouring and patterning. Most commonly seen colour in the UK waters is dark brown with regularly arranged creamy white spots. As the name suggests, the dorsal surface is covered with spines which continue along the long and solid tail. Up to two additional thorns can be seen between the dorsal fins. The ventral surface for adults is creamy-white, whereas juveniles are pale with large, dark eyespots on each wing. The mouth with 36-44 rows of teeth on the upper jaw is found on the ventral surface. The female Thornback Ray grows to ~25lb.

Females and males are estimated to reach maturity at approximately 3lbs. Egg cases are laid once a year and depending on water temperature, the juveniles (11-13cm in length) will hatch after 4-6 months. The young feed mainly on small crustaceans, as they mature the prey includes sandeels, small gadoids and dragonets.



Distribution of thornback ray reaches from northeast Atlantic, Mediterranean and the Black Sea with reported sightings as far south as off western Africa.

Map of distribution (Image from: www.aquamap.org)

Thornback rays are commercially targeted fish, caught by gill net, long line and as bycatch. It is commonly found on European fish markets. Along with this it is highly valued by recreational anglers. To date, only one thornback ray has been recorded as a recapture with the SSTP. This 4lb heavy (width 35cm) male was originally caught at 10 am in Loch Etive and recaptured later in the afternoon at the same location.

Bullhuss/Nursehound (*Scyliorhinus stellaris*)

IUCN Red List: Near Threatened (NT)



Background:

Dorsal surface of the bullhuss is dark to creamy brown with numerous various sized black/dark (sometimes white) spots. It has an extensive amount of teeth on both the upper (44-56 teeth) and lower (38-56 teeth) jaw. Estimated overall size can reach up to ~160cm and maturity is estimated to be reached at ~100cm long for both sexes. As juveniles, the diet consists mainly on crustaceans (hermit crabs, swimming crabs, shrimp etc). As they mature the diet will also include molluscs (squid, octopus), bony fish (mackerel, herring, flatfish etc) and other smaller shark species.



The distribution of bullhuss is from N.E Atlantic (including southern Scandinavia) and the Mediterranean Sea to eastern and central Atlantic. Bullhuss are eaten in Mediterranean regions where they are targeted by the commercial fisheries. In addition to this, it is also landed as a bycatch.

Map of distribution (Image from: www.aquamap.org)

Records collected by the SSTP show the recapture of one bullhuss, a female which was initially tagged in 2008 in the Irish Sea weighing 1.6lb; after travelling ~150km she was recaptured nearly two years later off Dumfries weighing 2.0lb, the recapture records.

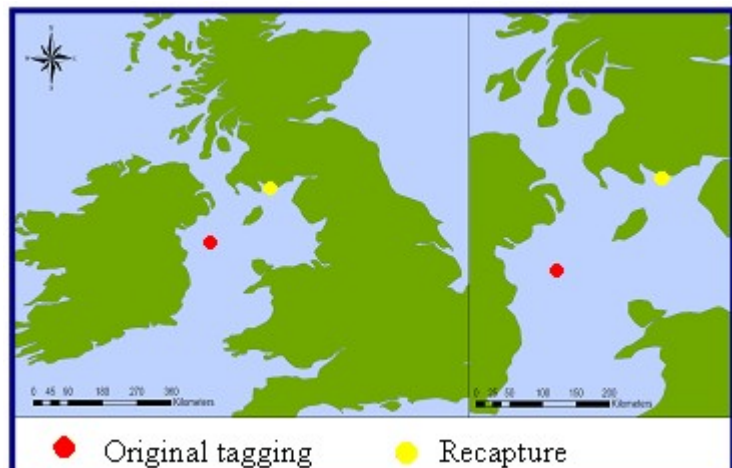


Figure 10: The original and recapture locations of the recaptured female Huss.



General SSACN / SSTP News – Ian Burrett

It has been another fantastic year of growth for the tagging programme.

It is now acknowledged by the Scottish Government, Government scientists and the academic world that the data the SSTP is gathering is vital to increasing the understanding of Scottish shark stocks and will also provide valuable input into any shark management plans.

In a Press release earlier this year, Richard Lochhead, Cabinet Secretary for Rural Affairs and Environment, said: “Shark tagging plays an important role in monitoring the sharks around Scotland’s coasts and helping us increase our knowledge of the marine environment and I’m delighted that we have surpassed 1,000 sharks tagged.”

What a long way we have come. Only 5 years ago, SSACN was told by Mr. Lochheads predecessor to go see the tourist board as anglers had no right interfering with fisheries management.

Thankfully statements like that are becoming a thing of the past and the success of the SSTP shows sea anglers really can make a huge difference.

What has the Project Leader been up to?

January 2010, SSACN appointed James Thorburn as our SSTP Project Lead, since then he has made a huge contribution to the program and although employed for his academic skills, we think James has really taken to the angling side of the job – even treating himself to a rod and reel.

James duties have involved

- Running the many day to day practical and administrative tasks associated with the SSTP programme.
- Creating material for trainer and tagger courses
- Creating material for schools and running 6 education days
- Contacting, visiting and working with anglers outside the SSTP.
- Designing and implementing additional SSACN research programmes such as the acoustic tagging in Loch Etive
- Inputting and quality control of data into the SSTP data base
- Field work in support of the research activities
- And of course, creating Progress Reports

Sadly James’ year is almost up. He will be leaving SSACN in February to undertake a Ph.D associated with the state of Scotland’s inshore sharks. However, as he has enjoyed working with anglers so much, he intends to use the tagging program and angler support as an integral part of his Ph.D; this will be the first time that anecdotal data and angler tagging programs will have been used to support a scientific paper.

On behalf of SSACN I would like to thank James and wish him all the best in his future career.

What Next.

The trouble with the tagging program is the more questions the data appears to answer the more questions it throws up.

We now have the Glasgow museum dataset, much of the pertinent UKSTP dataset and old Fisheries Research Scientist's tagging data which we have turned from paper version to electronic.

A funding bid is in place to replace James with a similar post. James' successor will be expected to spend less time on the administrative side of the program and spend more time analyzing the data. By this time next year we should have a few more answers and probably a few more questions !

We have also submitted a funding bid to enable us to employ an additional project co-ordinator in the Solway.

To help with the ongoing need for shark research, it is likely SSACN will be entering a collaborative partnership with marine scientists and academia to produce an all encompassing "bible" which will input into shark management plans.

We are also looking at sourcing funding for the effects of wind-farms on sharks. The government has introduced consultations on the placement of wind farms that fall right in the middle of migratory routes of spurdog and tope. The effect that electro magnetic fields have on elasmobranch migratory routes has never been assessed and this research will be a "worlds first".

Please visit the website to find the dates of next years big events
<http://www.tagsharks.com/category/events>

And finally

SSACN would like to wish all our Members and Taggers a Merry Christmas and a Happy New Year.

Ian

SSACN Projects Director

