Elasmobranch projects update

1. Northern Devon Skate (Ray) Pilot Project

1.1 Rationale

The Bristol Channel is one of the few targeted skate fisheries in the UK with landings of ray from this area contributing about 20% by weight of the total skate landed by all English & Welsh fisheries. The Bristol Channel skate fishery has an estimated annual value of approximately £1 million. The main skate species caught by otter trawls and gill-nets in the Bristol Channel are thornback ray *(Raja clavata),* blonde ray *(Raja brachyura)* and small-eyed ray *(Raja microocellata).* The initial idea for the project came about after the closure of UK skate and ray fisheries in October 2014 when quota for skate and ray ran out before the end of the year. Skate fisheries are currently managed by a multi-species quota, with TACs often covering large geographic areas. A total allowable catch (TAC) was first introduced for skates in the Celtic seas ecoregion (which includes the Bristol Channel) in 2009. Initially the quota for this area was set at 15,748 tonnes with yearly reductions down to 9,915 tonnes in 2012. Historically quotas for skates were at or above the total landings however recent reductions in quota are now restrictive to some fisheries partly due to a precautionary approach to a paucity of data. It is acknowledged that the issues with ray quota and evidence gaps cannot be solved at a local level alone. However, local initiatives can help improve the resolution of data collection which in the long-term may be able to feed into quota decisions and in the short-term may provide information on the sustainability of local stocks. Additionally evidence on local sustainability of stocks can help influence suppliers directly providing benefits to North Devon fishers. The project also aimed to champion the work of the North Devon Fishermen's Association (NDFA) which has implemented voluntary conservation measures in North Devon to try and secure the long-term sustainability of the rays stocks.

1.2 Funders

Devon and Severn Inshore Fisheries and Conservation Authority, Northern Devon FLAG (European Fisheries Fund and MMO), North Devon Coast AONB and North Devon Biosphere Reserve.

1.3 Objectives

The North Devon Skate Pilot Project had two main objectives. The first objective of the project was to pilot the use of data storage tags (DSTs) for monitoring of patterns of distribution, movement and migration of commercially important ray species in North Devon. The second was to bring together interested parties to discuss the potential for the development of a long-term monitoring plan and explore the possibility of the development of a Fisheries Improvement Plan. It was foreseen that this would be via a formal workshop and via more informal links created in the development of the project and the IFCAs engagement in various existing networks relating to elasmobranch science and policy.

1.4 Achievements to Date

- A one day workshop was held in Barnstaple in May 2015. There was good attendance from all sectors of the industry (see Table 1). The morning session focused on the combination of complex issues surrounding the North Devon ray fishery, the knowledge of local fishermen

regarding ray biology and what research could be done to support the industry's belief that the North Devon ray fishery is sustainable. The afternoon saw a series of talks about the project and other complimentary initiatives relating to ray ecology and sustainable fisheries. Participants then took part in a workshop which split attendees into groups to discuss scientific, socio-economic and management elements of a sustainable fishery. New connections were formed at the workshop and it has allowed closer working of different groups as described in the following sections.

- Two officers trained and signed off as competent to tag fish under the Animal Scientific Procedures Act (ASPA) following a formal training course and informal training with Cefas
- 50 Data Storage tags deployed in October 2015 in Bideford Bay and around Hartland Point on-board the Ann Louise with local trawlerman Steve Taylor (Appendix 2)
- Strong links with Cefas Shark By-Watch UK 2 project developed. Data from tags to feed into future iterations of the Shark ByWatch UK 2 proj
- IFCA became formal partners of Shark By-Watch UK 2 and committed further time and funding to the project to develop the research outlined in the workshop run in this project (see next section).
- Presentation given to North Devon Coast AONB on the project
- Presentation given to South West branch of the National Federation of Fishermen's Organisations (NFFO)
- Links developed between D&S IFCA with industry (e.g. Morrison's Ltd and Young's Seafood)
- Links developed between D&S IFCA and Welsh Government elasmobranch interests
- Participation in Seafish Skates and Rays group meetings
- Various publicity in local papers and press

1.5 Future Work

- Maintain and develop possible leads for funding for more Data Storage Tags
- Maintain and develop links with the NDFA, Cefas, Morrison's Ltd and Young's Seafood regarding setting up a Bristol Channel Ray Management Forum.
- Advertise tag return information
- Return tag data will feed into future Shark By-Watch UK projects
- Input into Shark By-Watch UK 2 as outlined below

Table 1. Composition of attendees at the North Devon workshop

Sector	**Representatives**
Industry	North Devon Fishermen's Association members including active fishers. Local and national producers and buyers.
Managers	Defra, IFCA
Local funders	Northern Devon FLAG, North Devon Coast AONB, North Devon Biosphere
NGOs	Shark Trust, Marine Conservation Society
Academic - fisheries	Cefas, Bangor University
Academic – socio-economic	University of Greenwich, University of Durham

2. Shark By-Watch UK 2

2.1 Rationale

Shark By-Watch UK is a project where fishermen and scientists work together to improve fishing practices and knowledge for sustainable shark, skate and ray fisheries. In the first phase of the project, a series of workshops were held in which we actively shared expertise to develop fishery surveys and tagging schemes to find out when, where and how elasmobranchs are caught (as target and non-target species), how many survive capture and how we can build sustainable shark, skate and ray fisheries for the long-term. The project is now in its second phase - Shark By-Watch UK 2 - and is running three field studies in different fisheries across the UK [North Devon being one]. Building on the collaborative work undertaken in the first phase, we are gathering new information to be fed into how the reformed Common Fisheries Policy (CFP) is implemented in the UK.

After the workshop held by the North Devon Skate Pilot Project it became clear that further research was needed, and a long-term partnership approach was needed in order to develop this. As a pre-existing project with a well-developed network run by elasmobranch scientists at Cefas it was decided that the best way forward for collecting better information on rays in North Devon was via Shark By-Watch UK 2. D&S IFCA therefore became a match-fund partner.

2.2 Funders

Cefas, Defra, European Fisheries Fund, Kent & Essex IFCA, Eastern IFCA, Devon and Severn IFCA, Isle of Man Government, Scottish Natural Heritage, Morrison's Ltd.

2.3 Objectives

The primary aim of the Devon and Severn IFCAs match fund contribution to the Shark By-Watch UK 2 project was to address some of the research questions developed in the North Devon Skate Pilot Project workshop (those highlighted in Appendix 3), which provides leverage for work funded by Shark By-Watch into catch composition and spatial variation in catches in North Devon.

Specifically the IFCA committed to:

- Work with local fishermen to map areas which are known to support different ray species
- Compare areas fished in North Devon with areas sampled during the ICES Bottom Trawl Surveys which feed into the ICES stock assessment for rays and helps to inform quota decisions
- Collate existing GIS information on the distribution of habitats in North Devon
- Conduct a sidescan sonar survey of the areas mapped by fisherman as being important to different ray species to look at fine-scale habitat association of each species

2.4 Achievements to Date

- Local fishermen have helped to map where they catch different species of ray in North Devon and these are mapped in GIS

- Existing data has been collated on habitat and sediment distribution in North Devon and this has been mapped in GIS
- Locations on ICES Bottom Trawl Surveys have been mapped in GIS
- A detailed sidescan survey has been planned which included 5 sites which are thought to be representative of areas fished for either blonde, thornback or small-eyed ray with a specific focus on transitional areas between areas important for one rays species to areas important for a different species
- A number of quotes for different survey vessels were compiled and an agreement reached to use the EA- Briggs Marine vessel 'Severn Guardian' for the work
- A day was spent on-board Severn Guardian alongside in Ilfracombe, allowing the environment team time to meet the crew, discuss the survey plan and sync the IFCAs sidescan sonar equipment with the GIS, plotter and IT systems on-board.
- A combined trials and recce day at sea with environment team on-board the Severn Guardian from Ilfracombe allowed a recce to all planned sites to check for the existence of pots and/ or nets within the survey sites. Sidescan sonar surveys require long, straight, continuous transects and therefore sites need to be almost clear of pots and nets. D&S IFCAs own sidescan sonar was trialled as was the more advanced IFCA-pool Edgetech 4200 sidescan and only the latter performed well enough to be suitable for use in the strong tides of the Bristol Channel.
- Four possible survey dates were arranged with the Severn Guardian, planned around vessel availability and neap tides. Unfortunately the survey has not taken place due to strong winds and rough seas throughout all of the planned survey windows. This means that the IFCA match fund provided by the IFCA is much smaller than originally planned.

2.5 Future Work

- The sidescan sonar survey plan has been developed and can be used, either in a future iteration of the Shark By-Watch UK 2 project or earlier depending on other IFCA research priorities.
- A report will be written up summarising the findings of the GIS mapping exercise. This has been extremely productive, clearly showing that in North Devon ICES BTS surveys are not sampling the most important blonde ray habitat, which could have implications for stock assessment assumptions.
- As for the North Devon Skate Pilot Project, all of the links and networks developed will be maintained and conversations surrounding the development of a Fisheries Improvement Plan with industry and Welsh Government will continue.
- Successfully secure the return of tags released during the North Devon Pilot Project and analyse the data obtained through future iterations of Shark By-Watch UK projects (see Appendix 4 for tag return poster).

Appendix 1

Table 2. Summary of North Devon Skate Pilot Project progress

Target and Benefits identified in project application	**Progress**
Trial the deployment of 50 DST tags on 25 thornback and 25 blonde rays in North Devon, both inside and outside the existing 'Ray box'	*Completed*. Rays tagged outside the ray box due to the time of year of tagging. Blonde rays found further inshore so had to be adapted. Still relevant as rays likely to move within the upper Bristol Channel.
Pilot the application of DST tags for assessing the benefits of the ray box for two commercially important species of skates.	*Completed.* Rays tagged outside the ray box due to the time of year of tagging. Blonde rays found further inshore so had to be adapted. Still relevant as rays likely to move within the upper Bristol Channel.
Bring together key players in the supply and management chain for skates to discuss and plan a way forward for long-term monitoring and funding options with Northern Devon fishers engaged with the project.	*Completed.* The ray workshop has successfully been completed as described above. Additional talks and publicity have highlighted the issues the North Devon ray fishery faces and long term funding and monitoring options continue to be explored. North Devon fishers remain engaged and future meetings with Welsh Government should give direction to the concept of a Bristol Channel Ray Management Forum.
Identify potential way forward for future projects to gap-fill key evidence gaps in ray sustainability with the long-term goal of enhancing the marketability and provenance of North Devon rays.	*Completed and ongoing*. As a result of connections made at the North Devon workshop, Devon and Severn IFCA are now formal partners of Shark By-Watch UK 2, a Cefas project which aims to gain better understanding of local ray stocks to better inform management plans for the benefit of both the fishery and fishers. The IFCA is also a development partner of the RENEW COAST project which will aim to develop initiatives that add value to short supply chains and support sustainable fishing activities (commercial and recreational), building growth opportunities around conservation and local ecological knowledge of SSF.

Appendix 2

Pictures of rays tagged during the North Devon Skate Pilot Project on board the Ann Louise from Bideford.

Figure 1. A large male Blonde ray (*Raja brachyura*) being measured and having its health checked prior to tagging

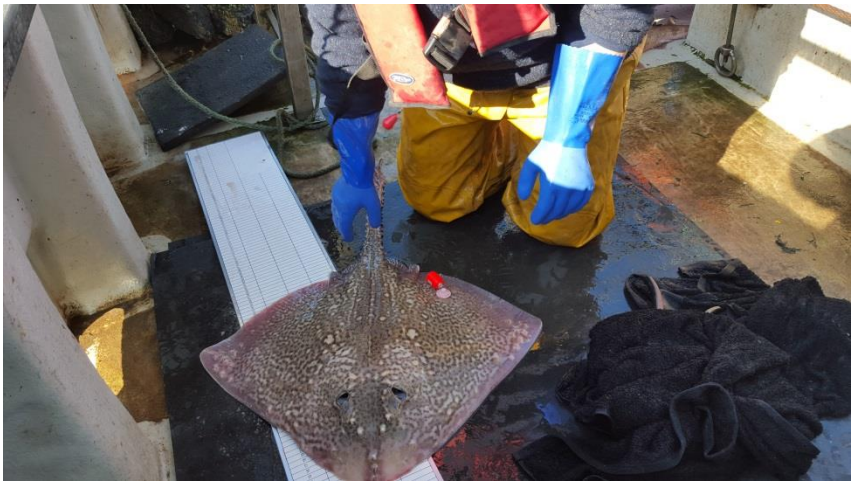

Figure 2. A large female Thornback ray (*Raja clavata*) post tagging, prior to release back into the wild. The position of the tag is specifically chosen to minimise disturbance to the ray's swimming behaviour and has been developed following extensive research by Cefas scientists.

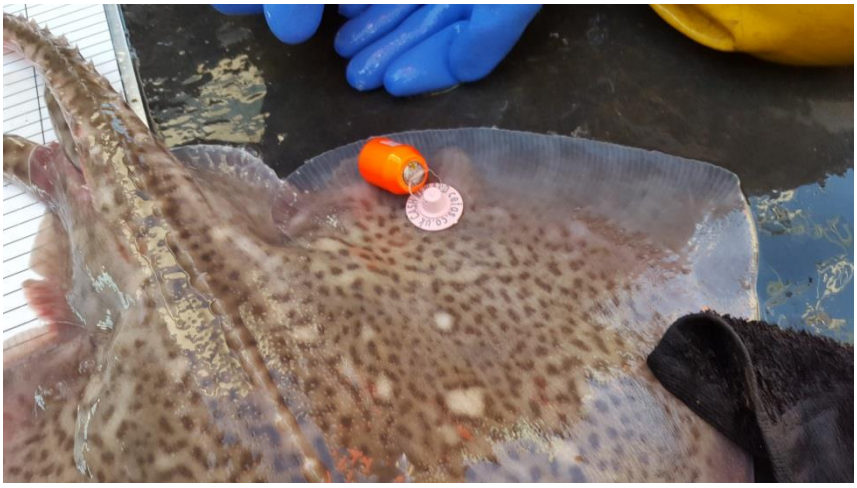

Figure 3. The bright orange float on the Data Storage Tag means they are regularly spotted on the strandline and returned by the public to Cefas. The pink coloured tag safely attaches the DST tag to the ray and is similar to those used to tag sheep's ears.

Appendix 3

Research questions developed following the North Devon Skate Pilot Project workshop to be addressed by Shark ByWatch UK 2 and future scientific/monitoring work are found below. Those currently being addressed as part of the Shark By-Watch UK 2 project are highlighted in yellow. Those that will be in-part addressed by data collected by the data storage tags are highlighted in green.

Should rays in the Bristol Channel be considered as a separate management unit?

- What are the home range sizes of the most commercially important ray species?
- Are populations of rays in the Bristol Channel part of widely distributed, panmictic populations with high levels of interchange or are they spatially restricted? (NB similar question to above)?
- What is the appropriate spatial scale of management for commercially important ray species in the Bristol Channel?
- Are populations of rays species in the Bristol Channel genetically distinct from populations of the same species outside the Bristol Channel and should they be considered as separate Evolutionary Management Units?

What are the habitat preferences of different ray species in the Bristol Channel & Severn Estuary?

- Do rays in the Bristol Channel show seasonal movements and are these the same across species and sexes?
- Do rays display species-specific habitat preferences in the Bristol Channel and how do these vary seasonally?
    - Could split it down based on fisher knowledge
- Do rays display aggregating behaviour within habitat types in the Bristol Channel and how does this vary seasonally?
- Do rays reproduce within the Bristol Channel and which habitats are important for key life-history stages?
- Does the ray-box protect important habitat for rays and if so, which species and during which life-history stages?

Sustainability of the fishery

- Are there large areas of the Bristol Channel which are naturally unsuitable for the operation of towed gear?
- Are these habitats suitable for rays and thus offer a natural protection from fishing activity?
- Has CPUE been relatively stable over time and what can and can't landings data tell us about the sustainability of the fishery?
- Does the towed gear closed-area in the Severn Estuary SAC provide important habitat & therefore protection for any ray species?
- Do current survey methodologies which inform stock assessments target the correct habitats at the correct time of year for the most commercially important species of ray in the Bristol Channel?

Appendix 4

Reward poster for tags released in North Devon, to be circulated amongst IFCA and other coastal networks