INT2018-04: Improving the collection of biological data and samples from basking sharks taken as bycatch by commercial fishing vessels

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Climate, Freshwater & Ocean Science

Prepared by:
Brittany Finucci

For any information regarding this report please contact:

Brittany Finucci
Fisheries Scientist
Marine Megafauna and Fish Biology
+64-4-386 0583
brit.finucci@niwa.co.nz

National Institute
of Water & Atmospheric
Research Ltd (NIWA)

301 Evans Bay Parade
Hataitai
Wellington 6021
Private Bag 14901
Kilbirnie
Wellington 6241

Phone +64 4 386 0300

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	Reviewed by:	David Thompson
	Formatting checked by:	Alex Quigley
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Contents

Tables

Figures

Executive summary

The Department of Conservation (DOC) contracted NIWA to develop and manage a data collection and specimen sampling programme for basking sharks (*Cetorhinus maximus*) that are captured by commercial fishing vessels. Basking sharks were listed as a protected species in New Zealand in 2010, but they are occasionally taken as bycatch, mainly in trawl fisheries operating from Otago southwards to the Auckland Islands. This report details the final data collection and sampling protocols that were implemented, sampling outcomes, and future recommendations.

Sampling protocols were designed to collect information and samples that will be useful for understanding more about the biology, population structure and behaviour of basking sharks in New Zealand waters. The key parameters are date, location, size, sex, maturity (males only), in combination with photos and a fin clip for genetic analysis. A sampling kit was supplied to each vessel involved in the programme. In the first year 10 sampling kits were deployed with fishing companies that operate on the Stewart Island – Snares Shelf and the Auckland Islands Shelf (where most basking sharks have historically been caught). At the end of the first year of the project, one sampling kit was used and the whereabouts of a second kit remains uncertain. For the second year of the project, additional sampling kits were made up to increase sampling capacity and cover the full extent of observed vessels in the arrow squid fishery, for a total of 20 available sampling kits. Four additional kits were made available to deploy on non-observer vessels.

Kits were deployed on approximately 50 trips across 22 vessels. These vessels targeted arrow squid (*Nototodarus sloanii*), barracouta (*Thyrsites atun*), and hoki (*Macruronus novaezelandiae*) in areas Southland/Southeast Coast/Southeast (SOU/SEC/SOE) and Sub-Antarctic/Sub-Antarctic Islands (SUB/SOI) across Fisheries Management Areas (FMAs) 3, 4, 5, and 6. It was estimated that from December 2020, all trips targeting arrow squid had a sampling kit onboard and kits have remained on vessels where observer coverage was continuous. As of 30 April 2021, one sampling kit had been returned to NIWA.

From 01 September 2019 to 30 April 2021, there were 16 reported basking shark interactions (for a total of 17 sharks). Fifteen interactions occurred during commercial fishing operations and one occurred during a research trawl survey. Most commercial interactions occurred when an observer was onboard (80%) and most occurred during December (60%) and in FMA 5 (60%). Most interactions were reported by vessels targeting arrow squid (53%) at depths from 145–350 m and all interactions were reported by trawl fishing. One vessel reported 30% of the basking shark interactions.

Of the observed captures, nine sharks were reported to be released alive and three were dead. Observers often noted visible injuries of captured sharks, including bleeding around the snout, pectoral fins, and claspers. One shark was observed swimming away after release. Six basking sharks were male, two were female, and five were unsexed. Most sharks were estimated to be at least 8 m in length (n=7). The smallest shark (3.3 m) was reported off the West Coast of the South Island in FMA 7 and is one of the smallest reported basking shark from New Zealand waters.

Efforts should be made to continue sampling bycaught basking sharks with the available sampling kits. Alternative means of sampling sharks (e.g. biopsy poles) will be necessary to ensure health and safety regulations are met with regards to observers approaching sharks. NIWA will continue to maintain its sample collections for basking sharks in the DOC protected species genetics tissue bank, managed by NIWA through the NIWA Invertebrate Collection. Genetic samples are needed for

understanding stock structure, aggregation structure and dynamics, and with sufficient sampling, could be used to estimate population size. It is also recommended to continue the collection of basking shark biological measurements, including length and sex, to understand spatial differences in catch composition and commercial vessels are also encouraged to collect this information. Sampling efforts should be targeted to where interactions are most likely to occur – in the arrow squid target trawl fishery operating on the southern edge of the Stewart-Snares Shelf during December. Preference could also be given to these vessels to deploy popup satellite tags to released basking sharks to provide insight into post-release survival and movement patterns.

1 Introduction

The Department of Conservation (DOC) contracted NIWA under DOC project INT2018-04 to develop and manage a data collection and specimen sampling programme for basking sharks (*Cetorhinus maximus*) that are captured by commercial fishing vessels. Basking sharks listed as a protected species in New Zealand in 2010, but they are still occasionally taken as bycatch, mainly in trawl fisheries operating from Otago southwards to the Auckland Islands (Francis 2017).

The contracted deliverables for this project are:

1. A summary of results and tools developed will be reported, and reviewed by the Conservation Services Programme (CSP) Technical Working Group, and published on an annual basis.
2. Provision of training, data collection instructions and, where necessary, equipment to key commercial fishing vessels.
3. Provision of all data collected in electronic format, suitable for updating Ministry for Primary Industries databases and/or other relevant databases.

The third and fourth milestones of the project relate to the findings from this project, and require:

1. A draft report describing the methodology, findings and recommendations for further research in this area (third milestone).
2. Final revised report taking into due consideration any feedback from the CSP Technical Working Group.

2 Data collection and sampling methodology

The data collection and sampling protocols proposed are included in Appendix A. The goal was to collect information and samples that are useful for understanding more about the biology, population structure and behaviour of basking sharks in New Zealand waters. The information and samples requested were relatively simple to obtain, and it was not anticipated that the process would interfere unduly with the operations of a commercial fishing vessel. No formal training of crew was proposed.

Given the protected status of basking sharks, there is a need to return live sharks to the water quickly. For live sharks, the protocol was developed to prioritise the rapid collection of key information and samples. The key parameters were date, location, size, sex, maturity (males only), combined with photos, and a fin clip for genetic analysis. For dead sharks there is not the same urgency, so the collection of a larger suite of information and samples if practical was proposed. This was to include the same items as for live sharks, plus inspection of the mouth and gills for regurgitated food, presence or absence of gill rakers and embryos, collection of a muscle sample for stable isotope analysis, and retention of whole small sharks (less than 2.5 m total length and 300 kg weight).

In the second year of this project, the data collection and sampling protocols were updated due to concerns for observer health and safety when approaching sharks (live or dead). The document was reduced in length for simplicity and only the key items mentioned above were retained for sampling requests. Emphasis was on collecting samples only if it was safe to do so. Additional images of juvenile animals were included (which have been confused with sleeper sharks of the family

Somniosidae), as well as illustrations outlining the different shark body measurements (total length, total natural length, and pre-caudal length). It was also requested that video be taken of sharks being released, regardless of being alive or discarded as dead.

2.1 Sampling kits

A sampling kit was supplied to each vessel involved in the programme (see Table 2-1 for the contents of the kit). At the end of each trip, if a basking shark was caught, small frozen biological samples (fin clips, muscle) were to be shipped to NIWA in pre-paid Hall's Refrigerated Transport boxes/bags. Large samples (e.g. whole sharks, embryos) were expected to be extremely rare, and their shipping was to be arranged jointly among NIWA, the company involved, and the Museum of New Zealand Te Papa Tongarewa (which is likely to be the final repository for large specimens). Datasheets and Secure Digital (SD) cards with images were to be posted to NIWA at the end of each trip in pre-paid bags. Each kit had a spare SD card so that shark photography can continue on subsequent trips by the same vessel. Images were to be downloaded from SD cards received by NIWA and the cards to be returned to the vessel as soon as possible. The project was initially budgeted to provide and service sampling kits for 10 trawl vessels. It was anticipated that most trips would not catch basking sharks, so the need for replenishment would be minor.

Table 2-1: Basking shark sampling kit to be provided to each commercial vessel.

Item	Details	Year 1	Year 2
Canon IXUS 185 Digital Camera	20 Megapixel , 8x Zoom Lens, 2.7-inch TFT Color LCD, Video Recording HD 720p	√	
SD cards	2 x 16 GB	√	
Measuring tape	30 m fibreglass	√	
Tissue sample bags	40 minigrip 250 x 150 mm	√	√
Preprinted labels	50 waterproof 'never tear'	√	√
Preprinted datasheets	10 sheets waterproof 'never tear' (room for 40 sharks to be recorded)	√	√
Pre-paid Hall's frozen shipping bags/boxes	For frozen shipping to NIWA	√	√
Pre-paid and pre-addressed padded bags	5 x postage bags 240 x 135 mm for SD cards and datasheets	√	√
Sampling kit box	7 litre Sistema box	√	√
Bags for SD cards	10 minigrip 120 x 75 mm	√	
Plastic sleeve for datasheet	A4 clear sleeve	√	√

Kits were made to be available for the observer programme by the commencement of the squid fishing season (November). Most basking sharks have historically been caught in January-February on the Snares Shelf, allowing for sufficient time to deploy the sampling kits. Vessels were selected in conjunction with fishing companies that operate on the Stewart Island – Snares Shelf and the Auckland Islands Shelf. These vessels target mainly arrow squid (*Nototodarus sloanii*), silver warehou (*Seriolella punctata*), hake (*Merluccius australis*), and hoki (*Macruronus novaezelandiae*), and have been responsible for most of the recorded basking shark captures since 2010 (Francis 2017).

At the end of the first year of the project, one sampling kit was used and the whereabouts of a second kit remains uncertain. The remaining eight kits were unused and remained with the Ministry for Primary Industries (MPI) Observer Programme. For the second year of the project, it was requested that additional sampling kits were made up to increase sampling capacity and cover the full extent of observed vessels in the arrow squid fishery. An additional 12 kits were made up (two to replace the previous season and 10 new kits). Additionally, four more kits were made available to deploy on non-observer vessels. As per recommendation by the Observer Programme, the new kits provided during the second year of the project only contained datasheets, labels, and supplies required to ship samples to NIWA and did not contain digital cameras, SD cards, or measuring tape (Table 2-1).

2.2 Fisheries bycatch

To compare reported basking shark interactions with sampled basking sharks, commercial catch and effort data from the *Warehou* database (managed by MPI) and observer data from the Central Observer Database (*COD)* (managed by NIWA for MPI) were extracted. All commercial records (hereafter referred to as *reported*) and observer records (hereafter referred to as *observed*) with a basking shark interaction were requested from the MPI Fisheries Data Management team for the time period 01 September 2019 to 30 April 2021. Reported records were linked with observed records on behalf of the Fisheries Data Management team. One basking shark interaction with a research trawl vessel during this time period was extracted from the *trawl* database at NIWA.

3 Results

3.1 Kit deployment

As of 30 April 2021, only one sampling kit had been returned and delivered to NIWA. In November 2020, a vessel targeting hake on the Stewart-Snares shelf caught and released a male basking shark alive. The shark was measured to be 8 m in length (the crew measured 8.3 m but over the top of the body from snout to end of the caudal fin) and claspers were 1.03 m in length. The shark was assessed as *possibly injured*, but the extent of its injuries was uncertain. Lacerations were noted on the snout and grazing/blood on the body. A tissue sample was collected and video of the shark being release was recorded. One additional genetic sample has been returned to NIWA during the course of this project, however, this was taken before the deployment of kits in September 2019.

The exact number of kit deployments was unavailable from Fisheries New Zealand (FNZ); however, kits were deployed on approximately 50 trips across 22 vessels. These vessels targeted arrow squid, barracouta (*Thyrsites atun*), and hoki in areas Southland/Southeast Coast/Southeast (SOU/SEC/SOE) and Sub-Antarctic/Sub-Antarctic Islands (SUB/SOI) across Fisheries Management Areas (FMAs) 3, 4, 5, and 6. It was estimated that from December 2020, all trips targeting arrow squid have a sampling kit onboard. Kits have remained on vessels where observer coverage is continual.

3.2 Basking shark interactions

From 01 September 2019 to 30 April 2021, there were 16 reported basking shark interactions within New Zealand waters: 15 interactions occurred during commercial fishing operations and one occurred during a research trawl survey (December 2020) (Table 3-2). All records reported a single shark captured, with the exception of one commercial interaction where two sharks were reported (for a total of 17 sharks). Of the 15 commercial reported interactions, 12 events (80%) were also observed (13 sharks were observed). Most interactions occurred in FMA 5 (n=9, 60%), four occurred

in FMA 6, one occurred in FMA 4 (July 2019), and one occurred in FMA 7(August 2020) (Figure 3-1). Most interactions took place in December (n=9, 60%) or November (n=3).

Table 3-1: Basking shark interactions between 01 September 2019 to 30 April 2021 by Fisheries Management Area (FMA) and vessel type (commercial – observed or not observed, research). All interactions reported one shark, with the exception of one event where two sharks were reported, indicated by *.

Fisheries Management Area (FMA)	Vessel type		
	Commercial		Research
	Observed	Not Observed	
FMA 4		1	
FMA 5	8*	1	
FMA 6	3	1	1
FMA 7	1		

Basking sharks were caught by eight different vessels, with one vessel responsible for 30% of the interactions. Most interactions were reported by vessels targeting arrow squid (n=8, 53%) (Figure 3-2). Two vessels were targeting hoki, two were targeting ling (*Genypterus blacodes*), and one each was targeting hake, orange roughy (*Hoplostethus atlanticus*) , and silver warehou. All interactions were reported by trawl fishing. Gear depth varied from 145–1024 m, with 13 vessels using bottom gear and two using mid-water gear. The squid-targeting vessels fished at the shallowest depths, from 145–350 m (mean=219 m), and orange roughy was the deepest (1024 m). The depth at which the sharks were captured is not known. Tagging data has shown basking sharks can occur at the surface, as well as to depths greater than 1200 m (Skomal et al. 2009) so it is not possible to determine if the sharks were caught during gear deployment or retrieval.

According to reported interactions, six sharks were released alive and uninjured, six sharks were released alive and injured, and four sharks were dead upon release. Of the observed interactions, nine sharks were reported to be released alive and three were dead. Two of the unobserved captures were reported dead and one was alive and uninjured. There was one discrepancy between the commercial and observer records, with the commercial record reporting the shark to be alive and injured, and the observer recording the shark as dead. Observers often noted visible injuries of captured sharks, including bleeding around the snout, pectoral fins, and claspers. There were two instances where observers reported injuries were incurred to the gills and caudal fin while untangling and removing sharks from the trawl. One shark was observed swimming away after release.

According to observed interactions, six basking sharks were male, two were female, and five were unsexed (Table 3-2). Most sharks were estimated to be at least 8 m in length (n=7), four were estimated between 5 and 8 m, one shark was less than 5 m (3.3 m), and one shark did not have an estimated size. The smallest shark was reported off the West Coast of the South Island in FMA 7. Sex and size data were not available for the three unobserved interactions.

The basking shark interaction with a research trawl survey occurred in December 2020. The shark was a 5 m male, captured in trawl gear operating at approximately 500 m depth, and was released alive. As mentioned above, the depth at which the shark was captured is not known.

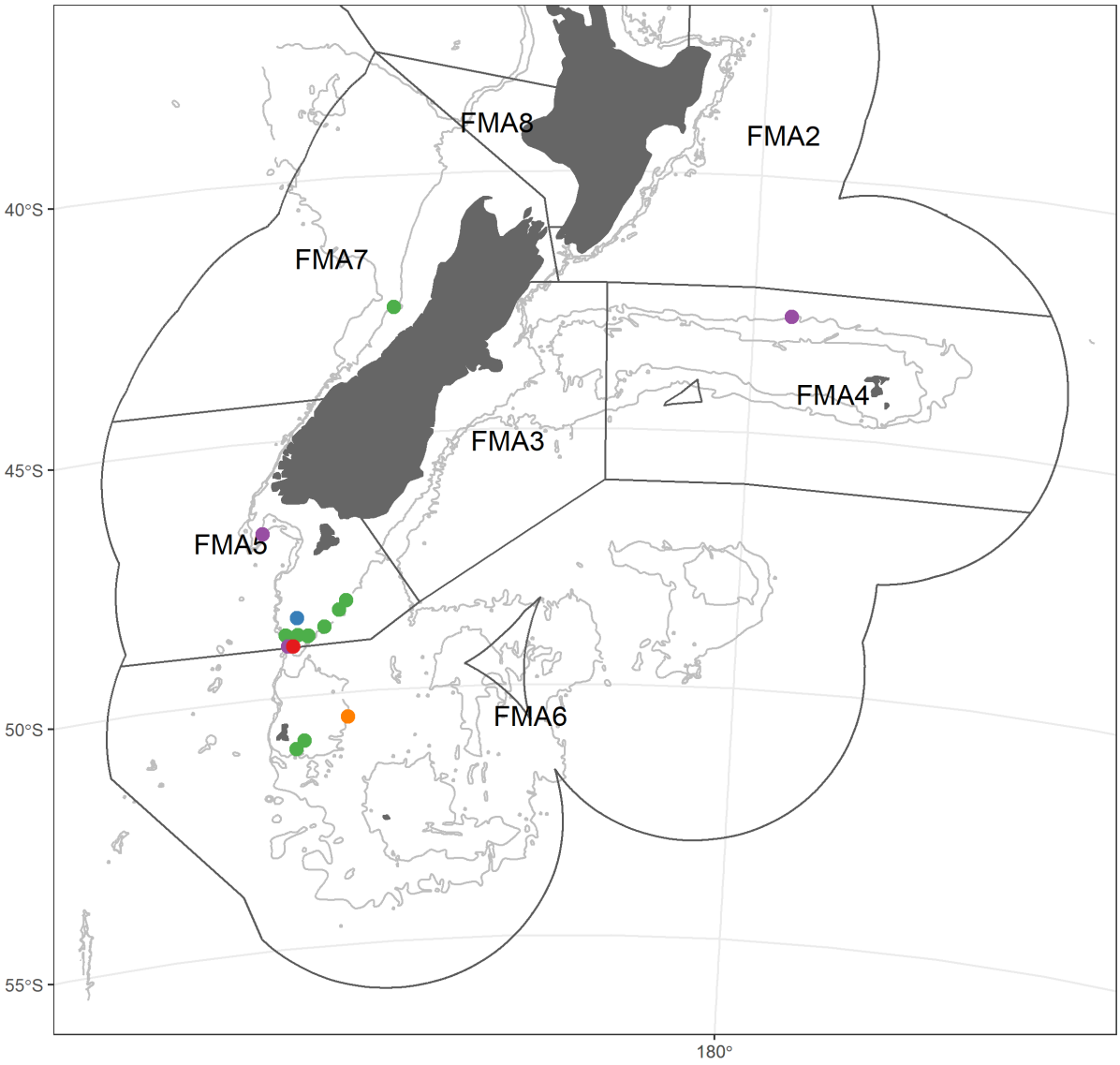

Figure 3-1: Location of basking shark records between 1 September 2019 and 30 April 2021 by observer (green), commercial vessels (purple), and research trawl survey (orange). The red point indicates the location of the basking shark sampled with the sampling kit (November 2020) and the blue point represents an additional sample collected by observer without a sampling kit (September 2019).

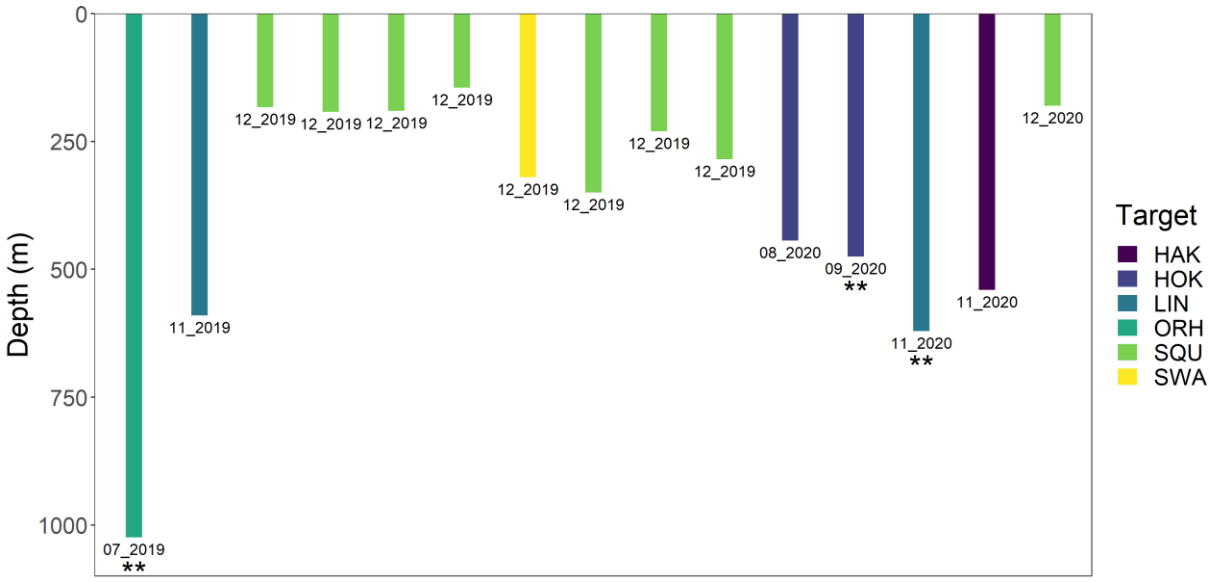

Figure 3-2: Commercial fisheries basking shark interactions (n=15) reported chronologically between 1 September 2019 and 30 April 2021. Depth of capture (m), month and year (month_year), and target fishery (HAK = hake, HOK = hoki, LIN = ling, ORH = orange roughy, SQU = arrow squid, SWA = silver warehou) are shown for each interaction. Commercial interactions that were not also reported by fisheries observers (n=3) are indicated by **.

Table 3-2: Reported sex and size estimates of basking sharks (n=13) observed in commercial fisheries between 1 September 2019 and 30 April 2021.

	Size (m)			Size not reported	Total sharks reported
Sex	3-5	5-8	8+		
Male	1	1	3	1	6
Female		1	1		2
Unsexed		2	3		5

4 Discussion

Basking sharks are difficult to locate and study in New Zealand waters. Since the disappearance of large groups off the East Coast of the South Island in the 1990s, regional basking shark sightings have been largely restricted to infrequent, offshore captures in deep-water fisheries (Francis 2017). The irregular and opportunistic nature of sampling basking sharks impedes our ability to understand their regional ecology, habitat use, and movement patterns.

As previously reported in Francis (2017), most basking shark captures continue to occur in the arrow squid target trawl fishery operating on the southern edge of the Stewart-Snares Shelf at depths <350 m. Catches were still primarily large male sharks, although additionally there were several large unsexed sharks reported. The capture of the 3.3 m individual off the West Coast of the South Island in August 2020 is one of the smallest known basking shark reported within New Zealand waters.

While the establishment of this project has only led to the sampling of one shark thus far, efforts should be made to continue sampling bycaught basking sharks with the available sampling kits. NIWA will continue to maintain its sample collections for protected species, including basking sharks, in the

DOC protected species genetics tissue bank, managed by NIWA through the NIWA Invertebrate Collection. All data on basking shark interactions is retained with the Ministry for Primary Industries. Recommendations for further basking shark sampling in New Zealand waters are made below.

Recommendations

1. **Continue collection of basking shark interaction data and biological samples**. Genetic samples are needed for regional and global stock structure studies, to identify genetic stocks for conservation management, and for understanding aggregation structure and dynamics (Lieber et al. 2020). Molecular genetics can also be used to identify individual sharks, and could offer some insight into regional site fidelity (Gubili et al. 2009). With sufficient sampling, a close-kin mark-recapture framework could be explored to estimate basking shark population size (Hillary et al. 2018). Where white muscle samples are available, these samples can be used for trophic ecology (e.g. isotope, lipid) and physiology (e.g. ecotoxicology) studies. The ecological role of basking sharks in New Zealand is largely unknown.

2. **Continue collection of basking shark measurements, including length and sex**. Of the 13 sharks captured by observed commercial fisheries, 62% were sexed and all but one shark had an estimated length. No information was available for the three sharks captured on unobserved commercial vessels. It is encouraged that commercial vessels collect such data (using the sampling protocol in Appendix A) as it has been shown previously that basking shark catch composition (size, sex, maturity) varies among fishery regions (Francis 2017). One observer reported unusual scarring on one shark. Photographs of dorsal and caudal fins, as well as defining characters on the body could be used to catalogue and identify individual sharks (Gore et al. 2016).

3. **Target sampling efforts where interactions are most likely to occur**. Most recent basking shark interactions are reported in the arrow squid target trawl fishery operating on the southern edge of the Stewart-Snares Shelf during December. To maximize sampling potential, priority should be given to ensure all vessels in the fleet have the capacity to sample basking sharks. A sampling kit should also be made available to research vessels operating in the area.

4. **Retain juvenile basking sharks for scientific study**. Small juvenile basking sharks are globally rare. With the capture of a 3.3 m individual off the West Coast of the South Island in August 2020, we can confirm the presence of juvenile basking sharks in New Zealand waters. Efforts should be made to vessels operating in the area to be on alert for small (<3 m) sharks, confirm identification, and retain any juveniles caught for scientific study.

5. **Include biopsy poles to future tagging kits**. Sampling sharks has become difficult as the priority for the vessel is to release the shark as quickly as possible while maintaining the safety of the crew and observers. Biopsy poles are often used to sample large sharks underwater and may provide a means for observers to sample sharks quickly and from a safe distance. Training can be provided to observers.

6. **Source and deploy popup satellite tags to basking sharks**. All basking sharks are released alive or discarded, but the fate of released sharks is unknown. Estimates of post-release mortality could be assessed by tagging released sharks with a popup

archival transmitting tag (survivorship PAT, sPAT). Preference could be given to vessels that most frequently encounter basking sharks (e.g. targeting arrow squid on the Stewart-Snares Shelf) and have a trained observer onboard. The remaining kits could be equipped with conventional tags. Tagged sharks can also offer insight to movement patterns in New Zealand, of which we currently know almost nothing.

5 Acknowledgements

Thanks to David Thompson and Steve Parker (NIWA) for helpful suggestions and for reviewing this report, and to all those involved with establishing this project, including Malcolm Francis and Warrick Lyon (NIWA), Kris Ramm, Katie Clemens-Seely, and Shannon Weaver (DOC), and Zane Duncan and Adrian McNabb (FNZ).

6 References

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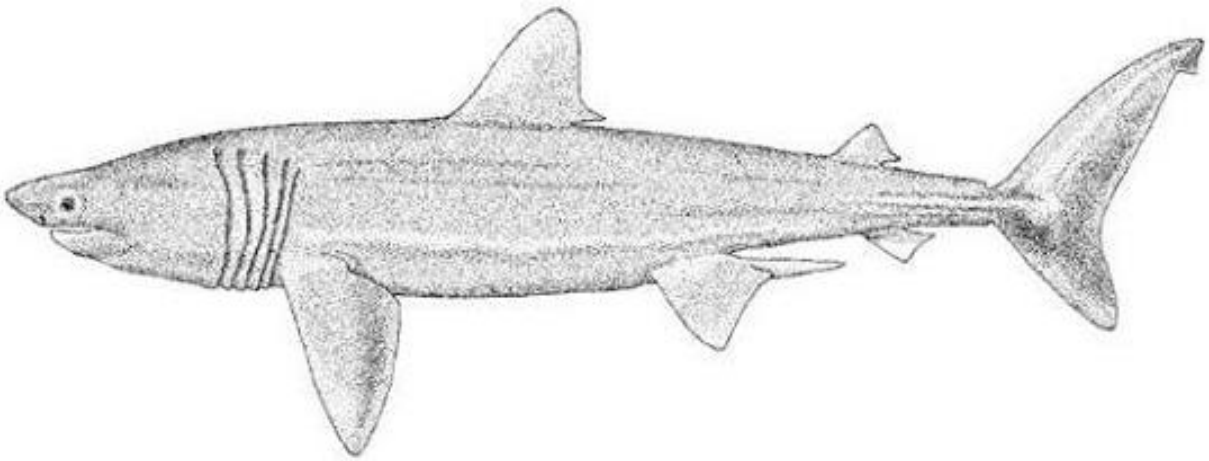
Appendix A Sampling protocol for basking sharks

Sampling instructions for basking sharks caught aboard commercial fishing vessels



Mature male basking shark (*Cetorhinhus maximus*) (Compagno 2001, FAO).

Basking sharks are caught incidentally in New Zealand trawl and set net fisheries, with most recent captures being from deep water trawl fisheries. The species' naturally low population size, slow growth rate and very low reproductive rate makes it vulnerable to over-fishing. However, its behaviour, low encounter rate and the inherent difficulty of working on such a large animal make it difficult to study. Consequently, improvements to our knowledge of basking shark biology depend upon the slow, often incremental accumulation of data. Opportunistic sampling and observations made aboard commercial fishing vessels can therefore make a significant contribution to our understanding of the species and the impact fishing has on it.

Raise this sampling programme during your initial meeting with the vessel so that they are aware of your requirements. This discussion should include the potential retention of a small basking shark (< 3.0 m total length) in the unlikely event that one is captured and dies before it can be released.

Information related to the captures should be recorded on the supplied data sheets. The required information should also be recorded on the Protected Species Interaction form (as per usual) and a trigger notice sent through to observer@mpi.govt.nz if a capture occurs (dead or alive).

Your safety comes first! Only attempt the following if you can do so safely.

1. **Total length – the straight-line or horizontal distance (in metres) from the tip of the snout to the tip of tail.**

Do not attempt to directly measure a basking shark regardless of its life status.

If possible, try to correlate the length of the shark to a known distance or reference point instead of just estimating the length by eye. For example, if the shark reached from the net roller to the forward part of the aft deck hatch measure that distance with your tape measure once the deck is safe to access and record that measurement as the length of the shark.

2. **Sex.** Males can be distinguished by the presence of a pair of tapering, rod-like claspers attached to the inner margins of the pelvic fins (Figure 1). Females don't have claspers. NB: Immature males have short claspers that don't extend, or extend only a small way, beyond the pelvic fins, and they could be confused with females.

3. **Male maturity.** Maturity of male sharks and rays is generally determined by measuring clasper length and assessing the degree of clasper calcification. Estimate the clasper length (in cm) from the front edge of the cloaca/vent to the tip of the clasper (Figure 1). Also record how far past the end of the pelvic fins they extend, or if they reach or extend past the origin of the anal fin.

4. **Photos and videos.** Take a series of photos showing the whole body (preferably from the side), the head from the side and/or above and below, the first dorsal fin and the cloaca and pelvic fins (to confirm sex, and maturity of males). If possible, video sharks being released alive or discarded.

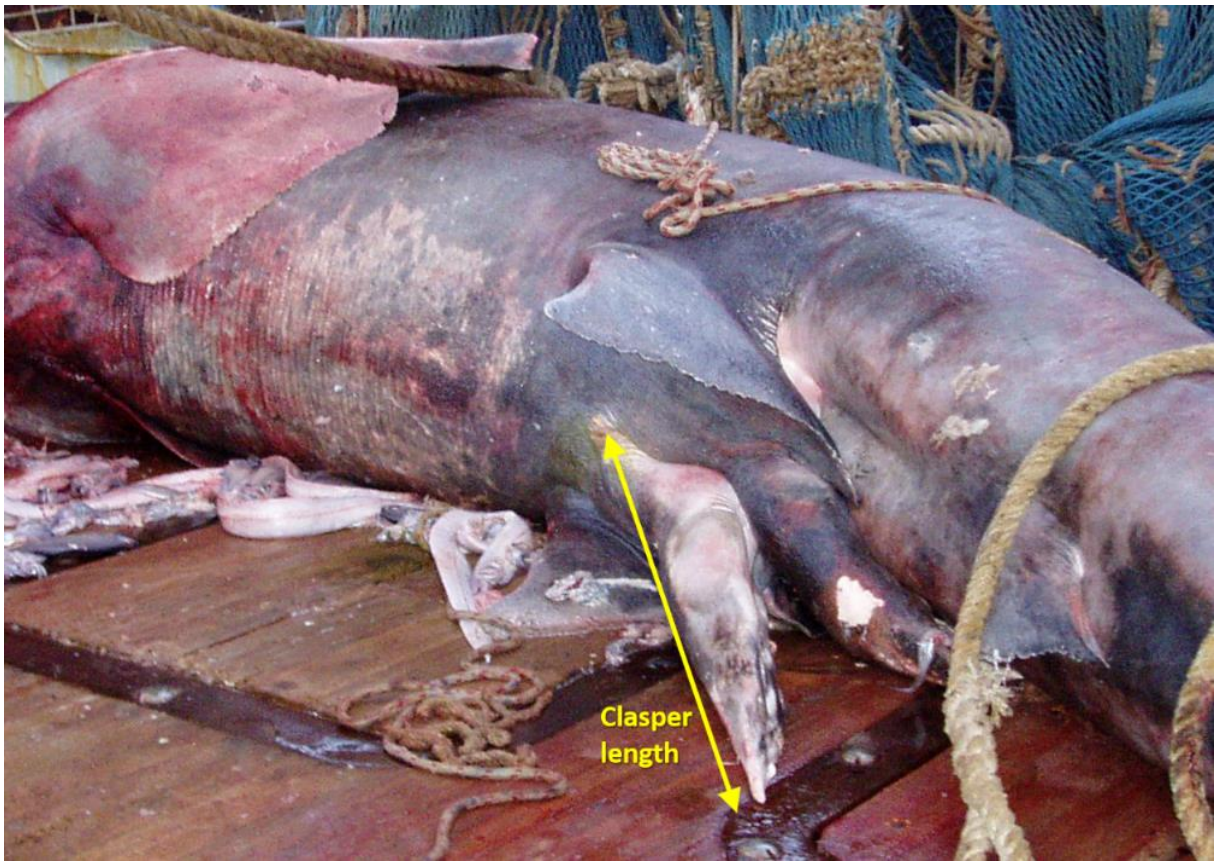


Fig. 1. Male basking shark showing mature claspers, and how to measure them

5. DNA samples.

- Observe the movement of the animal and if it looks likely that it will move during your sampling procedure then **do not attempt to collect the sample**.
- If the sea state is rough stay away from the animal and **do not attempt to sample of it**. If the animal is injured during the removal you may be able to gain a skin, tissue or mucus sample from the gear.
- If the animal is constrained within the net, coordinate with the vessel to keep the net in a fixed position.
- **Do not put yourself in a position where you could become trapped by the animal if it were to move. Ensure that you always have a clear escape route should you need to move out of the way quickly.**
- Cut a piece about the size of a fingernail from the tip or edge of any fin and place in a labelled resealable (zip lock, minigrip) plastic bag and freeze. **Record the species, trip, tow, vessel name, date/time of tow, shark and sample number on the included forms and sample labels.**
- **Do not** place samples from multiple animals in the same bag.

6. **Retain small deceased basking sharks or embryos.** The early life history of basking sharks, including size at birth, is virtually unknown so if at all possible, retain whole and freeze any dead juveniles less than 3 m total length, or any aborted embryos (alive or dead).

Shipping samples

There are two options for shipping the samples:

Option 1 (if other samples are being sent to NIWA): Send to NIWA via Halls with other NIWA samples

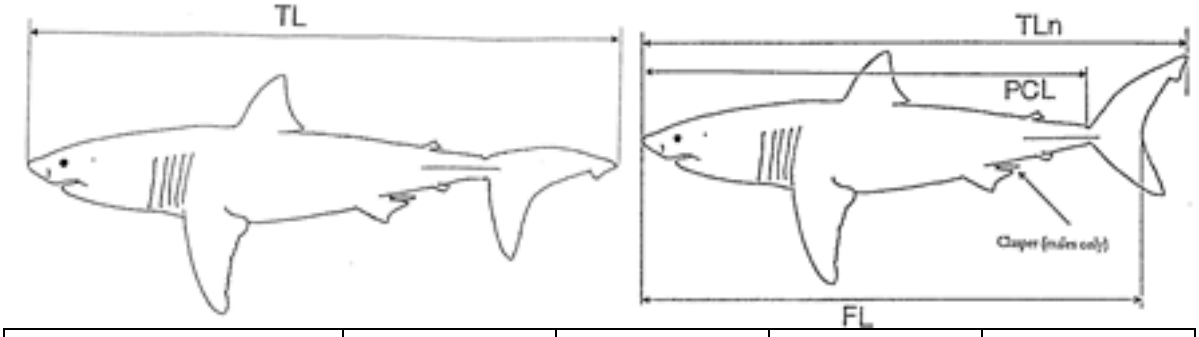
Option 2 (if NO other samples are being sent to NIWA): Send to NIWA via NZ Couriers in the pre-paid courier bag. Use the freezer packs in the sampling kit to wrap the sample in, and place this in the cooler bag provided to keep it frozen/cold during shipping. Samples should be sent to **Brit Finucci, NIWA, 301 Evans Bay Parade, Greta Point, Wellington. Ph. 04 386 0377. Email: Brit.Finucci@niwa.co.nz**

If a small juvenile basking shark (Fig. 2, 3) is caught contact the observer office immediately as we can advise on the retention and transport of the sample.

Fig. 2. Head of a 2.6 m total length basking shark from Japan (Izawa & Shibata 1993)

Fig. 3. A 2.63 m total length juvenile basking shark, Northern Ireland (Department of Environment, NI).

Protected shark data collection form



	Shark 1	Shark 2	Shark 3	Shark 4
Species code				
Trip/tow number				
Sample number				
Vessel				
Date (D/M/Yr)				
Tow start time				
Sex (M/F)				
Clasper length (cm)				
TL/TLn (m)				
FL (m)				
PCL (m)				
DNA sample no.				
Photograph of entire fish (Y/N)				
Photograph of vent and pelvic fins (Y/N)				
Comments				
Recorder's name				

The completed datasheet(s) should be returned at the end of your trip. These forms along with any photographs and samples will be sent to NIWA by MPI.