



Tāmaki
Paenga Hira
Auckland
War Memorial
Museum

Annual Report 2022/2023
INT2021-04 Collection and curation
of tissue samples from protected
fishes and turtles

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Annual Report 2022/2023 – Collection and curation of tissue samples from protected fishes and turtles

Project Code: INT2021-04

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Contents

1 Background: Tissue Archive purpose and objectives

2 Progress

- 2.1 Establish a physical archive that maximizes scientific value**
- 2.2 Coordinate the collection, receipt and curation of tissue samples**
- 2.3 Increase visibility of samples to researchers**
- 2.4 Report on the status and uses of tissues stored in the archive**
- 2.5 Establish appropriate cultural controls for the storage, use and disposal of tissue samples obtained from taonga species**
- 2.6 Cultural controls, Biocultural Labels and Notices**

3 Summary of samples

4 Tissue Archive development and expansion

5 References

Appendix A Tissue Archive summary of samples

Appendix B Tissue Archive sample submission datasheet

Collection and curation of tissue samples from protected fishes and turtles

1. Background: Tissue Archive purpose and objectives

The Protected Species Tissue Archive (Fishes and Turtles) is currently held at Tāmaki Paenga Hira Auckland War Memorial Museum and has been running for 18 months. The archive is an extension of project INT2018-04 Improving the collection of data and samples from bycatch basking sharks (Francis 2019, Finucci et al. 2021). It ensures appropriate curation of tissue samples obtained from protected fishes and turtles, improved visibility of and access to samples by researchers, and will track the fate of samples, as well as the outputs of research that they are used for. The Marine Conservation Services Program has provided partial funds for the development, maintenance and use of the Tissue Archive until mid-2024 with Auckland Museum providing in-kind support through staff time for the development and reporting on the Tissue Archive as it aligns with the advancement of tissue collection development at the museum and the role of Auckland Museum.

Auckland Museum has an active role in the research community, receiving and maintaining specimen and tissue collections, making collections digitally available online, and dispensing loans.

The Museum continues to actively develop its tissue holdings alongside the Protected Species Tissue Archive to support the growing interest in biodiversity genomics and other forms of sub-organismal molecular investigation. Our procedures are continually improved to ensure they follow best practice, and our vision includes supporting the research community in transitioning toward ethical research practice that is respectful and inclusive of indigenous communities.

The core role of the Museum is to care for the taonga of Aotearoa New Zealand (NZ) in a culturally appropriate way, following best practice methods. The taonga in our care are managed for current and future generations.

Tissue collections, particularly those from endangered species, are an invaluable biological resource for current and ongoing scientific research. Many tissues become irreplaceable as populations and distributions continue to decline or, in the worst case, species become extinct. The collection of tissues from all species, but particularly endangered species across their distribution and over time, allows researchers to carry out work such as tracking declines in genetic diversity, relationships among populations, inform translocation projects or examine changes in diet.

The objectives of the Protected Species Tissue Archive are to:

- 1) Establish a physical archive for tissue samples collected from protected species that meets accepted national and international standards, maximises their scientific value and allows tracking of the samples and the outputs any research using them.
- 2) Coordinate the collection, receipt and curation of tissue samples collected for research by fisheries observers, DOC staff, and collaborating organisations and individuals.
- 3) Increase the visibility of samples to researchers.
- 4) Report on the status and uses of tissues stored in the archive.
- 5) Establish appropriate cultural controls for the storage, use and disposal of tissue samples obtained from taonga species.

2. Progress towards objectives

2.1 Establish a physical archive that maximises scientific value

Archive standards have been developed and all samples deposited have been rehousing into cryo-vials (capable of being stored across different freezer temperatures) in 100% ethanol to ensure the high concentration. Where large samples have been taken these were divided between several vials to retain the original amount of tissue available for sampling, have the correct tissue to ethanol ratio and to minimise the amount of tissue that goes through a thaw cycle when subsampled.

Database fields within the Vernon database were assessed against the Global Genome Biodiversity Network (GGBN) Data Standard and tissue specific fields have been developed in conjunction with others in the museum and research sector to enhance the depth of tissue records within the Vernon database.

2.2 Coordinate the collection, receipt and curation of tissue samples collected for research by fisheries observers, DOC staff, and collaborating organisations and individuals.

Tissue Sampling Kits

Five tissue sampling kits were provided in 2023 to the DOC Marine Species Manager for distribution.

A sample submission spreadsheet has been provided to MPI, DOC staff and researchers to ensure the recording of all applicable information from each sample (Appendix B).

All tissues deposited in the archive in the 22-23 year have been receipted and curated.

2.3 Increasing the visibility of samples to researchers

Tissue archive samples and associated data are shared with generalised locations on Auckland Museum collections online. The locality has been generalised due to the threatened status of the species involved. Data will be shared further via aggregators such as the Genomic Observatories MetaDatabase (GEOME) in the 23-24 year.

Images associated with the samples in lieu of voucher specimens are attached to the Vernon database records and maintained within the Auckland Museum servers. These images allow for expert confirmation of species identification and accurate recording of bycatch species.

Information and images are provided to the Marine Species Manager, Department of Conservation and to researchers through direct request with permission sought from MPI to share images collected as part of the fishery observer program.

2.4 Report on the status and uses of tissues stored in the archive.

All tissues received have been housed in cryo-vials and are stored in absolute ethanol in a -20 Celsius freezer.

We have received a single loan request (11 May 2023) from the Australian Museum via the DOC Marine Species Manager for tissue samples from Leatherback Turtles. The Museum is facilitating this request and will collate samples from collections across Aotearoa for the tissue grant. If samples sizes allow, sub-samples of these collections will be retained for Auckland Museum's archive for future research.

2.5 Establish appropriate cultural controls for the storage, use and disposal of tissue samples obtained from taonga species.

The data use and loans process for this project involves an ongoing working relationship between the Marine Species Manager, DOC, the Senior Collection Manager, Natural Sciences, Collection Managers and Curators at Auckland Museum, and the relevant iwi/whanau/hapu as communicated through the cultural permissions process and via Traditional Knowledge (TK) and Biocultural (BC) Labels associated with samples. The latter will be automated through the [Local Contexts Hub](#).

Access to archived samples is moderated by the Marine Species Manager, DOC, and any identifying iwi/whānau/hapū. Auckland Museum will therefore:

- i) Liaise with the Marine Species Manager, DOC and relevant iwi/whānau/hapū identified within the Local Contexts Hub regarding requests to loan research material.
- ii) Define conditions of loan (if not stipulated by TK or BC Labels), and researcher reporting requirements (i.e. provision and sharing of data, retention and reporting of Notices/Labels alongside data, metadata, and publications).

2.6 Application and Use of Biocultural Labels and Notices

Dr Libby Liggins engaged with members of the Local Context Hub (Prof. Maui Hudson and Prof. Jane Hudson) and the scientific community both in Aotearoa New Zealand and internationally to set up a Technical Working Group with the purpose of defining standard fields, and rules for field use, in support of Traditional Knowledge and Biocultural Notices and Labels across data repositories.

Biocultural Notices and Labels will be applied within the Vernon database and in the aggregator GEOME using the four Permit fields in GGBN Data Standards. The project will begin to apply notices in the 23-24 year.

These fields are in a table and allow for the addition of permits and permissions applied directly in addition to those applied through the Local Context Hub.

Intended future use of the notices and labels

i) Upon receipt, tissue samples within a geographic sampling point (scale yet to be determined) will be provided a unique TK Notice and BC Notice generated by the Local Contexts Hub. These Notices signal the indigenous provenance of samples, and the rights of indigenous communities to define the future use of samples and derived benefits. Through the Hub, Notices invite Māori communities to use BC Labels to define community expectations about appropriate use of biocultural collections and data (see [Local Contexts](#)).

ii) Applied Notices and Labels will be linked to physical samples using the Museum's Vernon database and form part of the metadata shared on GEOME.

iii) Annual reports will be provided to DOC on the application TK and BC Notices and Labels, and the Māori communities that have rights and interests in the samples housed in the collection.

3. Summary of samples

A total of 114 samples from 62 individuals of protected fishes and reptiles were curated in the tissue archive in the second year of the project (July 2022 – June 2022; Table 1). Samples collected as part of the POP2021-05 project (Finucci & Maolagáin 2022) were provided by NIWA and have been integrated into the archive. Only 10 samples from three individuals were collected by the fisheries observer program.

A summary of samples in the Tissue Archive is provided in Appendix A. Locality information has not been included due to the protected status of the species concerned but can be provided on request. Full data for the samples currently held in the Tissue Archive has been submitted to the DOC Marine Species Manager.

Table 1. Number of individuals for each species deposited in the Protected Species Tissue Archive during July 2022 – June 2023. Source of the samples: MPI = Ministry of Primary Industries Observer Program, DOC = Department of Conservation Marine Species Manager, NIWA = National Institute of Water & Atmospheric Research.

Species	Common Name	Total	MPI	DOC	NIWA
<i>Carcharodon carcharias</i>	White pointer shark	51	0	15	36
<i>Cetorhinus maximus</i>	Basking shark	2	1	0	1
<i>Dermochelys coriacea</i>	Leatherback turtle	1	0	1	0
<i>Eretmochelys imbricata</i>	Hawksbill turtle	1	0	1	0
<i>Lepidochelys olivacea</i>	Olive ridley turtle	5	2	3	0
<i>Mobula birostris</i>	Giant oceanic manta ray	2	0	2	0
		62	3	22	37

4. Tissue Archive development and expansion

The limited number of tissue samples (three individuals) collected by fishery observers represents a missed opportunity. Tissue samples from bycaught species allow for ongoing genetic monitoring of populations, including estimation of population size, stock structure, inter- and intra-group relatedness, movements and connectivity of populations and identification of source populations (e.g. Pardini et al. 2001; Hoelzel et al. 2006; Gubili et al. 2012; Francis & Ritchie 2016; Corrigan et al. 2018; Hillary et al. 2018; Lieber et al. 2020; Jensen et al. 2022). As a result of the limited numbers Auckland Museum will prioritise the integration of existing samples held by DOC and researchers in the 2023-2024 year including researchers from Massey University and Auckland Zoo to integrate existing sea turtle samples into the Archive.

Cultural controls will be put in place at the request of relevant iwi to ensure researchers seek and receive their permission prior to tissue loan approval.

5. References

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Accession No.	Accession Date	Taxonomic Classification	Common Name	Specimen Category	Storage Method	Other Id	Acquisition Source	Count	Related Objects
TA000257	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_10B	NIWA	1	TA000256
TA000258	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_11	NIWA	1	
TA000259	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_12	NIWA	1	
TA000260	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_13	NIWA	1	
TA000261	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_14	NIWA	1	
TA000262	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_15	NIWA	1	
TA000263	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_16	NIWA	1	
TA000264	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_17	NIWA	1	
TA000265	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_18	NIWA	1	
TA000266	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_19	NIWA	1	TA000267
TA000267	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_20	NIWA	1	TA000266
TA000268	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_21	NIWA	1	
TA000269	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_22	NIWA	1	
TA000270	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_23	NIWA	1	
TA000271	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_24	NIWA	1	
TA000272	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_25	NIWA	1	
TA000273	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_26	NIWA	1	
TA000274	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_27	NIWA	1	
TA000275	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_28	NIWA	1	
TA000276	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_29	NIWA	1	
TA000277	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_30	NIWA	1	
TA000278	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_31	NIWA	1	
TA000279	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_32	NIWA	1	
TA000280	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_33	NIWA	1	TA000287
TA000281	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_34	NIWA	1	TA000286
TA000282	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_35	NIWA	1	
TA000283	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_36	NIWA	1	
TA000284	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_37	NIWA	1	TA000285
TA000285	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_37	NIWA	1	TA000284
TA000286	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_34	NIWA	1	TA000281
TA000287	18 Nov 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius	ururoa_33	NIWA	1	TA000280
TA000384	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000385, TA000386, TA000387, TA000388, TA000389
TA000385	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000384, TA000386, TA000387, TA000388, TA000389
TA000386	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000384, TA000385, TA000387, TA000388, TA000389
TA000387	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000384, TA000385, TA000386, TA000388, TA000389
TA000388	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000384, TA000385, TA000386, TA000388, TA000389
TA000389	16 Dec 2022	<i>Carcharodon carcharias</i>	White Shark; Mangō Tuatini	tissue	-20° celcius		DOC	1	TA000384, TA000385, TA000386, TA000387, TA000388
TA000503	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000504, TA000505, TA000506, TA000507, TA000508
TA000504	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000503, TA000505, TA000506, TA000507, TA000508
TA000505	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000503, TA000504, TA000506, TA000507, TA000508
TA000506	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000503, TA000504, TA000505, TA000507, TA000508
TA000507	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000503, TA000504, TA000505, TA000506, TA000508
TA000508	02 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6262; 6686/24; 9859	NIWA	1	TA000503, TA000504, TA000505, TA000506, TA000507
TA000516	23 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6756/7; KOSB	Ministry for Primary Industries	1	TA000517, TA000518, TA000523
TA000517	23 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6756/7; KOSB	Ministry for Primary Industries	1	TA000516, TA000518, TA000523
TA000518	23 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6756/7; KOSB	Ministry for Primary Industries	1	TA000516, TA000517, TA000523
TA000523	23 Mar 2023	<i>Cetorhinus maximus</i>	Basking Shark; Reremai	tissue	-20° celcius	6756/7; KOSB	Ministry for Primary Industries	1	TA000516, TA000517, TA000518
TA000028	20 Jul 2022	<i>Dermodochelys coriacea</i>	Leatherback turtle; Leathery Turtle; Honu Hiwihwi	tissue	-20° celcius	Tissue 28	DOC	1	
TA000029	20 Jul 2022	<i>Eretmochelys imbricata</i>	Hawksbill turtle; Honu	tissue	-20° celcius	Tissue 7	DOC	1	
TA000021	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 37	DOC	1	TA000022, TA000023

Accession No.	Accession Date	Taxonomic Classification	Common Name	Specimen Category	Storage Method	Other Id	Acquisition Source	Count	Related Objects
TA000022	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 38	DOC	1	TA000021, TA000023
TA000023	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 39	DOC	1	TA000021, TA000022
TA000026	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 31	DOC	1	TA000027
TA000027	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 32	DOC	1	TA000026
TA000053	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 51	DOC	1	TA000054, TA000055
TA000054	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 52	DOC	1	TA000053, TA000055
TA000055	20 Jul 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	Tissue 53	DOC	1	TA000053, TA000054
TA000059	01 Aug 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	frozen	6027-ORT-1-1; 6027; MPI 1	Ministry for Primary Industries	1	TA000060, TA000061
TA000060	01 Aug 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	frozen	6027-ORT-1-1; 6027; MPI 2	Ministry for Primary Industries	1	TA000059, TA000061
TA000061	01 Aug 2022	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	frozen	6027-ORT-1-1; 6027; MPI 2	Ministry for Primary Industries	1	TA000059, TA000060
TA000527	11 Apr 2023	<i>Lepidochelys olivacea</i>	Olive ridley sea turtle; Pacific ridley sea turtle	tissue	-20° celcius	61490	Ministry for Primary Industries	1	
TA000044	20 Jul 2022	<i>Mobula birostris</i>	Giant oceanic manta ray	tissue	-20° celcius	Tissue 12	DOC	1	
TA000210	28 Oct 2022	<i>Mobula birostris</i>	Giant oceanic manta ray	tissue	-20° celcius			1	MA127317, TA000241
TA000241	28 Oct 2022	<i>Mobula birostris</i>	Giant oceanic manta ray	tissue	-20° celcius			1	MA127317, TA000210

