



Photo: Gavin Klee, Waikanae Estuary



TARA / WHITE-FRONTED TERN

Diet and population survey, a photographic competition

Final report

Purpose

The aim of this project was to survey tara diet with prey identified through a photographic competition run across the 2022-2023 breeding season. This complemented the continuation of colony surveys in the wider Hauraki Gulf Region that have been ongoing since 2019. We proposed a nation-wide photo contest and encouraged citizen science participation in the 'Year of the Terns 2022'. Funding was required to cover some of the competition costs, but mainly for boat fuel costs to ensure the colony counts for the wider Hauraki Gulf region continued into a fourth season.

The aim of this research project was to gather data about tara diets around the motu using the non-invasive method of digital photography. Tara are one of the few seabirds we can do this for, and it is an easy way of gathering a lot of good data about what prey they rely on. This was intended as a pilot study to see how much data we could source in one season from photographers around Aotearoa, with the aim of continuing long-term monitoring using this method over the coming years if successful.

Results

Tara Photography Competition

Twenty seven photographers entered the competition. We received 192 photographs (some were not included for judging as they were outside the 2022-2023 season dates 1 October 2022, 10 February 2023). There were several portfolios of images from colonies, some taken over multiple months. We did not receive any colony data from photographers which was disappointing, as this was one of the categories of the competition. However, some sites will have been closely monitored by others (e.g., Waikanae Estuary, Aramoana Mole), so it could be possible to follow up for colony counts, fledging success, threats. Images were collated and presented to the judges without the photographers' names visible, to ensure blind judging of images.

Judging

The judges for this competition were: Edin Whitehead – seabird biologist and conservation photographer; Tony Whitehead – award-winning nature photographer; and Neil Fitzgerald – ornithologist and wildlife photographer

Best Overall Image – Axel Mertens, Shelly Beach, Kaipara Harbour



The judges thought this image perfectly encapsulated the core goal of the research project, which was to get identifiable images of Tara prey, as well as being a classically gorgeous portrait.

Runner up – Gavin Klee, Waikanae Estuary



- Portfolio Award – Nick Beckwith, Aramoana Spit



- Runner up for Portfolio award – Roger Smith, Waikanae Estuary



- Prize for Most Unique Prey Item – Steve Wood, Motueka Spit



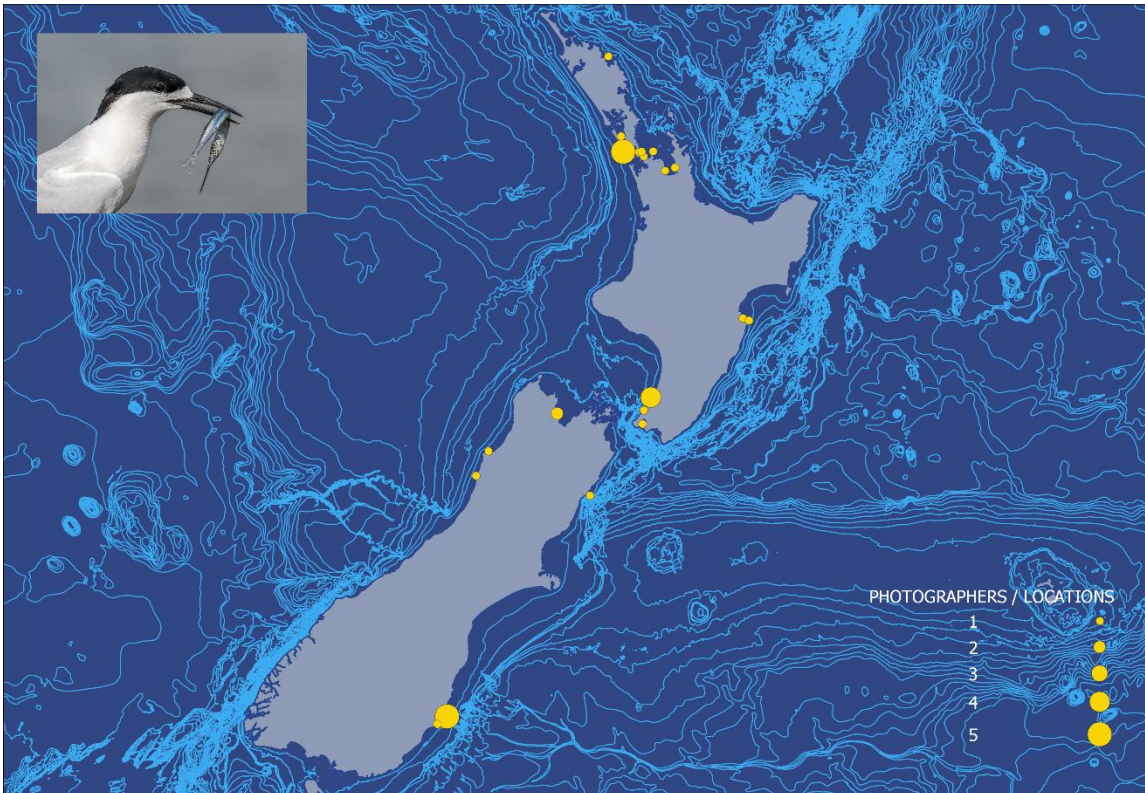
- Highly Commended Images – Vandy Pollard, Grant Watson, Nick Beckwith, Gavin Klee, Steve Wood, Roger Smith.
- All finalists, including highly commended images were exhibited at the Birds NZ 2023 Conference in New Plymouth.

Tara diet

Prey items were identified, where possible, by Malcolm Francis and Clinton Duffy (see appended initial raw list below). A quick literature search suggested that there isn't much information available on the diet of tara/white-fronted terns in New Zealand. From this project, there is probably enough information in the prey identification for a short note (species richness, frequency of occurrence). Data could probably be pooled by [marine biogeographic region](#), although there likely aren't enough observations to look at seasonal shifts. We have supplemented competition images with photos taken during the 2022-2023 season by other photographers, including two of the three judges. It has been suggested a paper could be submitted to Notornis in the form of a technical note regarding the project methods, something we will look into (C. Symes, pers. comm.).

Coverage

The map below shows locations where images were taken and number of photographers at each location.



While there is fairly good coverage from around the country there are notable areas missing, for example: Northland, Bay of Plenty, Kaikoura, North and South Canterbury, outland and Rakiura. This is something we would address were the competition and photographic survey repeated.

Sponsors

The Birds NZ Research Fund support was key to running the competition, with further sponsorship provided by Nikon NZ, Photo & Video International, and ourselves at the Northern NZ Seabird Trust. Nikon NZ have expressed support for a second competition. We will be proposing this for the 2024-2025 season, with plenty of lead in time to get photographers busy in those areas we missed in this first competition.

Wider Hauraki Gulf Tara Survey - 2022-2023 Season

This was the fourth consecutive year we have run surveys across the wider Hauraki Gulf. Survey counts were completed by Cathy and Pete Mitchell, James Ross, Matt Rayner (with support from Ricky-Lee Erikson, Rebecca Bray (Dec) and Edin Whitehead, Chris Gaskin (Jan)), and Rob Chappell. The data (sent through in various forms) is being collated and mapped. A comparison will be made with previous three seasons.



Tara / white-fronted terns and a tarāpunga / red-billed gull, Koi Island, Waiheke Group. Photo: Edin Whitehead.

ADDENDUM

NORTH ISLAND LOCATIONS

File name	PREY TYPE
Tara-005_white-fronted...Jan23 (1)_WAIKANAE.jpg	?
Tara-005_white-fronte...n_10Jan23_WAIKANAE.jpg	Engraulis australis
Tara-005_white-fronted...16 Jan 23_WAIKANAE.jpg	Hyporhamphus ihi
Tara-005_white-fronte...n_18Jan23_WAIKANAE.jpg	?
Tara-005_white-fronte...n_26Jan23_WAIKANAE.jpg	Scomberesox saurus
Tara-005_white-fronted...26Jan23 (1)_WAIKANAE.jpg	Thyrsites atun
Tara-005_white-fronte...n_30Jan23_WAIKANAE.jpg	Squid
Tara-005_white-fronted...30Jan23 (2)_WAIKANAE.jpg	Scomberesox saurus
Tara-005_white-fronted tern_3Feb23_WAIKANAE.jpg	Engraulis australis
Tara-005_white-fronte...n_3Feb23_WAIKANAE.jpg	Engraulis australis
Tara-005_white-fronted tern_9thFeb23_WAIKANAE.jpg	Trachurus sp.
Tara-005_white-fronted tern_9thFeb23(2)_WAIKANAE.jpg	Engraulis australis
TARA007_15122017_Tukituki R mouth Hawkes Bay.JPG	?
TARA007_17122017_Cape...appers Hawkes Bay.JPG	Scomberesox saurus
Tara-009 Tara with Fish Scorching Bay Wellington_14 Jan 2021 (1 of 1).jpg	Sardinops sagax
Tara-009 Tara with Squid Scorching Bay Wellington_16 Jan 2021 (1 of 1).jpg	Squid
Tara-010_White-fronted...3Oct22A_Plimmerton.jpg	?
Tara-010_White-fronted...3Oct22B_Plimmerton.jpg	Sprattus sp.?
TARA-012_11022022_MAORI BAY MURIWAI.JPG	Engraulis australis

TARA-012_11022022 (1)_MAORI BAY MURIWAI.JPG	Engraulis australis
Tara-013_Fish 3_26-12-2022-Waipuna Bridge.jpg	?
Tara-013_Fish 1_26-12-2022-Waipuna Bridge.jpg	Engraulis australis?
Tara-013_Fish 2_26-12-2022-Waipuna Bridge.jpg	?
Tara-013_Fish 5_26-12-2022-Waipuna Bridge.jpg	?
Tara-013_Fish 4_26-12-2022-Waipuna Bridge.jpg	?
Tara-015_White-fronted... Auckland Downtown.JPG	?
TARA_16 White-fronted tern_04_12_2022_Waikanae.jpg	Engraulis australis
TARA-16 White_fronted tern_02_12_2022_Waikanae.jpg	Engraulis australis
018_tara_17.12.22 (1)_Thames Coast.jpg	Engraulis australis
018_tara_17.12.22_Thames Coast up to Tapu.jpg	Engraulis australis
018_tara_04.09.22 (1)_Thames Coast.jpg	Sprattus?
018_tara_04.09.22_Thames Coast.jpg	Sprattus?
018_tara_13.01.23_Thames Coast.jpg	Engraulis australis
Tara-023_WFT_Waikanae_21-01-23-2.jpg	?
Tara-023_WFT_Waikanae_14-01-23-4.jpg	Sprattus sp.?
Tara-023_WFT_Waikanae_20-01-23.jpg	Scomberesox saurus
Tara-023_WFT_Waikanae_01-02-23.jpg	Moth
Tara-023_WFT_Waikanae_20-01-23-3.jpg	Engraulis australis
Tara-023_WFT_Waikanae_21-01-23.jpg	Squid
Tara-023_WFT_Waikanae_20-01-23-2.jpg	Squid
Tara-023_WFT_Waikanae_25-01-23.jpg	Squid
Tara-023_WFT_Waikanae_26-01-23.jpg	?
Tara-023_WFT_Waikanae_14-01-23-2.jpg	Engraulis australis
Tara-023_WFT_Waikanae_14-01-23-3.jpg	?
Tara-023_WFT_Waikanae_14-01-23.jpg	Sprattus sp.?
TARA_023_WFT_Waikanae_9-02-23.jpg	Engraulis australis?
TARA_023_WFT_Waikanae_9-02-23-2.jpg	Engraulis australis
TARA_024_Motueka Spit.MP4	?
Tara-026-WhiteFrontedTern-ShellyBeach-2022-10-11.jpg	Hyporhamphus ihi
Tara-28_Tara_Waikanae Sandspit colony_31 Jan 2023_001.jpg	Scomberesox saurus
Tara-28_Tara_Waikanae S...ony_31 Jan 2023_002.jpg	Thyrsites atun?
Tara-28_Tara_Waikanae S...ony_31 Jan 2023_004.jpg	Thyrsites atun
Tara-28_Tara_Waikanae S...ony_31 Jan 2023_003.jpg	Hyporhamphus ihi
Tara-28_Tara_Waikanae S...ony_31 Jan 2023_005.jpg	Hyporhamphus ihi
Tara-28_Tara_Waikanae S...ony_31 Jan 2023_006.jpg	Thyrsites atun
Tara-030_white-fronted tern_Muriwai_25thDecember2022.jpg	Engraulis australis
Tara-030_white-fronted tern_Hamer Street Auckland City_21stJanuary2023.jpg	Sprattus?
Tara-32_WhiteFrontedTern_Maori Bay-Muriwai_02.01.23.jpg	Engraulis australis
Tara-32_WhiteFrontedTern_Maori Bay Muriwai_02.01.23_Image2.jpg	Cicada?
Tara-32_WhiteFrontedTern_Maori Bay Muriwai_02.01.23_Image3.jpg	Engraulis australis
Tara-32_WhiteFrontedTern_Maori Bay Muriwai__02.01.23_Image4.jpg	Engraulis australis
Tara-32_WhiteFrontedTern_Maori Bay Muriwai_02.01.23_Image5.jpg	Engraulis australis?
TARA34_5APR2021_WAITEMATA HARBOUR_DEVONPORT (1).jpg	Sprattus?
TARA_037_White-fronted tern_Muriwai_16Oct22_3.jpg	Engraulis australis?

TARA_037_White-fronted tern_Muriwai_16Oct22_4.jpg
TARA_037_White-fronted tern_Muriwai_16Oct22.jpg
TARA_037_White-fronted tern_Muriwai_16Oct22_2.jpg

Engraulis australis
Engraulis australis
Engraulis australis?

SOUTH ISLAND LOCATIONS

File name

TARA-08_1_WESTPORT TIPHEAD.jpeg
TARA-08_2_WESTPORT TIPHEAD.jpeg
TARA-08_3_WESTPORT TIPHEAD.jpeg
TARA-08_4_WESTPORT TIPHEAD.jpeg
TARA-08_5_WESTPORT TIPHEAD.jpg
TARA-08_6_WESTPORT TIPHEAD.jpeg
TARA-08_7_WESTPORT TIPHEAD.jpeg
TARA-08_8_WESTPORT TIPHEAD.jpeg
TARA-08_9_WESTPORT TIPHEAD.jpeg
TARA-08_10_WESTPORT TIPHEAD.jpeg
TARA-08_11_WESTPORT TIPHEAD.jpeg
TARA-08_12_WESTPORT TIPHEAD.jpeg
TARA-08_13_WESTPORT TIPHEAD.jpeg
TARA-08_14_WESTPORT TIPHEAD.jpeg
TARA-08_15_WESTPORT TIPHEAD.jpeg
TARA-08_16_WESTPORT TIPHEAD.jpeg
TARA-08_17_WESTPORT TIPHEAD.jpeg
TARA-08_18_WESTPORT TIPHEAD.jpeg
TARA-08_19_WESTPORT TIPHEAD.jpeg
TARA-08_20_WESTPORT TIPHEAD.jpeg
TARA-08_21_WESTPORT TIPHEAD.jpeg
TARA-017_TARA_13122022_Pancake Rocks Punakaiki.JPG
TARA-19_8JAN2023_1_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_2_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_3_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_4_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_5_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_6_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_7_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_8_MOTUEKA SPIT.jpeg
TARA-19_8JAN2023_9_MOTUEKA SPIT.jpeg
TARA_024_Motueka Spit.MP4
Tara-027_WhiteFrontedTern_Kaikoura_2022-12-24.jpg
Tara-031_white-fronted tern_Aramoana_01:02:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_01:02:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_01:02:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_01:02:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-5.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-6.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-7.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-8.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-9.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-10.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-11.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-12.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-13.jpg

PREY TYPE

Sprattus antipodum?
?
Squid
Sprattus antipodum?
Sprattus antipodum?
Engraulis australis
Engraulis australis?
Sprattus muelleri?
Sprattus antipodum?
?
?
Possibly Family Leptoscopidae (L. macropygus)?
Probably Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Sprattus antipodum?

Probably Hyporhamphus ihi
?
?
?
Scomberesox saurus
Squid
Beetle?
Thyrsites atun
Hyporhamphus ihi
Engraulis australis
Beetle?
Hyporhamphus ihi
Engraulis australis?
Flounder?
?
Thyrsites atun
Thyrsites atun
Hyporhamphus ihi
Thyrsites atun
Thyrsites atun
Thyrsites atun
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Thyrsites atun
Hyporhamphus ihi
Thyrsites atun
Hyporhamphus ihi
Hyporhamphus ihi
Possibly but not clear; Hyporhamphus ihi?

Tara-031_white-fronted tern_Aramoana_04:02:2023-14.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-15.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-16.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-17.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-18.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-19.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-20.jpg
Tara-031_white-fronted...moana_04:02:2023-21.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-22.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-23.jpg
Tara-031_white-fronted tern_Aramoana_04:02:2023-24.jpg
Tara-031_white-fronted tern_Aramoana_06:02:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_12:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_12:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_12:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_12:01:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_12:01:2023-5.jpg
Tara-031_white-fronted tern_Aramoana_13:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_15:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_15:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_15:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_15:01:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_16:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_16:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_16:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_17:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_17:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_17:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_17:01:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_17:01:2023-5.jpg
Tara-031_white-fronted tern_Aramoana_21:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_21:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_21:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-5.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-6.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-7.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-8.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-9.jpg
Tara-031_white-fronted tern_Aramoana_22:01:2023-10.jpg
Tara-031_white-fronted tern_Aramoana_24:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_24:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_24:01:2023-3.jpg
Tara-031_white-fronted tern_Aramoana_24:01:2023-4.jpg
Tara-031_white-fronted tern_Aramoana_26:12:2022-1.jpg
Tara-031_white-fronted tern_Aramoana_28:01:2023-1.jpg
Tara-031_white-fronted tern_Aramoana_28:01:2023-2.jpg
Tara-031_white-fronted tern_Aramoana_30:09:2022-1.jpg
TARA_035_White-fronted tern_Aramoana Mole_20 10 2022_1.jpg
TARA_035_White-fronted tern_Aramoana Mole_20 10 2022_2.jpg
TARA_035_White-fronted tern_Aramoana Mole_20 10 2022_3.jpg
TARA_035_White-fronted tern_Aramoana Mole_20 10 2022_4.jpg
TARA_035_White-fronted...na Mole_20 10 2022_5.jpg
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_1.jpg

Thyrsites atun
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Sprattus antipodum?
Sprattus antipodum?
Sprattus antipodum?
Hyporhamphus ihi
Hemerocoetes sp.
?
Thyrsites atun
Thyrsites atun
Sprattus antipodum?
Thyrsites atun
Thyrsites atun
Thyrsites atun
?
Squid
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun
Thyrsites atun ?
Forsterygion varium
Forsterygion varium
Sprattus antipodum?
Sprattus antipodum?
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Hyporhamphus ihi
Sprattus antipodum?
Sprattus antipodum?
Hyporhamphus ihi
Hyporhamphus ihi
Squid
Thyrsites atun
Thyrsites atun
Thyrsites atun
Forsterygion sp. (probably F. varium)
Thyrsites atun
Thyrsites atun
Engraulis australis
Sprattus antipodum?
Sprattus antipodum?
Sprattus antipodum?
Sprattus antipodum?
Sprattus antipodum?
Crustacean

TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_2.jpg	Hyporhamphus ihi
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_3.jpg	Forsterygion varium
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_4.jpg	Thyrsites atun
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_5.jpg	Thyrsites atun
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_6.jpg	Hyporhamphus ihi
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_7.jpg	Thyrsites atun
TARA_035_White-fronted tern_Aramoana Mole_24 01 2023_8.jpg	Sprattus antipodum?
Tara-036_WhiteFronted tern_Aramoana Mole_24Jan2023.JPG	Crustacean?
Z Tara-33_Tara_Dunedin_06Feb2023.JPG	?