SEAMOUNT (TE AKAU TALIE) FISHING TRIP REPORT

TUVALU FISHERIES DEPARTMENT

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Executive Summary

This report presents the results and findings of the creel survey that was carried out on two fishing trips to the seamount (Te AKAU Talie), which is being undertaken by the Coastal Section of the Tuvalu Fisheries Department (TFD) as part of a request from the Island of Nanumaga. Creel survey was well suited to the request from the Island of Nanumaga, because they provide information on the resources being caught and the effort required in a way that can be used to assess the health of the fishery, particularly the seamount (Te Akau Talie). The purposes of this creel survey were to (i) assess the health of the resources in terms of numbers, weights and sizes being caught in relation to size at maturity; and (ii) identify types of different fish species present on the seamount.

Fisher's catch data were collected between the 5th and 6th July 2021. A survey team went on board the TFD research vessel, Manaui, together with Fishermen from Nanumaga to collect data while the fishers landed their catches on the vessel. The team identified, measured and weighed each specimen in the catch. Data on fish lengths were compared with known values of length at maturity (Lm) for 79 species (for which data were available) as an indicator to assess whether the resources on the seamount were healthy. The fish resources on the seamount (Te AKAU Talie) were considered not healthy if 50% or more of the animals landed were smaller than the size at maturity.

The result of this survey showed that 17 different species of fishes were landed on the MANAUI, with five of the species (6.3%) caught being considered in good condition because greater 50% of the individuals were larger than their size at maturity. Four species (5%) were found to be overfished (greater than or equal to 50% of landed individuals were below their size at maturity). Most of the fish (88.6%) species landed could not be evaluated because there is at present no known value for size at maturity (Lm) to use for the assessment.

TFD is working together with SPC to get an expert to determine the Lm size limits for most fish species in Tuvalu, so that most of the catches can be evaluated in the future. Nevertheless, this on-demand request was a prototype to carry out such a survey at the Nanumaga seamounts and will be applicable elsewhere. Studies of this kind are essential for our work on promoting livelihoods and food security in years to come.

Introduction

The Tuvalu Fisheries Department has adopted the use of creel survey methods coupled with comparing lengths of all landed fishes with their size as maturity (Lm) to calculate % of landed catch which is undersized as a way of determining whether overfishing is occurring and resources are being damaged. This approach is being used on all of the islands on an on-going basis to guide management of the resources, see (Alefaio et al. 2016, Alefaio et al. 2018). For example, the creel survey plays a vital role in the Funafuti Reef Fish Stewardship Plan (FRFSP) using information that has been collected from each Fisherman on Funafuti, and allowing for periodic assessments of the state of the fisheries in response to management

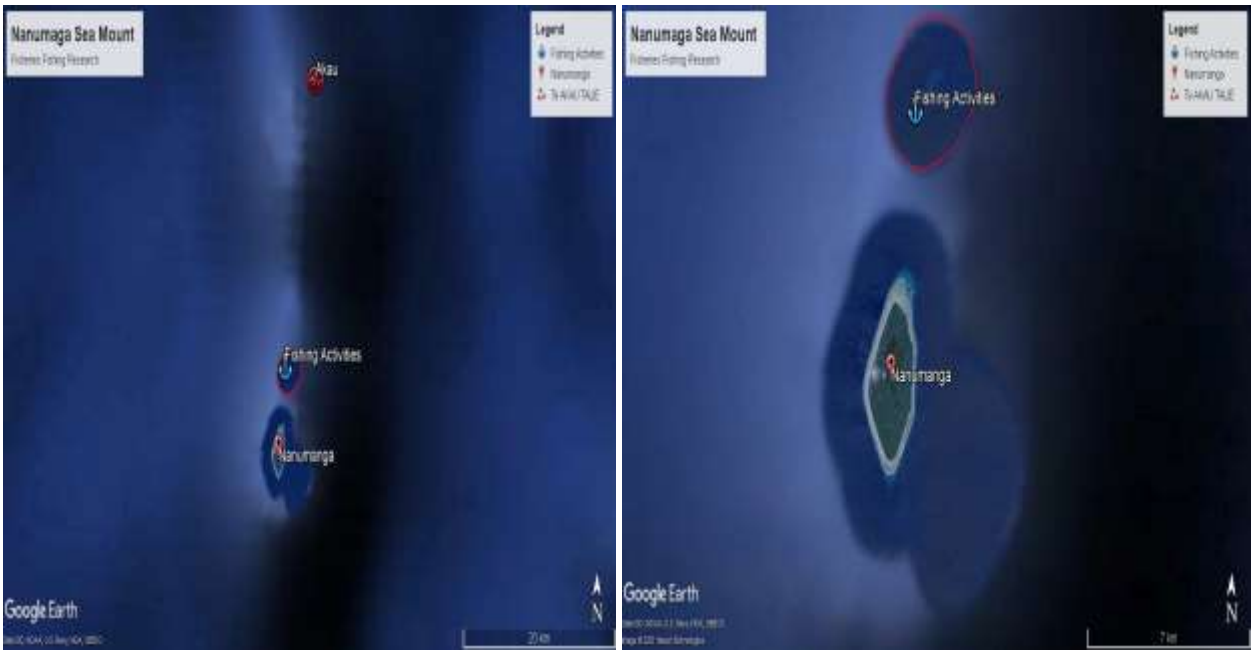
In 2021 Nanumaga Island kindly requested the Tuvalu Fisheries Department (TFD), to undertake a quick survey of fishery health on two seamounts North of Nanumaga.

On the 30th July 2021, the Director of Fisheries (DOF) approved the request and the two officers departed Funafuti on the 02nd of August 2021, and they were travelled on the Manaui II which if the TFD's research vessel.

The two officers arrived and met with Kaupule members, together with the Minister of Fisheries and Trade to discuss details of the survey. Kaupule members and the Minister of Fisheries and Trade agreed that the survey should completed in two days, without use of Underwater Visual Census (UVC), due to safety concerns for divers working on the seamounts collectively Te Akau Talie. Instead, the two fisheries officers advised the Kaupule members and Minister of Fisheries and Trade to use the Creel Survey method already in use throughout Tuvalu to assess the health of fisheries and provide data for management.

Two seamounts, one 14 nm north of Nanumaga (6° 03.3329'S and 176°19.2522'E) and another 3 nm north (Te Akau Talie) (6°14.325'S and 176°19.567'E) were included in this study. Both seamounts are well-known by Nanumaga people however fishers rarely fish at these areas due to distance concern as well as high fuel consumption. Although the seamounts fishing history is uncommon, the island community is eager to find out on the diversity of species and the associated benefits the community could have in terms of food security and livelihood.

Figure 1: Location of 2 seamounts surveyed as part of Te Akau Talie.



Two fishing trips were intended for Fishermen to go out and fish on the seamount and at the same time the two officers from the Coastal Section and one officer from Operations & Development conducted a survey of their landings.

Aims

The main aims of this survey were to;

- Explore the seamounts North of Nanumaga, including Te Akau Talie, and identify different types of species that are caught,
- To determine the health of the seamount resources, and
  For the people of Nanumaga to understand the status, importance and potential benefits they can get from the seamount, in order to utilize their marine resources for food security and livelihoods.

Methods

Creel Survey methods were used for this study, coupled with the calculation of the percent of landings of fishes that were under or over the size at maturity (Lm) for each species. As noted above, creel surveys have been adopted for surveying marine species such as finfish and invertebrates using data collectors on each island.

The fisher's catch data were collected between 5th and 6th August 2021 whilst fishers were fishing on Te Akau Talie, north of Nanumaga. The survey team collected data on methods and gear used, costs of fishing, location of fished areas, identified species landed, as well as the

weight and length of each individual fish landed. Data on fish lengths were compared with known values of size at maturity for 79 species (for which data were available) as an indicator to assess whether the resources were overfished (see Box 1). However, for many species Lm is not known and the indicator could not be evaluated. Fishes were considered overfished if 50% or more of the animals landed were smaller than the size at maturity.

Box 1: Key indicator of fishery health

One of the key indicators used by TFD during creel surveys is concerned with the percentage of fishes that are landed which are smaller than the size at which at least 50% of the fish can breed (called length at maturity, Lm). This value as "% undersized" should *decline* and approach zero as management actions improve, followed by improvements in the resources.

Fishermen used the deep-sea hand-line method, and the total amount of fish caught on day one was 59 different fish species. They were able to catch at the depth of 51fathoms which is 93.26mtr if converted to meters, and the wind direction was from the North West of TE AKAU TALIE, and thus, the tide prediction was a low tide during the time of fishing.

Results & Findings

Although it was intended to fish on both of the two seamounts north of Nanumaga, fishing was not done on the furthest seamount because the water depth was too great at 276m. All of these results therefore come from the closer seamount, 3 nautical miles north of Nanumaga.

A total of 259 fishes in 17 species and 15 genera was landed during the fishing survey trip, including both days of sampling (**Table 1**). Tafauli (*Caranx lugubris)* dominated the catch on both days, accounting for 55% of the fishes landed overall (a total of 142 landed). The next most abundant species were Palusega (*Aphareus furca*) with 58 landed (22% of the overall catch) and Pula (Cephalopholis miniata) with 24 fishes landed (9% of the catch). Fagamea (*Lutjanus bohar*) accounted for 6% of the catch. Overall, just 4 species of the 17 landed accounted for 92% of the catch, so most others landed were in low numbers, usually with 1-3 fishes landed overall.

Table 1: Total catches by count and weight for each species on each fishing day.

Tuvalu Name	English name	Sci Name	Day 1		Day 2		Total Count	Total Wt (kg)
			Count	Wt (kg)	Count	Wt (kg)		
Afulu	Multibar Goatfish	*Parupeneus multifasciatus*			2	0.18	2	0.18
Aseu	Bluefin Trevally	*Caranx melampygus*			1	0.56	1	0.56
Atualo	Oriental Bonito	*Sarda orientalis*			1	1.4	1	1.4
Fagamea	Twinspot Snapper	*Lutjanus bohar*	3	3.83	12	8.83	15	12.66
Filu	Island Jack	*Carangoides orthgrammus*	1	0.87			1	0.87
Gole	Tripletail Wrasse	*Cheilinus trilobatus*			1	0.27	1	0.27
Kaivete	Yellowfin Goatfish	*Mulloidichtys vanicolensis*			3	0.39	3	0.39
Mataele	Darkfin Hind	*Cephalopholis urodeta*			1	0.12	1	0.12
Palusega	Smalltooth Jobfish	*Aphareus furca*	13	3.16	45	8.17	58	11.33
Pula	Coral Hind	*Cephalopholis miniata*	5	2.19	19	7.82	24	10.01
Sumu	Black Durgon	*Melichthys niger*			2	0.32	2	0.32
Sumu niu	Orangeline Triggerfish	*Balistapus undulatus*			2	0.58	2	0.58
Sumumoana	Blueline Triggerfish	*Xanthichthys caeruleolineatus*			3	3.55	3	3.55
Tafauli	Black Trevally	*Caranx lugubris*	40	32.15	102	84.44	142	116.59
Tapou	Reef Lizardfish	*Synodus variegatus*			1	0.08	1	0.08

Tonu	Squaretail Coral Grouper	*Plectropomus areolatus*			1	0.68	1	0.68
Utu	Green Jobfish	*Aprion virescens*	1	2.9			1	2.9
Totals	17 species in 15 genera		**63**	**45.1**	**196**	**117.39**	**259**	**162.49**
Percent of catch			**24%**	**28%**	**76%**	**72%**		

Table 2 shows that overall, 5 of the 17 species evaluated (29%) had at least 50% of the landed individuals at a size greater than Lm and were considered of good status. This includes Afulu, Kaivete, Mataele, Tapou and Utu. Four of the species (24%) failed the health test because the fishes landed included more than 50% that were undersized. These species are being caught at a size too small to ensure the resource and includes Aseu, Fagamea, Tafauli and Tonu. **Figure 2** shows the results for Tafauli in which a large proportion of the fishes caught during the survey were under the Lm of 35 cm, indicating that the species is not being fished sustainably.

Eight species (47%) could not be evaluated because at present we do not have estimates of Lm for them, so their status remains unknown.

Table 2: Assessment of the species landed identifying those with Total catches from the second day of the fishing trip.

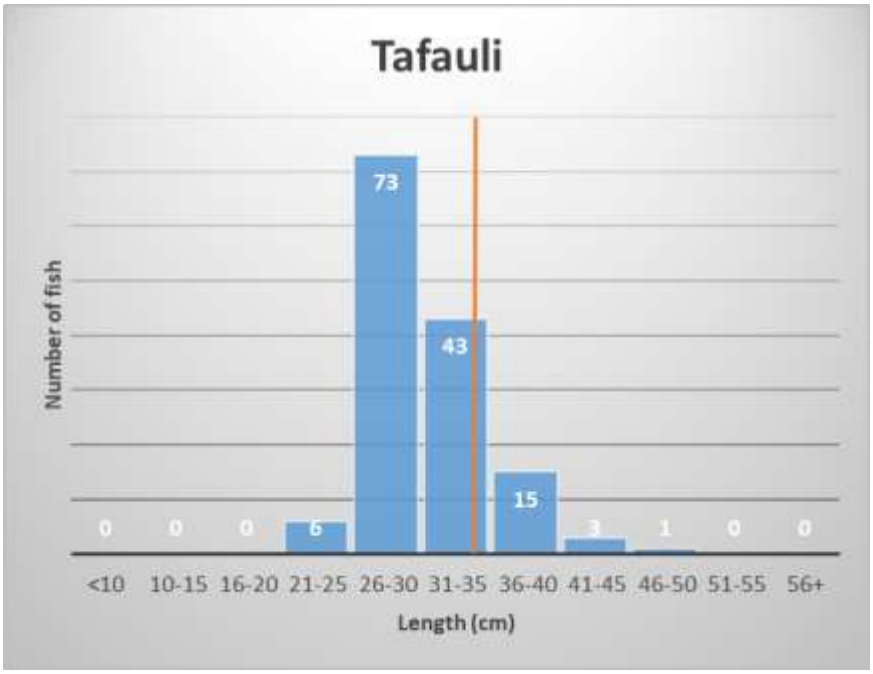
Species coloured in green below have >50% of the individuals landed larger than the size at maturity (Lm) and are considered of good status. Species in orange have 50+% of landed individuals with a length of <= the size at maturity. The species without colour coding could not be assessed at this time because no value for Lm is known.

Tuvalu Name	Scientific Name	Lm	ND	OK	Undersized	%OK	%Undersized	Total
Afulu	*Parupeneus multifasciatus*	15		2		100	0	2
Aseu	*Caranx melampygus*	35			1	0	100	1
Atualo	*Sarda orientalis*		1					1
Fagamea	*Lutjanus bohar*	42.9		5	10	33	67	15
Filu	*Carangoides orthgrammus*		1					1
Gole	*Cheilinus trilobatus*		1					1
Kaivete	*Mulloidichtys vanicolensis*	17		3		100	0	3
Mataele	*Cephalopholis urodeta*	18		1		100	0	1
Palusega	*Aphareus furca*		58					58
Pula	*Cephalopholis miniata*		24					24
Sumu	*Melichthys niger*		2					2
Sumu niu	*Balistapus undulatus*		2					2
Sumumoana	*Xanthichthys caeruleolineatus*		3					3
Tafauli	*Caranx lugubris*	35		20	122	14	86	142
Tapou	*Synodus variegatus*	14		1	0	100	0	1
Tonu	*Plectropomus areolatus*	40			1	0	100	1

Utu	*Aprion virescens*	40		1	0	100	0	1
Total			**92**	**33**	**134**	**61**	**39**	**259**

Figure 2: Length frequency graph showing the number of Tafauli in size classes between 10 and 56+ cm. The orange line shows the length at maturity (Lm)

All fishes to the left of the orange line are undersized. Those to the right of the line are OK.



Discussion

The results of this survey show that four of the species landed during the creel survey at te Akau Talie were being landed at sizes *too small* for sustainable use. That is, more than 50% of the catch was under the size at maturity (Lm) which would lead to removal of fishes from the population before they would have the chance to breed and result in overfishing. Five of the species were considered of good status using the creel indicator, and at least for now are not of further concern.

However, 47% of the species could not be evaluated at all because there are no Lm values for evaluation against the indicator, and even some of the species evaluated are only tentative results because the total numbers measured were too small. That is, 13 of the 17 (76%) species only had between 1 and 3 individual fishes landed, so the numbers were not high enough to make a true evaluation. Overall, only 2 species, Tafauli and Fagamea were landed in sufficient numbers and had a length at maturity (Lm) available for a full and valid test of fishery health. It

will be important to obtain Lm values for all of the main fished species in Tuvalu and to ensure the creel surveys are repeated to ensure there are enough data for a valid test.

This creel method using the indicator of percent of the landed catch undersized in relation to Lm is now becoming a focus of the Pacific Community's (SPC) work on evaluating the status of resources using practical low-cost methods. It can be supplemented by underwater visual census (UVC) but on its own is enough to identify stressed resources in need of management and further investigation. Tuvalu has led the way in developing this technique and can now use these results to begin management for the seamounts at Nanumaga.

Recommendations

The recommendations listed below are lifted from the various parts of the report, they are proposed to capture a few but important issues that are current in regard to the creel survey at the seamount (Te Akau Talie):

1. Action is needed now for the TFD to work with the Nanumaga community to establish size limits and/or other management strategies for the species being caught at the seamounts, particularly for Tafauli and Fagamea which are being overfished;
2. Further creel studies of these seamounts is needed to properly evaluate species with low landing counts during this survey;
3. On-going surveys should be done when possible at the seamounts to monitor the health of the stocks and success of the management measures, adjusting as necessary, and including UVC if needed. These could be added to the Nanumaga Fishery management Plan;
4. There is an urgent need to develop Lm values for all the main fished species in Tuvalu, and assistance from SPC on this needs to be requested and supported; and
5. TFD needs support from the Government of Tuvalu (CABINET), to ensure that creel surveys like this can be carried out for good management of the resources.

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