Coastal Fisheries Creel Report Card

2023

ALL ISLANDS

Introduction

This Coastal Fisheries Creel Report Card summarises the results of key indicators, based on creel surveys. The Tuvalu Fisheries Department (TFD) carries out these surveys across all islands in Tuvalu, except Niulakita.

The Key indicators we use to show the health of the resources and state of overfishing are:

Indicator 1: 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 should decline and approach zero as management actions improve, followed by improvements in the fisheries resources.

This is an indicator of **overfishing**.

Indicator 2: Catch of fishes per unit of effort (CPUE). We use the weight (kg) of fishes being landed: (a) per fisher per hour spent fishing and (b) per fishing trip. The values for Indicator 2 should increase as things improve. That is, fishers should be able to catch more fish in less time.

This is an indicator of **abundance** of the fishery as well as the **efficiency** of the fishing method.

Indicator 3: Spawning Potential Ratio (SPR). The SPR compares the number of eggs (spawn) produced by a fish species over its lifespan when there **is fishing**, to the spawn that would have been produced over the fish stock's lifespan if there were **no fishing**. SPR measures the impact that fishing has on the ability of fish to contribute to spawning.

This is an indicator of **relative fishing pressure.**

When there is no fishing, the SPR is 100%. An overfished fishery where all mature fish have been caught, or all female fish have been caught, has an SPR of 0%.

Results

Overall status of the coastal resources is poor, with an average of 41% of the fishes caught being undersized.

IDEAL: % UNDERSIZED should DECLINE over time and approach 0%

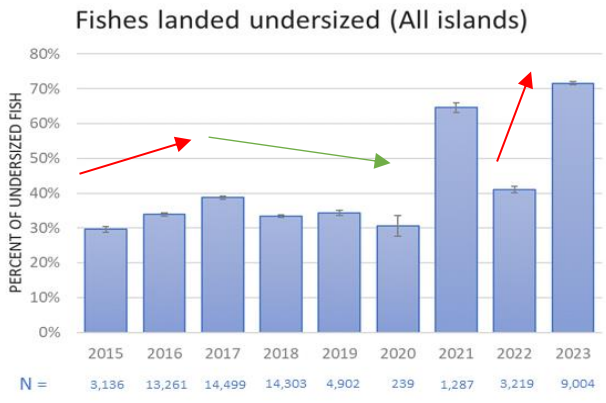

***Figure 1**: Percentage of fishes being landed undersized by year +/-SE. The total sample size (N) is reported in blue.*

Green arrow = good trend
red arrow = bad trend

Across the islands in Tuvalu, Indicator 1 slightly increased between 2015 and 2017. That is, the number of undersized fishes being landed increased, a bad sign. This trend reversed in 2018, and the numbers of undersized fish continued to decline in 2020. However, Indicator 1 drastically increased in 2021. The percent of fishes that were landed undersized doubled in 2021 compared with other years (Figure 1 and Table 1).

The ideal % of fishes being landed that are undersized is 0, so any actions that will reduce this to lower levels is a step in the right direction and is expected to lead to improvements in the resources.

Every fish should have the chance to breed at least once to ensure the resources can be replenished.

For Indicator 2a, the total weight of fish being landed per fisher per hour spent fishing appears to have slowly decreased over the survey years for all fishing methods. The exception was trolling, which generally showed an upward trend in this period. The weight of fish per hour caught by trolling was greater in 2019 and 2021 than in 2016-2018 per fisher (Figure 2).

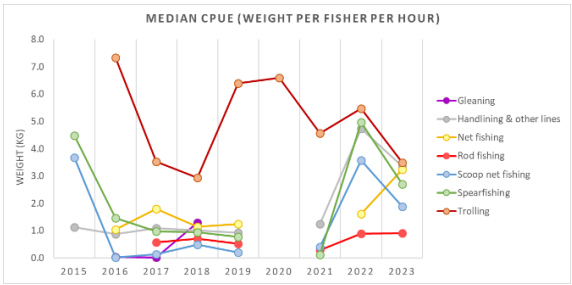

Figure 2: Indicator 2a. Weight (in kg) of fishes landed per fisher per hour spent fishing across Tuvalu 2015-2021. There was no method data available for 2020.

The weight of fishes landed per fisher per entire fishing trip as Indicator 2b showed a decline between 2015 and 2017 for all methods, except for net fishing (Figure 3). This shows that the returns per fishing trip have declined over that period. The returns stabilised in 2018 and 2019, with the exception of trolling, which decreased in 2018, and gleaning which increased in 2018.

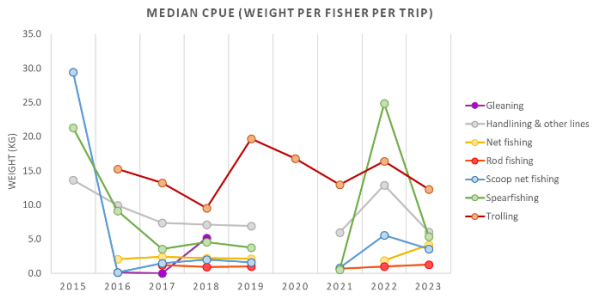

Figure 3: Indicator 2b. Weight (in kg) of fishes landed per fisher per fishing trip across Tuvalu 2015-2021. There was no method data available for 2020.

Catch per unit of effort (CPUE) should INCREASE over time in a well-managed fishery.

Trolling appears to bring the best returns per hour of fishing, and also per fishing trip, compared to other methods. This is likely because of the target species are typically offshore species such as tuna and mackerels which are generally bigger than the reef species.

Note: The catch reported do not include offshore fish species such as Atu (skipjack tuna). These pelagic species accounted for 31% of the total catch numbers recorded in the creel surveys (2015-2023).

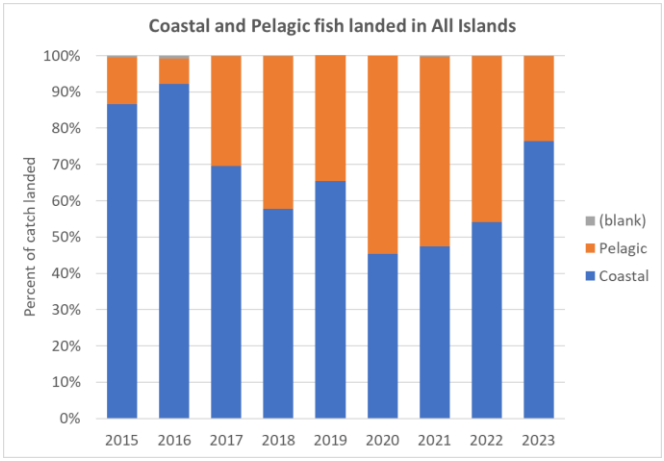

***Figure 4:** Table contrasting Coastal and Pelagic fish landed per Year in All Islands of Tuvalu.*

Conclusions

Overall, there has been little improvement to the health of coastal fisheries the past 7 years, since surveys were begun. The percentage of

fish landed undersize has doubled in 2021, and could reflect an increased reliance on coastal fisheries resources due to lack of affordable protein alternatives in the as a result of COVID-19 pandemic restrictions.

Management plans need to be developed and implemented more efficiently, to improve the health of Tuvalu's coastal fisheries.

Why are some figures different from the previous report card?

This is due to a number of reasons:

1. We have received more data from the years 2015-2022
2. We have more accurate information on the size of maturity from recently published studies and recent studies conducted by the Fisheries Department.
3. We have now included size of maturity data for 30 extra species
4. CPUE has now been displayed by fishing method
5. We have added a new indicator, the spawning potential ratio (SPR)

Appendix I: Size of maturity (L_m) for all 90 species

Table 1 is part of indicator 1. It shows the breakdown of species that have 50% or more fishes landed that are undersized. A value of 100 means that all fish landed are undersized. The ideal value for a well-managed fishery is 0. Blank cells indicate that no catch has been recorded for that species in that year. This table shows that many of the species being monitored are being caught undersized, and this varies by year.

The species are listed in order of their abundance in the catch landed (% Sum of Weight).

Table 1: List of species for which size at maturity (L_m) is known, showing percentages landed which are undersized (2015-2023).

No.	Species Names	Local Names	% Sum of Weight	2015	2016	2017	2018	2019	2020	2021	2022	2023	Grand Total
1	*Lutjanus gibbus*	Taea	13.7%	20%	26%	25%	27%	7%	0%	39%	25%	68%	25%
2	*Acanthurus triostegus*	Manini, Koinava	5.8%	0%	17%	37%	24%	34%	41%	16%	46%	12%	29%
3	*Caranx sexfasciatus*	Teu	4.5%	33%	85%	63%	76%	89%		71%	75%	100%	75%
4	*Caranx melampygus*	Aseu	3.7%	0%	36%	48%	35%	48%	67%	40%	74%	81%	63%
5	*Elagatis bipinnulata*	Kami, Kamai	3.6%	100%	76%	80%	47%	100%	0%	67%	69%	92%	77%
6	*Caranx lugubris*	Tafauli, Tino tafauli (large), Aheu tafauli, Uluat	3.5%		90%	96%	100%	75%		100%	100%	95%	98%
7	*Naso unicornis*	Ume, Pokapoka	2.9%	60%	49%	24%	60%	75%		33%	31%	0%	46%
8	*Hipposcarus longiceps*	Ulafi	2.7%	24%	21%	15%	26%	19%			16%	5%	17%
9	*Crenimugil crenilabis*	Kanase	2.6%	100%	0%	67%	23%	56%			41%	80%	55%
10	*Siganus argenteus*	Maiava	2.5%	0%	30%	27%	37%	0%		5%	40%	57%	28%
11	*Lethrinus obsoletus*	Tanutanu	2.4%	10%	40%	21%	14%	7%		18%	18%	77%	26%
12	*Epinephelus fuscoguttatus*	Munua	2.4%	47%	38%	81%	63%	67%			47%	79%	73%
13	*Epinephelus polyphekadion*	Gatala (one dot)	2.3%	54%	42%	26%	31%	33%		82%	64%	0%	39%
14	*Naso lituratus*	Maninilakau	2.2%	49%	27%	12%	7%	4%	0%	1%	22%	0%	15%

15	*Acanthurus lineatus*	Ponelolo, Alogo, Pone hamoa	2.1%	7%	47%	32%	30%	8%	100%	17%	12%	93%	31%
16	*Epinephelus merra*	Gatalaliki	1.9%	4%	0%	9%	16%	0%	0%	67%	1%	3%	7%
17	*Decapterus macarellus*	Atule	1.7%	31%	29%	13%	61%	41%			60%	60%	45%
18	*Caesio caerulaurea*	Ulia, Ulihega	1.6%	0%	9%	0%	0%			0%		0%	8%
19	*Lutjanus kasmira*	Savane	1.5%	59%	55%	63%	43%	43%	100%	85%	40%	72%	53%
20	*Lutjanus fulvus*	Tagau,Takape	1.5%	0%	8%	26%	10%	14%	0%	17%	3%	61%	19%
21	*Kyphosus vaigiensis*	Nanue (Ff, Nm)	1.4%		75%	71%	60%	98%			63%	51%	71%
22	*Epinephelus maculatus*	Fapuku	1.4%	65%	63%	69%	58%	63%		20%	59%	100%	70%
23	*Lethrinus amboinensis*	Noto, Gutulo, Sapotu	1.4%	0%	6%	10%	11%	3%		36%	2%	98%	28%
24	*Monotaxis grandoculis*	Muu, Mufala	1.3%	74%	68%	39%	53%	27%	0%	82%	48%	61%	48%
25	*Sargocentron spiniferum*	Tamalau	1.3%	66%	63%	50%	39%	54%		35%	54%	96%	55%
26	*Lutjanus monostigma*	Taiva	1.3%	3%	8%	40%	27%	73%	0%	57%	30%	39%	29%
27	*Fistularia petimba*	Taotaoama (NB, Tvd)	1.3%	100%	100%	100%							100%
28	*Selar crumenophthalmus*	Salala, Atule	1.3%	4%	8%			31%		100%	84%	99%	90%
29	*Liza vaigiensis*	Kafakafa	1.2%		70%	75%	64%	67%		100%	35%	21%	63%
30	*Lutjanus bohar*	Fakamea, Fagamea	1.2%	58%	78%	64%	69%	29%		63%	70%	100%	69%
31	*Chlorurus (Scarus) microrhino*	Laea	1.2%	0%	46%	51%	0%						47%
32	*Epinephelus macrospilos*	Gatala (Ff), fÄpuku (Nm)	1.2%	13%	61%	89%	81%	56%	8%	50%	100%	93%	76%
33	*Naso vlamingii*	Pokapoka lanulanu	1.1%	0%	33%	18%	16%	0%		40%	0%		24%
34	*Aprion virescens*	Utu	1.1%	50%	71%	45%	39%	56%		50%	50%	100%	58%
35	*Kyphosus cinerascens*	Nanue	1.1%	25%	80%	22%	4%	65%			9%	0%	24%
36	*Naso brevirostris*	Pokapoka, Kosotu	1.0%	6%	27%	3%	2%	9%	0%	13%	17%	100%	14%
37	*Lethrinus microdon*	Filoa, Kapatiko	1.0%				16%	23%		65%	53%	88%	45%
38	*Lethrinus erythracanthus*	Saputu	1.0%	61%	52%	36%	50%	0%		40%	100%	80%	49%
39	*Naso caesius*	Ume (Ff?), pokapoka (Nm?)	0.9%		9%	18%	57%	40%		38%			24%
40	*Sphyraena forsteri*	Taotao	0.8%	19%	6%	4%	16%	13%			0%	80%	14%
41	*Aphareus furca*	Palusega, Kotua, Taelepe, Takuoga	0.8%	78%	97%	89%	100%	100%		100%	100%	96%	97%
42	*Myripristis pralinia?*	Malau puku	0.7%	0%	4%	1%	3%	3%	0%	0%	10%	20%	4%
43	*Lethrinus xanthochilus*	Tanutanu	0.7%		72%	83%	0%		0%		47%	100%	72%

44	*Macolor macularis*	Tonu	0.7%	78%	50%	9%	16%						30%
45	*Naso hexacanthus*	Pokapoka, Ume tinae sega	0.6%		66%	64%	55%	100%	100%	100%			72%
46	*Macolor niger*	Makala	0.6%	89%	87%	73%	70%				100%		80%
47	*Lethrinus miniatus*	Noto	0.6%	91%	75%	90%	85%	56%	0%	90%	0%		83%
48	*Myripristis berndti*	Malau	0.5%	29%	26%	14%	47%			80%	33%	79%	27%
49	*Anyperodon leucogrammicus*	Gatala lautalo, Gatala lautala	0.5%	8%	5%	87%	0%				0%	80%	45%
50	*Sargocentron tiere*	Malau gutu loa, Malua mata loa	0.5%	50%	48%	74%	49%	20%	0%	100%	67%		47%
51	*Lethrinus variegatus*	Noto, Tanutanu	0.5%		0%	3%		0%					2%
52	*Lethrinus microdon*	Kapatiko	0.4%	0%	11%	18%	0%	0%			0%	27%	11%
53	*Caranx ignobilis*	Tino ulua (lge), Lupo (small), Aseu (med); Mea tal	0.4%		100%	97%	99%	100%	100%	100%	100%	100%	99%
54	*Myripristis kuntee*	Malau	0.4%	6%	6%	50%	0%				0%	56%	8%
55	*Lethrinus olivaceus*		0.3%				0%			100%	75%		81%
56	*Priacanthus hamrur*	Matapa	0.3%	33%	14%	2%	10%						12%
57	*Mugil cephalus*	Kanase	0.3%			86%					90%		87%
58	*Selar boops*	Salala, Atule	0.3%				5%			100%	100%	99%	91%
59	*Parupeneus barberinus*	Malili, Kaivete	0.2%		2%	6%	0%				0%		5%
60	*Ctenochaetus binotatus*	Pone uli	0.2%	0%	2%	7%	33%					0%	4%
61	*Lutjanus argentimaculatus*	Tagau	0.2%	100%	100%	100%	100%					100%	100%
62	*Carangoides plagiotaenia*	Aseu ululi	0.2%			36%	83%	100%				98%	71%
63	*Parupeneus cyclostomus*	Kaivete piniki	0.2%		0%	40%	22%	0%					26%
64	*Siganus punctatus*	Maiava fiiti	0.1%	36%	29%	18%	10%			44%	100%		29%
65	*Epinephelus fasciatus*	Gatala	0.1%		0%	0%		0%					0%
66	*Epinephelus miliaris*	Gatala	0.1%	0%	0%	0%	0%	0%		100%		100%	27%
67	*Cephalopholis argus*	Loi	0.1%	0%	11%	19%	41%	60%		0%	33%	56%	30%
68	*Myripristis adusta*	Malau fagamea, Malau matakelkele	0.1%	60%	60%	21%	82%				0%		51%
69	*Variola louti*	Pula	0.1%		81%	90%	75%				100%	50%	82%

70	*Myripristis violacea*	Malau	0.1%		0%	0%	33%	0%		0%	0%	61%	18%
71	*Plectropomus areolatus*	Tonu gatala	0.1%			89%	50%			100%		0%	78%
72	*Plectropomus leopardus*	Tonu	0.1%		100%	0%							14%
73	*Acanthurus nigricauda*	Kapalagi, Pone	0.1%	0%	15%	0%							8%
74	*Rastrelliger kanagurta*	Salala	0.1%		0%		100%			100%		100%	95%
75	*Cephalopholis urodeta*	Mataele	0.1%	75%	52%	43%	0%			0%	100%		49%
76	*Sargocentron caudimaculatum*	Malau	0.0%		0%	0%	0%					0%	0%
77	*Scarus oviceps*	Laea	0.0%	0%	0%	0%							0%
78	*Acanthurus xanthopterus*	Kapalagi, Maa	0.0%	0%		0%	50%						25%
79	*Mulloidichthys vanicolensis*	Kalo	0.0%			26%	100%			0%			26%
80	*Parupeneus multifasciatus*	Afulu	0.0%	0%		0%				0%	0%		0%
81	*Cephalopholis sexmaculata*	Mataele	0.0%			100%	100%				100%	100%	100%
82	*Lethrinus nebulosus*	Tanutanu, Morikoi	0.0%				100%			100%		100%	100%
83	*Neoniphon sammara*	Talakihi	0.0%	0%		0%	0%					0%	0%
84	*Cheilinus fasciatus*	Gole	0.0%		0%	0%	0%	0%					0%
85	*Siganus fuscescens*	Maiava	0.0%		0%								0%
86	*Parupeneus crassilabris*		0.0%			0%					0%		0%
87	*Scarus psittacus*	Taona	0.0%			17%							17%
88	*Oxycheilinus digrammus*	Gole (Ff)	0.0%				20%						20%
89	*Platax orbicularis*	Lau laufau	0.0%				0%						0%
90	*Platax teira*	Lau laufau	0.0%		0%								0%
	Grand Total			30%	34%	39%	35%	35%	29%	62%	40%	72%	41%