Department of Primary Industries

Fishery statistics summary 2022 – Sea Urchin and Turban Shell Fishery

Red Sea Urchin (Heliocidaris tuberculata)

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Executive summary

This report provides updated fishery statistics for the NSW Sea Urchin and Turban shell (SUTS) Fishery- Red Urchin stock for 2022 and should be read in conjunction with the 2021 fishery statistics (Chick 2021) and 2020 stock assessment reports for Red Urchin (Chick 2020).

Stock status

The determination of stock status has not been revised from the 2020 stock assessment report and the status of the Red Urchin stock remains classified as **sustainable**. Importantly, this determination is reliant on a number of assumptions including an assumed biomass of Red Urchin, expected to be maintained at or about levels of an unfished stock, in areas closed to commercial fishing. Further, the 2020 assessment report stated that the status of the Red Urchin stock from areas open to commercial fishing is likely depleting. However, substantially reduced fishing mortality, from low levels of commercial catch in 2021 and 2022 that have been substantially below regional catch limits and the total allowable catch, together with the introduction of a minimum legal size from Oct. 2019, reduces the likelihood of stocks in areas open to fishing becoming depleted.

An assessment of the Red Urchin stock was not done in 2021 or 2022 due to the low level of commercial fishery data and limited new data to reliably inform it. This decision was made by DPI Fisheries, with the NSW Total Allowable Fishing Committee (TAFC), understanding that reduced demand, primarily a consequence of COVID-19 management impacting on the domestic economy, had substantially influenced levels of commercial catch in recent years and areas closed to fishing Red Urchins remain, indicating stock status has unlikely changed.

Fishery statistics

In 2022 (to 1 September), the commercial fishery had reported a total catch of 1.5 t of Red Urchin, the lowest catch reported to the end of August since 2000 and ~15% of the last 5-year average catch to the same time. In 2022, the total catch was <2.5% of the 60 t TAC and ~8% of the total regional catch limits (19 t). In 2022, 66 hours of effort was reported harvesting Red Urchin, the lowest level of effort to the end of August since 2000. Further, nominal catch rates (kg/hr) for harvesting Red Urchin together with other SUTS species on the same day and for Red Urchin only fishing days were at the lowest and second lowest levels since 2000, respectively, with that for Red Urchin only being about 60% the 5-year average (40 kg/hr), 40% of the 10-year average (60 kg/hr) and substantially below historical peaks in excess of 100 kg/hr.

Stakeholder engagement

- SUTS Fishery licence holders (or representatives) were invited to an online meeting and presentation of the fishery statistics for 2022. Feedback was provided, to inform the understanding of the performance of the stock and fishery.
- There was positive feedback regarding the implementation of a size limit protecting spawning stock and management of catch through the TAC and regional catch limits supporting the operation of the fishery.
- There was substantial concern that areas open to the harvesting of Red Urchins generally continue to show signs of a depleting stock with recent patterns in fishing consistent with controlled serial depletion.

1. Stock status

The determination of stock status for the Sea Urchin and Turban Shell (SUTS) Fishery – Red Sea Urchin (*Heliocidaris tuberculata*, CAAB 25 247002, hereafter referred to as Red Urchin) has not been revised from the 2020 stock assessment report (Chick 2020) and the status of this stock remains classified as **sustainable**. However, as stated in the 2020 assessment report, this determination is complex and reliant on an assumed biomass of Red Urchin, expected to be maintained at or about levels of an unfished stock, in areas closed to commercial fishing that comprise about 30% of the total area inhabited by Red Urchin in NSW, including SUTS Fishery specific closures since 1994 (~18% of area). Moreover, the 2020 assessment report stated that the status of the Red Urchin stock from areas open to commercial fishing was likely depleting. This determination remains as no new determination of status is made from the summaries of limited fishery statistics in 2021 and 2022. Further, whilst relatively low fishing mortality, from relatively small commercial catches, as well as the introduction of a minimum legal size since Oct. 2019, reduces the likelihood of the biomass of Red Urchin in areas open to fishing becoming depleted, prolonged low catches together with low catch rates indicate productivity of the Red Urchin stock is low.

This report provides a summary of the fishery statistics at the state-wide level for Red Urchin and the SUTS fishery as a whole (Appendix 1), from 2000 to 2022 (to 1 September). It updates those data presented in the 2021 fishery statistics report (Chick 2021) and the 2020 stock assessment report (Chick 2020) and should be read in conjunction with them. The data in this 2022 report have not resulted in any substantial and unexpected change in previously reported data. The methodology and rationale for the determination of stock status, uncertainty in the assessment, and detailed presentations and interpretations of fishery statistics for Red Urchin at scales of the whole fishery (state-wide) and SUTS Regions and Subzones are provided in the 2020 assessment report.

An assessment of the Red Urchin stock was not done in 2021 or 2022 due to the low level of commercial fishery data and limited new data available to reliably inform it. This decision was made by DPI Fisheries, in consultation with the NSW Total Allowable Fishing Committee (TAFC), understanding that reduced demand, primarily a consequence of COVID-19 management impacting on the domestic economy, has substantially influenced levels of commercial catch in recent years and areas closed to fishing Red Urchins have remained, indicating stock status has unlikely changed.

Background information regarding the biology and stock structure of Red Urchin is described and cited in the 2020 stock assessment report (Chick 2020) and provides evidence for the determination of stock status of Red Urchin to be made at the biological stock level.

2. Fisheries statistics

Information regarding the structure and development of the SUTS Fishery (in particular, that for Red Urchin) together with a detailed interpretation of fishery statistics to inform the assessment was provided in the 2020 stock assessment report (Chick, 2020). This presented the weight of evidence for determination of stock status and support for the determination of a total allowable catch (TAC) for Red Urchin.

This 2022 update of state-wide fishery statistics is provided to maintain a current series of these fishery statistics to inform stakeholders, including management decision makers (including the TAFC) and to support determination of a TAC for Red Urchin. Due to the limited data in 2021 and 2022 the presentation of data in this report to spatial scales below the state-wide level are restricted to the total catch at the SUTS Fishery Region level only. All reference to fishery statistics in 2022 includes data from January to 1 September 2022, unless otherwise stated. The update of fishery data in 2022 included a review of data records back to 2010. As such, minor differences in summary statistics from previous reports are apparent and expected as records have been exposed to quality assurance and control processes.

2.1. Catch, effort and catch rate information

Commercial

In 2022, the commercial fishery had reported a total catch of 1.5 t of Red Urchin, harvested by 6 active fishers over a total of 66 hours (Figure 1 and Table 1). This is the lowest catch reported to the end of August since 2000 (previous lowest was 2.5. t in 2021) and equates to ~15% of the most recent 5-year (9.6 t), and ~35% of the 10-year (7.3 t) average catch to the end of August (excluding 2022). In 2022 the total catch was <2.5% of the allocated 60 t total allowable catch and ~8% of the total regional catch limits applied in 2022 (19 t; Figure 1).

In the SUTS Fishery, fishers can harvest Red Urchin and/or other SUTS Fishery species on the same FisherDay, whilst still reporting species specific catch and effort. In 2022, 28 FisherDays and 55 hours were reported harvesting Red Urchin when also reporting the catch of other SUTS species (RU+SUTS) and only a total of 6 FisherDays and 11 hours were reported harvesting Red Urchin only (RU only) (Figure 2A and Table 2). These levels of effort are at or among the lowest levels reported for harvesting Red Urchin to the end of August since at least 2000. In 2022, nominal catch rates (kg/hr and kg/day) from records where both Red Urchin and other SUTS species (RU+SUTS) and Red Urchin only (RU only) were harvested are at or among the lowest levels recorded since at least 2000 (Figure 3 and Table 3). In 2022, catch rates (kg/hr) recorded for Red Urchin on days where other SUTS species were harvested (RU+SUTS; 23.1 kg/hr) and Red Urchin only (RU only; 25.2 kg/hr) were fished on a day are the lowest and second lowest catch rates (kg/hr) recorded since 2000.

Catch among Regions and as a proportion of annual catch has varied substantially through time (Figure 4 and Table 4). In 2022, the 1.5 t of catch was predominantly harvested from Region 4 (60%) and relatively evenly distributed among the remaining regions, Regions 1 to 3 (range; 11-16%) (Table 4).

Notably, in October 2020, a voluntary industry-based catch sampling program was established (a recommendation from the TAFC in 2020). The objective of the program is to obtain size frequency data of commercially harvested Red Urchins. Information, instructions and a data sheet are available online (Information paper and data sheet - Red Urchin and Data Sheet only - Red Urchin), allowing fishers to collect and return to DPI, spatially referenced size-frequency information from each fishing day. Low levels of fishing in addition to other priorities of fishers has resulted in a limited number of samples from across the fishery in 2021 and 2022, with the exception of that in sub-zone L4 (Figure 5).

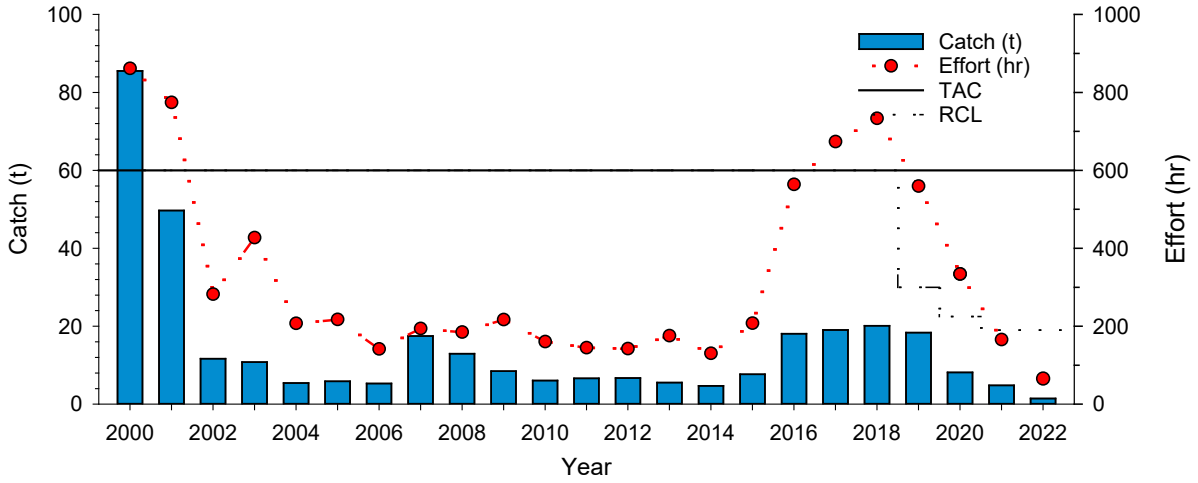

Figure 1 Annual catch (t), effort (hr), Total Allowable Catch (TAC) and total Regional Catch Limit (RCL) on Red Urchin in the Sea Urchin and Turban Shell (SUTS) Fishery, from 2000 to 2022* (*data to 1 September).

Table 1 Annual catch (t), effort (hr) and number of active fishers harvesting Red Urchin in the SUTS Fishery, from 2000 to 2022* (*data to 1 September). Effort excludes records with <0.25 or >8 hrs effort per FisherDay.

Year	Catch (t)	Effort (hr)	No. active fishers (RU)
2000	85.5	861	10
2001	49.7	774	13
2002	11.7	282	6
2003	10.8	427	9
2004	5.4	207	11
2005	5.9	217	14
2006	5.3	142	9
2007	17.5	194	8
2008	12.9	185	8
2009	8.5	217	12
2010	6.1	160	10
2011	6.6	145	10
2012	6.7	143	8
2013	5.5	176	9
2014	4.7	130	8
2015	7.7	208	10
2016	18.1	564	11
2017	19.0	674	16
2018	20.1	733	13
2019	18.4	559	17
2020	8.2	334	13
2021	4.8	166	10
2022*	1.5	66	6

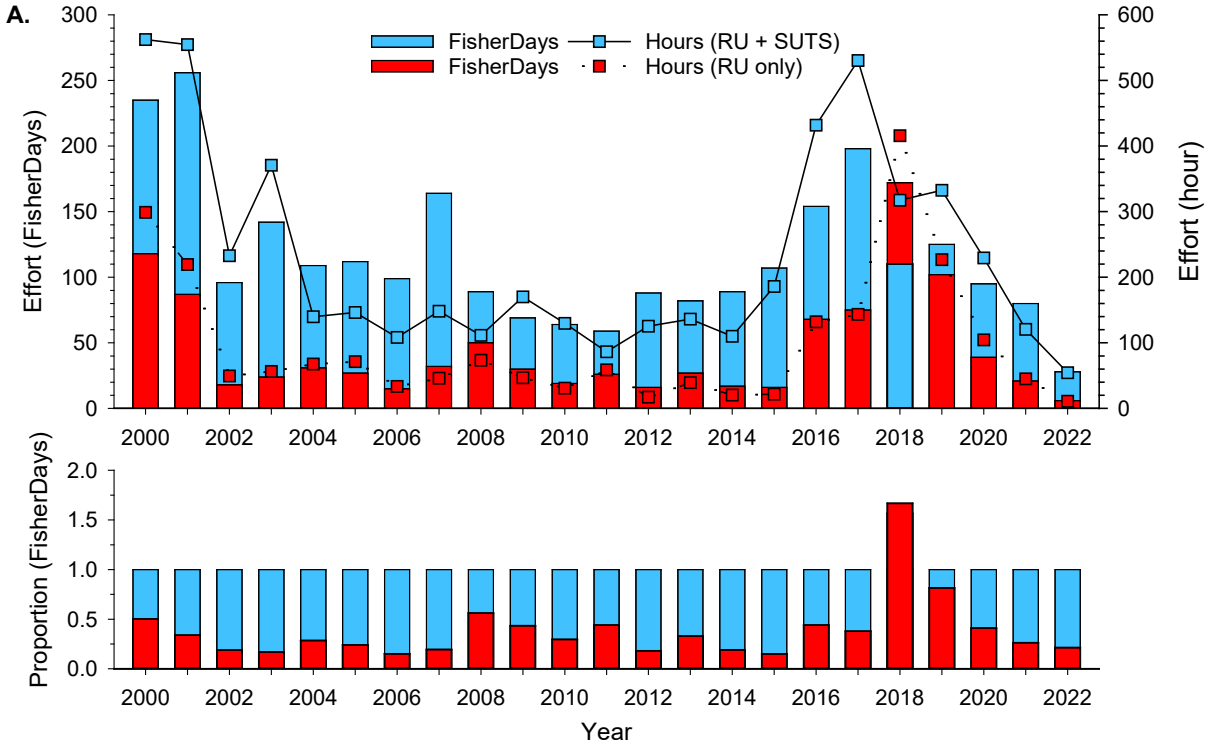

Figure 2 Whole Fishery – Effort – A. Number of FisherDays and hours where Red Urchin and other SUTS species (RU + SUTS) and Red Urchin only (RU only) were reported; and B. FisherDays (RU only) as a proportion of FisherDays (RU + SUTS), from 2000 to 2022* (*data to 1 September).

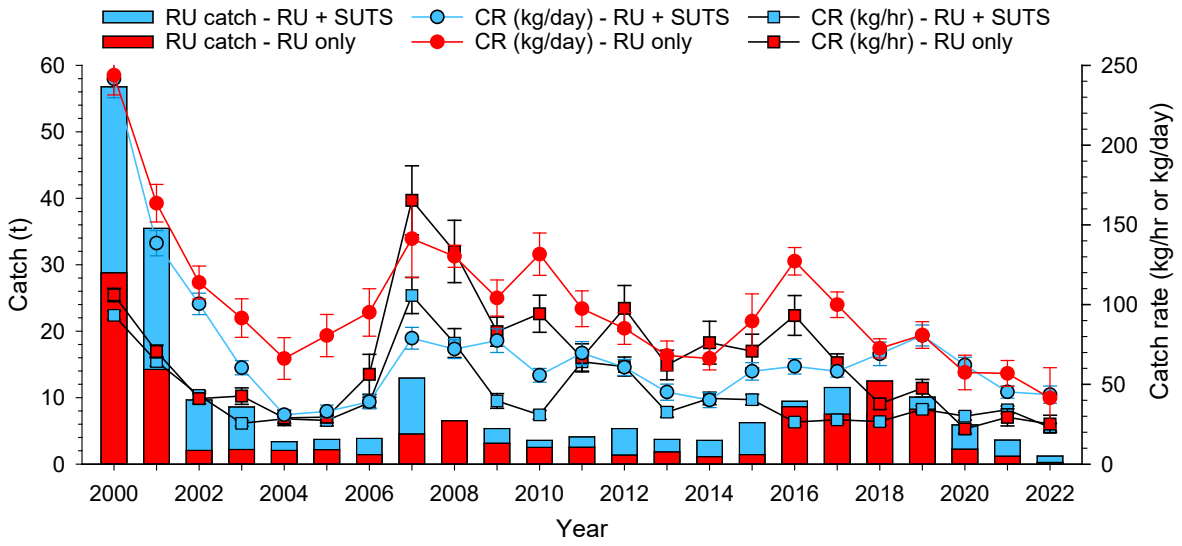

Figure 3 Whole Fishery – Catch and catch rate. Catch (t) where Red Urchin and other SUTS species (RU + SUTS) and Red Urchin only (RU only) were reported each day; and Catch rate (kg/day and kg/hr as average (± SE) of daily records for RU + SUTS and RU only days from 2000 to 2022* (*data to 1 September).

Table 2 Whole Fishery – Effort – Number of FisherDays and hours where Red Urchin and other SUTS species were reported (RU + SUTS) and Red Urchin only were reported (RU only); and FisherDays (RU only) as a proportion of FisherDays (RU + SUTS), from 2000 to 2022* (*data to 1 September).

Year	FisherDays (A) (RU + SUTS)	FisherDays (B) (RU only)	Proportion FisherDays (B/A)	Effort (hr) (RU + SUTS)	Effort (hr) (RU only)
2000	235	118	0.50	562	299
2001	256	87	0.34	555	219
2002	96	18	0.19	233	50
2003	142	24	0.17	371	56
2004	109	31	0.28	140	68
2005	112	27	0.24	146	71
2006	99	15	0.15	108	33
2007	164	32	0.20	148	46
2008	89	50	0.56	111	74
2009	69	30	0.43	170	47
2010	64	19	0.30	130	31
2011	59	26	0.44	86	59
2012	88	16	0.18	125	17
2013	82	27	0.33	136	39
2014	89	17	0.19	110	20
2015	107	16	0.15	186	22
2016	154	68	0.44	432	132
2017	198	75	0.38	530	143
2018	110	172	1.56	317	416
2019	125	102	0.82	333	227
2020	95	39	0.41	230	104
2021	80	21	0.26	121	45
2022*	28	6	0.21	55	11

Table 3 Whole Fishery – Catch and catch rate – Catch of Red Urchin on FisherDays where Red Urchin and other SUTS species were reported (RU + SUTS) and Red Urchin catch from FisherDays (RU only); Catch rate (kg/hr and kg/day) from FisherDays (RU + SUTS) and FisherDays (RU only), from 2000 to 2022* (*data to 1 September). Catch rate data excludes FisherDays with effort <0.25 and >8 hr.

Year	Catch (t) (RU + SUTS)	Catch (t) (RU only)	CR (kg/hr) (RU + SUTS)	CR (kg/hr) (RU only)	CR (kg/day) (RU + SUTS)	CR (kg/day) (RU only)
2000	56.76	28.78	100.9	96.2	241.5	243.9
2001	35.48	14.24	64.0	64.9	138.6	163.6
2002	9.65	2.05	41.4	41.4	100.5	114.0
2003	8.59	2.20	23.2	39.0	60.5	91.6
2004	3.38	2.06	24.2	30.4	31.0	66.3
2005	3.70	2.18	25.3	30.6	33.1	80.7
2006	3.87	1.43	35.7	42.6	39.1	95.2
2007	12.95	4.53	87.4	98.5	79.0	141.4
2008	6.43	6.52	57.7	88.6	72.2	130.4
2009	5.35	3.13	31.4	66.9	77.5	104.2
2010	3.57	2.50	27.5	81.2	55.7	131.7
2011	4.11	2.53	47.6	43.2	69.7	97.5
2012	5.34	1.36	42.6	79.6	60.7	85.2
2013	3.70	1.84	27.2	46.7	45.2	68.1
2014	3.58	1.13	32.5	55.5	40.2	66.4
2015	6.23	1.43	33.5	66.2	58.2	89.6
2016	9.45	8.65	21.9	65.5	61.4	127.2
2017	11.53	7.50	21.7	52.4	58.2	100.0
2018	7.61	12.50	24.0	30.1	69.2	72.7
2019	10.09	8.26	30.3	36.5	80.7	81.0
2020	5.91	2.24	25.7	21.5	62.2	57.5
2021	3.62	1.20	30.0	26.5	45.3	57.0
2022*	1.22	0.25	22.4	22.6	43.6	41.5

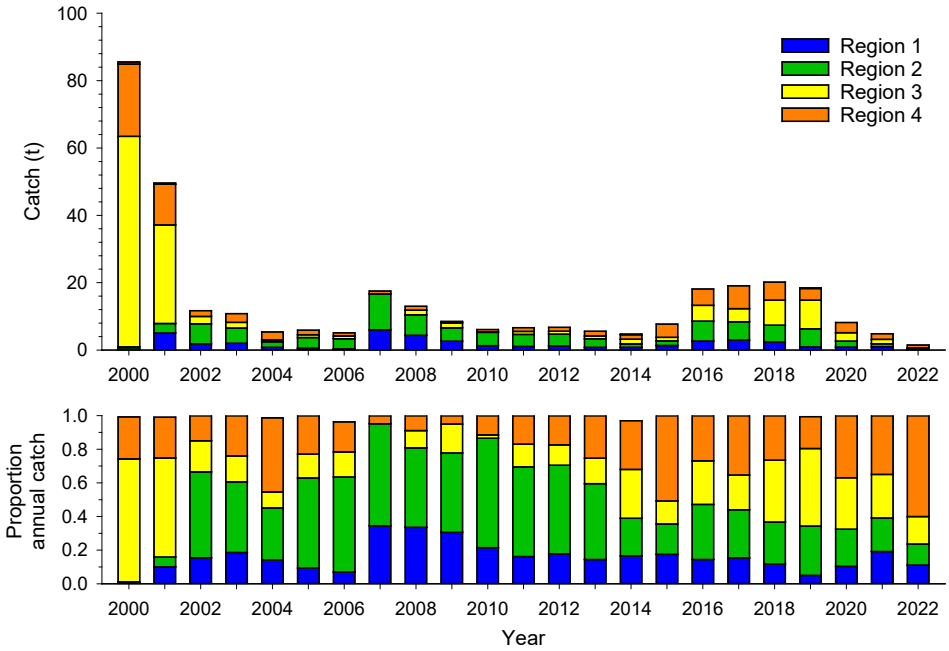

Figure 4 A. Catch (t); and B. Proportion of annual catch for Regions 1-4, from 2000 to 2022* (*data to 1 September).

Table 4 Catch (t) (percent) for Regions 1-4, from 2000 to 2022* (*data to 1 September).

Year	Region 1 Catch (t) (%)	Region 2 Catch (t) (%)	Region 3 Catch (t) (%)	Region 4 Catch (t) (%)
2000	0.27 (0.3)	0.68 (0.8)	62.50 (73.1)	21.37 (25)
2001	5.02 (10.1)	2.85 (5.7)	29.28 (59)	12.07 (24.3)
2002	1.81 (15.5)	5.97 (51)	2.17 (18.5)	1.75 (15)
2003	2.00 (18.6)	4.53 (42)	1.67 (15.5)	2.58 (23.9)
2004	0.77 (14.1)	1.69 (31)	0.52 (9.5)	2.40 (44.1)
2005	0.55 (9.3)	3.15 (53.5)	0.83 (14.2)	1.35 (23)
2006	0.36 (6.8)	3.00 (56.6)	0.79 (14.9)	0.95 (17.9)
2007	6.03 (34.5)	10.60 (60.6)	0.00 (0)	0.85 (4.9)
2008	4.34 (33.5)	6.11 (47.2)	1.33 (10.3)	1.16 (9)
2009	2.58 (30.5)	4.00 (47.2)	1.45 (17.2)	0.43 (5.1)
2010	1.30 (21.5)	3.94 (65)	0.12 (2)	0.70 (11.5)
2011	1.08 (16.2)	3.54 (53.3)	0.90 (13.5)	1.14 (17.1)
2012	1.19 (17.7)	3.53 (52.7)	0.82 (12.2)	1.17 (17.4)
2013	0.80 (14.4)	2.50 (45.1)	0.83 (15)	1.41 (25.4)
2014	0.78 (16.5)	1.05 (22.4)	1.37 (29.1)	1.36 (29)
2015	1.34 (17.5)	1.38 (18.1)	1.04 (13.6)	3.90 (50.9)
2016	2.61 (14.4)	5.93 (32.8)	4.69 (25.9)	4.87 (26.9)
2017	2.92 (15.3)	5.46 (28.7)	3.92 (20.6)	6.74 (35.4)
2018	2.33 (11.6)	5.04 (25.1)	7.39 (36.8)	5.35 (26.6)
2019	0.90 (4.9)	5.38 (29.3)	8.47 (46.2)	3.47 (18.9)
2020	0.84 (10.3)	1.80 (22.1)	2.50 (30.7)	3.01 (36.9)
2021	0.92 (19.2)	0.96 (19.9)	1.25 (25.9)	1.69 (35)
2022*	0.16 (11.1)	0.18 (12.5)	0.24 (16.3)	0.88 (60.1)
Min#	0.27 (0.3)	0.68 (0.8)	0.00 (0)	0.43 (5.1)
Max#	6.03 (34.5)	10.60 (60.6)	62.50 (73.1)	21.37 (25)
Mean (5 Yr)#	1.58 (12.3)	3.73 (25)	4.71 (32)	4.05 (30.6)
Mean (10 Yr)#	1.46 (14.2)	3.30 (29.6)	3.23 (25.6)	3.30 (30.2)

excludes 2022 data

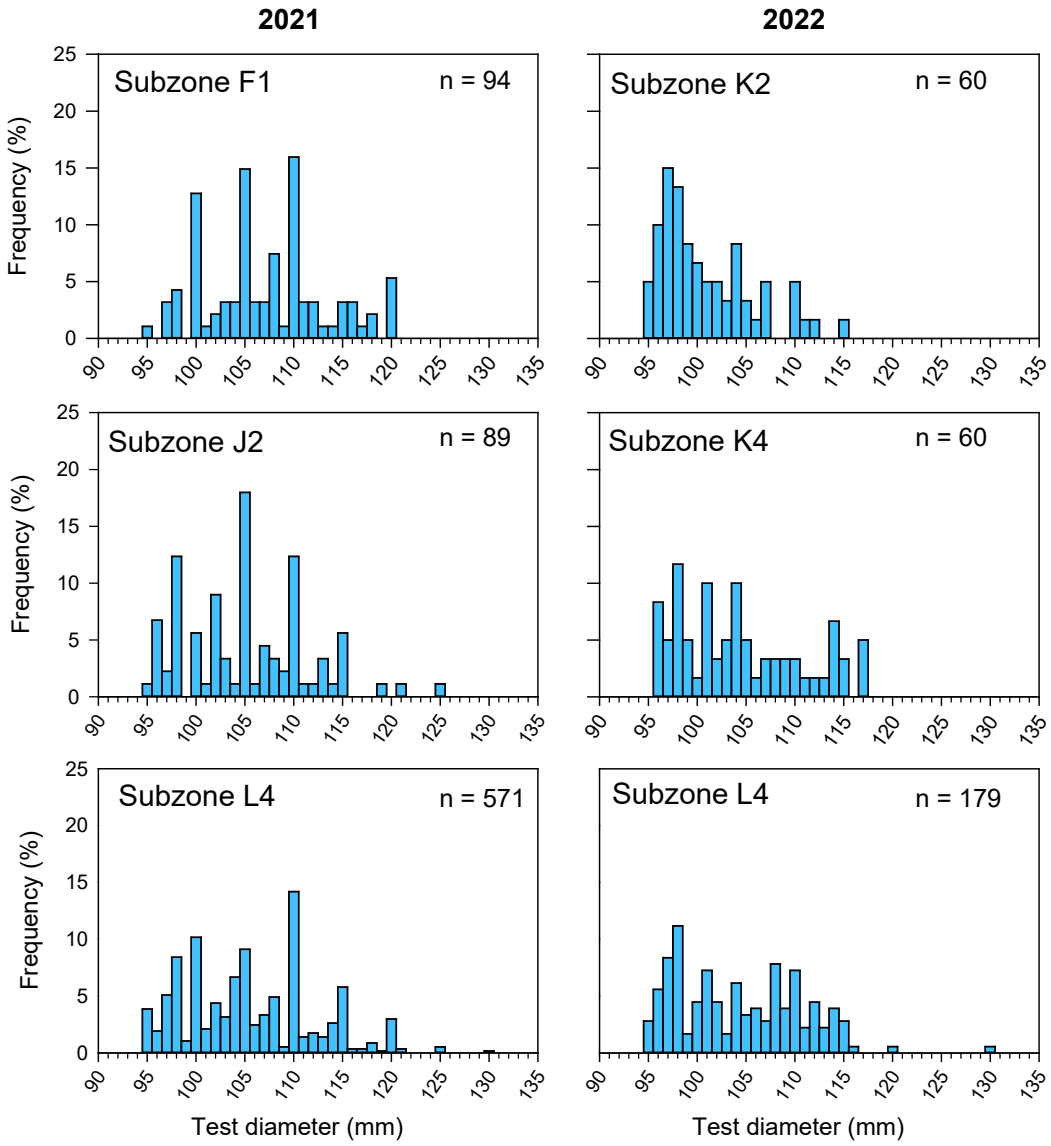

Figure 5 Test diameter frequency distribution for Red Urchin from voluntary commercial catch sampling in 2021 and 2022* (*data to 1 September).

Recreational fishery

In NSW, there is a recreational daily bag limit of ten sea urchins (Red Urchin and/or other sea urchin species). Recreational fishery statistics for the harvest of sea urchins are limited. During 2018-19, NSW recreational fishery retained harvest estimates for all sea urchins was about 1 t (~2400 individuals) (Murphy et al. 2020), the majority of which are considered Longspined Sea Urchin. No recreational catch estimates for sea urchins are available from previous state and national recreational fishing surveys, with sea urchins either not having been reported (West et al. 2015) or included into a species reporting group 'Other Taxa' along with various other 'non-fish' species (Henry and Lyle, 2003).

Aboriginal cultural fishery

There are limited data to inform the level of catch from Aboriginal fishers in NSW. Synthesis of catch composition from Indigenous fisheries indicated that the SUTS Fishery overlaps with Indigenous fisheries (Schnierer and Egan 2016) and sea urchins were identified by Aboriginal fishers in a 1999 survey, as a species either targeted or harvested. Further, in the Tweed region, annual catch of sea urchins (unidentified species) by Aboriginal fishers was estimated at 1.8% of total harvest. Schnierer (2011) described the importance of marine invertebrate species as culturally important but did not specify sea urchins in this study.

2.2. Illegal Unregulated and Unreported

The level of Illegal Unregulated and Unreported (IUU) fishing has not been quantified.

NSW Fisheries Compliance provide annual summaries of seizures of fish and invertebrates due to non-compliance (NSW DPI Fishing compliance). These reports indicate regular seizures of sea urchins (range 482-1274 sea urchins p.a.) within financial years between 2014-15 and 2020-21. In 2020-21, 923 sea urchins and 2 854 turban shell were seized.

3. Stakeholder engagement

Contemporary data supporting the assessment of Red Urchin are fishery-dependent i.e. sourced from logbook and size structure data from catches voluntarily provided by commercial fishers in the NSW SUTS Fishery. NSW DPI Fisheries convened an online meeting of SUTS Fishery licence holders, or their representatives, and presented a summary of information in this report together with that from the 2020 assessment report (Chick 2020). The objective was to present the data and its interpretation and gain feedback and any other information from stakeholders who have contributed to the data, to help inform assessments.

Stakeholders expressed high levels of support for the information provided in the reports and the opportunity to engage and contribute to the assessment process. Points raised by stakeholders included:

- Concern and agreement that areas open to the harvesting of Red Urchins generally continue to show signs of a depleting stock. In fact, some stakeholders report, despite good market prices, having to move to areas with lower abundances of Red Urchin with the expectation (and realisation) of lower catch rates because previously fished areas, which produced 'good weights of about 200 kg', have not recovered, even after 3 years, with few if any Red Urchins recruiting through to the fishery.

- There was some discussion describing inferred historical (<1990's) and more recent (2000-2010's) differences in patterns of catch and catch reporting by some fishers through time that have impacted on long-term fishery productivity and sustainable fishing practices in some areas. Some stakeholders considered some Red Urchin populations in the late 1990's having shown patterns reflecting very high levels of fishing from years earlier. Further, there was concern expressed by stakeholders about what was understood to be i) substantially under reported levels of catch during the early 2000's, after the introduction of the total allowable catch, particularly in areas around Batemans Bay and Jervis Bay in Region 4; ii) likely gaps in the catch records series during the early 2000's from misplaced catch disposal records; and iii) recent fishing practices (late 2010's) by some fishers (i.e. indiscriminate harvesting of Red Urchins at very small sizes (<95 mm)) leaving areas that were otherwise curated for sustainable fishing (fished at >100 mm test diameter), substantially depleted and unable to be fished for years.
- More recently, despite size structure data in some fished areas suggesting the maintenance of a relatively broad size distribution through time (2 years), anecdotal evidence and patterns of localised fishing, described by fishers, indicates the abundance of remaining Red Urchin stocks do not support levels of viable commercial harvest, with statements like '…the area is finished, and in easy to fish areas there's nothing left over 95 mm.' and '…in other areas it's hard, scraping around for 50-60 kg…' '…because there's a good market price'.
- Significant natural events were also cited as contributing to stakeholder observations of substantially reduced Red Urchin biomass and patterns of catch. Notably, stakeholders observed the complete loss of Red Urchin populations from some specific areas immediately after the 2016 NSW East Coast Low (Louis et al. 2016), where sea conditions and wave heights resulted in substantial damage to coastal habitats, particularly the relatively shallow reef habitats inhabited by Red Urchins.
- Positive feedback from stakeholders was noted with respect to implementation of the size limit (from Oct 2019), and that the size limit of 95 mm test diameter 'is right', to provide a good spawning biomass to areas where there are healthy populations of Red Urchins. Management of the level and distribution of Red Urchin catch, through the TAC allocation and Regional Catch Limits, was also seen as positive for the operation of the fishery.

The observations above suggest Red Urchin biomass was more heavily depleted during the early 2000's than catch records would otherwise indicate. Further, natural events have substantially and negatively impacted on Red Urchin populations. However, patterns of catch and catch rate together with anecdotal information of the patterns of fishing described to have occurred in recent history and that are currently occurring, strongly suggest populations of Red Urchin in areas open to fishing are being exposed to fishing patterns consistent with controlled serial depletion.

Also, importantly, stakeholder comments received from previous stock assessment meetings, and captured in those annual stock assessment and fishery statistics summary reports, remain relevant. For example, fishers '*...reported observations from different areas along the NSW coast, of very high Red Urchin abundance and larger Red Urchins in areas closed compared to those open to fishing.*'; '*Adoption of GPS logging technology on commercial vessels was proposed to provide additional, cost-effective information into future assessments and improve compliance, whilst reducing risk from commercial fishing in any change to the management of areas open and closed to the fishery.*'; and others (Chick 2021).

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Appendix 1 – Sea Urchin and Turban Shell Fishery – All species – Summary fishery statistics

SUTS Fishery species catch

The total reported catch (t) of each of the species described in the Sea Urchin and Turban Shell (SUTS) Fishery, from 2000 to 2022 (data to 1 September) are provided in Figure A1-1 and Tables A1-1 (Sea Urchin) and A1-2 (Turban Shell). Species catch as a percentage of total annual catch of all SUTS species is provided in Figure A1-2 and Tables A1-1 (Sea Urchin) and A1-2 (Turban Shell). The catch of Turban Shell was reported to species from mid-2009. Prior to this date all Turban Shell catch was reported to the code 'Turban Shell – other'. Similarly, the code 'Sea Urchin – other' is a reporting code available to fishers.

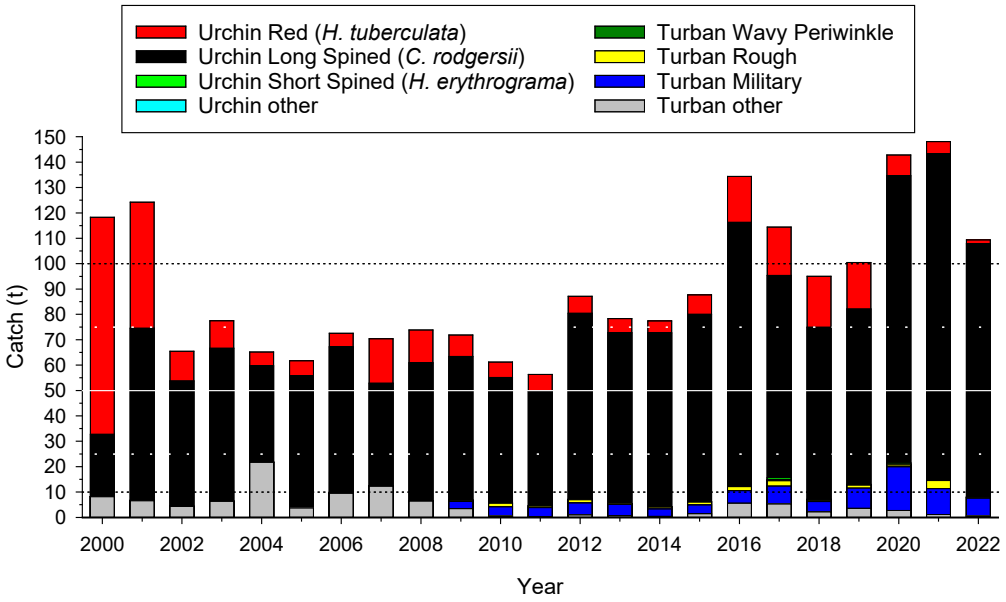

Figure A1 - 1 Annual catch (t) of all SUTS Fishery species, from 2000 to 2022* (*data to 1 Sept.).

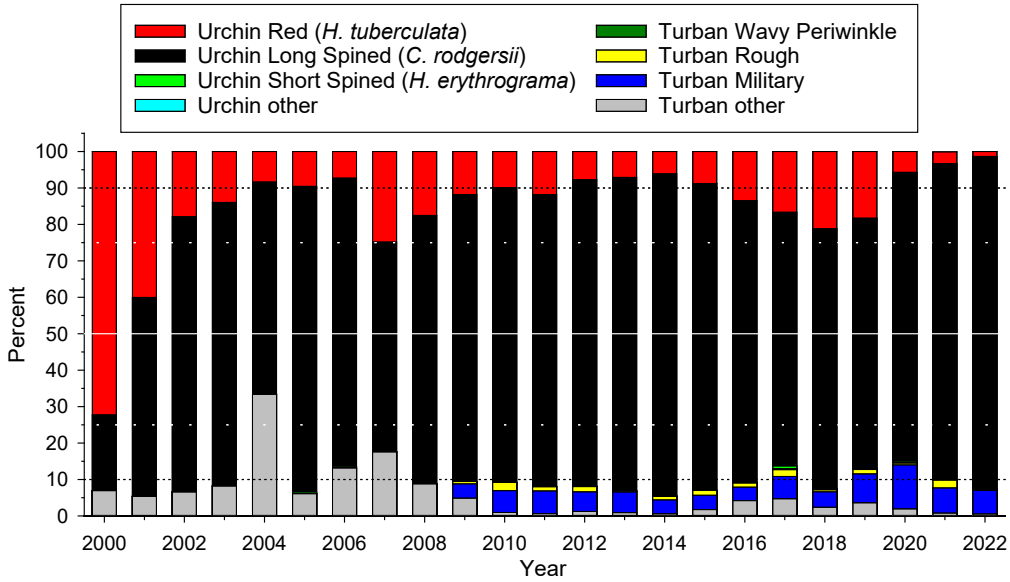

Figure A1 - 2 Species catch as a percent of annual SUTS Fishery catch, from 2000 to 2022* (*data to 1 Sept.).

Table A1 - 1 Annual catch (t) of each species of Sea Urchin and percent of total annual catch of all SUTS species (%), from 2000 to 2022* (*data to 1 Sept.).

Year	Urchin-Red Urchin Catch (t) (%)	Urchin-Long Spined Catch (t) (%)	Urchin-Short Spined Catch (t) (%)	Urchin_other Catch (t) (%)
2000	**85.5** (72.3)	**24.5** (20.7)	**0.1** (0.06)	
2001	**49.7** (40)	**67.7** (54.5)	**0.2** (0.14)	
2002	**11.7** (17.9)	**49.4** (75.5)	**0.04** (0.06)	
2003	**10.8** (13.9)	**60.3** (77.9)	**0.01** (0.02)	
2004	**5.4** (8.3)	**38.0** (58.2)	**0.04** (0.06)	
2005	**5.9** (9.5)	**51.8** (83.9)	**0.3** (0.47)	
2006	**5.3** (7.3)	**57.3** (79.1)	**0.4** (0.48)	
2007	**17.5** (24.8)	**40.5** (57.6)	**0.03** (0.043)	
2008	**12.9** (17.5)	**54.4** (73.7)		
2009	**8.5** (11.8)	**56.6** (78.8)		
2010	**6.1** (9.9)	**49.5** (80.9)		
2011	**6.6** (11.8)	**45.1** (80.1)		
2012	**6.7** (7.7)	**73.3** (84.2)	**0.01** (0.01)	**0.01** (0.01)
2013	**5.5** (7.1)	**67.3** (86)	**0.1** (0.12)	
2014	**4.7** (6.1)	**68.5** (88.5)		
2015	**7.7** (8.7)	**73.9** (84.2)	**0.04** (0.04)	
2016	**18.1** (13.5)	**103.9** (77.3)	**0.1** (0.05)	**0.1** (0.05)
2017	**19.0** (16.6)	**79.7** (69.7)	**0.8** (0.7)	**0.02** (0.01)
2018	**20.1** (21.2)	**67.7** (71.3)	**0.3** (0.29)	**0.1** (0.06)
2019	**18.4** (18.3)	**69.1** (68.8)	**0.04** (0.04)	**0.01** (0.01)
2020	**8.2** (5.7)	**113.1** (79.2)	**0.6** (0.4)	**0.03** (0.02)
2021	**4.8** (3.3)	**128.6** (86.9)	**0.07** (0.05)	**0.00** (0)
2022*	**1.5** (1.3)	**99.9** (91.3)	**0.0** (0)	**0.00** (0)

Table A1 - 2 Annual catch (t) of Turban Shell species, percent of total annual catch of all SUTS species (%), total catch of all SUTS Fishery species and number of active fishers in the SUTS fishery and harvesting Red Urchin, from 2000 to 2022* (*data to 1 Sept.).

Year	Turban-Wavy Periwinkle Catch (t) (%)	Turban-Rough Catch (t) (%)	Turban-Military Catch (t) (%)	Turban-other Catch (t) (%)	SUTS Fishery Total catch (t)	No. active fishers SUTS	RU
2000				**8.2** (6.9)	**118.3**	**14**	**10**
2001				**6.6** (5.3)	**124.2**	**20**	**13**
2002				**4.3** (6.6)	**65.5**	**10**	**6**
2003				**6.4** (8.2)	**77.4**	**11**	**9**
2004				**21.7** (33.4)	**65.2**	**12**	**11**
2005				**3.8** (6.1)	**61.7**	**19**	**14**
2006				**9.5** (13.2)	**72.5**	**11**	**9**
2007				**12.3** (17.5)	**70.4**	**9**	**8**
2008				**6.5** (8.8)	**73.9**	**11**	**8**
2009		**0.5** (0.6)	**2.8** (3.9)	**3.5** (4.9)	**71.9**	**17**	**12**
2010		**1.4** (2.3)	**3.7** (6)	**0.6** (0.9)	**61.2**	**12**	**10**
2011	**0.04** (0.06)	**0.6** (1.2)	**3.5** (6.2)	**0.4** (0.6)	**56.3**	**14**	**10**
2012	**0.1** (0.09)	**1.2** (1.4)	**4.7** (5.4)	**1.1** (1.2)	**87.1**	**15**	**8**
2013	**0.04** (0.05)	**0.2** (0.2)	**4.4** (5.7)	**0.7** (0.9)	**78.3**	**17**	**9**
2014	**0.1** (0.12)	**0.7** (0.9)	**2.9** (3.8)	**0.5** (0.6)	**77.4**	**23**	**8**
2015	**0.04** (0.05)	**1.2** (1.3)	**3.4** (3.9)	**1.5** (1.7)	**87.7**	**19**	**10**
2016	**0.1** (0.09)	**1.6** (1.2)	**4.9** (3.7)	**5.6** (4.2)	**134.4**	**17**	**11**
2017	**0.4** (0.32)	**2.1** (1.9)	**7.0** (6.1)	**5.4** (4.7)	**114.4**	**22**	**16**
2018	**0.1** (0.08)	**0.5** (0.5)	**4.1** (4.3)	**2.2** (2.3)	**95.0**	**23**	**13**
2019	**0.2** (0.17)	**1.2** (1.2)	**8.0** (8)	**3.6** (3.6)	**100.5**	**20**	**17**
2020	**0.3** (0.18)	**0.7** (0.5)	**17.2** (12.1)	**2.8** (1.9)	**142.8**	**23**	**13**
2021	**0.0** (0.01)	**3.2** (2.1)	**10.2** (6.9)	**1.1** (0.8)	**148.1**	**24**	**10**
2022*	**0.0** (0.02)	**0.4** (0.3)	**7.0** (6.4)	**0.6** (0.5)	**109.4**	**18**	**6**