Department of Conservation
Te Papa Atawhai

Meeting:	Conservation Services Programme Technical Working Group
Date:	29 July 2024
Time:	10:15 am – 1.00 pm
Place:	Microsoft Teams Meeting
Chair:	Tiffany Plencner (Technical Advisor Marine Bycatch and Threats team)

Attendees: Tiffany Plencner, Lyndsey Holland, Karen Middlemiss, Hollie McGovern, Hannah Hendriks (DOC), Karli Thomas (Deep Sea Conservation Coalition), Brit Finucci Matt Dunn, Jaret Bilewitch, Malcolm Clark, Matt Pinkerton, Mel Underwood, Jenny Beaumont, (NIWA), Di Tracey (NIWA – Emerita Researcher), Olivia Hamilton, Heather Benko, Campbell Murray, Karen Tunley, Andy Biggerstaff, Lyla Tapusoa (FNZ), Karin Forney, Scott Benson (NOAA - Southwest Fisheries Science Center USA), Kristin Reed (Upwell), Karen Baird (SPREP), Ben Leslie (DOC Protected Species Liaison Program (North Island)), Rosa Edwards (SNZ Inshore Council), Edward Abraham (Dragonfly Data Science), Sean Williamson (Monash University), Peter Langlands (Wild Capture Fisheries Research), Barry Weeber (ECO), Ben Steele-Mortimer (DWC Seafood NZ), Simon West (Bioresearches)

Presentations:

10:20 am	INT2023-03 Characterising SLL behaviour for turtle bycatch	Matt Dunn, NIWA
11:15 am	POP2022-03 Deep sea protected coral reproduction study	Jennifer Beaumont, NIWA
12:00 pm	INT2023-05 High-resolution estimation of species diversity for a protected coral family commonly occurring as trawl bycatch	Jaret Bilewitch, NIWA

1. **INT2023-03 Characterising SLL behaviour for turtle bycatch**

Matt Dunn presented the draft report for INT2023-03.

Discussion:

OH Will effort and different spatial variation in effort be taken into account when considering where the turtle hotspots are; more vessels fishing in one area creates bias?

> **MD** Did not take account of autocorrelation bias. There are methods that take into account spatial variation and bias of effort in a certain area (eg VAST and GAMS), however we did not use those methods as very little has been gained from previous experience in fisheries and it would also burn through the entire project budget. Conclusion is that it wouldn't offer major benefit by using statistical method that

dealt with that issue. Model doesn't select amount of effort in each event as significant predictor. If you were going to drive this approach as central part of LBT monitoring and conservation, eg to inform spatial closures, then you might want to take step into more advanced analysis as will be more credible.

EA Most LBT captures are reported by 1-2 vessels, how does the effort from those two vessels compare?

> **MD** That will be covered later in the presentation, however these vessels fish mostly in the Bay of Plenty area. Location seems to be key in terms of whether LBT captures are being reported.

> **EA** How do problems of non-reporting vessels impact analysis?

> **MD** Did not use the entire commercial fleet; the models only included vessels that have reported LBT captures previously, and excluded vessels that had never reported LBT before.

RE Regarding Table 3-2 and 3-3, it would be useful to include an additional column showing the number of vessels, to better understand how many vessels are undertaking that many events.

> **MD** Noted.

RE Was there any investigation into the percentage of overall catch taken by individual vessels, and do you have tools to do that? Keeping it in context is important.

> **MD** We did not investigate at the vessel level, but it can be done. We are aware some vessels that stay in that area will be more heavily impacted. Happy to provide this to SNZ or can discuss offline.

SB Were sunfish reported as observations or catch? If catch are they caught by depredation on the hook or get snagged?

> **MD** They were reported as catch in fishery statistics, but unsure as to how they are caught. Assume they are snagged rather than eating bait.

> **SB** Related to catchability of a sunfish vs leatherback.

> **MD** A reasonable number are reported as captures via the electronic fisher reporting system. Do get these species reported as catch even though they are not target species, but strongly assume that tangled animals would not be reported.

> **KM** Thinking about gap size of sunfish compared to hook size, it's hard to image them being able to ingest a baited hook.

> **BL** An SLL skipper who fishes BOP has said that most sunfish are hooked in mouth (taking SQU baits mainly), the odd one foul hooked.

> **KF** Does the fleet use different types of bait for different target species (e.g. fish instead of squid)?

> **KM** I can send you a link to a report that details the bait types used in our SLL fishery. They all use squid, and a few use fish too.

> **KM** I'll also get in touch with MPI regarding what information (if any) is collected on hook location/entanglement for sunfish. The fisher reported databases don't record

sunfish hook location while the observer database does have a field for recording location but it is frequently null. We would have to rely on anecdotal evidence from talking to fishers.

CM The model used similar environmental predictors for both LBT and swordfish captures. If fishing effort was moved away from the leatherback bycatch hotspot, would it negatively impact catch rates for target species, particularly swordfish? Does the analysis show any areas outside of the hotspot where target catch rates could be maintained?

> **MD** We didn't include this in our analysis but it could be done in future. It could follow previous work in the US West Coast where fishers are given information on the best places to catch target species. In NZ, there are a number of previous projects looking at what environmental data is linked to leatherback bycatch, but they all use different methodologies. Any predictive modelling tool such as TurtleWatch would need to consider the most appropriate variables. The only way to reduce leatherback bycatch in the swordfish fishery at present would be to reduce fishing effort in the hotspot area.

2. POP2022-03 Deep sea protected coral reproduction study

Jenny Beaumont presented the draft report from this study.

Discussion:

BW How would dioecious vs hermaphrodites affect productivity per colony? Assuming that for brooders it would depend on how far away male polyps are from the female polyps; has that been looked at? Assumption that it would be a 50:50 ratio?

> **JB** We looked at a much greater proportion of females, however unsure whether that is indicative of what is out on the Chatham Rise. All the specimens we looked at were either male or female, so agreed, we do not know what the fertilization process is, or what dispersal distance of male gametes is. If mature colony is left in an area that is very spread out, and there are separate male and females specimens, then the distance between is key to success.

> **BW** Is it possible that female colonies are bigger if they are brooders?

> **JB** We did not measure the size of polyps, but could do so in the future. Can only tell whether a polyp is male or female through histology on the polyp. We have not noticed any obvious trends.

LH There is so much we don't know, the more we look at this the more we realise there is a lot of uncertainty regarding temporal / spatial variation in reproductive traits, even sometimes within a species, and it is challenging applying these data to management approaches and risk assessments etc. Gonochoric v hermaphrodites is something interesting to compare, in terms of seasonality and timing of reproduction. Assuming lunar cycle doesn't happen in deep sea, which is a trigger for spawning in shallow corals, and triggers may be tied to something else

> **JB** Yes more likely food availability at depth; my thinking is that if you feed them, they will spawn, the tank-based GDU spawned early relative to the specimens we examined but they were fed continually which may not represent at-sea conditions.

LH Did you notice any evidence for positive or negative buoyancy of brooder larvae for Goniocorella dumosa when it spawned in the tank? Seasonal spawning and potential dispersal distances are tied to ocean currents etc and if that occurs on the surface or at depth can link back into connectivity estimates, so useful to know.

> **JB** We observed the larvae often toward the bottom of the tank, but some were swimming midwater, one settled at surface, one swam straight down. The tanks were relatively shallow. We are not sure if the larvae can control their buoyancy. Saw so few larvae, we were limited in what we could investigate. But hoping to get more live specimens from the Sonne voyage in January, and hopefully will be able to get them to spawn again.

LH What is your strategy for the next tranche of getting information in terms of taxa? More replicates for same coral taxa or attempt at first info for others?

> **JB** Would love to see more about GDU, however we do already have a lot of information on them. It would be great to get more information on ERO, stylasterids and black corals.

> **LH** What about Solenosmilia variabilis (SVA)?

> **JB** SVA is thought to have low connectivity, would be good to take a look at as another stony coral . We need to start drafting a plan for which species we would like to collect in January.

MC We are lacking knowledge of what are settlement cues, which is the key to recruitment of larvae. Do you think with the upcoming RV Sonne work you will be able to get detailed ROV observations on the substrate around the fringes of thickets or reef structures, and link with lab work to improve key information from a management perspective?

> **JB** Yes hopefully we will have opportunity to collect good quality specimens, but also look at the substrates the colonies are on and what the environment is. This will help to answer the key question about how these coral groups are able to recolonize after disturbance.

3. **INT2023-05 High-resolution estimation of species diversity for a protected coral family commonly occurring as trawl bycatch**

Jaret Bilewitch presented the draft report for INT2023-05.

Discussion:

BW What are the recommendations for future research? Are there other groups to be looked at or further work in this group?

> **JBil** There is so much to be done. With respect to discoveries made with these CSP projects, we need to take a better look at the information we already have and try to describe some of the material, in particular new families. Then moving forward there are always other groups to look at e.g. gorgonians, bamboo corals, bubblegum corals. The concern is that we would not want to keep producing diversity information, without any sort of uptake into a management framework i.e. How do we take all this information and incorporate into risk management or management framework.

There's no more planned research through a specific CSP project to continue to examine more material, but we do have the ongoing coral ID project that includes a genetic component, so could potentially continue through that.

BW Regarding the difference between taxa and populations, is there a clear sense from these results which are species and which are populations? Populations can be just as important as species, so it's important to know where it is for management purposes.

> **JBil** There are several ways to do this. First, you can arbitrarily set a cut-off for how much genetic divergence represents different species but this is subjective. Traditional taxonomic delineation of species requires assessments of morphological diversity, where some consistent and demonstrable differences can justify separating species. Assuming a species definition of a non-interbreeding unit, you can also take a population genetics approach and test the genetic data for evidence of interbreeding (admixture). There are also species delineation models that provide confidence intervals for species hypotheses, but many of these require a priori information on what you suspect the species are, which isn't useful when you have no species names and descriptions to begin with.

Any additional comments should be provided to csp@doc.govt.nz by 5pm, 12th August 2024. Close of Meeting @ 12:45 pm.