SPRFMO

SPRFMO 3rd Workshop

Deep Water Working Group

Hobart, Australia, 23-25 May 2017

SCW3 – Inf01

New Zealand draft summary of matters to consider in the development of a new bottom fishing measure

SPRFMO: Working draft (12 May 2017) options for a revised bottom fishing measure for the (western) SPRFMO Area

		Current objectives	Broad options
Objectives and broad options		• To promote the sustainable management of bottom fisheries including: ▪ Target fish stocks; ▪ Non-target fish stocks; ▪ Seabirds, marine mammals, marine reptiles, and other species of concern; ▪ Marine ecosystems (including prevention of significant adverse impacts on vulnerable marine ecosystems, VMEs).	• A single SPRFMO bottom fishing measure with a single footprint and rules that apply to all bottom fishing members; or • Bottom fishing measures to be implemented by each bottom fishing member to achieving an agreed outcome; • SC4 declined to support one over the other and instead suggested that AUS and NZ work together on getting as far as possible in time for the SC5 meeting in Sept 2017.
Target stocks	**Component**	**Current state**	**Options / discussion points**
Stock assessment	• Orange roughy • Other main targets (alfonsino, cardinalfish, oreo, bluenose, wreckfish, toothfish)?	• Need data from other nations to finalise preliminary stock assessments for orange roughy. Some progress with Australian and Korean data, but not Chinese or Russian data. • Formal stock assessments probably not possible for other target stocks (need data poor approaches or risk assessments)	• Finalise preliminary stock assessments for orange roughy with whatever data available? • Work toward integrating toothfish data into stock assessment for adjacent CCAMLR areas? • Consider or develop data-poor or risk assessment approaches for other stocks?
Catch limits	• Orange roughy • Other main targets (alfonsino, cardinalfish, oreo, bluenose, wreckfish)?	• NZ (and AUS?) currently have catch limits for orange roughy and aggregate limit for other species, based on 2002-06 reference years. • NZ has no species-specific limits for alfonsino, cardinalfish, oreo, bluenose, wreckfish (NZ aggregate catch is limited to level in reference years) • NZ's exploratory fishery only for toothfish has a catch limit of 30 tonnes in each of 2016 and 2017	• Single catch limit for orange roughy, all nations, all areas in western SPRFMO? • Catch limit for each assessed area? • Aggregate catch limit for un-assessed areas? • Catch limits by nation? Allocation by catch history or negotiation? • Aggregate western-SPRFMO catch limits for target species other than orange roughy (with close monitoring)? • Species-specific western-SPRFMO catch limits for target species other than orange roughy? • Catch limits based on reference years unless risk assessment shows high risk or new data shows ability to increase? • Allocation method(s) for target species other than orange roughy?
Other tools?	• Closed areas? • Gear restrictions? • Other ideas?	• Methods limited to those previously used and for which a bottom fishery impact assessment has been completed • Trawling for bentho-pelagic species using midwater gear is included in the definition of bottom fishing • Spatial extent limited to 2002-06 footprint: NZ has 3-tier open / move-on / closed regime for trawl fisheries • Exploratory fishery for toothfish is restricted to specified open blocks	• For discussion: should we integrate any area-based controls with any stock assessments, catch limits, and measures to avoid significant adverse impacts on VMEs?
Non-target fish	**Component**	**Current state**	**Options / discussion points**
Stock assessment	• Deepwater sharks • Other fish bycatch species	• NZ has no stock assessments other than for orange roughy (and envisages none) • Bottom fishery impact assessments cover all fish species (NZ's needs updating)	• Formal population model stock assessments unlikely except for orange roughy? • Characterisation then formal risk assessment for all species: tiered approach as per (simplified) Australian ERAEF and/or spatial overlap method(s)?
Catch limits	• Deepwater sharks • Other fish bycatch species	• NZ has aggregate catch limit all fish species combined, based on 2002-06 reference years	• Catch limits or triggers might be considered if formal risk assessment indicates high risk? • Do we need to consider how to provide for "new entrants" at some future time (as has happened with jack mackerel)?
Mitigation	• Deepwater sharks • Other fish bycatch species	• Few mitigation measures for non-target fish, some additional data required for "species of concern"	• Hook types to avoid unwanted bycatch or captures • Code of practice / guidelines for dealing with sharks? • Spatial closures for any identified nursery grounds • Ideally any spatial mitigation would integrate with spatial management approach to avoid significant adverse effects on VMEs • Move-on rules where captures of at-risk taxa or a high proportion of unwanted catch or juveniles occur (e.g. CCAMLR and rattails)?
Protected species	**Component**	**Current state**	**Options / discussion points**
Stock / risk assessment	• Seabirds, marine mammals, reptiles, other species of concern	• Bottom fishery impact assessments cover protected species (NZ's needs updating) • Expert-based risk assessment for seabirds conducted for exploratory fishery for toothfish	• Formal population model stock assessments unlikely and probably not need for any protected species • Characterisation then formal risk assessment for all species: tiered approach as per (simplified) Australian ERAEF and/or spatial overlap method(s)?
Catch limits	• Seabirds, marine mammals, reptiles, other species of concern	• Captures of seabirds, marine mammals, reptiles not explicitly capped • Seabird captures in SPRFMO fisheries to be included in NZ's Southern Hemisphere quantitative risk assessment (at least for NZ-nesting species)	• Bycatch limits or triggers might be considered if formal risk assessment indicates high risk?

Mitigation	• Seabirds, marine mammals, reptiles, other species of concern	• Mitigation measures are mandatory for all fisheries with respect to seabirds (streamer lines, line weighting, offal management etc)	• Seabird mitigation cross-referenced? • Hook types to avoid unwanted bycatch or captures? • Spatial closures for any identified spatial hotspots? • Ideally any spatial mitigation would integrate with spatial management approach to avoid significant adverse effects on VMEs
VMEs	**Component**	**Current state**	**Options / discussion points**
Footprint	• Fishing method • Nation • Grid size • Reference years or agreed design	• Each nation has its own footprints • Each method (trawl-line) has a different footprint • NZ has 3-tier open / move-on / closed regime for trawl fisheries • NZ line methods do not have a stratified spatial regime • Exploratory fishery for toothfish is restricted to specified research blocks • Korea, Chile, China, Russia have fished historically but have no approved bottom fisheries in SPRFMO Area	• SC agreed single footprint easier to manage and probably more effective • Single footprint may be more reflective of UNCLOS requirements? • Smallest grid size practicable preferred. Note that, as scale becomes finer: ▪ the performance of predictive models of VME taxa degrades; ▪ the ability of fishers and managers to understand the management regime declines; ▪ the ability to monitor and ensure compliance declines; ▪ the amount of unfished ground included in the footprint declines; • Suggest 6' (MOA) grid cells good compromise? • Suggest combined 2002-06 footprint good starting point for a single (all-nation, all-method) footprint? • Long-run combined footprint using reliable effort data may be an alternative (~1980 to date)? • Intermediate approach by including selected high fishery value areas from the long-run footprint as long as risk to VMEs not increased? ▪ VME / Zonation modelling of scenarios? ▪ No nett loss (*quid pro quo*) approach? • Do we need to consider how to provide for "new entrants" at some future time (as has happened with jack mackerel)?
Spatial management approach within the footprint	• Objective is to avoid significant adverse effects on vulnerable marine ecosystems • Stratification within footprint • Permanent areas or temporal rotation	• NZ has three strata: open; move-on; closed • AUS has one stratum with a move-on rule applied throughout • All areas are presumed "permanent" but NZ has slightly modified its trawl footprint and the strata of some blocks in response to new information	• How many strata will depend on other details of approach chosen? • Suggest relatively permanent spatial management settings (many VME taxa are long-lived) with some ability to respond to new information?
Impact of different fishing methods	• Bottom trawl • Mid-water trawl • Bottom long-line • Other line methods • Potting methods • Other methods	• Bottom trawling and using midwater trawls to target bentho-pelagic species considered together • Line fishing methods considered together • There are clear differences between methods in the area and intensity of impact but these are not explicitly addressed in current measures	• Do we include all bottom fishing in the bottom fishing measure? • Assuming so, how do we accommodate and allow for different area and intensity of impact in a combined footprint?
Response to new information (evidence of VMEs or fisheries potential)	• Speed of response required • Appetite for false positives, false negatives, delays • Triggers for response • Frequency of monitoring, analysis and response	• Current move-on rules provide a rapid but relatively short-lived response to evidence of a VME • Design and application of move-on rules in NZ and AUS regimes very different • Move-on rules very rarely triggered (but no analysis of how often they would have been triggered in NZ open areas) • Data on VME indicator taxa collected by NZ observers on almost all tows (higher quality than rapid assessment checklist used to assess the need for a move-on) • Data could underpin periodic review of all evidence of VMEs within areas open to fishing (whether using move-on or not) • Data for modelling and predicting VMEs are sparse, especially outside the fished areas • Not aware of any formal synthetic reviews of evidence of VMEs or new information on fisheries potential other than that used to modify NZ's trawl footprint and the strata of some blocks	• SC thought a spatial management approach not requiring move-on rules would be preferable • Need to consider the trade-offs in using move-on rules; do they offer more protection and, if so, does that benefit warrant the complexity and cost? • We are very short of data to build and test predictive models (or model ensembles) for VMEs • Data can be collected from the fishery whether or not move-on rules are in force • Move-on rules may lead to wider spread of effort and, potentially, more impacts on VMEs • Move-on rules: rapid but currently relatively short-lived response to unexpected evidence of VMEs? ▪ Area of application (2 or 3 strata, areas where predictive modelling least certain?)? ▪ VME indicator taxa and triggers? ▪ Response (how many vessels, how far, measured from where, how long?)? ▪ Medium to long term review and synthesis? • Periodic review of all evidence of VMEs and fisheries values: delayed but longer-lived and more tailored response to accumulated information? ▪ Frequency of review? ▪ Information to be included in review (NB confidentiality issues)? ▪ Thresholds for recommending changes to management settings? • A process of review and refinement is required for spatial management areas, catch limits, and other controls whether or not move-on rules are used?
Design of spatial management areas	• Objective is to provide for fisheries while avoiding	• Have NZ-region models that predict likelihood of VME taxa occurring	• Need stakeholders to nominate their objectives, values, desirable outcomes including: ▪ Distribution of fishing to define "cost layer"? ▪ VME indicator taxa or assemblages?

	significant adverse impacts on VMEs • No requirement for no risk or zero impact • Computer-assisted or *ad hoc* design • Choice of input data and layers • Choice of approach • Stakeholder / officials processes	• Developing NZ-region models and ensembles to predict density of VME taxa (much better approach) • Testing feature-scale models to predict density of VME taxa (very data hungry and not widely applicable across region) • Using *Zonation* software to design candidate spatial management solutions balancing protection of VMEs and cost to fisheries including sensitivity to: ▪ Taxa, model type, or ensemble ▪ Cost layer chosen (fishing method, time period) ▪ Aggregation / boundary penalty ▪ Treatment of uncertainty ▪ Bio-regionalisation or stratification ▪ Connectivity (developing this) • So far, discussed with NZ stakeholders and SPRFMO-SC only as a demonstration of the approach	▪ EBSAs and other spatially explicit "layers" ▪ Define other constraints and guidance from SPRFMO Convention and other (e.g., UN) documents • Suggest computer-aided design of candidate spatial management areas best as starting point? • Need to agree many modelling choices and sensitivities, some are not just technical choices: ▪ Models and treatment of uncertainty? ▪ Bio-regionalisation or stratification? ▪ Aggregation / level of boundary penalty? ▪ Include connectivity (may involve a delay)? • Process should include a series of workshops with time between to conduct analyses: ▪ Officials to develop a "straw man" first? ▪ Start *de novo* with stakeholders and develop a design with them? ▪ Technical review by NZ's South Pacific Working Group? ▪ Workshops and/or technical reviews to include AUS policy / science / industry representatives?
Monitoring and review	**Component**	**Current state**	**Options / discussion points**
Observers	• Objectives for coverage • Percent coverage by fishery • Data to be collected	• Bottom trawl fisheries have mandatory 100% coverage (of trips?) • Line fisheries have mandatory coverage of >=10% (of trips?) • NZ's exploratory toothfish fishery must have a government observer and an experienced assistant • Wide range of data collection to SPRFMO standards or better: ▪ Catch weight by species ▪ Length frequency distributions of key species ▪ Otoliths and other biological measurements ▪ Benthic invertebrates (including the rapid assessment checklist in move-on areas) ▪ Seabirds, marine mammals, etc ▪ Tag and release of >3 toothfish per tonne using CCAMLR protocols and tags	• Ensure key observer functions and data streams continue to SPRFMO standards or better, potentially complemented by EM (see below)? • Any other data that would be useful for monitoring or improving knowledge or models?
Electronic reporting	• Real-time submission of information to flag state and/or SPRFMO	• Reporting currently to flag state (on paper?) • Flag state submits to SPRFMO secretariat	• Requirement for electronic reporting: ▪ standard reporting requirement for key target species? ▪ requirement only once catch levels reach a certain percentage of the allowed catch for a species / group? • Report just catch by target species or other data (effort, length frequencies, bycatch, benthic data, etc.)?
Electronic monitoring	• Reason for and objectives for electronic monitoring • Percent coverage by fishery • Data to be collected	• Electronic monitoring in most SPRFMO fisheries is limited to VMS • NZ's exploratory fishery for toothfish required a video camera above the hauling station and post-voyage observation of >=50% of recorded hauls • AUS has trialled electronic monitoring including video cameras in some fisheries • NZ has trialled electronic monitoring including video cameras in several fisheries and will be implementing a fully integrated electronic monitoring and reporting system for all its domestic vessels (catch-effort reporting and VMS from October 2017, video cameras to be phased in from October 2018)	• Electronic monitoring (via VMS) could provide finer-scale information on the distribution of fishing (including relative to VMEs)? • Electronic monitoring (via video cameras) could provide more information on catch, bycatch, seabirds, marine mammals, other species of concern, benthic effects, etc. to complement information collected by human observers? • Electronic monitoring data streams provide opportunities but entail costs for storage, screening, analysis and reporting if those opportunities are to be realised? • Cameras on nets or lines might generate more data on the presence or absence of VME indicator taxa? • Acoustic remote sensing could generate more and finer-scale data on bathymetry and the distribution of substrata likely to support VMEs: ▪ would need to review available technologies and ability to review and analyse under current budget constraints
Analysis	• Catch against limits • Stock assessments • Risk assessments and bottom fishery impact assessments • Spatial management areas	• Catch monitored against limits for orange roughy and other species (in aggregate) • Stock assessments for orange roughy developing • Length frequency distributions collected but analysed only in aggregate • Benthic data and "move-on" forms collected but not analysed in detail • NZ's bottom fishery impact assessment needs updating • Predictive models of the distribution of VME taxa are being refined • Tools for designing candidate spatial management areas are being refined • Quantitative risk assessment for effects of fishing to NZ-nesting seabirds is being extended to included SPRFMO captures	• Suggest we need to develop processes for review and refinement for the following: ▪ Catch against limits? ▪ Stock assessments? ▪ Risk assessments? ▪ Bottom fishery impact assessments? ▪ Spatial management areas and the extent to which significant adverse impacts on VMEs are avoided? • It is not envisaged that we make all this part of the CMM or develop it all by SC05, but we need to be mindful of the resources required