Southern and Eastern Scalefish and Shark Fishery
Shark Resource Assessment Group (SharkRAG)

Meeting minutes

Date: 6-7 August 2018

Hobart

Attendees

Name	Membership
Mr Sandy Morison	Chair
Mr Brodie Macdonald	AFMA member
Dr Ian Knuckey	Scientific member
Dr Robin Thomson	Scientific member
Dr Charlie Huveneers	Scientific member
Mr Leigh Castle	Industry member
Mr David Stone	Industry member
Mr Kyri Toumazos	Industry member
Ms Anissa Lawrence	Conservation member (via telephone)
Dr Mark Bravington	Invited particpant
Dr Jeremy Prince	Invited participant
Dr Terry Walker	Invited participant
Dr Matias Braccini	WA DoF
Mr James Woodhams	ABARES Observer
Dr Simon Nicol	ABARES Observer
Mr George Day	AFMA Observer
Mr Ryan Keightley	AFMA Executive officer
Mr Ross Bromley	Industry Observer

Meeting Minutes

1   Preliminaries

1.1   Introduction and apologies

The Chair opened the meeting and welcomed Members, Invited Participants and Observers. The Chair noted apologies from Dr Kelaher and Ms Lawrence for Day 1 of the meeting (Ms Lawrence participated via phone on day 2).

1.2   Adoption of Agenda

The agenda at **Attachment A** was adopted by the RAG as final.

1.3   Declaration of interests

Members reviewed and updated the Declarations of Interest included at **Attachment B**.

The Chair asked participants to declare any interests in any Agenda Item to be considered by the RAG. Such interests were declared by:

- Dr Thomson, research interests, in particular in stock assessment, close kin and research priorities agenda items.
- Dr Bravington, research interests, in particular close kin
- James Woodhams, research interests,

- Ian Knuckey, research interests, in particular the research priorities agenda item any discussion regarding data collection and his current electronic monitoring discard and length measurement project.
- Charlie Huveneers, research interests, in particular the research priorities agenda item.
- David Stone, Industry interests in most items through his role representing gillnet and hook industry through the Sustainable Shark Fishing Industry Association.
- Kyri Toumazos, Industry interests in most items as a holder of concessions in the Southern and Eastern Scalefish and Shark Fishery (SESSF).
- Leigh Castle, Industry interests in most items as a holder of concessions in the SESSF.
- Ross Bromley, research interests as director of Girella Fisheries Services and contracted by Atlantis Fisheries Consulting Group.

Each participant declaring an interest left the meeting in turn while the RAG considered their interests. In each case, the RAG noted the conflict of interest and, recognising the participant's knowledge and valuable contribution to the discussions, agreed that the participants should participate in all Agenda Items.

2   Close kin mark recapture

2.1   Close kin mark recapture methodology (CKMR)

Dr Bravington provided the RAG with an update on the close kin mark recapture method. The RAG noted:

- the process for identifying half sibling pairs (HSPs), full sibling pairs (FSPs) and parent offspring pairs (POPs) using the PLOD statistic, ageing data and mitochondrial DNA.
- the CKMR technique is most effective with a large number of POPs and HSPs but that for species where all adults are fairly similar reproductively it is ok to just use HSPs.
- the spatial distrubition of kin pairs and whereby larger females were found at head of bight, and larger males off southern Tasmania.
- due to catches being mostly immature sharks (due to size selectivity) there were very few POPs found but lots of FSPs.
- the simple process for estimating abundance from HSPs.

The RAG agreed that getting large adult samples from west coast of Tasmania and other areas would be beneficial to find more POPs. Dr Braccini informed that RAG that vertebrae samples taken during the school shark surveys may still be in storage and may provide more adult samples.

The RAG thanked Dr Bravington for his thorough and well-paced discussion of the CKMR method.

Action: Dr Thomson to liaise with Dr Braccini to investigate the availability of further vertebrae sample taken during surveys.

2.2   Close Kin project results and modelling

The RAG noted an update from Dr's Bravington and Thomson on the results of the close kin project and the analysis undertaken to estimate adult abundance using the CKMR data.

The RAG was presented with three methods of estimating abundance from the close kin data; two simple analyses to provide a 'one-liner estimate' of abundance, a generalized linear model (GLM)

and another a more complex age structured population dynamics model (the 'close kin model'), with the former methods used primarily used as a rough check of the close kin model.

The RAG noted that the close kin model was also restricted to the 2000-2017 period, by restricting the (estimated) age of included samples. This reduced the effective sample size to 1 627 out of 2 438 original samples, and 29 out of 40 maternal half-sibling pairs. The restriction led to satisfactory model fits, but more uncertainty about abundance than might be obtained with the complete dataset. In addition, as there were no prior estimates of whether male fecundity varies much through adulthood, and not enough POPs to estimate it, the 27 paternal half siblings and the single father offspring pair were excluded from the analyses.

The RAG noted that as the close kin model only provides an estimate of current absolute abundance and the recent population trend (2000-2017), there is no estimate of population depletion compared to historic unfished biomass levels.

The close kin models indicate that adult abundance of school shark is much lower than that suggested by the stock assessment model in projections undertaken in 2012. This is supported by the findings of the simple model approaches which found around 80 000 "typical adults on average" across the 2000s (one line approach) and roughly 40 000 to 80 000 adults (GLM model). These indicate that estimates of adult abundance in the 200 000s from the 2012 stock assessment model are incompatible with the observed close kin data.
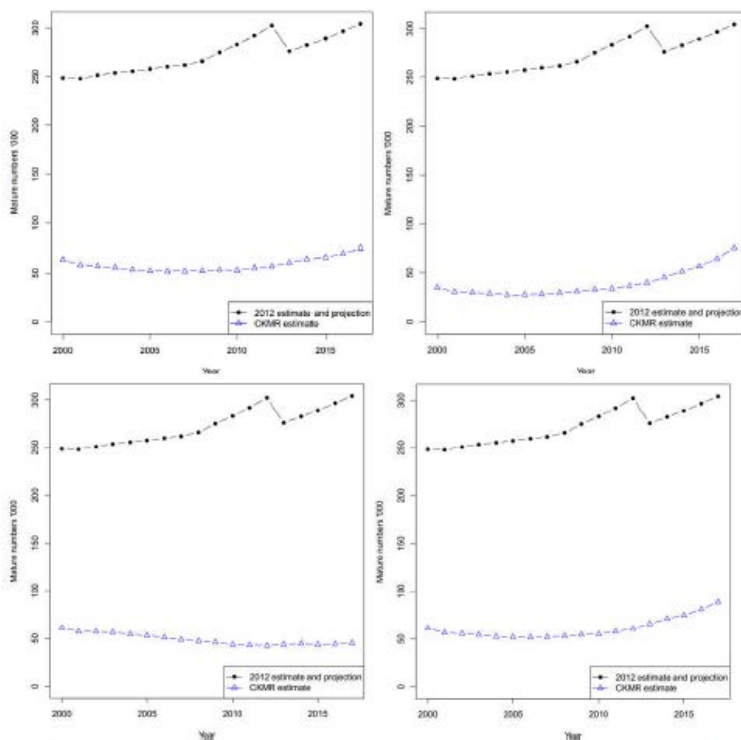

Figure 9. Numbers of mature school shark (females aged 11 and over, and males aged 7 and over) for the full stock assessment model's base case that assumed catches of 225t after 2011 (2012 estimate and projection; black line) and close kin model estimate (blue line). Results are shown for the base case scenario (upper left), effn=5 (upper right); CV=0.08 for all ages (lower left), and ring deposition rate after age 11 = 0.25 (lower right).

Upon considering the results of the analyses presented by Dr's Thomson and Bravington, the RAG gave clear support for the ongoing use of the close kin method for estimating abundance for school shark, although industry members noted some reservations about the cost of ongoing funding for the method.

3   Incorporation of Close Kin data into stock assessments

Dr Thomson provided a presentation on the existing school shark assessment model that was initially developed in 2000.

After noting the views and concerns of scientists involved with the development of the earlier school shark assessment model, the RAG expressed a reluctance to update the old model given its inherit complexities, limitations and assumptions. Specific concerns were that there is no new tagging data, the CPUE series is no longer considered useful as an index of abundance and the applicability of the complex movement matrix previously used. The RAG also noted that the model was developed prior to the development of the Harvest Strategy. On balance, the RAG agreed that it was not feasible or worthwhile to incorporate the close kin data into an updated version of the old model.

The RAG supported the ongoing development of the close kin model including the incorporation of additional datasets. For the next RAG meeting in October 2018, the RAG agreed that following changes should be made to the close kin model:

- incorporate data back to 1989
- incorporate more samples including PHSP
- trawl CPUE should be included as a sensitivity noting that quota availability for trawl may impact on the series
- assume a single stock (noting the eastern stock NSW/east Tas had largely been depleted by 1990)
- explore length based fecundity relationship rather than age based
- improve treatment of length frequency and investigate port, or observer length-frequencies that might be incorporated.
- look at sensitivities and likelihood profiles for estimating natural mortality

The RAG noted that outputs would include:

- improved estimate of current biomass
- improved estimate of biomass trends
- improved estimate of productivity
- projections of fishing mortality
- Updated estimate of unavoidable bycatch that allows rebuilding within the specified timeframe.

The RAG agreed that it would be critical to establish a link to the harvest strategy limit reference point (LRP) so the analysis should include some potential rebuilding times initially to the LRP and then to target levels.

On completion of this work the RAG agreed that a revised data strategy should be developed to include future sampling requirements including strategies for increase the number of adults samples (to look for more POPs).

The RAG also noted that with the new information from close kin it will be necessary to review the School shark Rebuilding Strategy. This will include reviewing management measures, rebuilding timeframe and the incidental bycatch TAC (recognising incidental bycatch will increase as biomass increases).
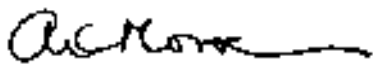
4 Other business and close of meeting

The Chair thanked participants for valuable input and closed the meeting at 12:30pm.

The Chair reiterated his thanks to Dr Thomson and Dr Bravington for their extensive work on the project.

Table 1: Actions arising from SharkRAG 2 2018.

Action	Agenda item	Description	Responsibility
1	1.4	Dr Thomson to liaise with Dr Braccini to investigate the availability of further vertebrae sample taken during surveys.	Dr Thomson/Dr Braccini

Signed (Chairperson): Alexander Morison

Date: 15 January 2019

Attachments

Attachment A: SharkRAG 2018 final agenda
Attachment B: Declarations of interest
Attachment C: Close kin model for school shark in the SESSF

School shark assessment workshop

Draft Agenda – 6-7 August 2018

CSIRO – Hobart TAS

Day 1

Preliminaries		10:30 am
Welcome	Chair	
Acceptance of agenda	Chair	
Declarations of interest	Chair	
Close kin mark recapture (CKMR) refresher on methodology	CSIRO	
CKMR project results	CSIRO	
Afternoon tea		**3:00 pm**
CKMR results continued	CSIRO	

Day 2

Assessments incorporating CKMR		9:00am
Assessment models available • Movement matrix model (current model used) • Availability model (alternative model)	CSIRO	
Morning tea		**10:30am**
Selected Assessment model - Key sensitivities and assumptions	CSIRO	
Lunch		**12:30 pm**
Selected Assessment model - Key sensitivities and assumptions	CSIRO	
Afternoon tea		**3:00 pm**
Summary of recommendations and timeline	AFMA	
Meeting close	Chair	

Attachment B – Register of interests

Member	Interest declared
Sandy Morison	Director of Morison Aquatic Sciences. Chair of SharkRAG, SERAG and the Tropical Rock Lobster Working Group. Scientific member on SEMAC. Contracted by government departments, non-government agencies and companies for a range of fishery related matters including research and (by SCS Global Services) for MSC assessments of AFMA managed and other Australian and international fisheries. No pecuniary or other interest in the SESSF.
Robin Thomson	CSIRO, Assessment scientist. Acquiring funding for research purposes. PI on data services contract and close kin project for school shark.
Charlie Huveneers	Senior lecturer and research scientist. Potential interest in funding for research. No pecuniary interest or otherwise.
Ian Knuckey * A full list of positions, current/recent project and funding, and current/recent clients was provided to the RAG in addition to these specific to SharkRAG	Director Fishwell Consulting Pty Ltd. Director – Olrac Australia (Electronic logbooks) Range of research interests and research projects in relation to South East fisheries particularly in the SESSF and GABTF. Involved in SESSF and GAB Fishery Independent Surveys. NPFRAG and TRLRAG Chair, Scientific member on NORMAC and GABRAG. Invited Participant of SEMAC and SERAG. Provides research advice to various industry associations, including Atlantis Fisheries Consulting Group, SETFIA, GABIA and SSIA.
David Stone	Executive Officer for Sustainable Shark Fishing Industry Inc. Declared interests in representing hook and gillnet industry member interests and in pursuing research for dolphin acoustic mitigation technology, and has a proposal to FRDC seeking funding. SESSFRAG observer. Declared interest in RBCs.
Leigh Castle	Tasmanian shark hook, scalefish hook and tuna minor line fisher. Owns SESSF quota and vessel statutory fishing rights. Has a declared interest in shark hook interests and RBC recommendations.

Kyri Toumazos	South Australia/Bass Strait shark fisher, boats fishing with hooks and gillnets. SESSF quota holder. Southern Rock Lobster Board CEO. Declared interests in RBCs.
Anissa Lawrence	Independent consultant. Director of TierraMar consulting.
	Conservation member on SEMAC.
	Undertakes environmental work with Southern Shark Industry Alliance on an ad-hoc basis. Undertakes contracts for a number of Conservation NGOs, government departments, non-government agencies on a range of fishery related matters. Provides environmental advice to industry associations. No pecuniary interest.
	President of the SEA LIFE Trust (ANZ).
	Director of FISHI International.
Brodie Macdonald	AFMA member. No interest pecuniary or otherwise.
Ryan Keightley	AFMA EO. No interest pecuniary or otherwise.
Invited Participant	**Interest declared**
Dr Mark Bravington	CSIRO researcher and CI on CKMR project
Jeremy Prince	No interest pecuniary or otherwise.
Terry Walker	No interest pecuniary or otherwise.
Matias Braccini	No interest pecuniary or otherwise.
Observers	**Interest declared**
James Woodhams	ABARES. Potential interest in funding for research. No interests, pecuniary or otherwise.
Ross Bromley	Undertakes contracts as an independent consultant.
George Day	AFMA. No interest pecuniary or otherwise.