

Proposed Modification to Government Net Closures on the West Coast

Application to PIRSA

by

**Neil Schmucker (President, West Coast Net Fishers Association,
Streaky Bay)**

Leon Wright (Streaky Bay)

Yanni Paul (Port Kenny)

&

Neil Carrick

(Fisheries & Environmental Consultant)

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The objectives of the community Open Day- Streaky Bay, 16 March 2016

- Explain the information in the proposal & make the public more aware of the issues. Lot of misunderstanding, misleading and 'untruthful' biased information out there and community need to be better informed.
- Report the concerns raised by public and assess the degree of support from attendees and follow up meetings and telephone discussions with community members.

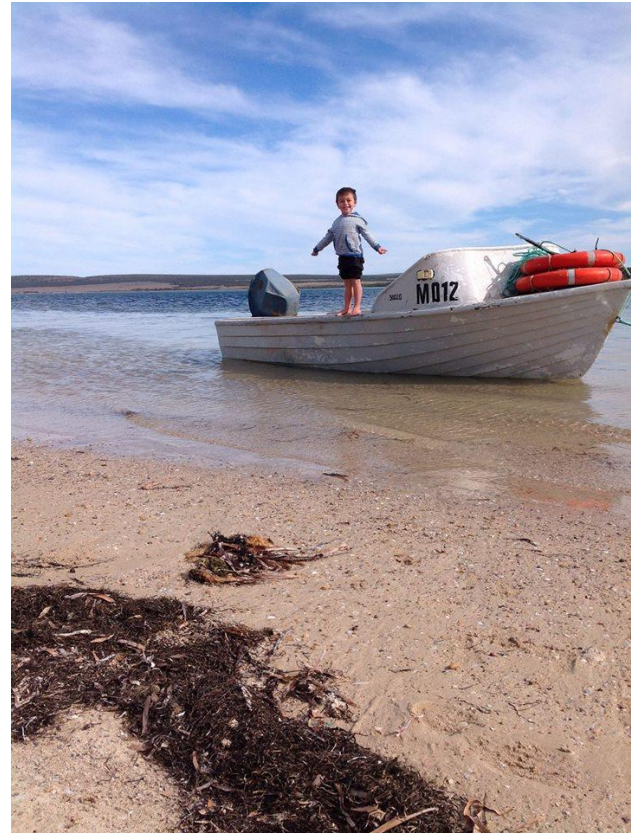
Need to explain and discuss issues based on facts derived from scientific reports and publications.

No-where to go

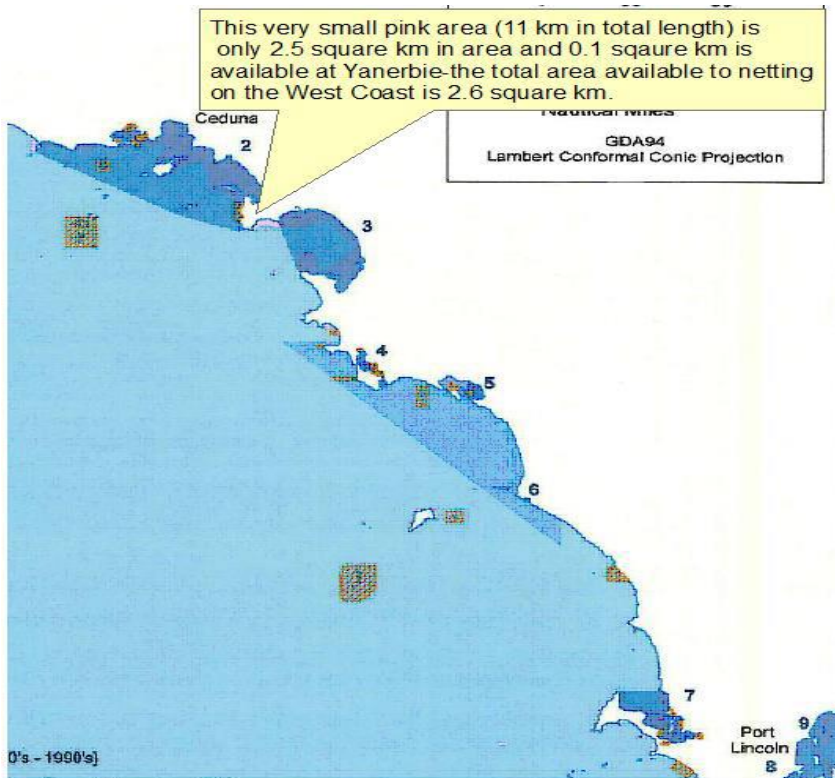
3rd generation but no where to go



4th Generation

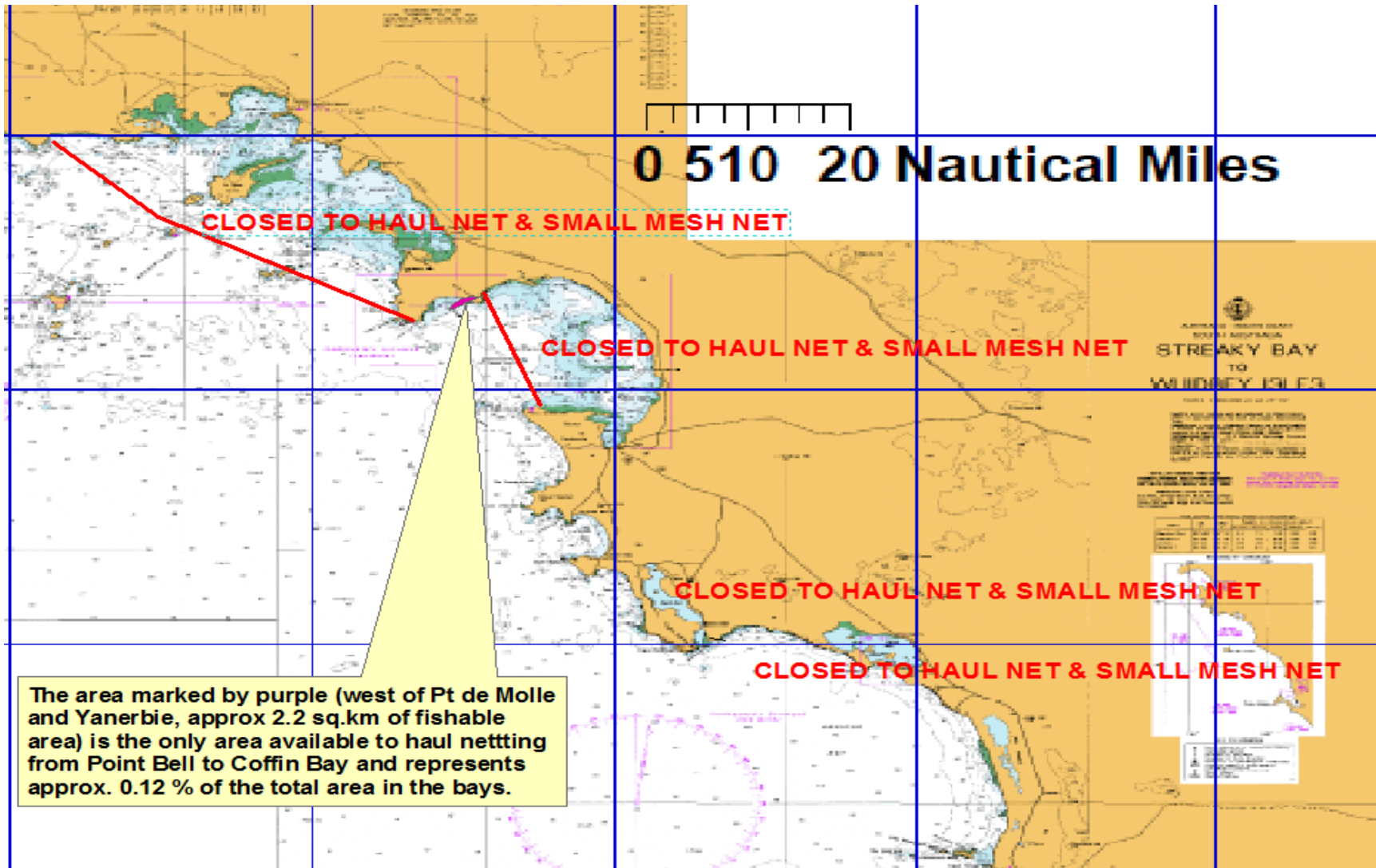


No where to go



- We have a disproportioned share of the available fishing area.
- No where to go.
- Our livelihood and families have suffered from past closures implemented by Government
- Social justice and a 'fair-go'

A disproportionate share of the resource



Target species

Southern Garfish, Australian Herring, Yelloweye Mullet & Sea Mullet



Benefits of the proposal-local community and the State

- **Economic:**
 - fishers livelihoods and family
 - Local employment and flow-on effects. Employment in netting operations and processing and promoting/marketing produce.
- **Seafood as ‘food’ at an affordable price** (garfish, sea mullet, tommy ruff, yellow-eye mullet) to local community and Adelaide markets. Add value to catch by smoking, filleting and packaging of catch (e.g. yellow eye mullet, Sea mullet)
- **Tourism- promotion of Seafood image** – Eyre and Streaky Bay, Farmers market, Streaky Bay Hotel, cafes and restaurants. High demand for a variety of fresh and processed products.
- **Community education** – teach seamanship, tying knots, appreciation of environment- Schools, ?Academy .
- **Research:**
 - Data and information to SARDI- e.g. Garfish Stock assessment. Currently undefined-insufficient data i.e. need for HN catch-effort and size(age) data.
 - Environmental research and marine ecology
 - Background data for monitoring long term trends and change

SARDI King George Whiting Stock Assessment Report (2014)

**King George Whiting
(*Sillaginodes punctatus*) Fishery**



AJ Fowler, R McGarvey, J Carroll and JE Feenstra

**SARDI Publication No. F2007/000843-4
SARDI Research Report Series No. 801**

**SARDI Aquatic Sciences
PO Box 120 Henley Beach SA 5022**

September 2014

Fishery Assessment Report to PIRSA Fisheries and Aquaculture

**PREMIUM
FOOD AND WINE FROM OUR
CLEAN
ENVIRONMENT**

**SOUTH
AUSTRALIA**

**Government
of South Australia
Primary Industries
and Regions SA**

**SARDI
RESEARCH AND
DEVELOPMENT**

Status of SA Fisheries Report-PIRSA (2014)

Common name	Stock/management unit	Stock status
Southern Rock Lobster	Southern Zone	Sustainable
	Northern Zone	Sustainable
Australian Sardine	South Australia	Sustainable
Golden Perch	Lakes and Coorong	Sustainable
	Recreational River Fishery	Sustainable
	River Murray	Undefined
King George Whiting	Spencer Gulf	Transitional-depleting
	Gulf St Vincent	Transitional-depleting
	West Coast	Sustainable
Mulloway	Lakes and Coorong	Sustainable
	Marine Scalefish fishery	Undefined
Murray Cod	Lakes and Coorong	Undefined
	Recreational River Fishery	Undefined
Snapper	South East	Transitional-depleting
	Southern Gulf St Vincent	Transitional-depleting
	Northern Gulf St Vincent	Sustainable
	Southern Spencer Gulf	Transitional-depleting
	Northern Spencer Gulf	Transitional-depleting
	West Coast	Undefined
Southern Garfish	West Coast	Undefined
	Northern Spencer Gulf	Transitional-depleting
	Southern Spencer Gulf	Undefined
	Northern Gulf St Vincent	Transitional-depleting
	Southern Gulf St Vincent	Undefined
	South East	Undefined
Yelloweye Mullet	Lakes and Coorong	Sustainable
	Marine Scalefish Fishery	Sustainable

PIRSA Stock Status Classification

Table 2: Stock status terminology for the Status of South Australian Fisheries (Flood et al. 2014)

Stock status	Description	Potential implications for management of the stock
Sustainable	Stock for which biomass (or biomass proxy) is at a level sufficient to ensure that, on average, future levels of recruitment are adequate (i.e. not recruitment overfished) and for which fishing pressure is adequately controlled to avoid the stock becoming recruitment overfished.	Appropriate management is in place
Transitional–recovering	Recovering stock — biomass is recruitment overfished, but management measures are in place to promote stock recovery, and recovery is occurring	Appropriate management is in place, and the stock biomass is recovering
Transitional–depleting	Deteriorating stock — biomass is not yet recruitment overfished, but fishing pressure is too high and moving the stock in the direction of becoming recruitment overfished	Management is needed to reduce fishing pressure and ensure that the biomass does not deplete to an overfished state
Overfished	Spawning stock biomass has been reduced through catch, so that average recruitment levels are significantly reduced (ie. recruitment overfished). Current management is not adequate to recover the stock, or adequate management measures have been put in place but have not yet resulted in measurable improvements	Management is needed to recover this stock; if adequate management measures are already in place, more time may be required for them to take effect
Environmentally limited	Spawning stock biomass has been reduced to the point where average recruitment levels are significantly reduced, primarily as a result of substantial environmental changes / impacts or disease outbreaks (ie. the stock is not recruitment overfished). Fisheries management has responded appropriately to the environmental change in productivity	Appropriate management is in place
Undefined	Not enough information exists to determine stock status	Data required to assess stock status are needed

King George Whiting stock status. The West Coast stock is sustainable and not overfished



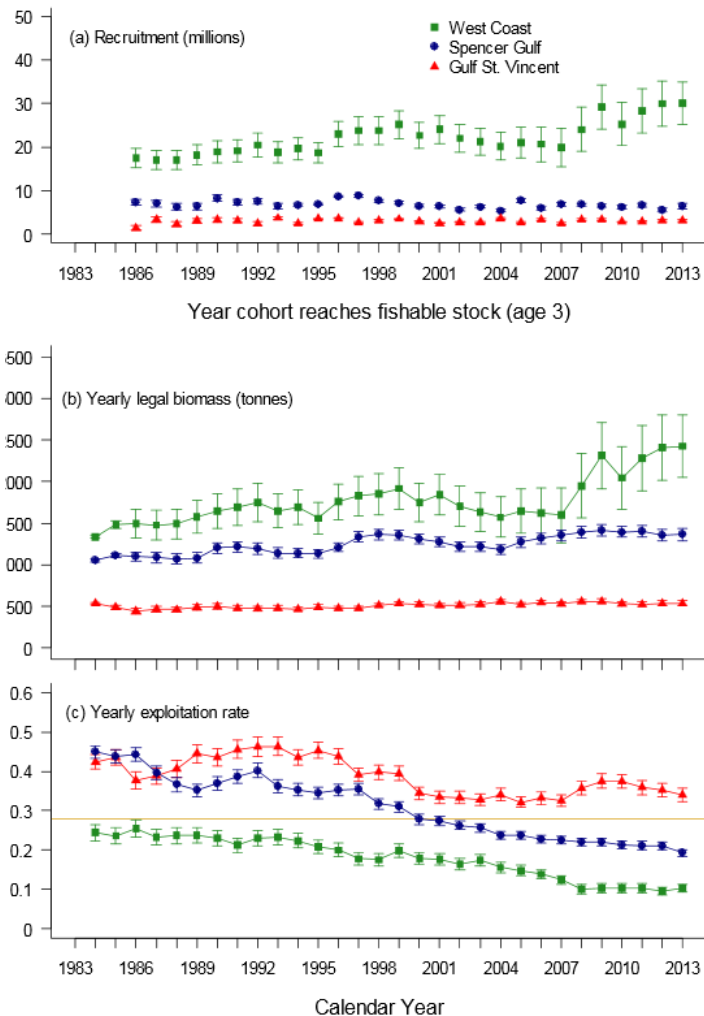
Table 77: Stock status determination for the King George Whiting Fishery of South Australia.

Stock	Spencer Gulf	Gulf St Vincent	West Coast
Status	Transitional-depleting	Transitional-depleting	Sustainable
Primary indicator	Weight of evidence	Weight of evidence	Weight of evidence

This publication may be cited as:

Fowler, A.J., McGarvey, R., Carroll, J. and Feenstra, J.E. (2014). King George Whiting (*Sillaginodes punctatus*) Fishery. Fishery Assessment Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. F2007/000843-4. SARDI Research Report Series No. 801. 85pp.

SARDI (2014) Fig. 5.5. King George Whiting yearly model biological indicators 1984-2013 by stock. WC (green) stock includes Far and Mid West Coast and Coffin Bay



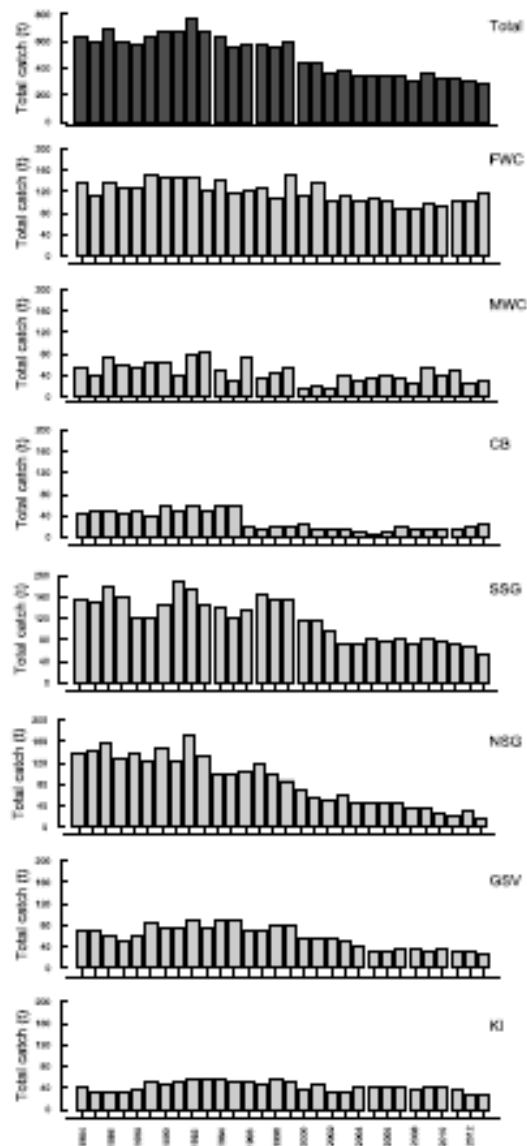


Fig. 3.6. Summary of annual commercial catches of King George whiting at the State-wide and regional scales from 1984 to 2013.

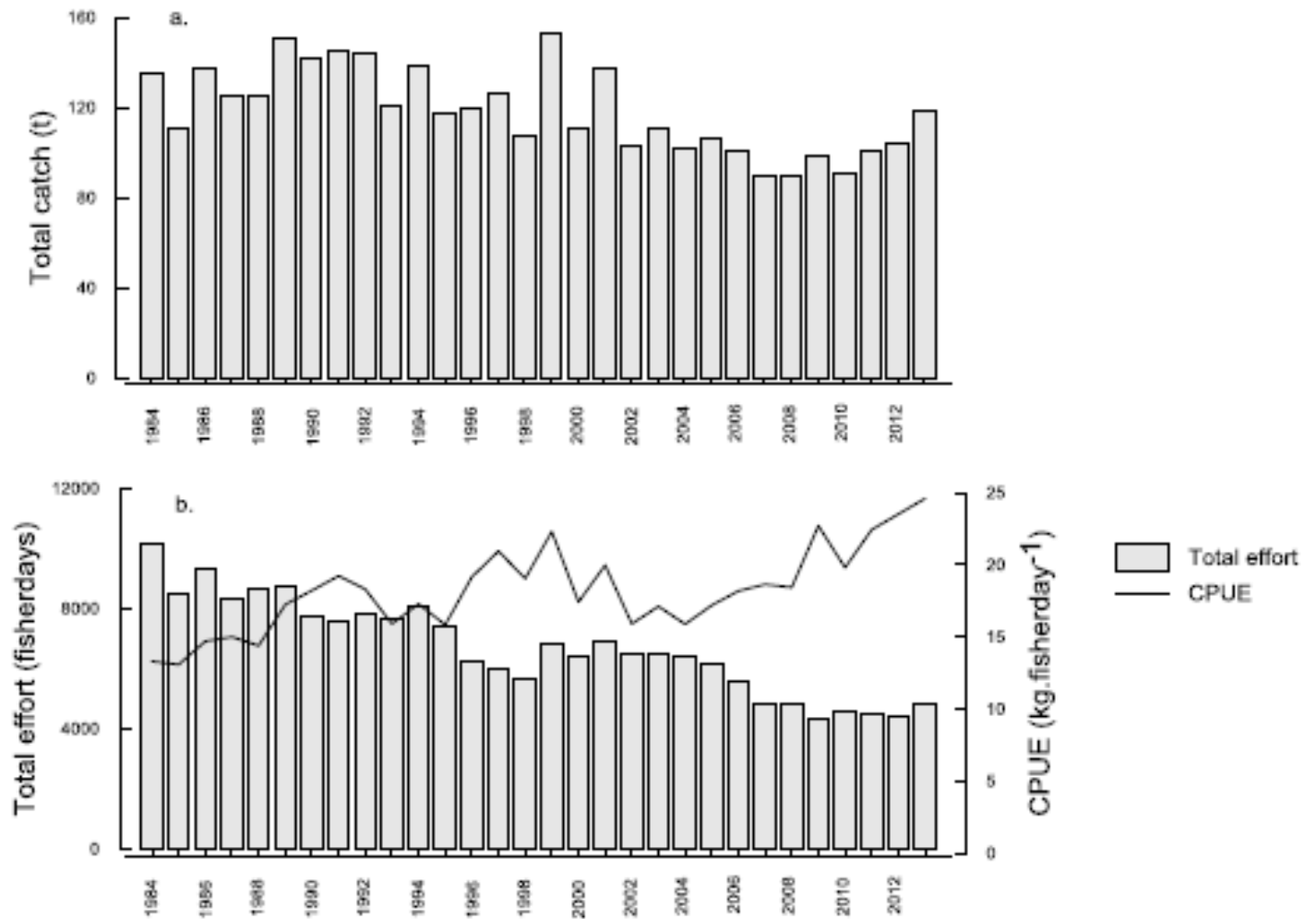


Fig. 3.8. Far West Coast. Historical trends in commercial fishery statistics for King George whiting. a. total catch by handlines. b. total effort and CPUE for handlines.

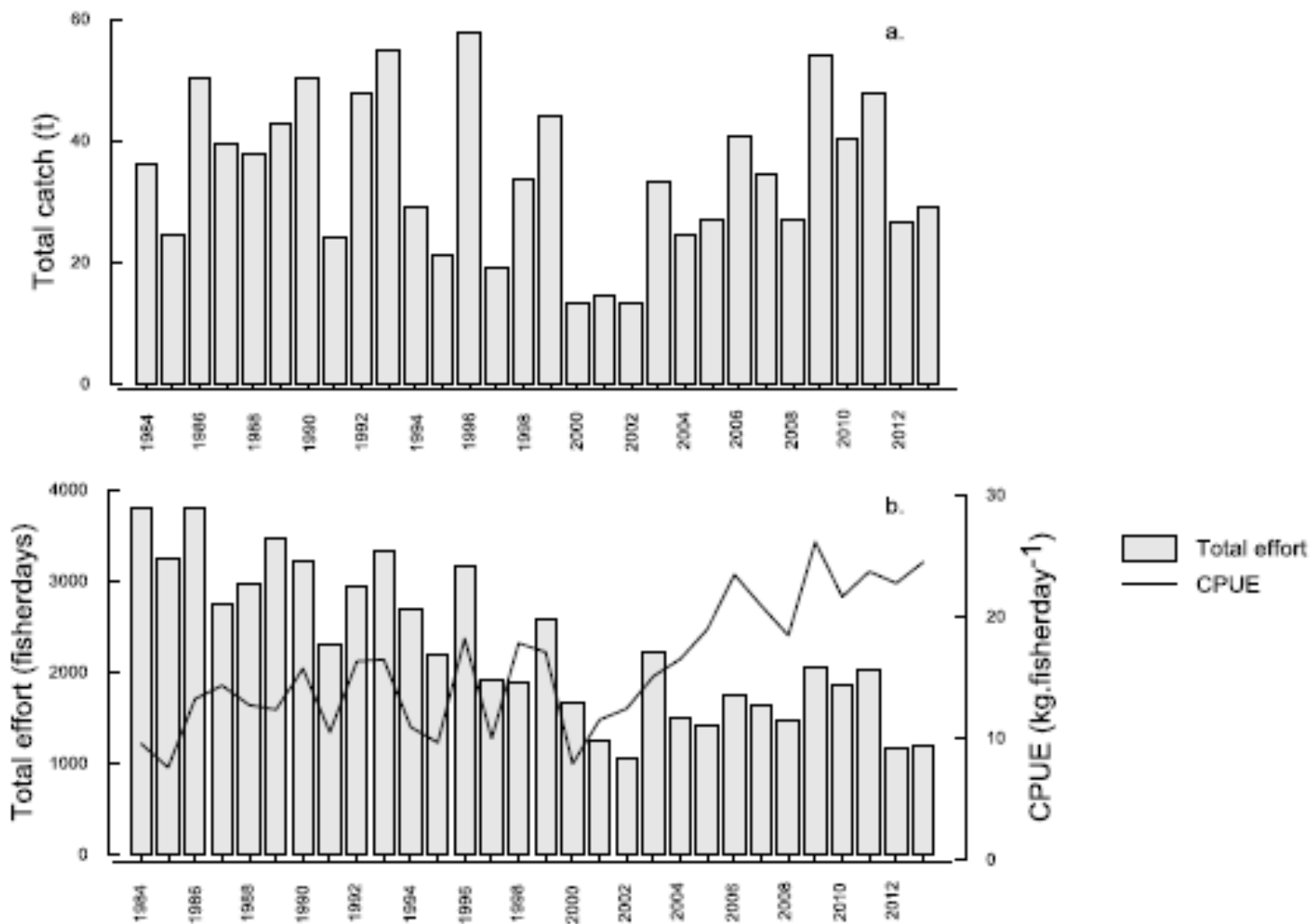


Fig. 3.9. Mid West Coast. Historical trends in commercial fishery statistics for King George whiting. a. total catch by handlines. b. total effort and CPUE for handlines.

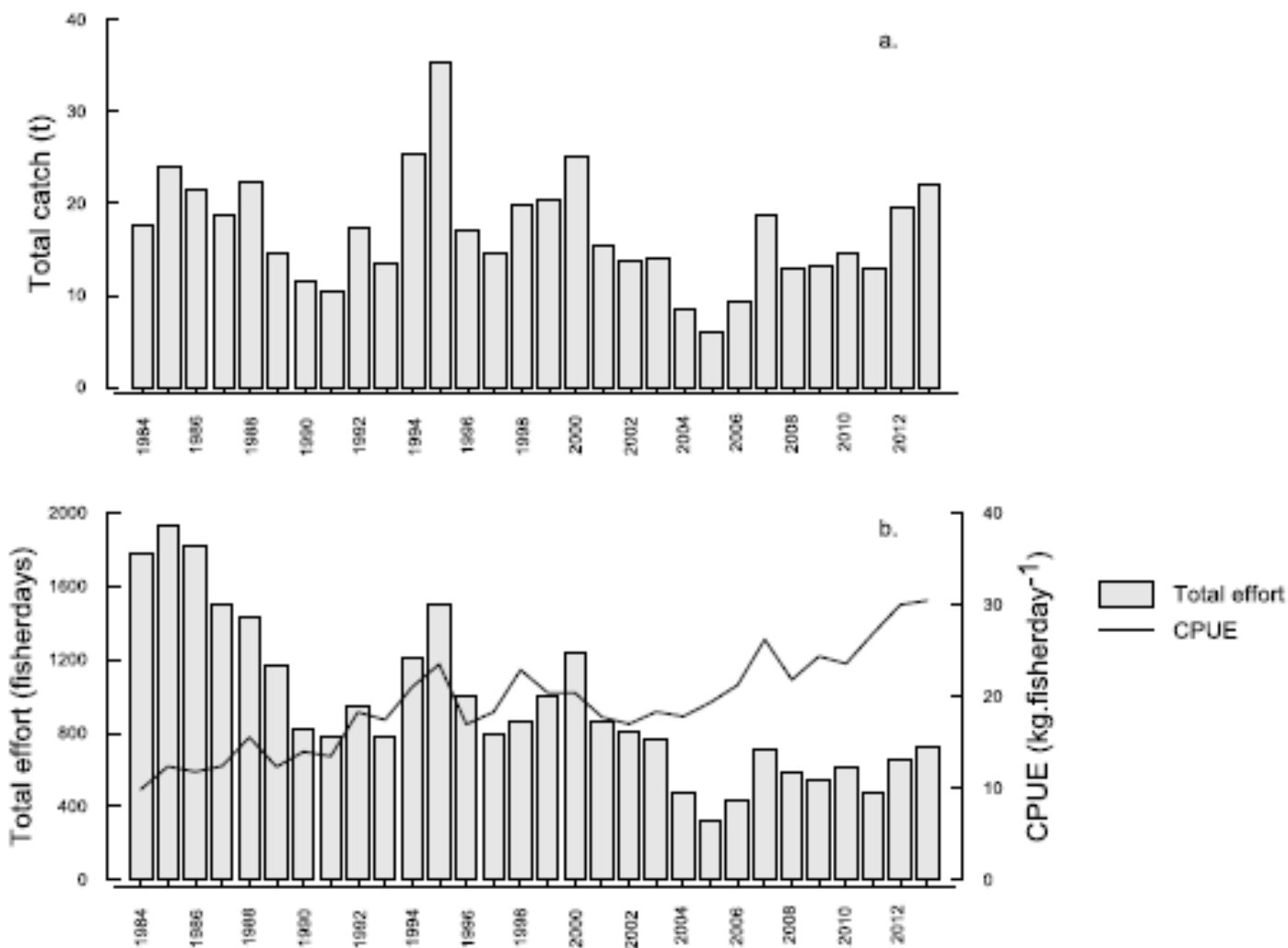


Fig. 3.10. Coffin Bay. Historical trends in commercial fishery statistics for King George whiting. a. total catch by handlines. b. total effort and CPUE for handlines.

King George Whiting stock assessment report 2014-note positive indicators of stock

Table 6.7 Yearly biological performance indicators, including three estimated by the WhitEst model, for the three stocks and for the State overall (excluding offshore cell 6). Limit reference points that have been breached are highlighted in yellow.

Biological performance indicator	Category	Trigger reference point	WC	SG	GSV/KI	State-wide
Fishable Biomass	Primary	3 yr average is +/- 10% of previous years	2011-2013 biomass 40% above average of previous years (1984-2010)	2011-2013 biomass 12% above average of previous years (1984-2010)	2011-2013 biomass 6% above average of previous years (1984-2010)	2011-2013 biomass 25% above average of previous years (1984-2010)
Harvest fraction	Primary	Exceeds international standard (28% yearly)	10%	19%	34%	16%
Age structure	Primary	Significant change in long-term or previous 5 years	No change over time	No change over time	No change over time	No change over time
Recruitment	Secondary	Ref year +/- 10% of previous 5-yr average	2010 year class 10% above average of previous 5 years	2010 year class 2% above average of previous 5 years	2010 year class 2% below average of previous 5 years	2010 year class 8% above average of previous 5 years

The proposed fishing areas

- Point de Mole to Point Lindsay – in waters < 5 m depth using haul net- target garfish.
- Northern and Southern sector of Streak Bay- Sea Mullet net operations. All Blanche Port and eastern sector of Streaky Bay closed to sea mullet netting.
- Western sector of Venus Bay- targeted garfish haul net operations.
- Baird's Bay- targeted garfish operation using surface floating mesh net.

Map 2. Point de Mole- proposed haul net closure modification



- The area in the blue is the current area available to haul netting (small mesh) and a very small area at Yanerbie. The actual area available to netting in the blue sector is smaller than map due to rocks and reefs.
- The area in green is the proposed area for garfish haul netting.
- The operations are restricted to waters less than 5 metre depth.
- Fishing would be prohibited in the Acramans creek area- all waters west of the red line are closed to haul netting.

Sea Mullet beach seine operation



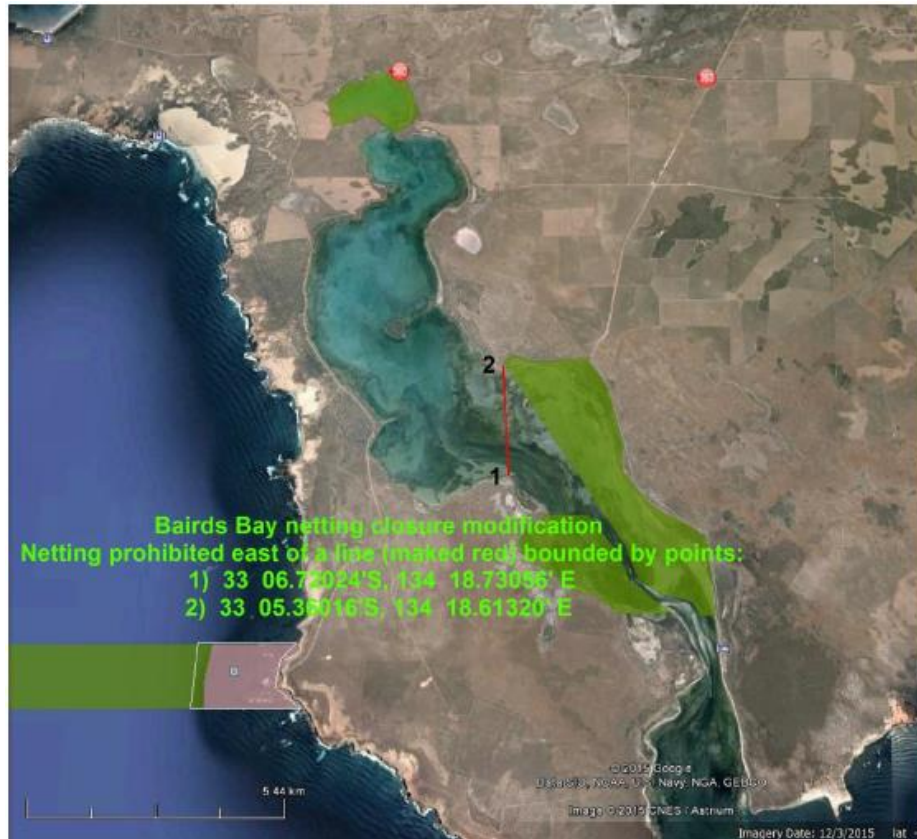
- Sea Mullet occur in very shallow water on sandy-mud bottom in the northern and southern sectors of Streaky Bay.
- No fishing would occur on the eastern side of streaky Bay nor in Blanche Port as it would be closed to fishing.
- Fishing does not take place on seagrass as the net is 'rowed' from shore around fish which occur in waters less than 2 m depth.
- The mesh size is large and the bycatch is negligible (see Report to PIRSA, Carrick 2007).

Proposed Garfish small haul net operation- Venus Bay



- Haul net operations would take place west of the red line on map with a buffer of 0.1 nm around the sanctuary zone.
- Prohibited to land KGW
- Some KGW would be captured and many released alive (see below).
- Maximum days available is 56 days/year spread over 3 areas.
- Bad weather would reduce the available days to fishing.
- Would develop gear and methods(code of conduct) to minimise mortality of KGW and discarded bycatch.

Baird's Bay garfish net closure modification



- Fishing to take place west of the red line (points 1-2).
- Targeted garfish using surface floating mesh net. Both ends of net are anchored.
- Net depth (drop of 3 foot, 91 cm)- only fishes surface waters. KGW are bottom dwellers and would not be captured.
- Fishing prohibited in 1.5 m depth
- Maximum available fishing days set to 14 days/year.
- Closure over garfish spawning season

Harvest strategy Schedule (Table 2)-green is maximum days available to haul netting and yellow closed fishing period

Harvest schedule

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
1	1	1	LQ	1	1	1	1	DM	DM	1	1
2	2	LQ	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	DM	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	DM	DM	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	DM	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	FQ	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	FQ	FQ	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15
16	16	Q	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	FM	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	FM	FM	22	22	22	22	22	22	22
23	23	FM	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	Q	28	28	28	28	28	28
29	29	29	29	LQ	29	29	29	29	29	29	29
30		30	LQ	30	30	30	30	30	30	30	30
31		31		31		31	31		31		31
0	0	14	14	16	12	0	0	0	0	0	0

Relevant Information

- Light green-maximum available fishing days. For Streaky Bay and Venus Bay is 56 days/year.
- Dark green-maximum of 14 days/year with 7 days May/June.
- Closure over garfish spawning period September to February (see Jones et. Al 2002, FRDC report).
- Closure from mid June to February coincides with Gulf closures and summer and public holiday periods.
- Sea mullet beach seine netting to take place from March-May depending on school availability and weather. Northern and southern sector of Venus Bay.

Table 2 Proposed Netting Harvesting Schedule for 2016 based on lunar month. The light green* represents maximum available fishing days for Point de Mole and Venus Bay and the dark green** represents the maximum days available for targeted Garfish using floating mesh nets at Bairds Bay. The yellow represents closure periods except for targeted Sea Mullet fishing from March to mid-June 2016 using large mesh beach seine at Streaky Bay.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
1	1	1	LQ	1	1	1	1	DM	DM	1	1
2	2	LQ	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	DM	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	DM	DM	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	DM	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	FQ	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	FQ	FQ	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15
16	16	Q	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	FM	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	FM	FM	22	22	22	22	22	22	22
23	23	FM	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	Q	28	28	28	28	28	28
29	29	29	29	LQ	29	29	29	29	29	29	29
30		30	LQ	30	30	30	30	30	30	30	30
31		31		31		31	31		31		31
0	0	14	14	16	12	0	0	0	0	0	0

Note: *Hand net operations (light green) are largely influenced by wind conditions, swell, dead weed, spotting and fish schooling behaviour. The actual nights fished will be influenced by these factors; hence the actual nights fished would be significantly less than the maximum available nights which totals 56 days per year for hand net operations at Pt de Mole and Venus Bay.

** Bairds Bay – netting is restricted (dark green) to a maximum of 7 days in May and June 2016 (3 before-3 after DM phase)

SARDI Aquatic Sciences- West Coast Garfish is a separate stock to the Gulfs-it is a widespread under-utilised stock and is not overfished in WC waters



Table 100: Stock status determination for the Southern Garfish Fishery of South Australia.

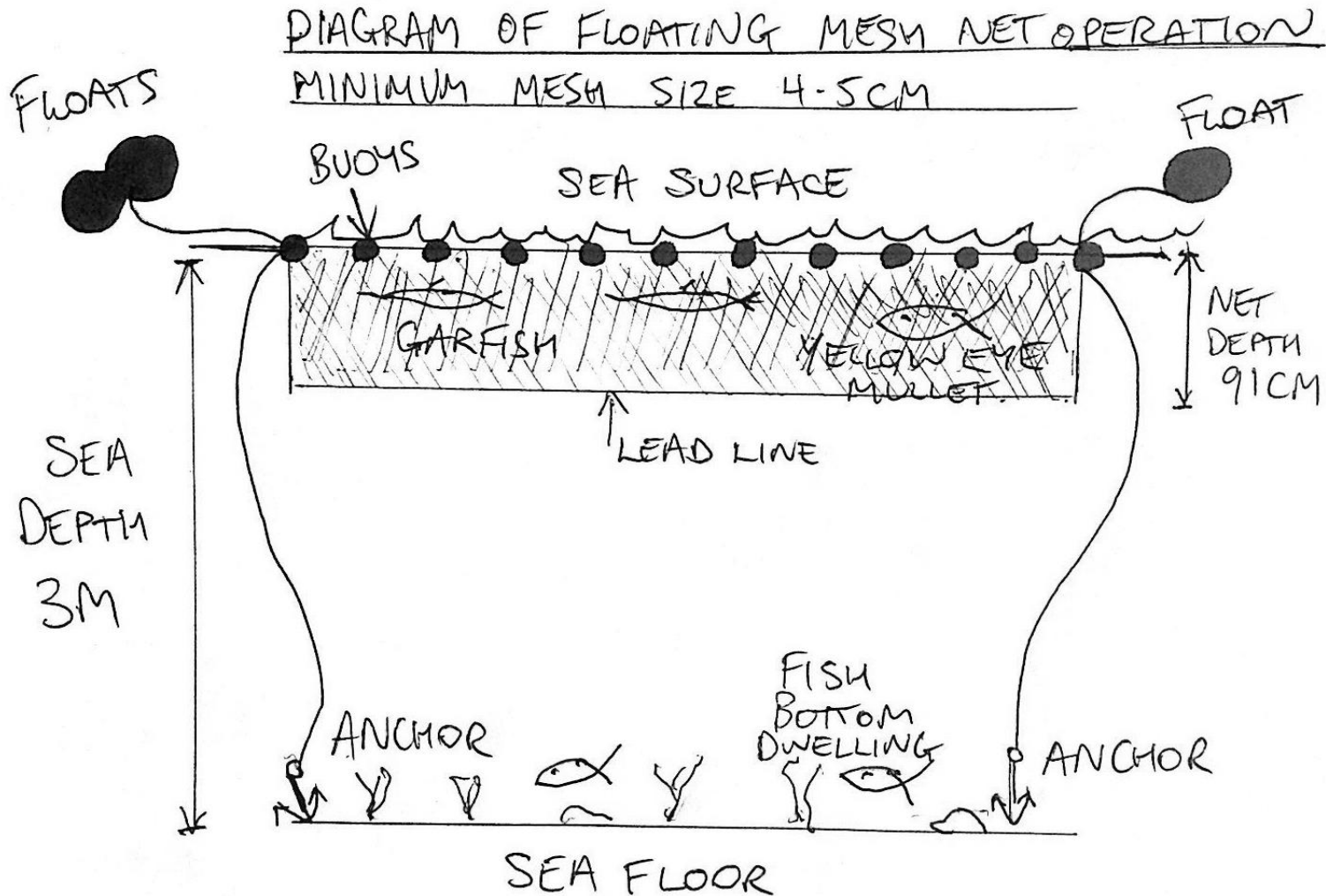
Management unit	West Coast	Northern Spencer Gulf	Southern Spencer Gulf	Northern Gulf St Vincent	Southern Gulf St Vincent	South East
Status	Undefined	Transitional-depleting	Undefined	Transitional-depleting	Undefined	Undefined
Primary indicators	Harvest fraction, egg production, fishable biomass					

A multi-disciplinary otolith-based study identified at least five biological stocks of Southern Garfish in South Australia: West Coast, Northern Spencer Gulf, Southern Spencer Gulf, Northern Gulf St Vincent and Southern Gulf St Vincent (Steer et al. 2009). Given the level of spatial separation of garfish observed within the gulfs it was assumed that garfish from the South East also comprised a distinct biological stock.

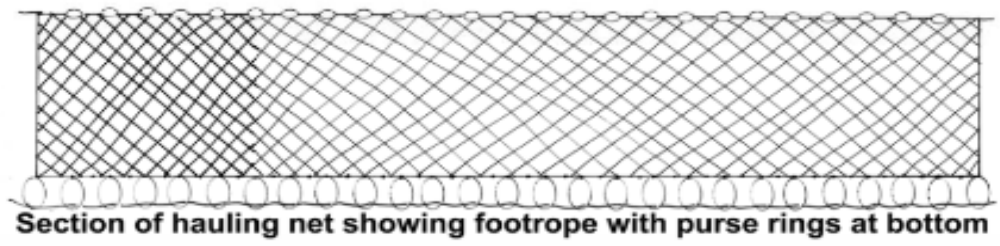
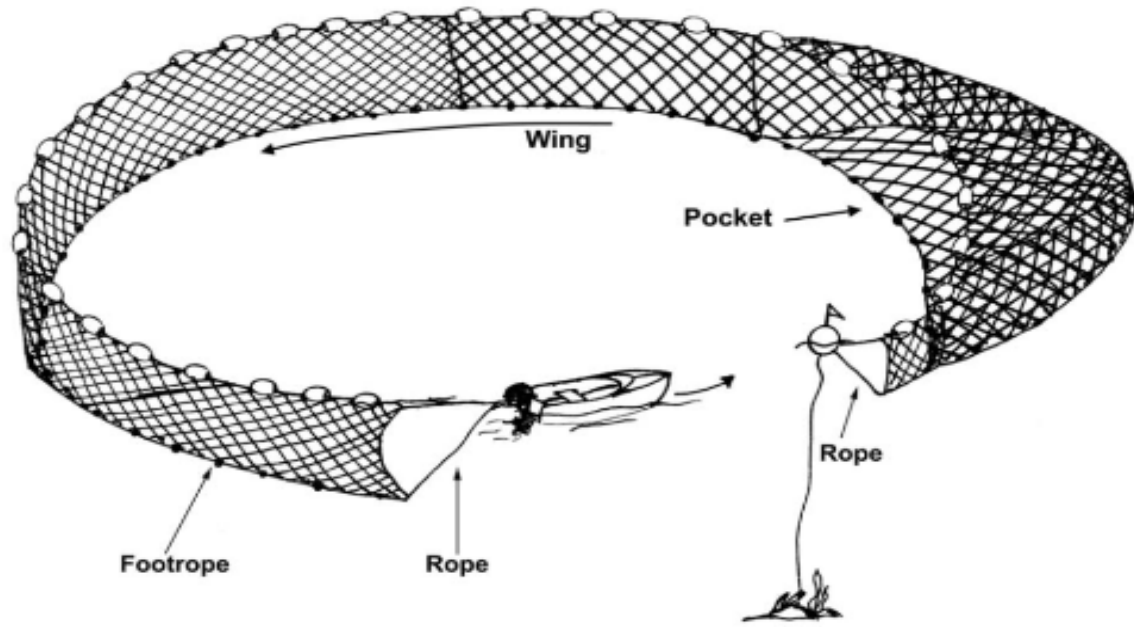
The fishing gear proposed to catch garfish and key secondary fish species

- **Sea mullet beach seine net**
 - Proposed to be used at northern and southern sectors of Streaky Bay.
 - Zero to negligible bycatch including zero KGW as demonstrated by Carrick (2007) report to PIRSA. Net is shot from shore using small craft and recovered from shore.
- **Garfish haul net**
 - Classified as a HNF (floating haul net) as targets surface swimming garfish. Proposed to be used at Pt de Mole and Venus Bay for a maximum 56 days/year.
 - Is NOT a KGW mesh net which is a mesh net that fishes surface to bottom waters primarily for KGW in the Gulfs.
- **Garfish floating mesh net**
 - Proposed to be used at Baird's Bay for a total of 14 days/year
 - This net is designed to catch large surface swimming garfish and catch negligible KGW as the floating net catches fish in surface waters (91 cm) with netting restricted in waters less than 1.5 m. KGW are bottom dwelling fish and escape under the net.

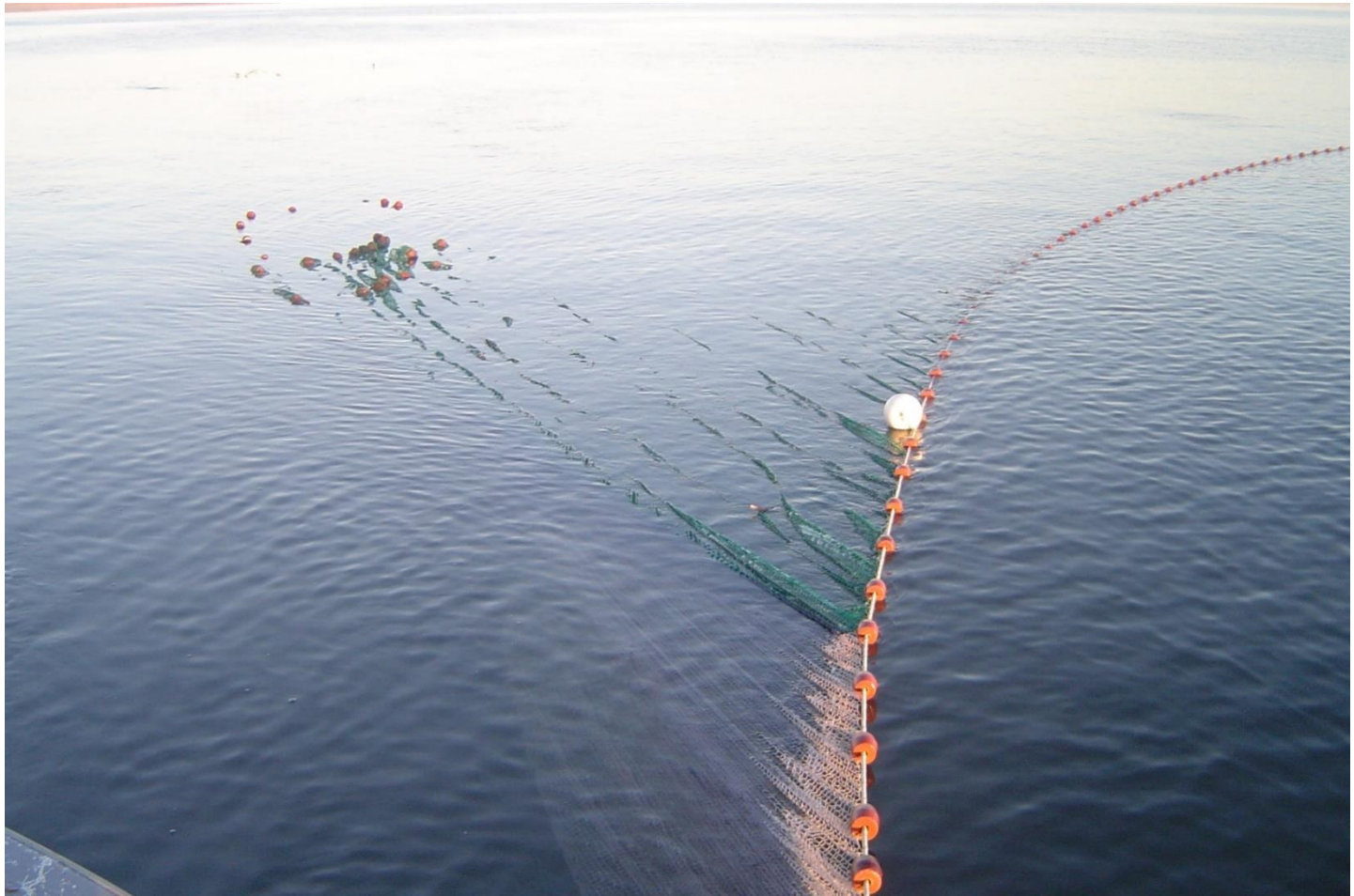
Floating mesh net for Garfish and Yelloweye Mullet- only Bairds Bay, no King George Whiting



Hauling net-target garfish, Yelloweye Mullet and Australian Herring-operates <5 m depth, mesh in pocket allows escapement of smaller fish



Haul net-bunt (green netting) and wing



Garfish in the haul net pocket (bunt)

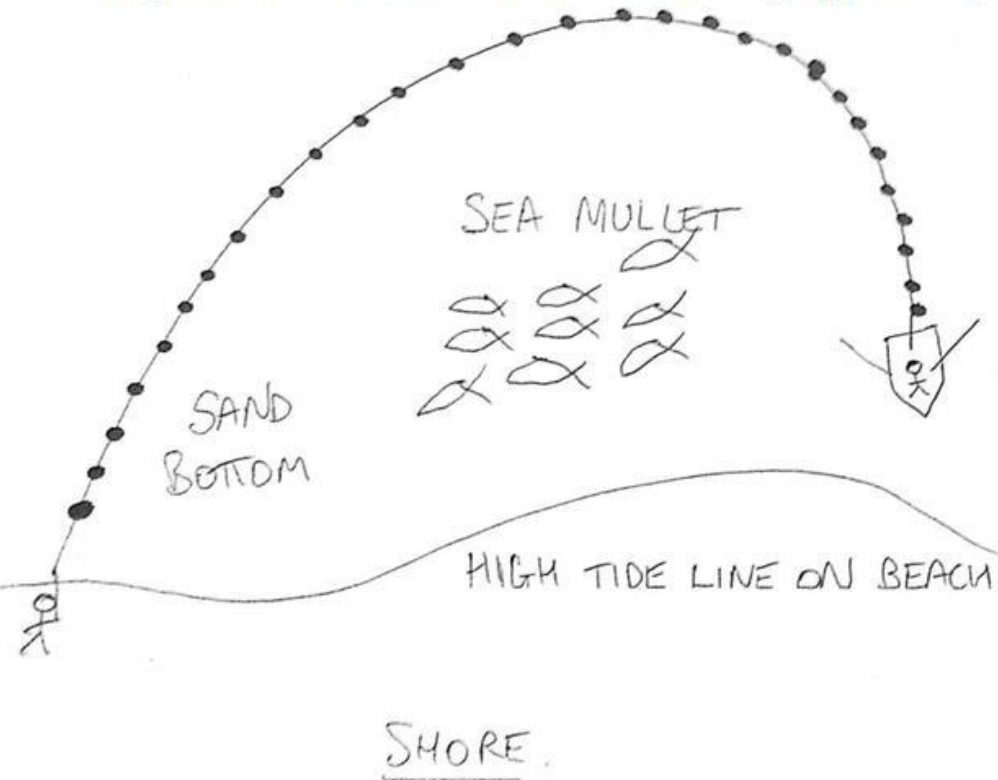


Brailing Garfish from haul net bunt



Sea Mullet beach seine netting

Diagram of Sea Mullet beach mesh netting operation



Operational practices, harvest strategy and potential threats

We have developed operational practices to ensure sustainable fishing strategies which require:

- Regulations on minimum legal size underpinned by appropriate mesh size to ensure smaller garfish (younger) fish have a greater chance to spawn and maintain egg production.
- Regulations on the length and the mesh size of nets
- Prohibit landing of King George Whiting
- Control of harvest rates (exploitation potential). Daily monitoring of spatial effort, catch, catch rates and size of fish for adaptive control of harvesting. This can only be done by fishers working collaboratively. Max. 56 available days. Bairds Bay limited to max.14 days.
- Spread of the spatial distribution of effort and catch based on defined harvest schedule(s)
- Non-targeting of sub-optimal fish size schools as there is an economic incentive to catch larger more economically valuable fish (e.g. garfish).
- Control of harvesting to maximise the value of catch and prevent growth overfishing
- Closures to fishing over the garfish the Garfish spawning period
- Release of King George whiting and bycatch (alive) from the net bunt.
- We will catch a small quantity of KGW as bycatch where majority would be released alive. Our operation would kill significantly less KGW than recreational and line fishing sectors. Hence, our operation poses a lower threat to KGW stock than either of the line fishing sectors.
- We do not expect many visitors from the Gulls due to (i) our closures (ii) limited days fishing and prohibition of taking King George whiting and gear restrictions.
- Prior daily reporting to PIRSA of our operations would be incorporated in the harvest strategy.
- Haul net operations would not have undetectable negative impact on seagrass habitats

Haul net species composition study in the gulfs- SARDI report, Fowler et al.(2009)

species catches. Whilst the HNF 3.0 nets were generally used during the warmer months to target southern garfish, they took a consistent suite of species whose numbers ranged across three orders of magnitude. The catches were dominated by four numerous species, i.e. southern garfish, Australian herring, spinytail leatherjacket and weeping toadfish, which were generally caught in hundreds of individuals per shot. Less numerous species that averaged tens of fish per haul included KGW, Western Australian salmon, western striped grunter and southern calamary. Numerous other species, such as globefish and different species of toadfish and leatherjackets, were regularly caught in low numbers, whilst for other species such as the flatheads and cowfish the catch rates were generally $<1.0 \text{ fish}\cdot\text{shot}^{-1}$. The southern eagle ray had the highest catch rate amongst the elasmobranchs, particularly in SG, where an average of 6.1 elasmobranchs were captured per shot. In contrast, in GSV only 0.6 elasmobranchs were captured per shot.

SARDI haul net Haul species composition and cpue (no/shot) bycatch study- Spencer Gulf, Fowler et al. 2009. KGW was 7.5 fish per HN shot

Major taxon	Species	No. captured	No. discarded	No. retained	CPUE per event	No. discarded per event	No. retained per event	% retained
Teleosts	Southern garfish	9872.9	1235.4	8637.5	548.5	68.6	479.9	87.5
	Australian herring	6679.1	3	6676.1	371.1	0.2	370.9	100
	Spinytail leatherjacket	2573.2	1694.6	878.6	143.0	94.1	48.8	34.1
	Weeping toad	1496.3	1496.3	0	83.1	83.1	0	0
	Western striped grunter	738.1	695.7	42.4	41.0	38.7	2.4	5.8
	Yellowfin whiting	341.2	27	314.2	19.0	1.5	17.5	92.1
	Prickly toadfish	299.1	299.1	0	16.6	16.6	0	0
	Bridled leatherjacket	143.7	143.7	0	8.0	8.0	0	0
	Silaspine leatherjacket	136.8	95.6	41.2	7.6	5.3	2.3	30.1
	King George whiting	134.4	113	21.4	7.5	6.3	1.2	15.9
	Western Australian salmon	95.5	33	62.5	5.3	1.8	3.5	65.4
	Globefish	57.0	57.0	0	3.2	3.2	0	0
	Smooth toadfish	52.1	52.1	0	2.9	2.9	0	0
	Rough leatherjacket	42.4	42.4	0	2.4	2.4	0	0
	Scarlet cardinalfish	30	30	0	1.7	1.7	0	0
	Snook	19	10	9	1.1	0.6	0.5	47.4
	Old wife	18.5	18.5	0	1.0	1.0	0	0
	Blue weed whiting	17	17	0	0.9	0.9	0	0
	Yelloweye mullet	11.0	0	11.0	0.6	0	0.6	100
	Greenback flounder	4	4	0	0.2	0.2	0	0
	Southern bluespotted flathead	3.6	0	3.6	0.2	0	0.2	100
	Shaw's cowfish	1	1	0	0.1	0.1	0	0
	Southern crested weedfish	1	1	0	0.1	0.1	0	0
	Soldier	1	1	0	0.1	0.1	0	0
Southern sand flathead	1	0	1	0.1	0	0.1	100	
Total		22768.9	6070.3	16698.5	1264.9	337.2	927.7	73.3
Elasmobranchs	Southern eagle ray	50.4	0	50.4	2.8	0	2.8	100
	Southern fiddler ray	43.2	43.2	0	2.4	2.4	0	0
	Smooth stingray	5	5	0	0.3	0.3	0	0
	Port Jackson shark	5	5	0	0.3	0.3	0	0
	Western shovelnose ray	4	4	0	0.2	0.2	0	0
	Bronze whaler	1	0	1	0.1	0	0.1	100
	Gummy shark	1	1	0	0.1	0.1	0	0
	Southern banded wobbegong	1	1	0	0.1	0.1	0	0
	Total		110.6	59.2	51.4	6.1	3.3	2.9
Cephalopods	Southern calamary	724.5	0	724.5	40.3	0	40.3	100
	Total	724.5	0	724.5	40.3	0	40.3	100
Crustaceans	Blue swimmer crab	473.5	472.5	1	26.3	26.3	0.1	0.2
	Red swimmer crab	1	1	0	0.1	0.1	0	0
	Total	474.5	473.5	1	26.4	26.4	0.1	0.2
Grand total		24078.5	6603.1	17475.4	1337.7	366.8	970.9	72.6

Recreational Survey 2013/14- KGW

Table 12: Estimated annual harvest (numbers), average weight (kg), estimated harvest weight (kg, live weight) and % of total harvest for key and other regulated species taken by SA recreational fishers in SA aged 5 years or older in 2013/14, compared with the commercial harvest for 2013/14.

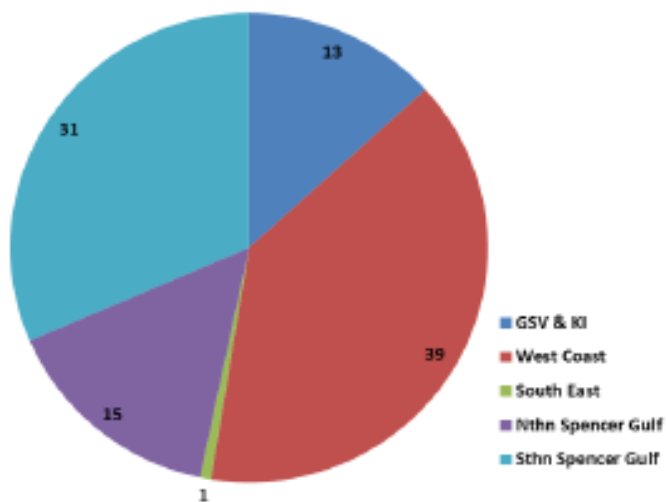
Common name	Estimated recreational harvest numbers 2013/14	Average individual fish weight (kg)	Estimated recreational harvest weight 2013/14 (t)	Estimated recreational harvest weight 2007/08 (t)	% change	Harvest weight of commercial catch ¹ (2013/14 financial year unless indicated otherwise)	Rec harvest weight as a % of total harvest (i.e. rec + comm)	Regional harvest weight of commercial catch (2013 calendar year) ²
King George Whiting	1,467,601	0.25	366.9	324.27	13 1	265t	58.1	Gulf St Vincent 50.064t Spencer Gulf 71.127t West Coast-Eyre Peninsula 171.126t*

Interstate Component of Recreational Fishing in South Australia

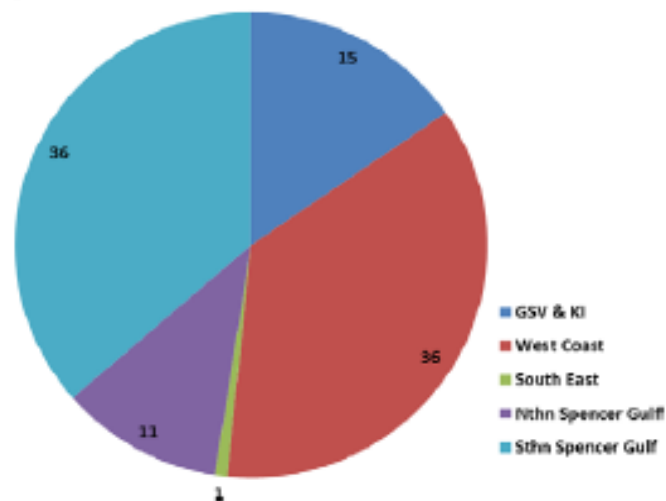
By design, the 2013/14 assessment of the SA recreational fishery does not include any estimates of catch and effort by interstate of residents or overseas visitors. Previous surveys (marine on-site surveys in 2007/08 and the 2000/01 survey) suggest an indicative figure of around 5% of the total fishing effort is likely to be derived from interstate residents.

Recreational Survey 2013/14-KGW

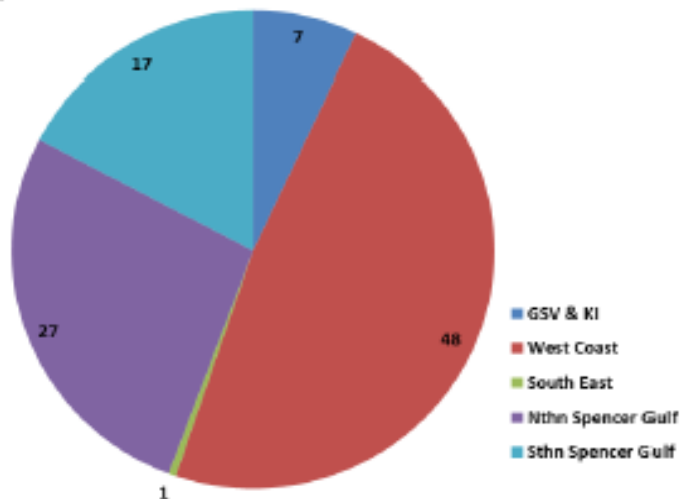
A, Total Numbers



B, Harvested Numbers



C, Released Numbers



D, Harvested/Released by Platform

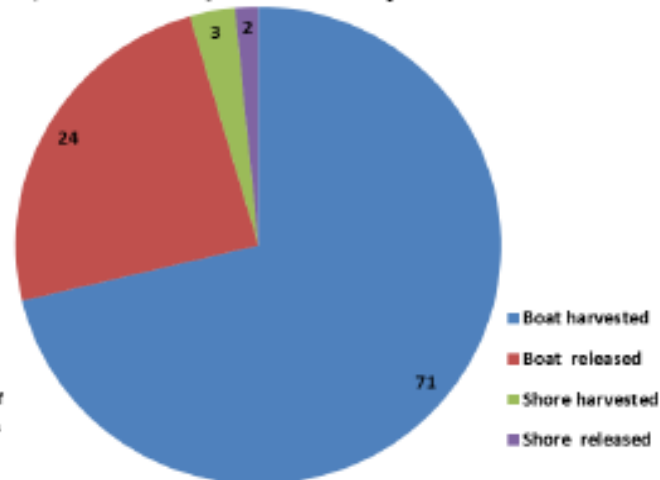


Figure 11: Regional proportional (%) catches of King George Whiting in SA by recreational fishers, aged 5 years or older in 2013/14; A: total numbers; B: harvested numbers; C: released numbers and D: proportion (%) of catch harvested or released by boat or shore-based fishers.

Potential threat to the West Coast King George Whiting stock by the constrained harvesting strategy- the facts

With 56 maximum days available in a year for 3 net operators with a maximum total of 168 shots/year using a worst case scenario (high catch numbers of KGW and high mortality rates) by haul netting the threat to KGW stocks is regarded as negligible.

The KGW “kill” by recreational and commercial line fishing would be substantially greater than the ‘kill’ generated by the proposed haul netting operations.

That is, line fishing poses a greater threat to the KGW population than that by the proposed haul net operations (see table).

Operational methods and gear (larger ply size in net pocket) will reduce the meshing of undersize KGW and ‘kill’.

Simulated comparison of KGW killed by recreational line (rec), commercial line (com) and haul net (haul)

- Recreational fishing survey 2013/14 data. Total numbers and Harvested numbers derived for WC. Does not include interstate visitors; hence is expected to be underestimation of kill.
- Recreational kill = Number harvested + number released * 2.8% mortality (Kumar et al. 1995, SARDI report).
- Commercial line. Information on regional fish sizes in summer and winter for FWC, MWC and CB from commercial line fishermen and Fowler et al. (2015), KGW stock assessment report. The % of average undersize fixed at 15% by commercial fishers and information from Kumar et al.
- SARDI regional catch data used to derive catch numbers -FWC, WC and CB.. Number harvested (H) weighted by regional catch and fish average size. $H = \text{catch weights} / \text{average fish sizes}$.
- Commercial line kill = Number harvested + (15% US * 2% to 1.5 % post-release mortality).
- Haul net. KGW Catch numbers from targeted garfish operations reviewed from SARDI reports (Kumar et. al. (1995), Fowler et al. (2009)) and former net fishers interviews and logbooks (VB and Streaky Bay).
- Simulation of average catch numbers 10, 25, 50 and 75 KGW/shot*3 operators*56 days.
- The average of 50/shot is an expected upper catch level.
- Haul net pre-release mortality (16%) and post-release mortality (11%), SARDI study (Kumar et.al 1995) used as input in simulation. The total mortality (27%) was set at high level and lower than estimates published by Knuckey et al. (2002) and Gray (2007) which were around 20%.
- Haul net kill = numbers captured * 0.16 + number released * 0.11. Assumed to be an overestimate.
- Information on average number of KGW captured in targeted garfish haul net studies (and range) and information provided by 'old' former historical WC net fishers. Kumar et al =av.36.6/shot.
- Fowler e al. ?2011 GSV = 17.2/shot and SG= 7.5/boat days. The average of 50 fish considered Maximum average and based on the upper range (0-50) in numbers captured.
- *Haul net operations based on 3 operators, fishing for 56 nights/year would be less than 0.25% of the total kill which is expected to be an over estimate of the kill (see Tables).*

Simulations of KGW killed by recreational and commercial line fishing vs. expected haul net kill

a) commercial line at 2% release mortality					
haul @10/shot	kill	%	haul @50/shot	kill	%
rec	535404	39.63	rec	535404	39.58
com	815288	60.34	com	815288	60.27
haul	424	0.03	haul	2120	0.16
	1351116	100.00		1352812	100.00
haul @25/shot	kill	%	haul @75/shot	kill	%
rec	535404	39.61	rec	535404	39.55
com	815288	60.31	com	815288	60.22
haul	1060	0.08	haul	3180	0.23
	1351752	100.00		1353872	100.00
b) commercial line 1.5 % release mortality					
haul @10/shot	kill	%	haul @50/shot	kill	%
rec	535404	42.05	rec	535404	41.99
com	737498	57.92	com	737498	57.84
haul	424	0.03	haul	2120	0.17
	1273326	100.00		1275022	100.00
haul @25/shot	kill	%	haul @75/shot	kill	%
rec	535404	42.03	rec	535404	41.96
com	737498	57.89	com	737498	57.79
haul	1060	0.08	haul	3180	0.25
	1273962	100.00		1276082	100.00

Risk levels

Table 8. Levels of risk and their associated likely management responses and reporting requirements (modified from Fletcher *et al.*, 2002; Fletcher, 2005).

Risk level	Risk scores (C × L)	Probable management response	Expected reporting requirements
Negligible (0)	0–2	Acceptable with no management actions or regular monitoring	Brief justification
Low (1)	3–4	Acceptable with no direct management actions and monitoring at specified intervals	Full justification and periodic reports
Moderate (2)	6–8	Acceptable with specific, direct management and regular monitoring	Full regular performance report
High (3)	9–16	Unacceptable unless additional management actions are undertaken. This may involve a recovery strategy with increased monitoring or even complete cessation of the activity	Frequent and detailed performance reporting

The perceived risks posed by the haul net operations

RISK	RATIONALE & MITIGATION OF POTENTIAL THREATS
1. Impact on KGW stock	<p>Negligible.</p> <ul style="list-style-type: none"> • Prohibited from landing KGW and would not catch spawners • Harvest strategy and targeted garfish operations using HN ring shots in night and on dawn would reduce KGW capture. By PIRSA regulation catch brailed in water from bunt and fish released alive. • The proportion 'killed', with a worse case scenario, less than 0.25 % of the kill attributable to the line fishing sectors (se below). The line sectors (rec & com) pose a greater threat to KGW stocks than that proposed by our operation.
2. Impact on recreational and commercial catch of KGW	<p>Negligible.</p> <ul style="list-style-type: none"> • KGW prohibited from catch. Targeted garfish operations catch few KGW. Limited days fishing max. 56 days/year • Fishing restricted to small areas away from recreational fishers and closed over the months from mid June to end of February. Catch brailed in water and released alive from pocket. Expected catch very low compared to line sector. • Would not fish in recognised recreational fishing areas and regions where juvenile are known to occur in high abundance including Blanche Port, Acraman's creek and adjacent mud flats, Germain Island and eastern side of VB.
3. Impact on tourism	<p>Negligible. However, would be a benefit to tourism</p>

The perceived risks posed by the haul net operations (continued)

RISK	RATIONALE & MITIGATION OF POTENTIAL THREATS
<p>4. Impact on seagrass and associated ecological communities.</p>	<p>Negligible</p> <ul style="list-style-type: none"> • As supported by scientific reports and DoF/SARDI underwater video • All our seagrass on the WC are in pristine state. Research has indicated that: coastal run-off and nutrient inputs from stormwater and effluent discharge (domestic and industrial), human disturbance and natural environmental perturbations pose the greatest threat to seagrass and associated ecological communities.
<p>5. Impact on fish and invertebrate communities</p>	<p>Negligible to minimal</p> <ul style="list-style-type: none"> • Targeted garfish HN catch on average 10 species/net shot with the majority of catch numbers consisting of garfish, Australian herring • The mesh size (3.5 cm) in bunt will allow escapement of undersize garfish and numerous small fish. • A majority of discards captured would be brailed in water (PIRSA regulation) and released alive from net pocket including sharks, rays and skates, as well, as numerous teleost species. • Some small delicate species would be killed but majority of species (>80 %) released alive and survive (Gray 2004,. Knuckey et al. 2002). • Netting would not take place in mangrove tidal creeks or adjacent mud flats
<p>6. Impact on Garfish spawning population</p>	<p>Zero. A large under-utilised resource. Net operations would be closed over the Garfish spawning season which in the West Coast extends from September to end of February. Harvest rate (exploitation) controlled.</p>

The perceived risks posed by the HN net operations (continued)

Risk	Rationale
7. Impact on West Coast Garfish stocks	<p>Negligible.</p> <ul style="list-style-type: none">• The WC stock is widespread (Fowlers Bay to Coffins including nearshore islands) along the WC and is a large under-utilised resource.• Currently classified by SARDI as 'un-assigned' due to no data from HN sector which is the prime data source for stock assessment of the species.• The new net size increase (3.5 cm in pocket will allow escapement of under size fish.• The harvest strategy including the spawning closure, extended seasonal closure and limited fishing days would control harvest rate and ensure the stock is sustainable.
8. Impact on Wildlife, threatened, endangered and protected species (TEPS) populations.	<p>Negligible.</p> <ul style="list-style-type: none">• Supported by PIRSA/SARDI reports on ESD, research reports and SARDI statistic reports.• Sea birds (e.g. cormorants) are active in daylight hours but operations would take place mainly in night when there are few seabirds.• SARDI Research has demonstrated that zero Syngathids are captured by HN operations.• Dolphins avoid capture in Haul nets.

Risk of non-compliance with PIRSA fishing regulations and defined harvest strategy

RISK	DISINCENTIVES AND MITIGATION
<ol style="list-style-type: none"> 1. Landing of KGW 2. Netting in closed periods 3. Netting in closed areas 4. Non-compliance with regulated fishing gear including: <ul style="list-style-type: none"> • Net dimensions 450 m length and max. depth of 3 m in wings • Mesh size • No mechanical hauling gear. 5. Under-size garfish 6. No hand line or rod on vessel 7. Non-compliance with MSF catch-effort logbook reporting. 	<ul style="list-style-type: none"> • Netting to take place according to a scheduled harvesting strategy at defined areas with daily pre-reporting of operations (see maps and table, above). • PIRSA compliance monitoring (ashore and on water). • PIRSA compliance audit and checks on fishing gear. • Confiscation of vessel, gear and vehicle. • De-merit points. Affects value and sale of licence. • Loss of catch and fined-3 times value of catch. • Consideration to loss of fishing days (as Spencer prawn). • GPS device used to record fishing location and SARDI logbook validation of catch. <p>PIRSA/SARDI officers and public welcome as observers of operations</p> <p>Risk: negligible</p>

Effects of haul netting

The only comprehensive quantitative study of the effects of hauling nets in New South Wales concluded that hauling net fishing did not appear to disrupt the normal life history events and ecological processes of fish and invertebrates that occupy seagrass beds (Otway and Macbeth 1999). Although there has not been any qualitative study carried out in South Australia, there have been several anecdotal reports that have suggested that there are no obvious impacts of nets on *Posidonia spp.* beds that commonly occur in the State's coastal waters (Fowler 2005). The hauling nets that are used to target Southern Garfish are typically light-weight and are designed to float and catch Southern Garfish which inhabit the surface water. In many cases the skirt of the net lifts up from the bottom during fishing, subsequently providing short-term escape gaps for the encircled fish (Steer et al. 2011).

Wild life and TEPS interactions with haul nets

Daylight- cormorants, gulls, pelicans at Gulf St Vincent



Impacts of hauling on wild life and TEPS species

- Sea birds are infrequent in night but visit in daylight hours as shown in image.
- Netting operations will take place at night and not in daylight hours.
- SARDI reports negligible deaths to wildlife and TEPS due to interactions with haul netting operations including daylight operations.
- Research has shown that no Syngathids (sea horses, sea dragons and pipefish) are captured by HN operations.
- See reports on SARDI Aquatic Sciences Web.

Haul net comparisons –species and no individuals in haul net floating (HNF)-Fowler et al. 2009.

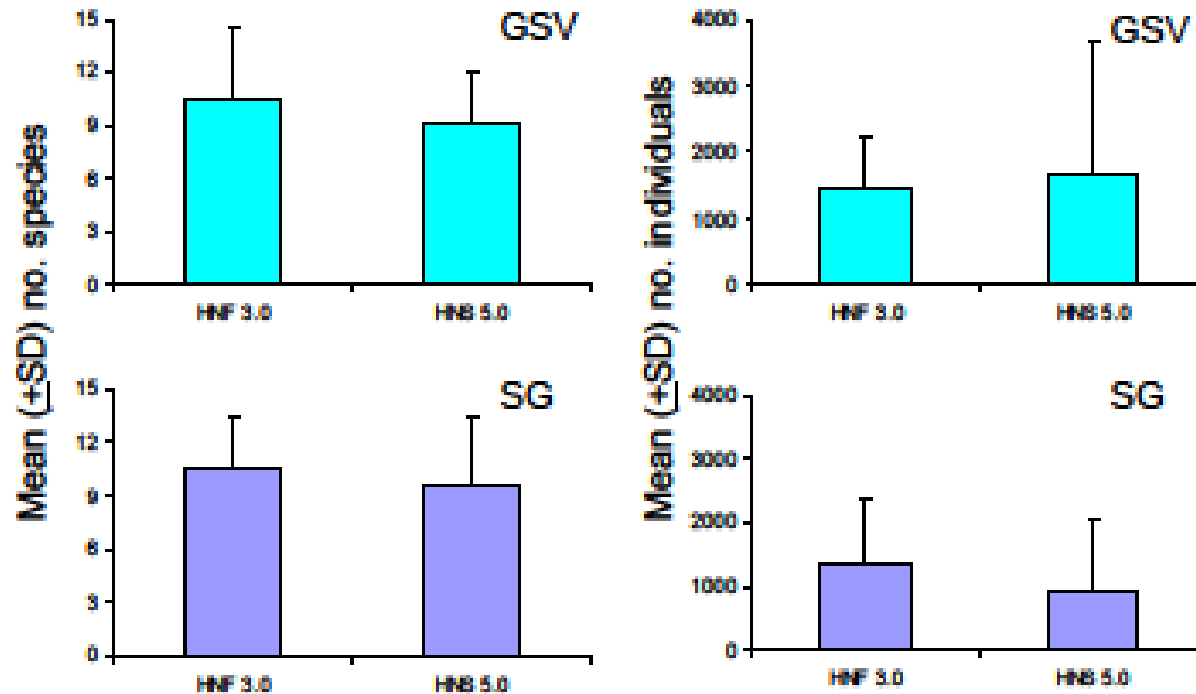


Fig. 4.6 Comparison of catch rates by the two different net types in the two gulfs. Left hand graphs show mean number of species and right hand graphs show the mean number of individuals taken per fishing operation.

SARDI haul net Haul species composition and cpue (no/shot) bycatch study-Gulf Saint Vincent, Fowler et al. 2009.

Major taxon	Species	No. captured	No. discarded	No. retained	CPUE per event	No. discards per event	No. retained per event	% retained
Teleosts	Southern garfish	11188.7	1783.0	9405.7	932.4	148.6	783.8	84.1
	Australian herring	958.5	32.4	926.1	79.9	2.7	77.2	96.6
	Spinytail leatherjacket	1571.5	1571.5	0	131.0	131.0	0	0
	Weeping toad	1121.4	1121.4	0	93.5	93.5	0	0
	Snook	981.7	233.8	747.9	81.9	19.5	62.3	76.2
	Western striped grunter	504.0	504.0	0	42.0	42.0	0	0
	King George whiting	206.1	148.6	57.5	17.2	12.4	4.8	27.9
	Soldier	141.3	141.3	0	11.8	11.8	0	0
	Globefish	75.6	75.6	0	6.3	6.3	0	0
	Yellowfin whiting	58.2	2	56.2	4.9	0.2	4.7	96.6
	Blue weed whiting	32.1	32.1	0	2.7	2.7	0	0
	Rough leatherjacket	31.1	31.1	0	2.6	2.6	0	0
	Yelloweye mullet	22.6	0	22.6	1.9	0	1.9	100
	Western Australian salmon	21.4	7	14.4	1.8	0.6	1.2	67.3
	Bridled leatherjacket	16.1	16.1	0	1.4	1.4	0	0
	Toothbrush leatherjacket	14.3	14.3	0	1.2	1.2	0	0
	Estuary cobbler	13.1	13.1	0	1.1	1.1	0	0
	Glover's anglerfish	13.0	13.0	0	1.1	1.1	0	0
	Southern cardinalfish	8.3	8.3	0	0.7	0.7	0	0
	Longray weed whiting	6	6	0	0.5	0.5	0	0
	Silver trevally	5.6	0	5.6	0.5	0	0.5	100
	Sharpnose leatherjacket	3	3	0	0.3	0.3	0	0
	Prickly toadfish	2	2	0	0.2	0.2	0	0
	Old wife	1	1	0	0.1	0.1	0	0
	Beaked salmon	1	1	0	0.1	0.1	0	0
	Sandy sprat	1	1	0	0.1	0.1	0	0
Little weed whiting	1	1	0	0.1	0.1	0	0	
Smooth toadfish	1	1	0	0.1	0.1	0	0	
Total		17000.6	5764.5	11236.1	1416.7	480.4	936.3	66.1
Elasmobranchs	Southern eagle ray	5.7	0	5.7	0.5	0	0.5	100
	Port Jackson shark	1.4	1.4	0	0.1	0.1	0	0
	Total	7.2	1.4	5.7	0.6	0.1	0.5	80.1
	Southern calamary	396.0	2	394.0	33.0	0.2	32.8	99.5
	Total	396.0	2	394.0	33.0	0.2	32.8	99.5
Crustaceans	Blue swimmer crab	99.0	96.0	3	8.2	8.0	0.25	3.0
	Red swimmer crab	1	1	0	0.1	0.1	0	0
	Total	100.0	97.0	3	8.3	8.1	0.25	3.0
Grand total		17503.8	5864.9	11638.9	1458.7	488.7	969.9	66.5

Historical netting closures implemented by Government on the West Coast-requires confirmation from PIRSA

Area	Year	Rationale
Streaky Bay	1971	Prior to 1971 Streaky Bay was open to haul and net meshing. A fisher used a salmon net to catch a school of snapper near the wharf which resulted in political lobbying to close the region to all net fishing, including haul net operations despite garfish HN operations catching no snapper.
Venus Bay	2005	In 2005, all Venus Bay was closed to netting by Government- the rationale was the SA garfish stock was over-fished and claimed to be 1 stock (false) but is a separate stock to the Gulfs and their was no evidence of overfishing in the bay. The reason for the closure was political and not based on scientific evidence.
Coffin Bay	1996	Originally, fished by gill net (KGW) and haul net but recreational and commercial line fishers lobbying on the take of KGW in closure by Government.
Ceduna (Denial and Smoky Bay) & Fowlers Bay	1961	Originally Denial & Smoky bays were fished by gill net (KGW) and haul net operators. Closed by the Director of Fisheries due to pressure by local Council and commercial line fishers.
	19?x xx	Fowlers Bay and Point Bell closed pre-2005. Garfish population large and widespread along the West Coast.

Sea Mullet-potential small fishery- see Carrick (2007) report to PIRSA

POTENTIAL NEW FISHERY TO OPEN MARKET OPPORTUNITIES FOR SA SEAFOOD

Monday 1 June 2015

The State Government is enthusiastic that a new process which enables investors to explore the feasibility for new fisheries may unlock new market opportunities for South Australian seafood.

The potential for a new commercial fishery for South Australia involving deep water crabs is one of the first applications to be considered under the State Government's new Exploratory and Development Fishing Permits process.

PIRSA Director Fisheries and Aquaculture Policy, Sean Sloan, said that regulations introduced in 2013 allow for new and emerging fishing opportunities to be explored and developed in a structured and sustainable way.

"The Government occasionally receives applications seeking permission to investigate the viability of new commercial fishing activities, including harvesting species not currently fished commercially," Mr Sloan said.

"These new fishery regulations, aim to facilitate the ongoing sustainable development of South Australia's aquatic resources in an open and transparent manner while providing some flexibility for new ventures to be explored."

"Factors that will be considered are the merits of the application against a set of established criteria including ecological sustainability, economic viability, the existing rights of current licence holders and potential effects on other stakeholders."

Influence of environmental variation on KGW stock- the natural environment has influence on recruitment and stock

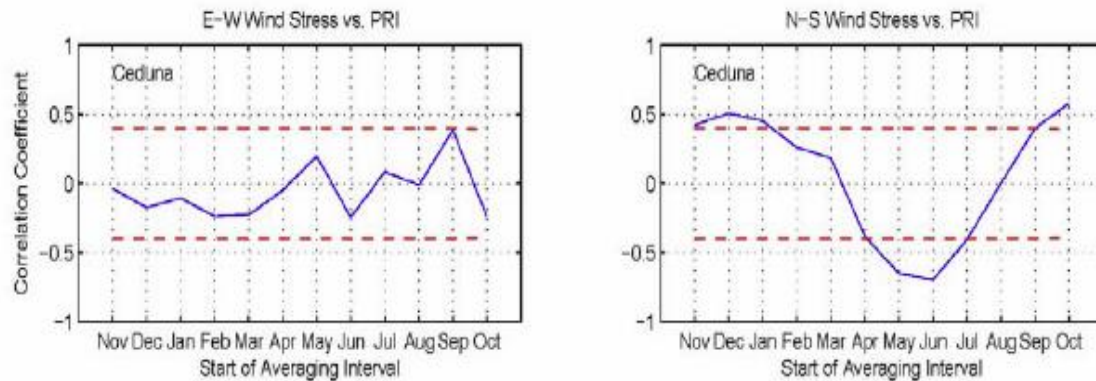


Figure 4.6. Correlations between wind strength Vs. KGW recruitment for the FWC. Significance limits at the 90% confidence level are indicated with red dashed lines.

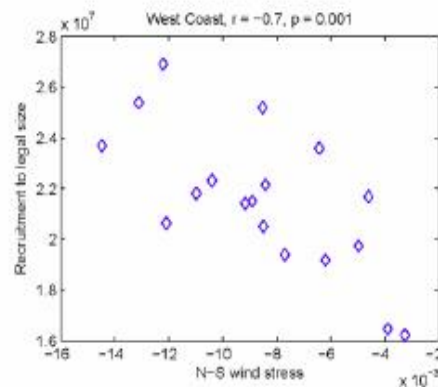


Figure 4.7. Plot of FWC KGW recruitment Vs. N-S wind stress measured at Ceduna, averaged between June and August.

Allocated shares of primary species for MSF -from PIRSA Management Plan (2013)- note this is for all SA

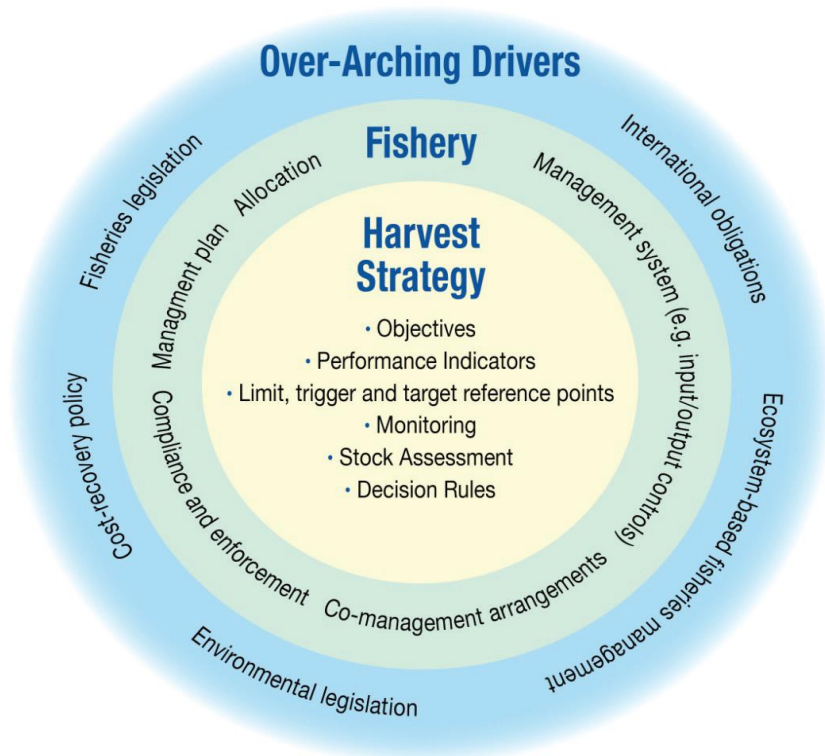
Species	Commercial		Recreational		Aboriginal traditional	Total
King George Whiting	MSF	49.5%	REC	45.5%	1%	
	SZRL	0.0%	CHARTER	3.0%		
	NZRL	1.0%				
Total	50.5%		48.5%		1%	100%
Snapper	MSF	79%	REC	8%	1%	
	SZRL	1.45%	CHARTER	10%		
	NZRL	0.55%				
	LCF	0.03%				
Total	81%		18%		1%	100%
Southern Garfish	MSF	79.33	19.5		1%	
	SZRL	0.13				
	NZRL	0.04				
Total	79.5%		19.5%		1%	100%
Southern Calamari	MSF	56%	37.4		1%	
	NZRL	0.45%				
	GSVP	0.45%				
	SGP	4.6%				
	WCP	0.1%				
Total	61.6%		37.4%		1%	100%

Over fishing-growth and recruitment & over-exploited stocks

- Growth overfishing. A level of fishing pressure beyond that required to maximise the yield (or value) per recruit; a level of fishing where young recruits entering the fishery are caught before they reach an optimum marketable size.
- Recruitment overfishing. Occurs when excessive fishing effort or catch reduces recruitment to the extent that the stock biomass falls below the pre- defined limit reference point.
- Over-exploited or over fished. A fish stock in which the amount of fishing is excessive or for which the catch depletes the biomass too much; or a stock that still reflects the effects of previous excessive fishing

Development of a Harvesting Strategy Framework for target Garfish and secondary species (Sea Mullet, Yellow-Eye Mullet, Snook and Australian Herring) for the WC

See Sloan et al. (2014), PIRSA 2015



There is limited data on the target (garfish & secondary species because there is no established net fishery on the WC. Data from net operations and associated fishery independent research provide scope to develop empirical stock assessments and ecological research. Line fishing or scoop nets cannot provide reliable data on the species listed above. It would take time to develop a rigid formal harvesting strategy requiring historical data on catch, effort and cpue, fish size (age) data and fishery independent monitoring to determine, clarify and set:

- 'operational Objectives'- would need to be clearly define in a Management plan
- Performance indicators- takes time to develop
- Clearly defined limit and target reference points
- Robust monitoring and stock assessment (empirical, if plausible include model based)
- Practical & effective harvest control decision rules
- Periodic review of harvest strategy

PIRSA take a step forward and plan direction with Industry and support the development of fisheries as in the past (e.g. GAB trawl, pilchard, blue-eye trevalla, oyster, SBT and abalone aquaculture, among others) which has resulted in economic benefits to the state.