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**MARINE RESOURCE UTILISATION PATTERNS IN TABLE MOUNTAIN
NATIONAL PARK MPA**

by Mbulelo Dopolo (SAEON Observation Summit, October 2010)



Presentation outline

- Management of marine resources
- TMNP MPA marine resource use:
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 - Study site
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SPECIAL ACKNOWLEDGEMENTS

Mr. W.L. Petersen (Director, KEAG) and his team played a pivotal role in getting the program off the ground. A special thanks to Sarah Titley (KEAG) who did preliminary analysis to the data.

Management of marine resources

Management is complex due to interconnectedness and dynamic three-dimensional medium.

Except for flora or seaweed (e.g. kelp and gracilaria), there is generally a large number of exploited resources (200 line fish species).

Subsequent to this, there is generally a lack of fish stock assessment research for many of the species, and this could be attributed to the following reasons:

- Lack of funds and equipment, and
- Capacity (i.e. insufficient skilled technical staff).



Objectives

The primary objective for monitoring marine resource use patterns in TMNP MPA is to assess trends in:

- composition and amount of harvested resources,
- size frequency distribution,
- catch per unit effort , and
- adherence to size and bag limit regulations.



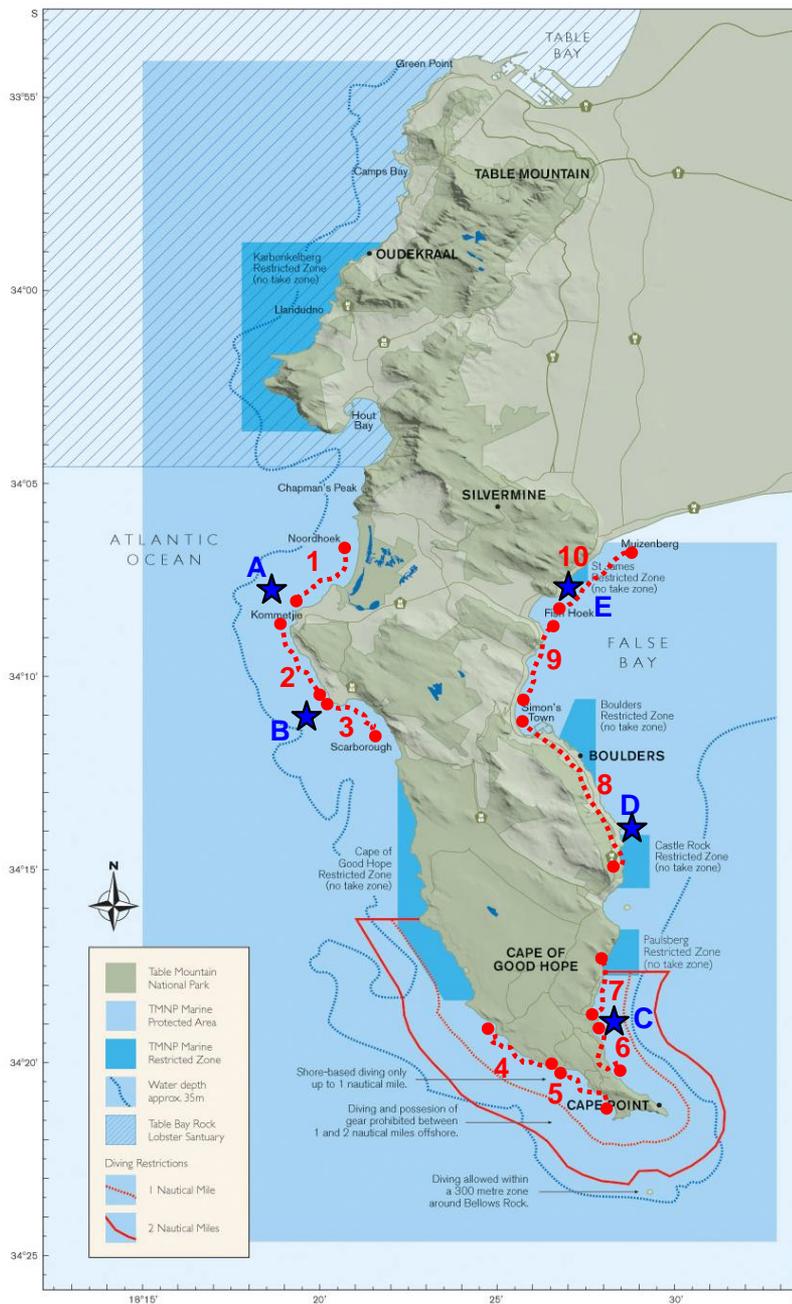
Study Site

PATROL AREAS

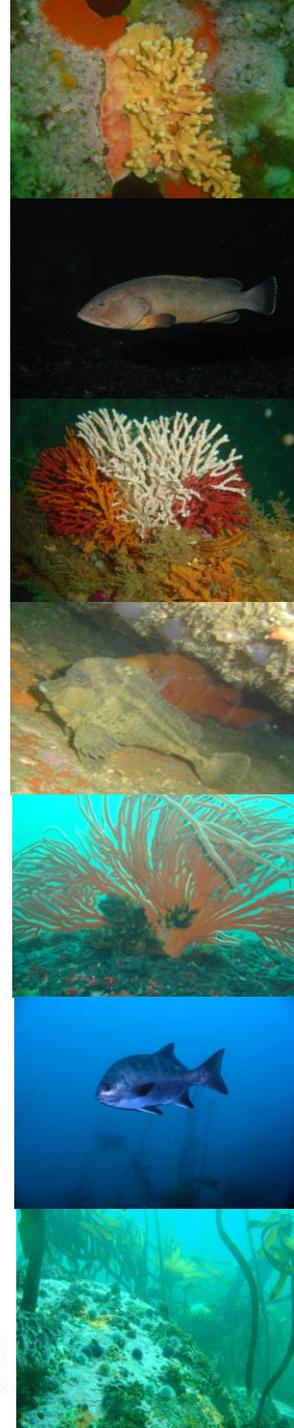
1. Noordhoek – Kommetjie
2. Kommetjie – Witsands
3. Witsands – Scarborough
4. Gifkommetjie – Platboom
5. Platboom – Cape of Good Hope
6. Rooikrans – Buffels Bay
7. Buffels Bay – Venus Pools
8. Castle Rocks– Simonstown
(Miller's Point – Seaforth)
9. Simonstown – Fish Hoek
10. Fish Hoek – Muizenberg

SLIPWAYS/HARBOURS

- (A) Kommetjie Slipway
- (B) Crayfish Factory Slipway
- (C) Buffels Bay Slipway
- (D) Millers Point Slipway
- (E) Kalk Bay Harbour

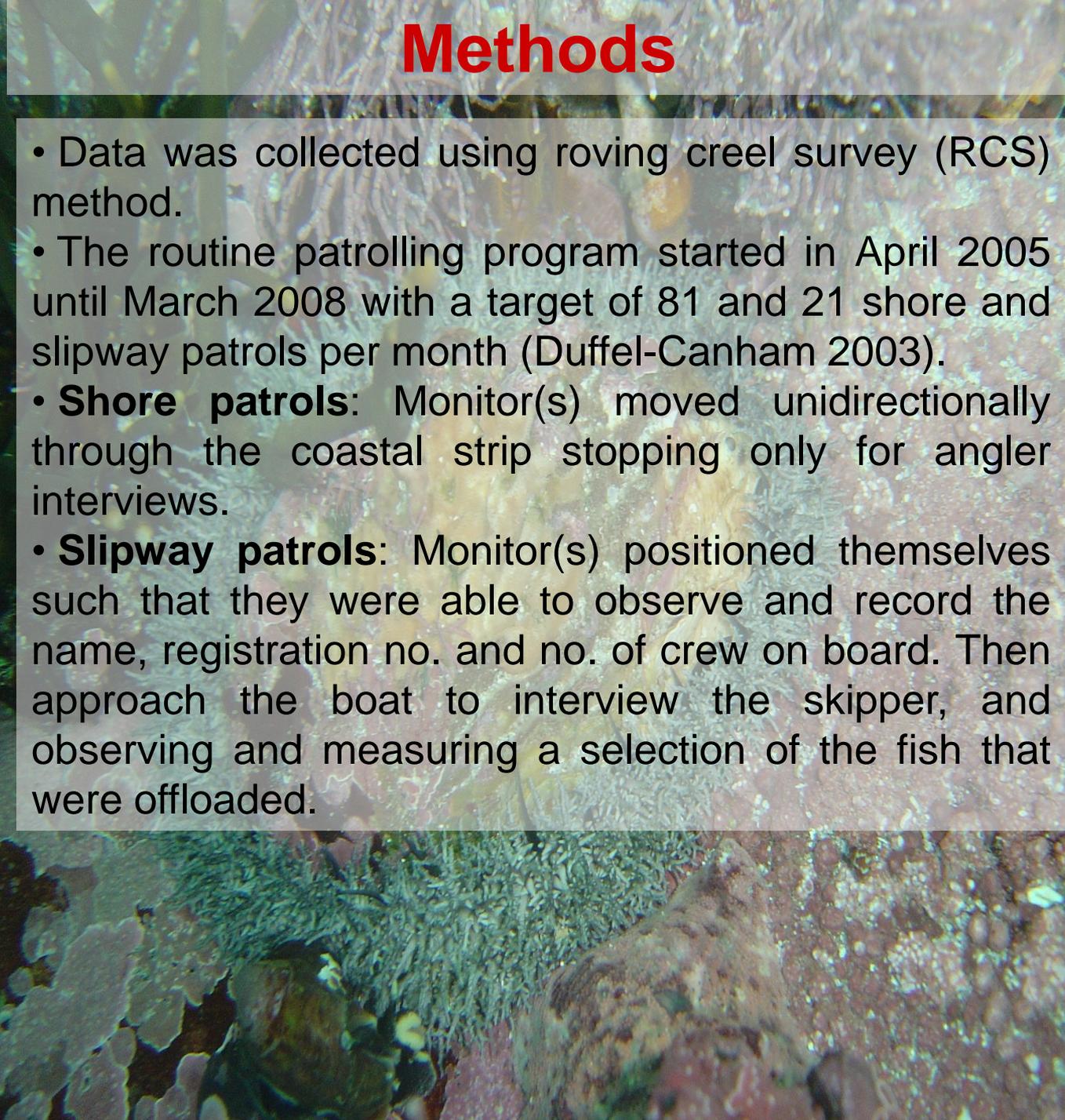


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Methods

- Data was collected using roving creel survey (RCS) method.
- The routine patrolling program started in April 2005 until March 2008 with a target of 81 and 21 shore and slipway patrols per month (Duffel-Canham 2003).
- **Shore patrols:** Monitor(s) moved unidirectionally through the coastal strip stopping only for angler interviews.
- **Slipway patrols:** Monitor(s) positioned themselves such that they were able to observe and record the name, registration no. and no. of crew on board. Then approach the boat to interview the skipper, and observing and measuring a selection of the fish that were offloaded.



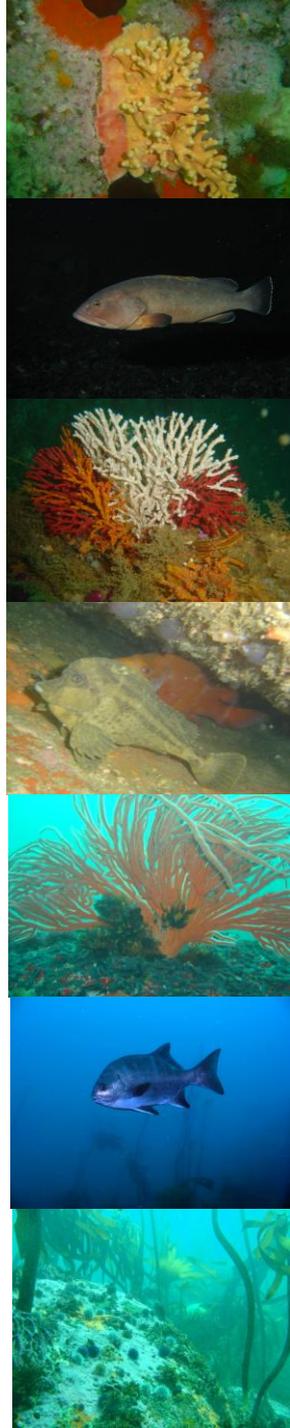
Methods

The monthly catch per unit effort (CPUE) for recreational shore anglers was estimated based on the formula described by Lo et al. (1992):

$$CPUE_i = \frac{\sum_{n=1}^{12} TC_{month,i}}{\sum_{n=1}^{12} E_{month,i}}$$

Whereby $TC_{month,i}$ is the total number of fish caught each month,

$E_{month,i}$ is the total effort per i month estimated as the total number of anglers interviewed during each i month.



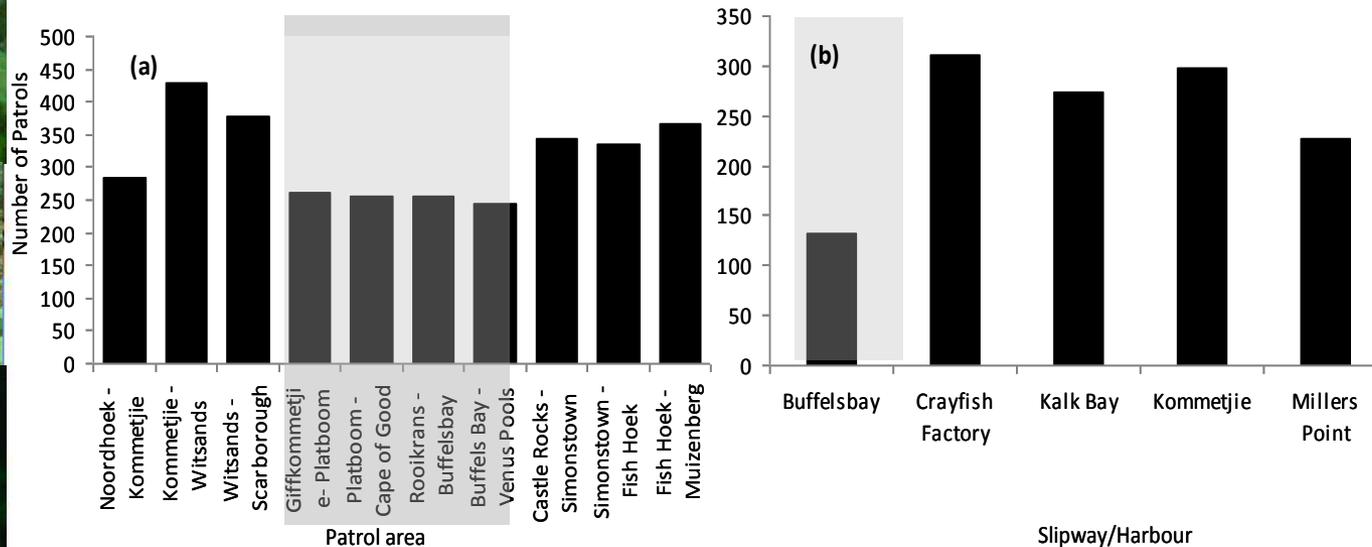
Results – Effort

Table 1: Annual total number (mean \pm stdev) of shore and slipway patrols between May 2005 and April 2008 during the TMNP Marine Monitoring Program (MMP) within the TMNP MPA.

| Date | Shore | Slipway |
|-----------------------|------------------------|------------------------|
| May 2005 – April 2006 | 815 (68 34.6) | 358 (30 19.2) |
| May 2006 – April 2007 | 1 343 (112 22.9) | 566 (47 11.1) |
| May 2007 – April 2008 | 1 077 (90 20.4) | 319 (27 12.9) |
| Pooled data | 3 235 (90 31.7) | 1 243 (35 17.1) |

Results – Effort: spatial distribution

Figure 2: Spatial distribution of the **total** number of (a) shore and (b) slipway patrols sampling effort between May 2005 and April 2008 of the TMNP MMP. *Note: The shading denotes areas within the Cape of Good Hope Reserve.*



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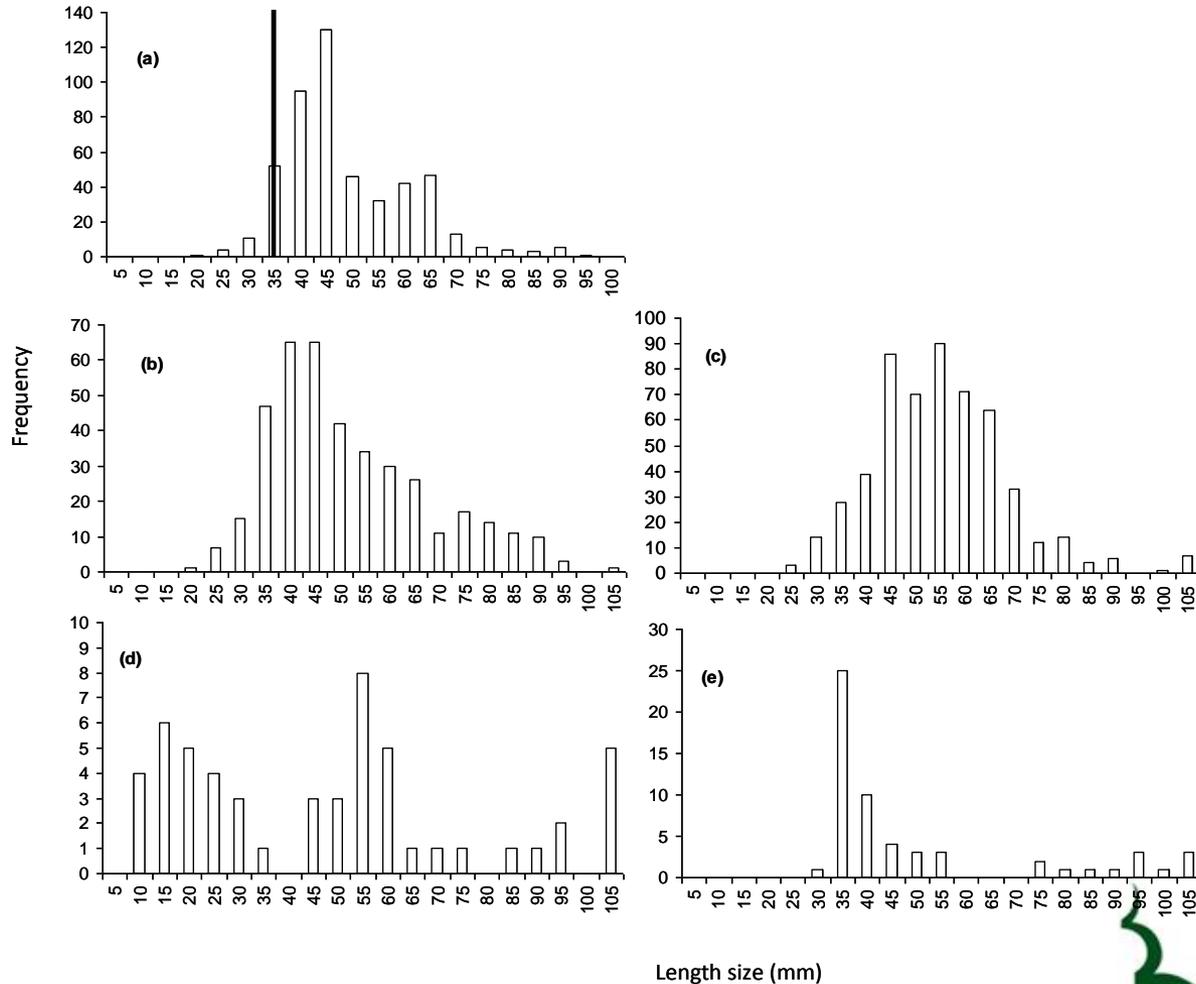
Results – Bait harvesting

Table 2: Number of bait catches (mean \pm stdev) recorded during shore patrols between May 2005 and April 2008 of the TMNP MMP. Areas not included because there were no bait recorded or < 5 .

| Invertebrate groups/species | Noordhoek–Kommetjie | Kommetjie–Witsands | Witsands–Scarborough | Gifkommetjie–Platboom | Buffelsbay–Venus Pool | Fish Hoek–Muizenberg |
|---|---------------------|----------------------|----------------------|-----------------------|-----------------------|----------------------|
| Limpets <i>Patellidae</i> | 147 (12.3 8.5) | 1 315 (24.0 22.2) | 311 (19.5 9.3) | 82 (41.0 38.2) | 0 | 5 |
| White mussels <i>Donax serra</i> | 10 | 171 (24.4 10.6) | 1 657 (23.4 19.1) | 0 | 0 | 0 |
| Black mussels | 293 (13.3 10.6) | 210 (23.9 16.4) | 815 (22.6 24.0) | 0 | 0 | 314 (52.3 48.0) |
| Polychaetes (Bristle worms) | 3 | 365 (18.8 26.7) | 60 (16.7 5.8) | 16 (8.0 2.8) | 68 (9.28 6.8) | 58 (7.6 6.5) |
| Periwinkles | 0 | 300 (60.0 78.0) | 28 (9.3 5.1) | 0 | 0 | 6 |
| Red bait <i>Pryuva solonifera</i> | 0 | 21 | 10 | 0 | 0 | 215 (21.4 32.7) |
| Brown crabs <i>Plagusia chabrus</i> | 0 | 0 | 0 | 0 | 0 | 62 |
| Mud prawns <i>Upogebia africana</i> | 0 | 6 | 20 | 0 | 18 (9.0 1.4) | 0 |
| Sand prawns <i>Callianassa kraussi</i> | 0 | 0 | 0 | 0 | 0 | 0 |

Results – Invertebrate harvesting

Figure 3: Size frequency distributions of (a) white mussel, (b) black mussel, (c) limpets, (d) polychaete worms and (e) periwinkles collected during May 2005 and April 2008, TMNP MMP.



Note: Data for periwinkles is lumped for all four periwinkle species recorded in the Cape Peninsula namely: *Oxystele variegata*, *Oxystele sinensis*, *Oxystele tigrina* and *Turbo sarmaticus*.

Results – Commercial rock lobster

A total of 204 508 west coast rock lobster *Jasus lalandii* were recorded between May 2005 and April 2008, and 90% of these were caught by commercial sector and the rest by recreational sector

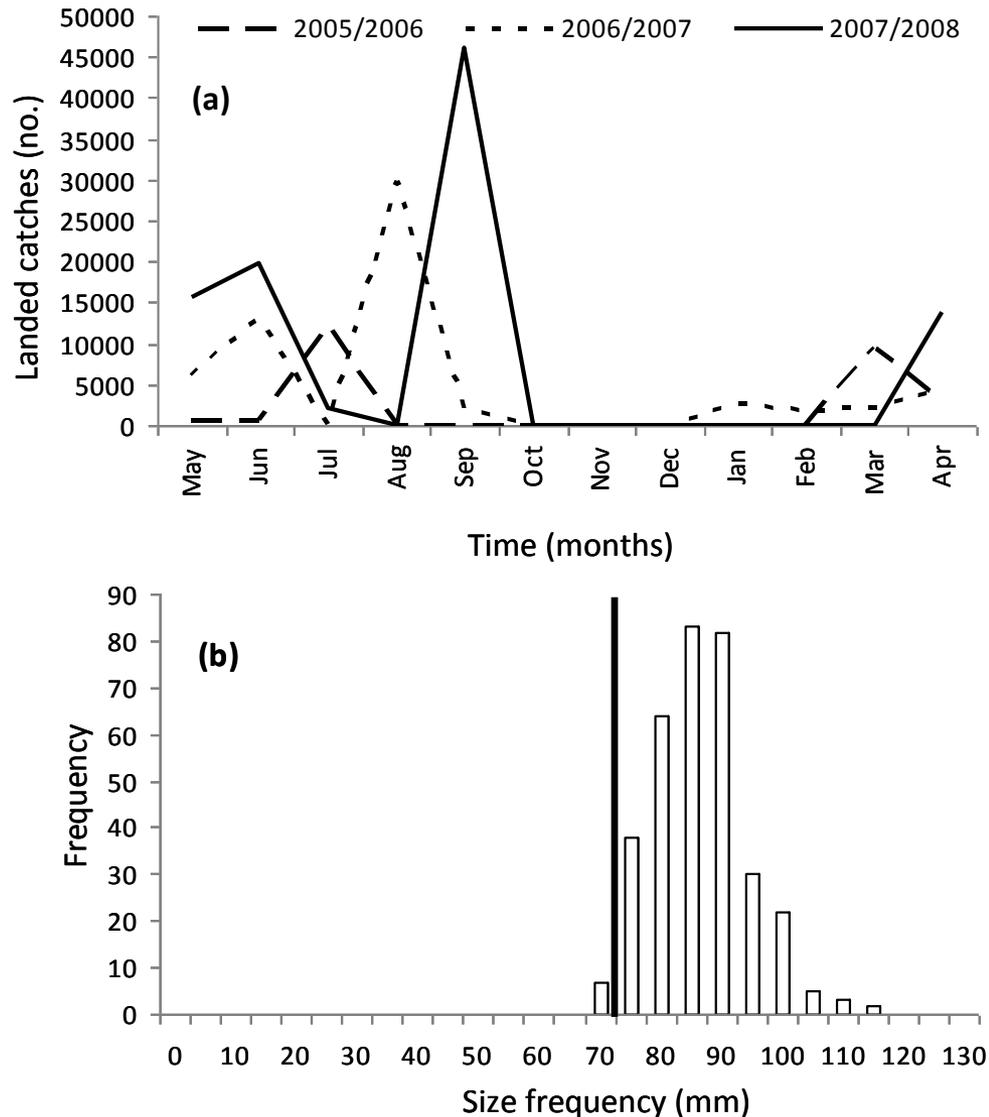
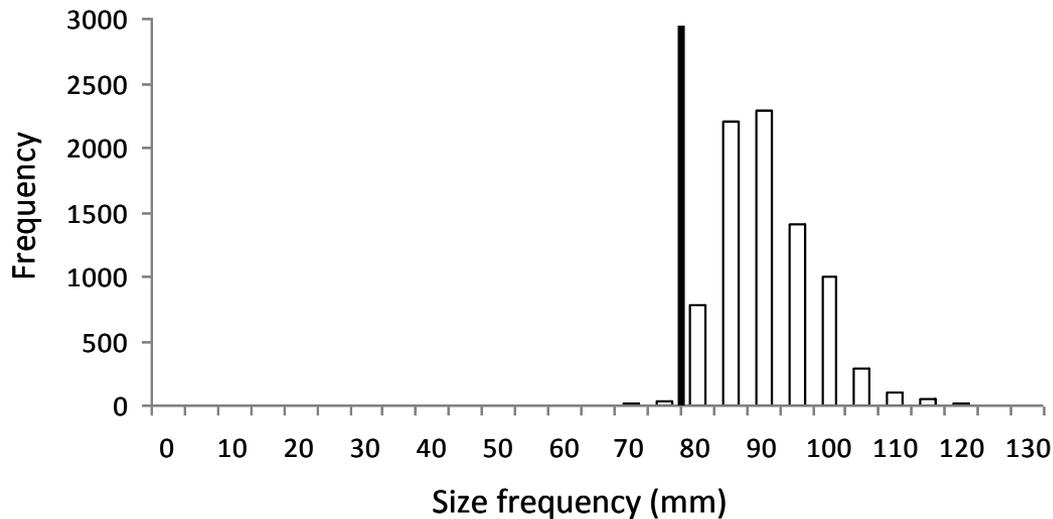


Figure 4: (a) Temporal and (b) size frequency distributions of commercial rock lobster *Jasus lalandii* landed at slipways / harbours between May 2005 and April 2008 of the TMNP MMP. **Note:** Measured samples represent <0.5%

Results – Recreational rock lobster catches

The majority (87%) of recreational fishermen used boat-based fishing method. Most of the catches by shore-based fishing were made between Kommetjie and Witsands, in the Soetwater conservation area.

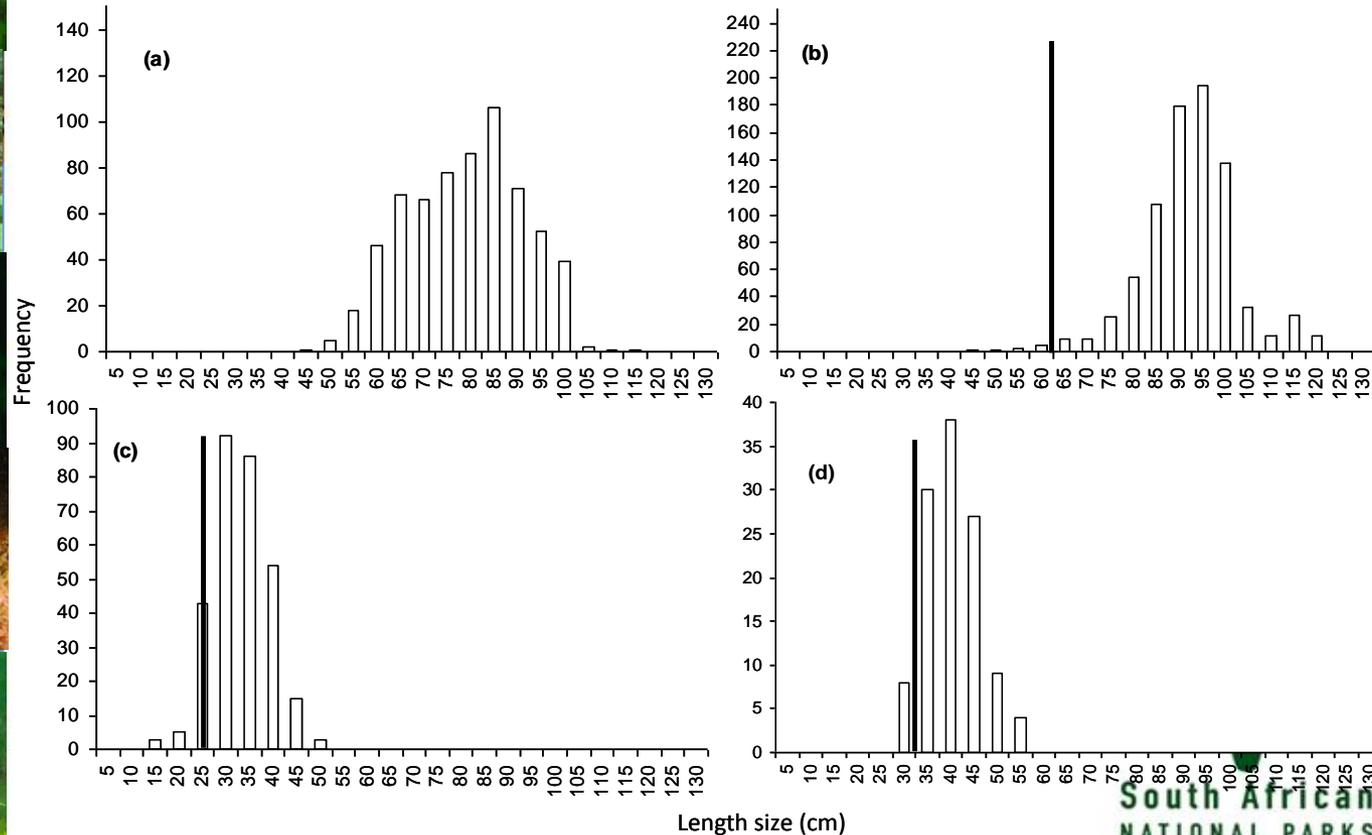
Figure 5: Size frequency distribution of recreational rock lobster caught by recreational sector between May 2005 and April 2008 of the TMNP MMP. **Note:** Measured samples represent 40%



Results – Boat-based line fishing catches

A total of 31 112 linefish (27 line fish species plus smoothhound shark *Mustelus mustelus* and a group of shark species) were recorded. Most commonly landed species include yellowtail, snoek, hottentot and roman.

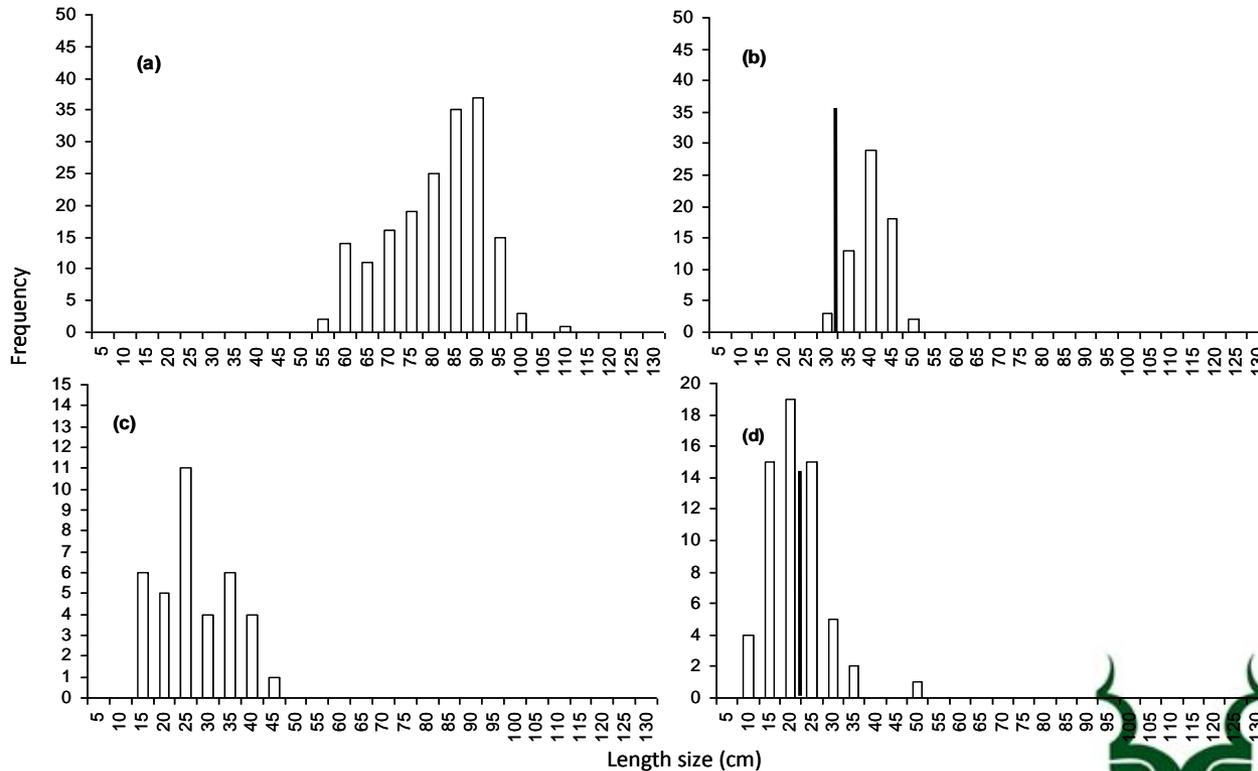
Figure 6: Size frequency distributions of (a) yellowtail *Seriola lalandii*, (b) snoek *Thysites atun*, (c) hottentot *Pachymetopon blochii*, and (d) roman *Chrysoblephus laticeps* caught by boat-based anglers and recorded during the TMNP MMP. **Note:** Y-axis scale bar are not standard.



Results – Shore-based line fishing catches

A total of 532 linefish (18 species) were caught by shore anglers, and the most commonly landed species include yellowtail, galjoen, maasbanker and hottentot.

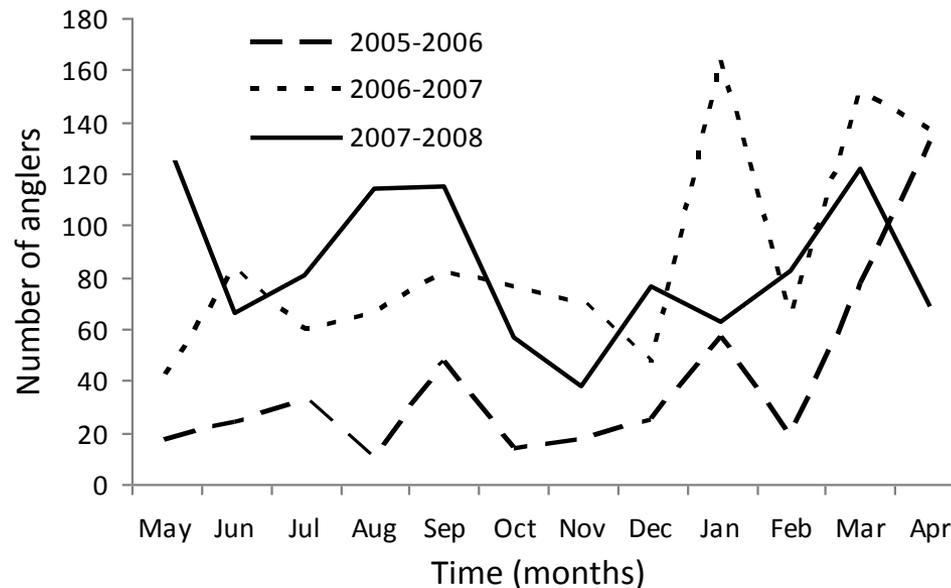
Figure 7: Size frequency distribution of (a) yellowtail *Seriola lalandii*, (b) galjoen *Dichistius capensis*, (c) maasbanker *Trachurus trachurus* and (d) hottentot *Pachymetopon blochii* caught by shore anglers. Note: Y-axis scale bar are not the same.



Results – Shore-based line fishing effort

These results show a consistent secondary peak during winter months (June-July) associated with galjoen inshore migration, and a primary peak during spring and summer school holidays.

Figure 8: Number of shore anglers on a monthly between May 2005 and April 2008 of the TMNP MMP.

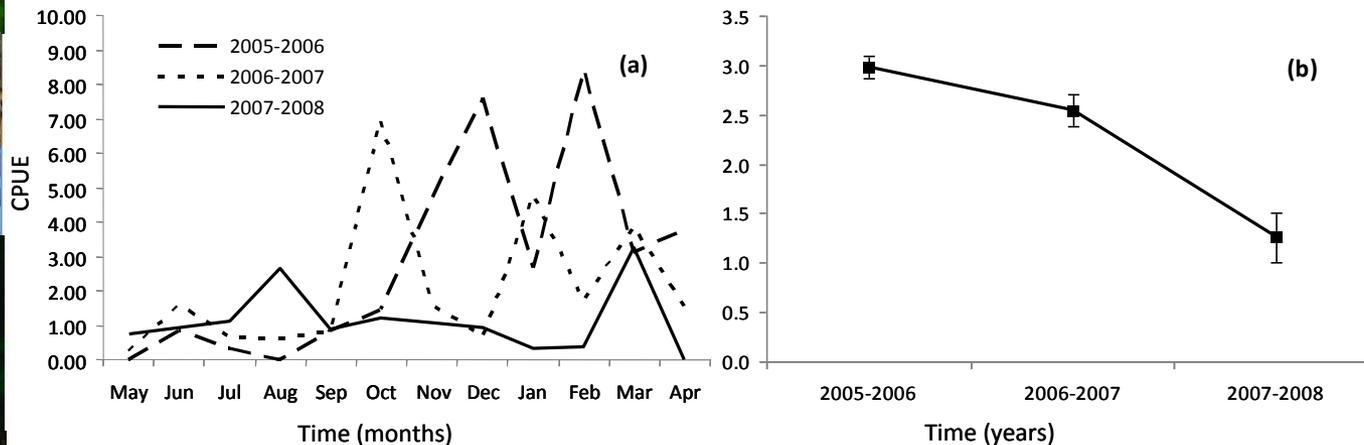


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Results – Shore-based line fishing cpue

CPUE has been on the decline over the three year period, from approximately 3 fish in 2005-2006 to approximately 1 fish per 10 angler days in 2007-2008. The substantial decline in CPUE **suggests** a decline in the abundance and/or availability of fish over the years along the Peninsula.

Figure 9: (a) Pooled monthly catch per unit effort (CPUE) per 10 angler days, and (b) overall CPUE per 10 angler days with standard error bars for shore anglers.



Take home message

- In yr1 the average effort for shore patrols was <math><16\%</math>, and this was attributed to insufficient personnel doing the patrols caused by limited funds.
- White mussels, limpets and black mussels were the most commonly harvested of all bait.
- Considerable catches were made between Noordhoek and Scarborough, in the Atlantic side



Take home message

- Commonly caught linefish species include yellowtail, snoek, roman, galjoen and hottentot (majority > minimum size limit).
- The decline in CPUE from 2.96 to 1.27 fish per 10 angler days is a call for concern, as this suggest a decline in the abundance and/or availability of fish.



Take home message

- Non-compliance in terms of bag limit was prevalent for bait collectors, and > 40% of anglers did not carrying valid fishing permits is a concern.
- Non-compliance in terms of bag limit was not prevalent for line fishing, but > 40% of anglers did not have valid fishing permits.



ACKNOWLEDGEMENTS

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