Tagging News

TAGGING ROYALTY
Movement of giant kingfish

MAIN SPECIES TAGGED

EXCITING RECAPTURES

REEF FISH CONNECTIVITY

TOP TAGGERS

SHOULD I STAY OR SHOULD I GO?
Understanding fish migration

News from the ORI Cooperative Fish Tagging Project
Number 30, Published July 2017, Results from 2016

From the tagging officer ...

As an avid fisherman, many people have asked me if I ever keep any fish I catch considering the line of work I am in. The simple answer is yes I do, but the feeling I get releasing a fish far outweighs any feeling I have ever had when eating a fish. For this reason I prefer to watch a fish I have caught swim strongly away, wondering if I will ever know the whereabouts of it again. And let me tell you there is nothing better than finding out that one of the fish you have tagged has been recaught. It's almost like remembering an old friend you have not seen in a while and it brings back all the memories of the day you tagged it! I am sure any tagger who has had one of his/her fish recaught can attest to this experience.

Welcome to the 30th edition of the Tagging News. The Tagging News has been communicating the results of the cooperative efforts between fishery scientists and anglers for more than three decades and has successfully promoted ethical angling while tracking the growth, migration and movement patterns of common linefish species caught along the southern African coast.

Out of the 457 tagging members who tagged one or more fish in 2016, eight of them tagged more than 100 fish. Our top tagger, Werner Coetzee, tagged a remarkable 272 fish, followed closely by Kobus Niehaus (267) (see page 5). However, more important are the numbers of fish that are recaptured. In 2016, Rob Kyle had 24 of the fish he tagged recaptured. Similarly, Piet Oosthuizen and Brendan O'Connell had 18 and 16 of the fish they tagged recaptured respectively. Remember, it's not always about the number of fish you tag but rather about the way in which you tag them! For those members wanting to brush up on their tagging technique, please email the Tagging Officer (oritag@ori.org.za) who will gladly assist you with a clear explanation and a short video demonstration.

The number of fish tagged during 2016 (11 555) represents only the eighth highest number of fish tagged since the project began in 1984, and was lower than the number tagged in 2015 (12 174; see page 4).While such a result may be considered disappointing, annual fluctuations in the number of fish tagged can be expected with natural fluctuations in fish populations. In early 2016, funding ceased for one of our long-term fish monitoring and tagging projects in the Pondoland Marine Protected Area (MPA), which could explain why the overall number of fish tagged in 2016 was lower. Furthermore, we also had a slight decrease in the number of new members, from 93 in 2015 to 84 in 2016. We hope to increase membership in 2017 with our greater presence on social media (follow us on Facebook at ORI TAG) and on our upgraded, more user-friendly website (www.oritag.org.za). The average number of fish tagged per member dropped from 27 fish in 2015, to 25 fish in 2016, but still represents the second highest average in the project's history. The total number of fish tagged on the project to date is 303 546, and passing the 300 000 mark can be considered to be a major achievement! Such long-term citizen science projects are very hard to come by these days and we hope to keep this remarkable project going for as long as possible.

Although the number of reported recaptures (940 or 8% of those tagged in 2016) was the fourth highest in the Tagging Project's history, it was the lowest it has been since 2013. Again the lower numbers can be attributed to the discontinuation of the Pondoland MPA monitoring project, which accounted for about 100 recaptures each year. If you do hear of any fellow anglers catching a tagged fish, please offer to assist them in reporting the right information timeously to ORI (via email/WhatsApp/Facebook/telephone/sms/ etc.). As members of the Tagging Project, we have a duty to ensure the correct handling and reporting of tagged fish. Page 11 provides a summary of some of the most exciting recaptures made during 2016.

The numbers of fish tagged each year vary for many reasons, not least of which is the availability of different species to anglers at different times and locations. The figures on the adjacent page highlight the percentage of fish tagged along the southern African coastline and show the top 10 species tagged in 2016 and overall since the Tagging Project began. South Africa's national fish, galjoen (19%), remained the top species tagged in 2016 and overall. Interestingly, there was a considerable increase in the number of galjoen tagged from 2015 to 2016 (from 1 695 to 2 199), which is encouraging. Dusky kob (10%), garrick/leervis (7%), spotted grunter (5%) and dusky shark (3%), made up the remainder of the top five species tagged in 2016. There was an overall decrease in the number of fish tagged for most of the other species in the top ten, with the number of dusky sharks tagged in 2016 (388) being less than half the number tagged in 2015 (994). In contrast, three species were tagged more in 2016 than in 2015, these were giant guitarfish (163 to 232), dusky kob (1 107 to 1 160) and of course galjoen. The number of blackspot smoothhound sharks tagged went from 420 in 2015 to 199 in 2016. This decrease is alarming considering that smoothhounds have been one of the top ten tagged species since 2007. This may be an early warning of possible overexploitation by the demersal shark longline fishery, which targets this shark species in the Eastern and Western Cape. Two rockcod species (namely catface and yellowbelly rockcod) now hold positions in the top ten fish tagged, which is particularly encouraging for these heavily targeted species. Furthermore, another two resident reef fish species, namely bronze bream and speckled snapper, were also more actively tagged in 2016. The tag and release of more resident reef species is very positive considering many of them have life-history strategies (i.e. slow growing, late maturing, sex changing, etc.) that make them vulnerable to exploitation. If you would like to learn more about the life-history strategies of some of our important linefish species, please go to the ORI website (www.ori.org.za) and download the "South African Linefish Species Profiles" from the homepage.

We sincerely hope that you enjoy this exciting issue of the Tagging News. We would like to say a big thank you to all of our tagging members for their ongoing support as well as to the numerous anglers who have provided information on tag recaptures. The long-term success of this project is entirely thanks to your on-going contributions towards the wise use and conservation of our marine linefish species. For those of you who have not already seen your tagging profile, please go to www.oritag.org.za. To login you need to enter your tagging reference number, e.g. TA0218, and repeat this number as your password. The tagging instruction booklet and this edition of the Tagging News are also available on the website. Furthermore, the electronic datasheets for tag release and recapture submissions via email/fax are also available for download. If possible, we prefer this method of data submission as it guarantees that we receive the data. Members who are no longer active are encouraged to please consider returning unused tags to ORI as we can reissue them. Alternatively, the tags can be passed on to an existing active member. However, please remember to inform us first before you do so! Please feel free to distribute the Tagging News to your fellow anglers. If you would prefer an electronic version of this newsletter, please go to www.oritag.org.za. For the latest tagging information and other interesting updates please 'like' us on Facebook at ORI TAG. We wish you tight lines and happy tagging.

Stuart Dunlop

The Tagging News is edited by Stuart Dunlop, Bruce Mann and Bernadine Everett

Contact information:
Oceanographic Research Institute
(a division of the South African Association for Marine Biological Research)

Postal address:
PO Box 736
Durban
4000

Cell: +27 79 529 0711
Tel: +27 31 328 8222
Fax: +27 31 328 8188
Email: oritag@ori.org.za

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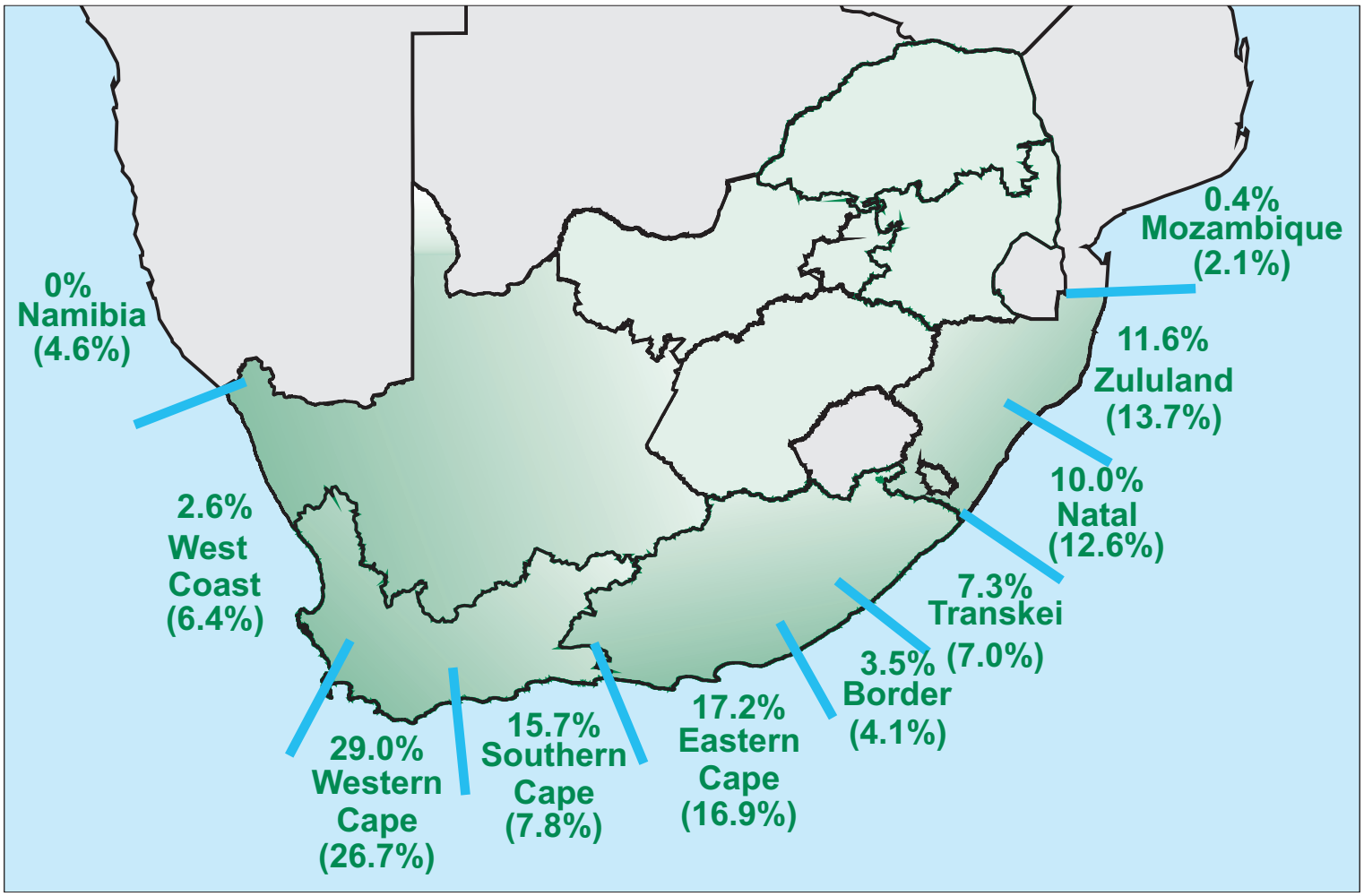
Cover photo: Grant Marshbank with his son Matthew and a tagged leervis caught in Port Elizabeth Harbour

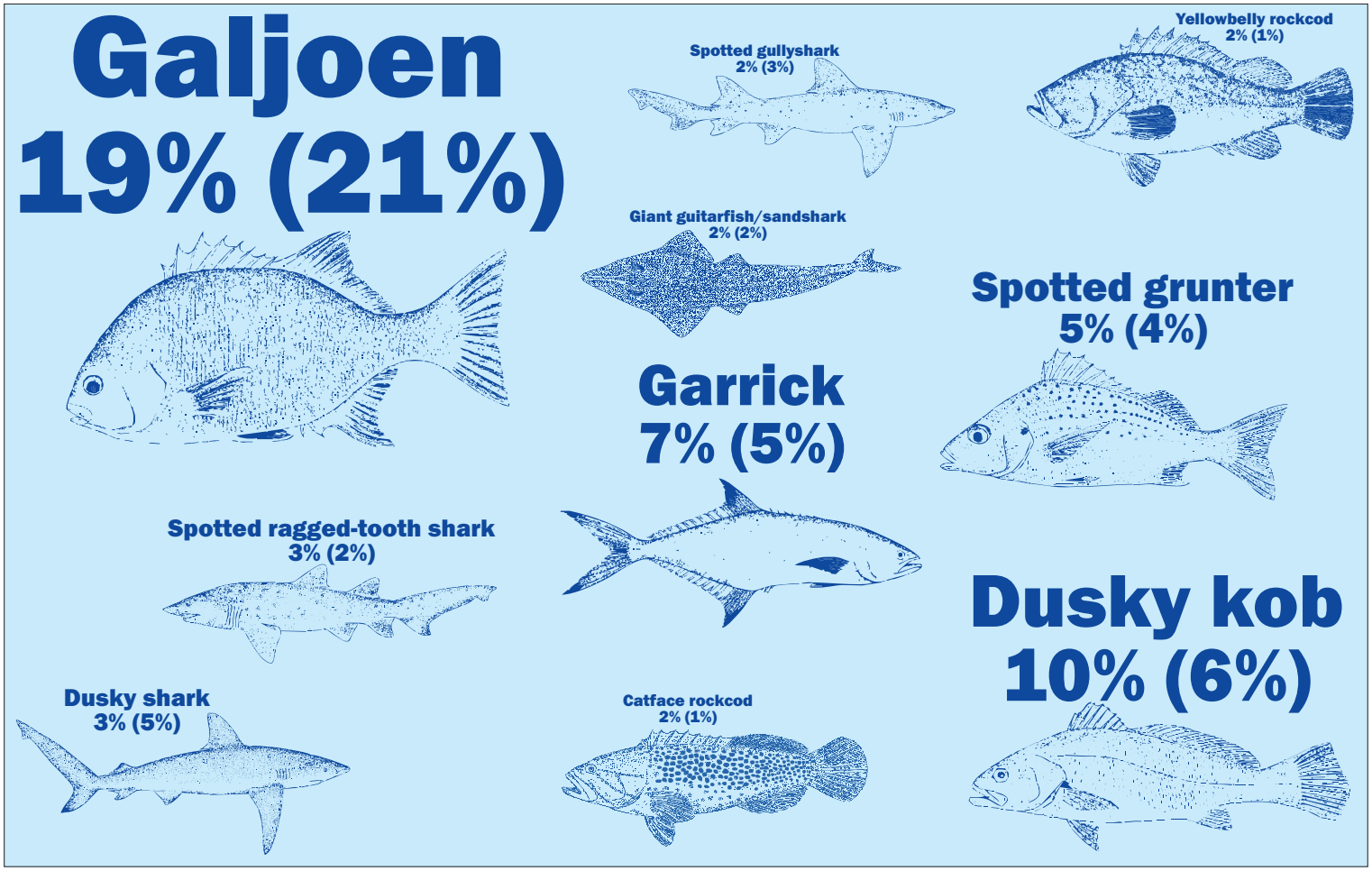
Percentage of Fish Tagged Along the Southern African Coast in 2016

(percentages in brackets indicate overall distribution of tagging since 1984)



Top 10 Species Tagged in 2016

(percentages in brackets indicate overall composition of tagging since 1984)



Tracking royalty – investigating the movement patterns of giant kingfish

by Paul Cowley – South African Institute for Aquatic Biodiversity

The giant kingfish (*Caranx ignobilis*) is undoubtedly one of the world's most sought-after recreational angling species that has adorned the front cover of many fishing magazines. Its popularity as a sport fish is most likely attributed to its powerful, persistent and doggish fighting abilities, and impressive displays when attacking surface poppers.

The giant kingfish, also known as giant trevally (GT), is widely distributed in warm temperate and tropical waters of the Indian and Pacific Oceans and occurs in a wide range of shallow coastal and offshore habitats, including estuaries, harbours, sandy beaches, rocky shorelines and offshore reef pinnacles. This species is also known to form spawning aggregations, and shoals of several hundred to thousands of individuals have been observed at known spawning sites around the world. Based on its "personality" traits (i.e. aggressive, commanding and overpowering), cosmopolitan habits and reproductive/spawning dynamics, it is easy to assume that this species is a highly mobile, wide ranging migratory animal. Ironically, evidence from the ORI Cooperative Fish Tagging Project (ORI-CFTP) suggests the opposite.

To date, more than 3 300 giant kingfish have been tagged in the ORI-CFTP, of which 126 (3.8%) have been recaptured. Despite some individuals displaying longshore movements (up to 419 km), most (73%) were recaptured at their release sites. Similar displays of residency have been recorded elsewhere in the world. For example, giant kingfish (locally known as Ulua) in Hawaii, equipped with acoustic transmitters, occupied defined home ranges (less than 5 km in length) and made daily movements between daytime and night-time habitats. Distinct summer migrations to known spawning grounds were also observed. Similarly, on the Great Barrier Reef in Australia acoustically tagged individuals showed extreme residency to reef sites where they were tagged. Inter-reef movements were rare and only ranged from 8 to 38 km away from their tagging sites.

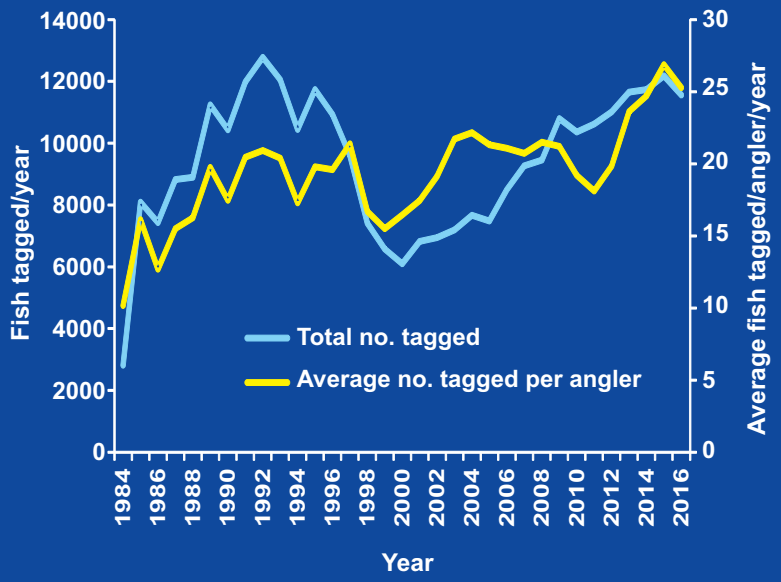
In South Africa, we have also initiated an acoustic telemetry study on giant kingfish. A team of scientists from ORI, the South African Institute for Aquatic Biodiversity (SAIAB) and the Save Our Seas Foundation (SOSF) have tagged a number of individuals over a wide region spanning southern Mozambique and northern KwaZulu-Natal. It is hoped that the acoustic tracking will shed more light on the behaviour of these elusive predators. Specific objectives of this research project include (i) identifying and describing seasonal patterns of residency and longshore movements, including transboundary movements (between South Africa and Mozambique), (ii) extent of the draw area (source) of individuals to a known spawning site in Mozambique and identification of new spawning sites, (iii) the dependence on estuarine habitats by juvenile kingfish, and (iv) the effect of tagging habitat on movement behaviour. The latter will be achieved by comparing patterns observed by individuals tagged in continental coastal waters off South Africa and Mozambique with individuals tagged at an island/atoll complex in Seychelles.

Despite being preliminary, this study has already revealed some interesting findings. These include (i) a record longshore movement of more than 500 km by an individual tagged in Mozambique, (ii) regular transboundary movements in summer to a spawning site in Mozambique, (iii) strong fidelity to shallow atoll habitats by juveniles in Seychelles, and (iv) restricted movements and resident behaviour by adults tagged in Seychelles. This project on the movement patterns of giant kingfish will be complimented with a population genetics study to investigate gene flow and connectivity between populations around the globe. Ultimately the results of this research will shed light on the management needs of this iconic recreational angling species.

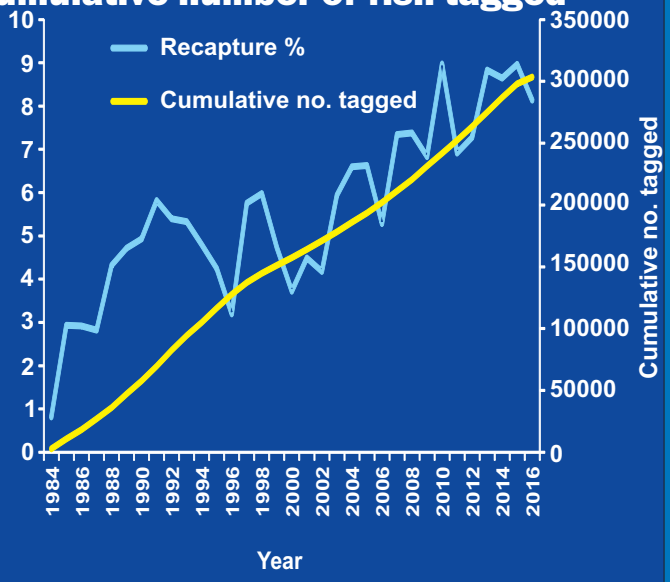
JD Filmalter, Paul Cowley and Ryan Daly with a beautiful GT tagged in Seychelles
Photograph by Clare Daly

ORI Cooperative Fish Tagging Project Statistics

Fish tagged per year and per angler

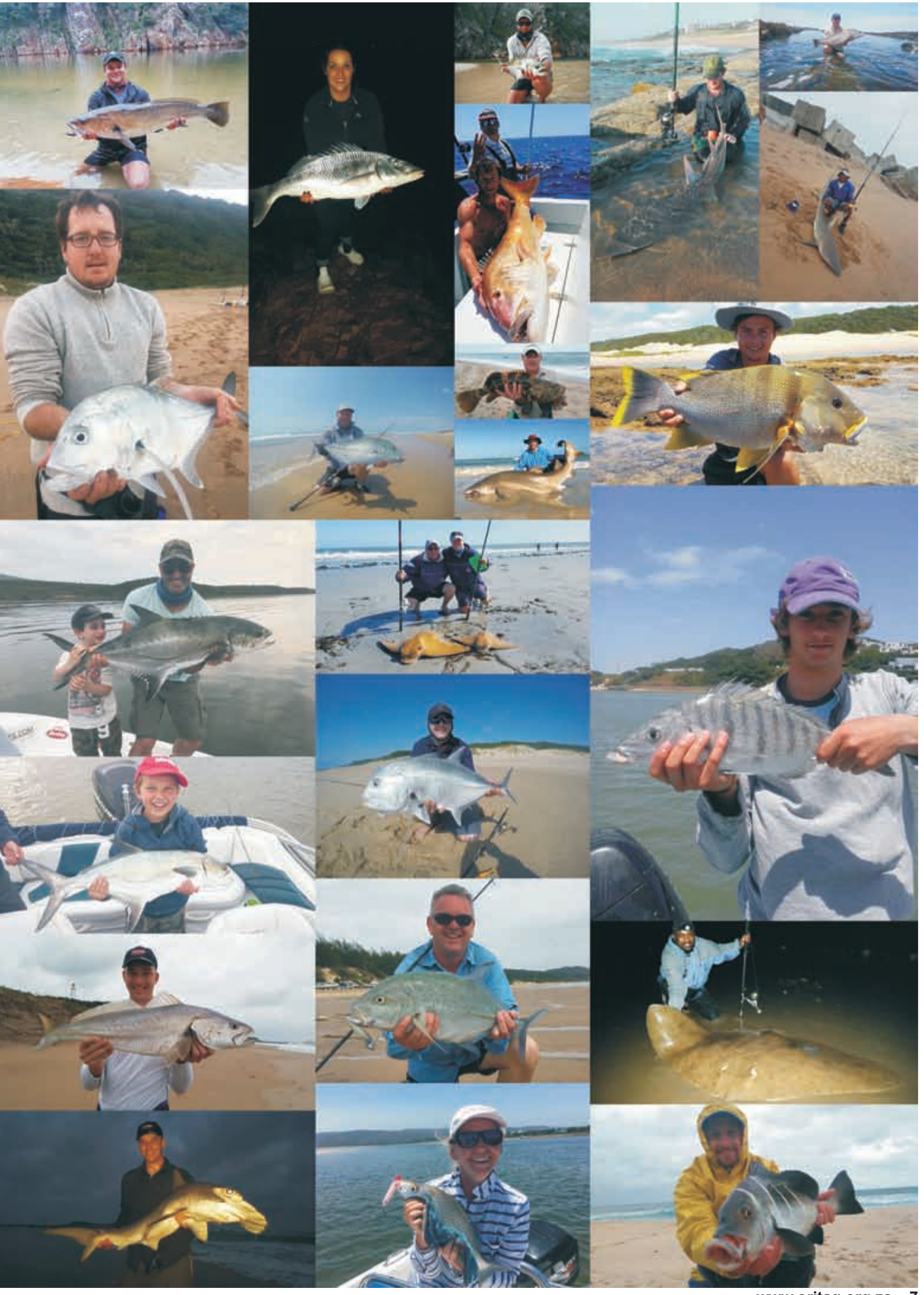


% fish recaptured per year and cumulative number of fish tagged



Top Taggers: 10 or more fish in 2016

Member Name	Facet	2016	Total	Recap In 2016	Recapt.	% Recapt.
MR W. COETZEE	DS	272	675	12	34	5.04
MR C.J. NIEHAUS	RS/EST	267	1112	15	40	3.6
MR G. MARCHAND	DS/RS	186	661	10	54	8.17
MR S. MEY	RS/EST	141	924	15	42	4.55
MR C. NELSON	RS	135	551	7	35	6.35
MR K.A. HUMPHREYS	EST/RS	132	1364	6	78	5.72
MR M. WEEDMAN	RS/EST	114	275	12	21	7.64
MR C.D. LILFORD	EST/RS	106	2519	2	119	4.72
MR R. KYLE	RS/EST	99	1559	24	186	11.93
MR N. DE KOCK	RS/DS	96	1759	7	107	6.08
MR D. COLE	RS/DS	96	501	2	9	1.8
MR L. ALLISON	RS/EST	93	362	9	28	7.73
MR B. FERREIRA	EST/RS	92	566	4	15	2.65
MR J. DE JAGER	RS/DS	91	333	15	43	12.91
MR K. SMITH	DS/EST	88	734	3	28	3.81
MR B. SPARG	RS/EST	84	2128	11	118	5.55
MR J.P. GELDENHUYS	RS/EST	80	308	6	17	5.52
MR M. DOHLHOFF	EST	77	340	3	14	4.12
MR G. GROBLER	EST	74	487	4	30	6.16
MR C. REIMAN	RS/DS	70	442	3	18	4.07
MR E. KYLE	RS/EST	69	1730	9	292	16.88
MR J. ISMAIL	RS	67	104	11	15	14.42
MR J. LUEF	DS/RS	66	388	11	49	12.63
MR B.D. CARR	RS/DS	63	850	10	61	7.18
MR G. SAVILLE	EST	60	1017	6	52	5.11
MR G. SHOUGH	RS	60	106	0	4	3.77
MR P.C. OOSTHUIZEN	EST/DS	59	417	18	80	19.18
MR R. TAYLOR	RS/EST	59	273	10	26	9.52
MR R. HARTWELL	RS/EST	59	74	0	0	0
MR L. SMITH	RS	58	412	6	21	5.1
MR S. VAN HUYSSTEEN	RS	57	70	1	2	2.86
MR P.D. MULLER JNR	RS	55	610	1	19	3.11
MR A. VAN DER WALT	RS	55	134	2	3	2.24
MR D. MARX	RS/EST	54	60	4	6	10
MR S. VAN ZYL	RS/EST	53	236	3	7	2.97
MR B. SNYMAN	DS/RS	51	90	1	1	1.11
MR S. OOSTHUIZEN	RS/EST	50	326	7	26	7.98
MR C. HART	RS	49	2530	5	163	6.44
MR K. WEBBER	DS	49	247	4	12	4.86
MR M. JOHNSON	DS/EST	48	48	6	8	16.67
MR M. MOLENAAR	RS	46	531	2	25	4.71
MR K. HANSEN	RS/EST	46	319	5	16	5.02
DR J.J. DE LA HARPE	RS/EST	44	999	3	74	7.41
MR C.S. MULLER	RS/EST	43	360	4	16	4.44
MR S. BRILL	RS/DS	43	81	3	7	8.64
MR J. ASHERWOOD	RS	42	411	2	17	4.14
MR B.M. OCONNELL	DS	42	348	16	52	14.94
MR D. GOVINDER	RS	41	236	9	34	14.41
DR R. VAN DER WALT	RS/EST	41	71	1	2	2.82
MR S. WALKER	RS/EST	39	5070	5	353	6.96
MR O. VON HASSELN	EST/DS	39	199	1	5	2.51
MR G. MULLER	EST/DS	39	125	1	4	3.2
MR G. SCHLECHTER	DS/EST	39	60	5	7	11.67
MR E. STEYLS	RS/EST	37	100	1	2	2
MR R.A. SHEPHERD	EST/FLY	36	581	1	23	3.96
MR G. MARSHBANK	EST/RS	36	530	0	51	9.62
MR V. REILLY	RS	36	131	8	21	16.03
MR M. MCIVER	RS	36	56	1	1	1.79
MR J. BRINK	RS/EST	35	227	0	5	2.2
MR G. HEIM	DS/RS	35	116	0	2	1.72
MR P. MORRIS	RS	34	812	4	51	6.28
MR D.M. IRVINE	RS	34	367	15	54	14.71
MR C. WILKINSON	RS/EST	33	181	0	7	3.87
MR L. TAYLOR	RS	32	214	1	5	2.34
MR B. WAREHAM	RS/DS	32	40	1	2	5
MR S.N. HUMPHREYS	RS/EST	31	254	1	4	1.57
MR D. SOLOMON	DS/EST	31	147	12	38	25.85
MR B. HARRIS	RS/EST	30	55	1	1	1.82
MR S. DUNLOP	RS/DS	29	267	7	25	9.36
MR R. BERMAN	EST/RS	29	95	0	4	4.21
MR A.P. HOWIE	RS/EST	29	75	0	1	1.33
MR G. WARNER	RS	28	158	0	9	5.7
MR C. ERASMUS	EST/RS	28	100	2	6	6
MR D. DRENNAN	RS/DS	27	1161	0	100	8.61
MISS K. KYLE	RS/EST	27	242	5	24	9.92
MR P. CURRIE	RS/EST	27	85	0	1	1.18
MR K. RUDOLPH	RS	27	33	4	4	12.12
MR S. SPOWART	DS/EST	26	65	0	0	0
MR B. TEDDER	RS	25	141	1	4	2.84
MR D.W. HERTZOG	RS	25	59	1	2	3.39
MRS W. BOTHMA	RS/EST	25	57	1	4	7.02
MR J. MOORCROFT	RS/EST	25	52	1	2	3.85
MR W.N.R. BOTHA	RS/EST	25	48	2	4	8.33
MR M. KAPLEN	RS/EST	25	25	0	0	0
MR T.T. HUMPHREYS	RS/EST	24	39	1	1	2.56
MR M. WHITE	EST/RS	23	605	1	44	7.27
MR J. PYBUS	RS	22	503	2	16	3.18
MR C. LIEBENBERG	RS/EST	22	77	0	3	3.9
MR G. KALTENBRUN	RS/DS	22	22	0	0	0
MR & MRS R. VAN DER SANDT	RS	21	271	3	16	5.9
MR A. MANN	RS/EST	20	97	5	19	19.59
MR V. DRIESSEL	RS	20	34	1	2	5.88
MR C.F. MARAIS	RS	19	745	2	45	6.04
MR D. PAUTZ	DS/EST	19	409	1	33	8.07
MR J.E. KUN	EST/DS	19	346	1	18	5.2
MR G. NICHOLSON	RS	19	29	0	1	3.45
MR D. MOODLEY	RS	19	19	1	1	5.26
MR C.K. DE CLERCQ	RS	18	500	2	21	4.2
MR J. COATES	EST	18	292	2	15	5.14
MR C. BOTES	EST/FLY	18	139	3	6	4.32
MR J. CLOETE	RS	18	21	2	3	14.29
MR R. THOMPSON	RS	17	643	3	28	4.35
MR P. TERBLANCHE	RS/EST	17	124	0	2	1.61
MR K. VRYENHOEK	RS	17	97	0	9	9.28
MR B. CRONEY	DS	17	52	0	0	0
MRS U. OTTO	RS/EST	17	26	0	0	0
MR L. MCKENZIE	RS	16	130	0	9	6.92
MR N.S. NAIDOO	RS	16	45	1	1	2.22
MR P. LEHMAN	FLY/EST	16	34	0	0	0
MR P. STEYN	EST/RS	16	28	0	0	0
MR W. MATHEE	RS	15	230	0	10	4.35
MR P.H. VAN NIMWEGEN	DS/RS	15	187	3	14	7.49
MR M. VLCEK	RS	15	162	3	20	12.35
MR M. DE LA HEY	DS	15	140	1	4	2.86
MR B. FUCHS	RS	15	109	0	4	3.67
MR J.J.P. VAN BLERK	RS/EST	15	41	1	2	4.88
MR G. DE GASPARY	RS	15	29	2	3	10.34
MR W.S. DE CONING	RS/DS	14	614	0	25	4.07
MR C.H. DE LA HARPE	RS/EST	14	338	2	45	13.31
MR C. VEUGELERS	EST	14	164	3	10	6.1
MR R. SINGH	RS	14	134	4	17	12.69
MR D.F. VAN DYK	RS	14	52	0	2	3.85
MR A. LEGGE	RS	14	43	1	5	11.63
MR K.W. STACEY	RS/EST	14	29	0	1	3.45
MISS M. GROENEWELD	RS/EST	14	24	1	1	4.17
MR J.D. LENTZ	RS/DS	13	356	1	16	4.49
MR J. OOSTHUIZEN	DS	13	227	12	66	29.07
DR D.E. MALAN	RS/EST	13	160	0	5	3.13
MR D. LA GRANGE	RS/DS	13	105	1	4	3.81
MR W. LABUSCHAGNE	RS	13	75	1	1	1.33
MR P.G. VILJOEN	RS/FLY	13	50	1	8	16
MR D. BURTON	RS/EST	13	28	2	3	10.71
MR R. CHINNASAMI	RS	13	15	0	0	0
MR W. PEENS	RS	13	13	0	1	7.69
MR J.D. LINDSAY	RS	12	301	0	14	4.65
MR H. LEWIS	RS/EST	12	214	0	8	3.74
MR R.F. BURGER	RS/EST	12	211	2	6	2.84
MR L. DAVIDOWITZ	EST/RS	12	207	1	9	4.35
MR J. VON BONDE	DS	12	127	0	1	0.79
MR C. LAING	RS	12	67	0	0	0
MR C. CARRUTHERS	RS/DS	12	45	1	3	6.67
MR H. CROUS	DS/RS	11	698	1	38	5.44
MR J. SCOTT	RS/EST	11	483	0	23	4.76
DR R. VAN HEERDEN	RS	11	421	0	12	2.85
MR R. SWART	RS	11	162	0	16	9.88
MR D. MULLER	RS/DS	11	88	0	1	1.14
MR E. DIEN	RS/EST	11	73	0	3	4.11
MR W.B. MULLINS	DS/EST	11	73	1	4	5.48
MR J. LOUW	RS	11	69	0	1	1.45
MR J. HAMMAN	RS/DS	11	65	3	5	7.69
MR W.R. BARFOOT	EST/RS	11	54	2	4	7.41
MR B. GERBER	RS/EST	11	48	0	1	2.08
MR K. LLOYD	RS/EST	11	41	2	2	4.88
MR R. POTGIETER	RS/EST	10	492	3	22	4.47
MR A. KRAHTZ	RS	10	224	2	14	6.25
MR J. ORMSHAW	EST	10	213	0	3	1.41
MR R.A. KOEKEMOER	RS/EST	10	166	1	18	10.84
MR J. LORD	RS/EST	10	85	0	4	4.71
MR D. & J. BOOYSEN	DS/BF	10	55	0	4	7.27
MR B. KARP	RS/DS	10	41	0	0	0
MR M. FAUEL	EST/RS	10	37	0	3	8.11
MR J. HAASBROEK	RS/EST	10	33	0	0	0
MR A. VILJOEN	DS/EST	10	33	0	1	3.03
MR J. BARLOW	RS	10	31	2	6	19.35
MR J.C. JOOSTE	RS/EST	10	19	0	0	0
MR A. BESTER	RS/EST	10	16	0	0	0
MR M. NORVAL	RS/EST	10	15	0	0	0
MR D. MACK	RS	10	14	0	0	0
MR R.J. VON HOLDT	RS/DS	10	13	0	0	0
MR R. WESEMANN	RS	10	10	0	0	0



Main fish species tagged up to 31 December 2016

Species	No. Tagged	Recaptured since 1984		Km travelled		Days free	
		No.	%	Avg.	Max.	Avg.	Max.
Galjoen	63073	4347	6.89	43	1892	426	5815
Dusky kob	18908	1253	6.63	27	1625	325	4370
Garrick/leervis	14889	1007	6.76	246	1670	332	3208
Dusky shark	13826	1038	7.51	67	1374	102	2772
Spotted grunter	12036	332	2.76	12	823	265	2950
Copper/bronze shark	9490	308	3.25	162	1790	430	3981
Spotted gulleyshark	8948	560	6.26	32	911	507	6332
Blacktail	8852	218	2.46	6	358	268	2715
Shad/elf	8593	330	3.84	278	1676	155	1106
White steenbras	7118	361	5.07	37	804	277	2262
Blackspot smooth houndshark	6796	196	2.88	46	582	573	2561
Lesser guitarfish/sandshark	6509	72	1.11	44	726	345	2572
Spotted ragged-tooth shark	5716	744	13.02	206	2966	735	8256
Slinger	5039	195	3.87	24	1110	210	2814
Roman	4746	300	6.32	4	294	326	3549
Giant guitarfish/sandshark	4612	293	6.35	30	360	308	1945
Largespot pompano	3721	70	1.88	12	270	247	1372
Sailfish	3554	29	0.82	61	1060	150	727
Black musselcracker/poenskop	3541	276	7.79	15	528	532	6809
Sevengill cowshark	3498	192	5.49	79	597	511	4332
Diamond ray	3418	25	0.73	237	1756	469	2184
Giant kingfish	3336	128	3.84	18	419	384	2226
Blue/marbled stingray	3176	10	0.31	38	234	341	1085
Zebra/wildeperd	3132	72	2.3	2	52	233	1399
Bronze bream	3094	110	3.56	19	799	190	1465
Yellowbelly rockcod	2875	530	18.43	6	355	344	2674
Catface rockcod	2829	623	22.02	6	525	187	2867
Carpenter	2588	25	0.97	45	290	897	4766
White musselcracker	2587	77	2.98	64	843	545	2313
Speckled snapper	2156	871	40.4	2	146	277	2376
Baardman/tasselfish/belman	2097	24	1.14	1	17	248	679
Santer/soldier	2016	128	6.35	19	490	230	1683
Sharpnose stingray	1809	5	0.28	8	24	198	465
Ladyfish/springer/skipjack	1653	30	1.81	25	412	369	1426
Unidentified hammerhead sharks	1651	10	0.61	74	218	219	955
Smooth hammerhead shark	1625	21	1.29	139	384	577	3075
Natal stumpnose	1549	45	2.91	15	230	215	698
Red steenbras	1540	149	9.68	122	923	855	8080
Perch/riverbream	1511	210	13.9	1	42	378	1583
Albacore/longfin tuna	1510	36	2.38	303	1008	412	2585
Striped catshark	1408	113	8.03	17	1353	300	2096
River snapper	1398	276	19.74	3	391	306	2403
King mackerel/couta	1364	55	4.03	397	1552	574	2604
Westcoast steenbras	1302	78	5.99	61	280	253	1449
Brassy kingfish	1231	78	6.34	1	13	274	1441
Dageraad	1228	80	6.51	20	592	340	1568
Grey grunter	1199	76	6.34	0	15	231	1099
Cape stumpnose	1152	8	0.69	9	56	188	732
Duckbill	1097	10	0.91	17	123	572	1427
Skipjack tuna	1023	1	0.1	1061	1061	464	464
Soupfin shark	1017	25	2.46	129	1034	745	3586
Cavebass	1016	165	16.24	8	328	334	2255
Blacktip shark	999	39	3.9	92	1288	218	1148
Scotsman	993	291	29.31	25	1211	459	2839
Yellowfin tuna	979	13	1.33	664	5645	242	697
Scalloped hammerhead shark	932	15	1.61	137	629	188	832
Milkshark	927	25	2.7	91	363	187	772
Cape/giant yellowtail	891	36	4.04	176	1746	271	1287
Geelbek	857	9	1.05	125	904	369	2569
Stonebream/stinker bream	853	9	1.06	75	524	242	563
Black marlin	824	2	0.24	256	504	124	159
Blacktip kingfish	769	26	3.38	4	54	146	545
Squaretail kob	747	41	5.49	8	266	147	2043
Honeycomb stingray	735	14	1.9	1	8	370	2543
Bigeye kingfish	713	37	5.19	11	163	240	2751
Spinner shark	663	22	3.32	101	1055	233	1295
Leopard catshark	653	73	11.18	13	722	387	4431
Seventy-four	640	21	3.28	60	521	514	2845
Silver kob	633	23	3.63	19	140	222	839
Eagle ray	613	4	0.65	14	49	278	635
Natal seacatfish	593	209	35.24	0	3	315	2031
Hardnose smooth houndshark	582	9	1.55	87	340	344	870
Striped marlin	549	2	0.36	805	848	202	379
Tiger shark	529	24	4.54	196	1751	379	1823
Janbruin/John Brown	514	14	2.72	1	12	110	279
Great white shark	505	14	2.77	345	1548	370	959
Zambezi shark	469	30	6.4	77	539	307	2599
Potato bass	461	26	5.64	2	22	334	2639
Queen mackerel	461	3	0.65	4	12	376	1044
Bonefish	410	2	0.49	4	6	46	75
Halfmoon rockcod	410	78	19.02	1	49	430	2511
Southern pompano	403	25	6.2	56	464	133	848
Blue marlin	397	0	0		0		0
White stumpnose	372	5	1.34	1	3	245	463
Hottentot	358	14	3.91	2	10	269	1078
Pickhandle barracuda	356	59	16.57	2	44	282	1856

Species	No. Tagged	Recaptured since 1984		Km travelled		Days free	
		No.	%	Avg.	Max.	Avg.	Max.
Largemouth queenfish	342	16	4.68	1	10	193	630
Red stumpnose	338	8	2.37	678	107	802	1998
Sandbar shark	329	6	1.82	166	345	250	536
Eastern little tuna	312	0	0		0		0
Flapnose houndshark	299	36	12.04	1	43	577	2216
Puffadder shyshark	296	30	10.14	1	20	157	741
Bartail flathead	283	7	2.47	3	18	295	796
Banded galjoen	281	5	1.78	112	562	230	507
Lemonfish	276	12	4.35	0	2	230	749
Brown shyshark	270	11	4.07	1	10	405	997
Bluntnose spiny dogfish	266	4	1.5	188	669	615	1476
Blackspot shark	263	6	2.28	35	192	281	708
Elephantfish/St Joseph	262	1	0.38	1342	1342	218	218
Spearnose skate	258	9	3.49	1	3	208	462
Bluefin kingfish	252	10	3.97	13	94	140	260
Blue hottentot	223	6	2.69	0	0	106	199
Snapper kob/salmon	221	10	4.52	20	132	170	378
Dark shyshark/catshark	219	84	38.36	1	15	120	635
Blue emperor	211	13	6.16	24	307	280	539
Malabar rockcod	203	31	15.27	1	8	219	1540
White seacatfish	200	4	2	14	21	595	1895
Whitespotted smooth houndshark	190	4	2.11	5	15	478	1627
Snoek (Cape)	181	1	0.55	136	136	491	491
Greyspot guitarfish/sandshark	175	1	0.57	6	6	51	51
Javelin grunter	158	16	10.13	9	65	378	2940
Dorado/dolphinfish	151	1	0.66	64	64	66	66
Spotted eagleray	141	2	1.42	8	15	460	850
Englishman	140	4	2.86	2	6	266	554
Smallspotted pompano	128	3	2.34	4	13	135	220
Striped threadfin	120	2	1.67	5	9	51	63
Short-tail stingray	115	3	2.61	77	231	830	2412
Cock grunter	109	5	4.59	14	65	144	490
Green jobfish	108	4	3.7	0	0	172	373
Flathead mullet	101	1	0.99	738	738	738	738
Great barracuda	100	23	23	0	1	170	467
Russell snapper	97	3	3.09	0	1	328	896
Eeltail catfish	96	1	1.04	1	1	47	47
Moustache rockcod	95	31	32.63	40	1200	432	2990
Cape gurnard	90	3	3.33	0	0	787	1947
Maasbanker	88	0	0		0		0
Thorntail stingray	87	2	2.3	0	0	295	357
Atlantic bonito	87	0	0		0		0
Sliteye/tope shark	87	2	2.3	290	565	1334	2652
Spotted spiny dogfish	82	1	1.22	36	36	120	120
Swordfish	78	1	1.28	9	9	1263	1263
Tomato rockcod	78	16	20.51	0	6	194	537
Oxeye tarpon	75	0	0		0		0
Blackfin reef shark	72	1	1.39	0	0	697	697
Banded catshark	68	8	11.76	16	55	423	1155
Striped mullet	66	1	1.52	1	1	230	230
Longfin/tropical yellowtail	66	0	0		0		0
Whitebarred rubberlip	65	1	1.54	1	1	176	176
Bigeye stumpnose	60	2	3.33	2	3	33	38
Java shark	59	2	3.39	14	18	67	76
Sailfin rubberlip	56	0	0		0		0
Yellowspotted kingfish	56	0	0		0		0
Doublespotted queenfish	55	0	0		0		0
Longfin kingfish	55	1	1.82	12	12	453	453
Needlescaled queenfish	54	1	1.85	0	0	227	227
Cape moony	53	0	0		0		0
Greater yellowtail/amberjack	53	1	1.89	77	77	27	27
Blue/ferdy kingfish	52	0	0		0		0
Sand steenbras	51	1	1.96	0	0	79	79
Yellowtail scad	51	0	0		0		0
Thintail thresher shark	47	0	0		0		0
Concertina fish	46	0	0		0		0
Round ribbontail ray	46	2	4.35	4	8	45	74
Marbled electric ray	45	0	0		0		0
Brown catshark	45	1	2.22	0	0	34	34
Panga	45	0	0		0		0
Lyretail rockcod	44	0	0		0		0
Shortfin mako shark	43	4	9.3	19	69	294	786
Yellowfin emperor	39	4	10.26	0	0	441	1187
Shortbill spearfish	39	0	0		0		0
Wreckfish	39	2	5.13	4	7	231	388
Blue shark	38	0	0		0		0
Minstrel	38	1	2.63	37	37	679	679
Steentjie	37	0	0		0		0
False thornback	37	2	5.41	0	0	194	340
Koester	35	1	2.86	0	0	1176	1176
Dusky rubberlip	35	1	2.86	0	0	645	645
Bludger	34	0	0		0		0
Tiger catshark	33	16	48.48	1	9	491	1776
Milkfish	31	0	0		0		0
Spadefish	31	1	3.23	118	118	2724	2724

Priority species for tagging are highlighted with colour

SHOULD I STAY OR SHOULD I GO?

by Jade Maggs, Oceanographic Research Institute

In 1982, the English punk rock band, The Clash released their hit song “Should I stay or should I go”, expressing indecision with which most of us are familiar. In South Africa's current political climate, many are asking the same question. This is essentially a trade-off decision. Staying in a place provides familiarity with surroundings, but it has always been human nature to wonder whether the grass is greener on the other side. The song by The Clash goes on to say, “If I go, there will be trouble and if I stay, it will be double”. The decision to stay or move ultimately comes down to an evaluation of the positives and negatives of staying versus the positives and negatives of moving. Within the human species, there are those that stay and those that go. This phenomenon is referred to as partial migration, but it is not unique to humans. Recent research has shown that partial migration is inherent in many species in nature, especially birds and fish.

Each year with the onset of winter, around May and June in South Africa, shore anglers in the province of KwaZulu-Natal eagerly await the arrival of migratory species, such as sardines, elf/shad and leervis/garrick. Similarly, ski-boaters anticipate the arrival of large dusky kob and geelbek. Most of these fish have moved up the east coast from the Cape to spawn and are well-known as migratory species. They have predictable, seemingly coordinated movement strategies covering vast distances. On the other hand, we know that some species, such as galjoen and speckled snapper are not migratory. These resident species occur in the same place year round throughout their distribution and show no marked seasonal shifts like migratory species.

However, despite the well-defined, coordinated movements of migratory or wide-ranging species and the site-attachment of resident species, it is becoming apparent that within each species there are non-conformists. Even in well-known migratory species, some individuals remain resident throughout the year, not participating in the annual migration. For example, some acoustic tag research conducted on elf/shad in Langebaan Lagoon on the Cape West Coast showed that some individuals were detected in the lagoon almost continuously over a 30-month period, meaning that they did not participate in the annual migration. There are also an increasing number of tag-recapture observations where individuals of resident species undertake long-distance movements. For example, a galjoen tagged at Lekkerwater in the De Hoop Marine Reserve moved 1 320 km up the east coast and was recaptured just south of Durban after 130 days. Similarly, a slinger tagged off Mtentu near Port Edward was recaptured off Quissico in Mozambique after 582 days. There are many such examples.

Fishery scientists in southern Africa have been studying movement of fishes for the past nine decades (1928-2017). While this has taught us much about fish movement, there is still much to be learnt about those individuals that do not conform to the regular pattern. In the past, these non-conformists received little attention and were often treated as unexplainable anomalies or outliers. But, these observations raise important questions. Why stay put when the rest of your population has migrated so far away? Why undertake a long-distance movement when the rest of your species is characterised by residency? Is this non-conformist behaviour persistent throughout the individual's lifetime? Does this uncharacteristic behaviour benefit the individual or population? These questions are especially relevant to placement of marine protected areas (MPAs).

As part of my PhD research, I have investigated the movements of five South African fish species – leervis/garrick, ragged-tooth shark, spotted gulleyshark, galjoen and speckled snapper. I used tag-recapture data collected by anglers participating in the ORI Cooperative Fish Tagging Project (ORI-CFTP). Using these data, I found evidence of residence and wide-ranging behaviour in juveniles and adults of all five species. There was also some indication that wide-ranging individuals grew faster, either because wide-ranging individuals found more food and therefore grew faster or faster growing individuals were encouraged to move to find more food resources. But, what does this mean for the species and what does it mean for anglers? Research in other parts of the world suggests that the coexistence of residence and migration within a species provides resilience for the population. Residence is a low risk, low reward behaviour, while migration is a high risk, high reward behaviour. This combined strategy can be likened to a balanced investment portfolio. Resident individuals represent the steady, safe, slow-growth component of the portfolio, while migratory individuals are the high-risk, potentially high-reward component. In years when wide-ranging behaviour does not pay off, residents provide insurance for the population. However, in years favouring migration, migrants are able to take advantage of opportunities further afield and contribute many juveniles to the population.

So, this strategy provides resilience against population declines. It therefore also offers some protection against overexploitation by anglers. However, this does not mean that our fish are immune to overexploitation. It simply means that, without this strategy some of our overexploited fish species would possibly be in worse shape if there was no variability in their movement behaviour. It also serves to highlight the importance of MPAs in providing protection for the resident components of these fish populations.

I would like to thank the many participants in the ORI-CFTP, who have contributed their tagging data over the years. My PhD research was heavily dependent on your valuable contributions. I would also like to thank SAAMBR and SAIAB for providing funding to enable me to complete my PhD through Rhodes University.

Special thanks

We would like to express our sincere gratitude for the financial support received from the South African Association for Marine Biological Research (SAAMBR) and the KZN Department of Economic Development, Tourist and Environmental Affairs (EDTEA), without which we would have been unable to continue this important project. Most of all, we would like to thank all of our active tagging members for their on-going contributions towards linefish research and conservation. In particular we would like to acknowledge the following taggers for monetary donations in 2016: Dawid van der Merwe and John Abraham (Madubula Safaris).

Hallprint© Australia is thanked for their excellent service and on-going supply of high quality tags and applicators. Roelf Venter is thanked for his assistance in fitting handles to the tag applicators. Lastly, we thank all of the other sponsors who have contributed in some way over the past 31 years, there are simply too many to mention.

Reef fish connectivity within the iSimangaliso Wetland Park

by Camilla Floros
Oceanographic Research Institute

South Africa's coral reefs are located along the Maputaland coast of KwaZulu-Natal. They are biologically diverse and economically important because they are focal points for tourism in the province. The reefs are situated within two long-standing marine protected areas (MPAs) that extend for approximately 150 km. The spatial management of these extensive ecosystems requires in-depth knowledge of connectivity in reef fish populations between reef units because certain reefs are zoned as no-take sanctuaries, while others are multiple-use zones, permitting activities such as SCUBA diving and pelagic gamefishing. No-take sanctuaries are important because they represent undisturbed ecosystems and have the potential to replenish fish stocks in adjacent areas open to fishing through spill-over. Recent studies have shown that the no-take sanctuaries have significantly larger and higher abundances of predatory species compared to multiple-use zones. It is thus important to determine which of the reefs are acting as sources or sinks of juvenile and adult fish so that management of the MPA zones can be aligned accordingly.

For this reason, the MPA Connectivity Project was initiated by ORI in 2013. The aim of the project was to investigate the movement of adult fish between reefs within the different MPA zones using acoustic telemetry. Acoustic telemetry typically uses high frequency sound to transmit information in mediums that are unsuitable for radio waves, such as salt water. Telemetry systems include a transmitter (tag) and a hydrophone receiver (listening station). Acoustic tags are inserted into the abdominal cavity of fish and transmit a signal made up of acoustic pulses or 'pings' that are detected by the listening stations. Each tag has a unique code so every time a tagged fish moves within listening range of a station, the fish's unique ID will be noted as well as the exact time. Listening stations are placed at strategic locations so that the movement of a particular fish or a group of fish can be recorded over many tens of kilometers.

Two key reef fish species were selected to investigate fish movement i.e. connectivity between the different MPA zones within the iSimangaliso Wetland Park; the iconic potato bass and the green jobfish (also known as a kaakap). These species were chosen because of their ecological significance as key predatory species and because previous studies have shown numbers and sizes of these fish differed between the MPA zones (note that previously green jobfish were considered to be “pelagic gamefish” and were allowed to be kept by boat anglers and spearfishers, however this was recently changed by the proclamation of a Park Rule which prohibited killing green jobfish caught in the iSimangaliso Wetland Park).

Photograph by Camilla Floros of a potato bass being released

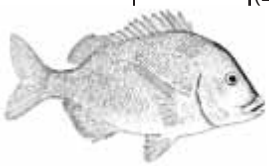
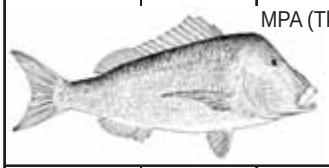
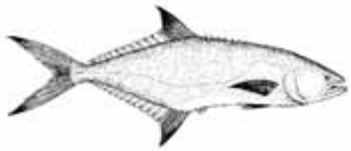
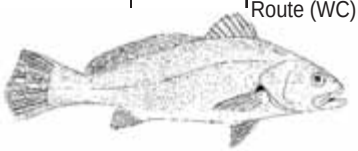
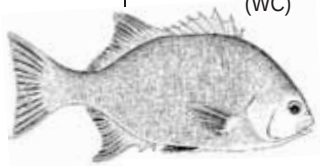
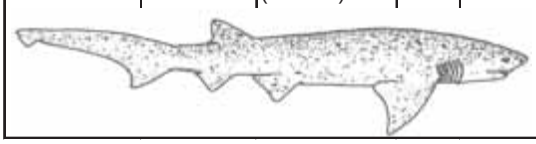
Since 2013, 30 green jobfish and 35 potato bass have been tagged with acoustic transmitters within the Park. In addition, 16 listening stations have been deployed on representative reefs to detect these tagged fish. The listening stations are serviced once a year to download the data. To date, the number of detections for potato bass total 275 560 and for green job, 110 213 detections. While this is a phenomenal dataset, long-term movement data are needed to fully understand the movement patterns shown by these two species. However, some very interesting behaviour has already been recorded including two potato bass that travelled from the southern sanctuary reefs near Leven Point (Cape Vidal) into southern Mozambique waters (Ponta do Ouro) and back again. This is a distance of over 220 km and was covered over 21 days. This behaviour is very unique because they returned back to their “home reef” and because potato bass are thought to be highly resident. Such movement behaviour may be related to spawning activity and this possibility is being investigated further. Another surprising movement was made by a green jobfish, which swam in the opposite direction and was recorded on the Aliwal Shoal near Scottburgh on the KZN south coast. The telemetry detections from the receivers indicate that this fish swam roughly 350 km in 16 days. Unfortunately, green jobfish may be caught outside of the iSimangaliso Wetland Park and this individual has not been recorded again. We urge any anglers who have caught a fish with a tag in it to please report this information to ORI. It is particularly important to note the location and date of capture.

Another interesting pattern has been the scarcity of detections of green jobfish in the multiple-use zones around Sodwana Bay (i.e. Two-mile, Five-mile, Seven-mile and Nine-mile Reefs) compared to the sanctuary reefs. This suggests that they have been removed either by predators or fishermen (prior to the ban on their capture) and emphasizes how important no-take sanctuaries are for protecting fish populations. More potato bass detections have also been recorded of individuals moving between reefs, but not between the different MPA zones. This is not unexpected as potato bass are known to be highly reef-associated and territorial. These characteristics make this charismatic, top predator vulnerable to overexploitation; fortunately though, this species is fully protected within South African waters, a regulation that was originally imposed in the 1970s largely due to concern expressed by conservation-conscious divers and spearfishers.

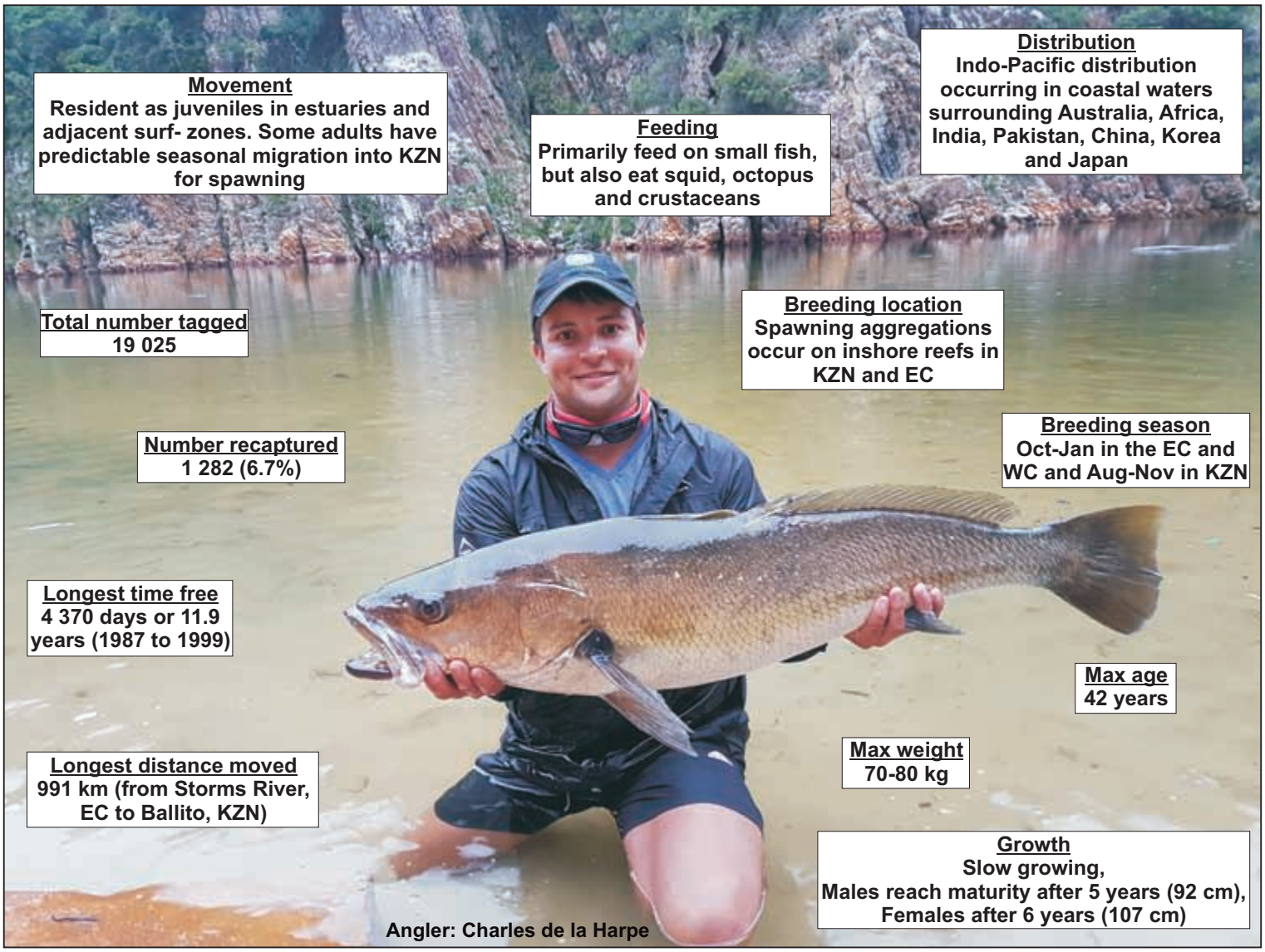
Photograph by Camilla Floros of a green jobfish

The MPA Connectivity Project is part of a national programme called the Acoustic Tracking Array Platform (ATAP) which aims to monitor the movements and migrations of inshore marine animals in southern African waters. A number of marine institutes are involved in this collaborative programme and many other fish species that have been tagged with acoustic transmitters have also been detected on the ORI receivers within the iSimangaliso Wetland Park. These include great white sharks, Zambezi sharks, tiger sharks, blacktip sharks, giant kingfish, giant sandsharks and garrick. The high numbers of detections within the Park highlight its importance as a corridor for these species and adds to its uniqueness.

Top 10 most exciting recaptures from 2016

Species	Tag date	Tag locality	Tag size	Tagger	Recap Date	Recap locality	Recap size	Recapturer	Dist. (km)	Days free	Growth (mm)	Comments
White musselcracker / brusher 	13/06/2012	Tinley Manor (KZN)	630	Mark de la Hey	23/03/2016	Cape Recife, PE (EC)	760	Sean Riley	816	1379 (3.8 yrs)	130	Second longest recorded distance moved for this species, suggests that adults return after spawning in KZN waters.
Dageraad 	05/11/2012	PE, Algoa Bay (EC)	490	Koos Smith	29/02/2016	Trafalgar, Port Edward (KZN)	550	Mark Snyman	567	1211 (3.3 yrs)	60	Second longest recorded distance moved and time free for this species, normally very resident.
Scotsman 	16/04/2014	Mtentu, Pondoland MPA (Tkei)	518	ORI scientist	06/04/2016	Guinjata, Mozambique	640	Gert Krugell	1171	721	122	Usually resident as juveniles, probably a northward movement for spawning.
Garrick/ leervis 	12/12/2014	Breede River (WC)	630	Mike Dohlhoff	22/08/2016	St Lucia (KZN)	790	Johan De Jager	1523	619	160	Northward spawning migration into KZN
Dusky kob 	11/09/2013	Natures Valley, Garden Route (WC)	770	Patrick McDonald	14/08/2016	Durban (KZN)	1160	Greg Noble	976	1068 (2.9 yrs)	390	Northward spawning migration into KZN
Galjoen 	20/07/2016	De Hoop MPA (WC)	350	DEA scientist	20/09/2016	Dwesa-Cebe MPA, Transkei (EC)	?	Subsistence fisher	964	62	?	One of the "movers" in the population. Moved 15.5 km per day!
Diamond ray 	29/01/2016	Gordons Bay, False Bay (WC)	1900	Armand van der Walt	28/12/2016	Port Durnford, Mtunzini (KZN)	1900	Mike Karon	1756	334	0	Longest distance moved for a diamond ray, only 25 recaptures recorded out of 3 477 tagged
Coral rockcod 	16/02/2002	Port Durnford, Mtunzini (KZN)	330	J. Niehaus	09/11/2016	Richards Bay New Mouth (KZN)	?	Zack	8	5380 (14.7 yrs)	?	This is the only recapture recorded for this species and it has a remarkable time at liberty!
Sevengill cowshark 	23/09/2015	Langebaan Lagoon, (WCoast)	1450	Werner Labuschagne	03/08/2016	Strandfontein (False Bay), Cape Town (WC)	?	Unknown	243	315	?	Moved from the West Coast around Cape Point to Strandfontein

Focus species: Dusky kob (*Argyrosomus japonicus*)



Movement
Resident as juveniles in estuaries and adjacent surf- zones. Some adults have predictable seasonal migration into KZN for spawning

Feeding
Primarily feed on small fish, but also eat squid, octopus and crustaceans

Distribution
Indo-Pacific distribution occurring in coastal waters surrounding Australia, Africa, India, Pakistan, China, Korea and Japan

Total number tagged
19 025

Breeding location
Spawning aggregations occur on inshore reefs in KZN and EC

Number recaptured
1 282 (6.7%)

Breeding season
Oct-Jan in the EC and WC and Aug-Nov in KZN

Longest time free
4 370 days or 11.9 years (1987 to 1999)

Max age
42 years

Max weight
70-80 kg

Longest distance moved
991 km (from Storms River, EC to Ballito, KZN)

Growth
Slow growing,
Males reach maturity after 5 years (92 cm),
Females after 6 years (107 cm)

Angler: Charles de la Harpe

Tagging in Marine Protected Areas

The top number is the number of fish tagged in 2016 and the bottom number is the number of fish tagged overall. The number of fish recaptured is given in brackets.