

Results of Three Years of the Great Fiji Shark Count, April 2015

Over the past three years, dive operators across the Fiji Islands and their diving and snorkelling guests have been recording their Shark, Ray and Turtle sightings over the months of April and November. Thanks to those dedicated divers, we now have some interesting facts to share about Shark populations in Fiji.

The data is analysed by the number of Shark/Ray/Turtle sightings recorded on every dive by every diver who takes part. This is called number of sightings per observation. Because there are usually many divers on each dive, we have thousands of observations every month.

We have separated dives where feeding was carried out from those where no feeding was done.

Highlights:

There have been some unexpected and exciting sightings recorded over the past three years.

- Guitarfish, previously very rarely recorded in Fiji, have been regularly seen on sites along the Coral Coast.
- A Leatherback Turtle was seen during a dive (a very rare occurrence) in the Yasawas in November 2014
- Schooling Hammerheads have been regularly recorded on a dive site on the South Coast of Vanua Levu
- *Mobula* Rays have been recorded in the Pacific Harbour/ Beqa region and also in Namena, south of Vanua Levu
- Tahitian Rays (*Himantura fai*) were recorded in the Yasawas
- Hammerheads and Guitarfish have only been recorded on non-feeding dives
- Rays and Turtles are more common on non-feed dives than on baited feeding dives
- The most common sharks seen on baited feeding dives are Bull, White Tip Reef, Grey, and Black Tip Reef Sharks
- Some sharks species, including Bull, Grey Reef and possibly White-tip Reef Sharks, exhibit seasonal patterns of higher and lower numbers, which are probably related to breeding behaviour.
- So far no significant decrease in coastal shark populations has been seen, good news for those of us fearing that shark-fin fishing was continuing to damage shark stocks, but we can only confirm this one way or the other by continuing these surveys over the long term

Participation:

Non-Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Numbers of Dive Operators participating	23	14	15	17	11	11
Number of Dives recorded	808	491	512	740	373	719
Number of total Observations (every diver taking part)	3,388	1,982	2,642	3,816	1,798	3,505

Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Numbers of Dive Operators participating	3	3	3	4	4	5
Number of Dives recorded	47	51	49	73	73	65
Number of total Observations (every diver taking part)	304	361	386	462	561	466

From a very enthusiastic start in April 2012, the number of participating dive operators has dropped to our reliable core team, representing operators on Viti Levu, Beqa, Taveuni, Vanua Levu, the Mamanuca and Yasawa islands, and the Lomai Viti / Vatu-i-Ra area. We'd like to thank those operators who have stuck by this project and worked hard to get the data to us in a useful format!

Even though the number of dive operators has decreased, the number of dives and of observations (every diver who takes part makes one observation per dive) has remained in the thousands, with the highest total of 4,278 observations in November 2013.

Non-Feeding Dives:

Total number of Species seen

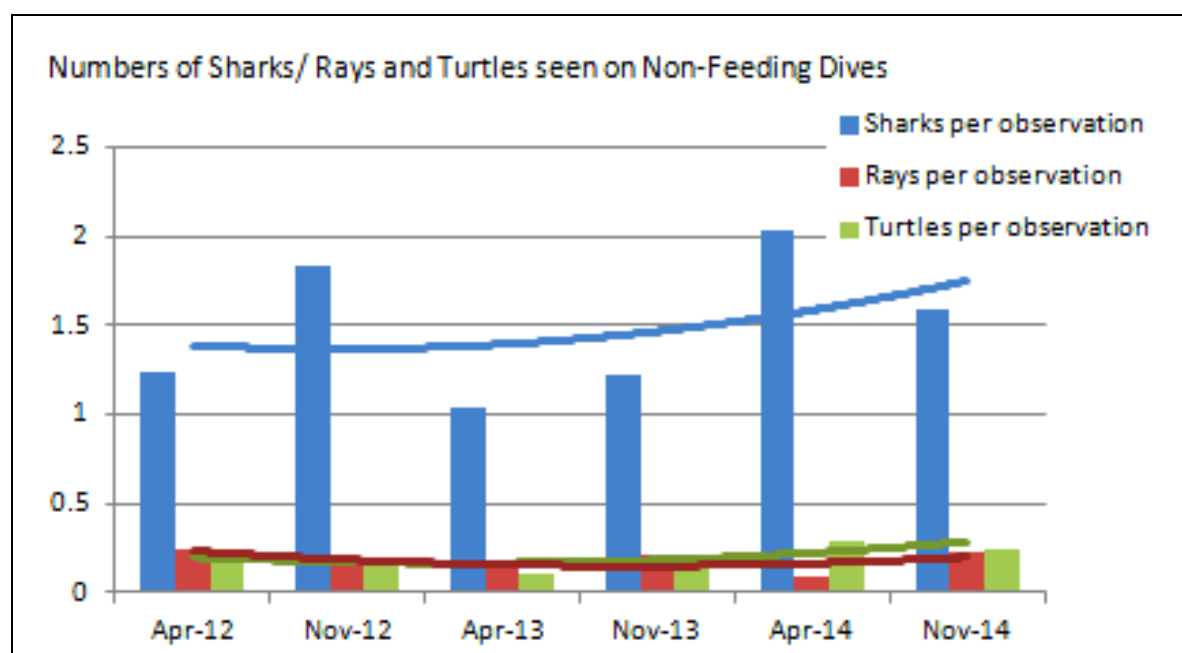
Non-Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Number of Shark species	11	7	10	9	10	9
Number of Ray species	5	5	4	5	4	6
Number of Turtle species	2	2	2	2	2	3

Total Numbers of Animals seen

Non-Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Total number of Sharks	4,197	3,642	2,731	4,650	3,646	5,591
Total number of Rays	821	320	420	793	176	778
Total number of Turtles	765	303	288	783	532	849

Average Numbers of Animals seen per Observation (per diver per dive)

Non-Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Sharks seen per observation	1.24	1.84	1.03	1.22	2.03	1.60
Rays seen per observation	0.24	0.16	0.16	0.21	0.10	0.22
Turtles seen per observation	0.23	0.15	0.11	0.21	0.30	0.24



Over the years, across Fiji, divers have seen an average of 1.22 to 2.03 Sharks on every dive, plus one Ray and one Turtle every 5 to 10 dives.

Shark sightings varied year by year, but the general trend appears stable or slightly increasing.

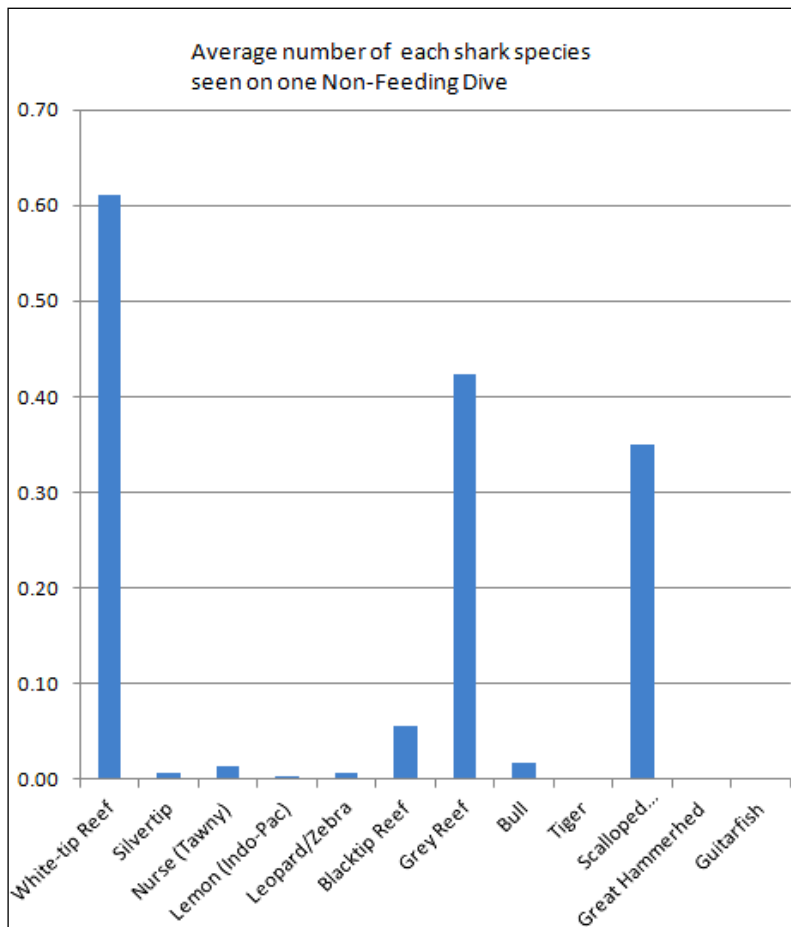
Ray and Turtle sightings appear to be very stable.

Non-Feeding Dives:

Shark Species most commonly seen Average numbers of animals per dive

	<i>White-tip Reef</i>	<i>Silvertip</i>	<i>Nurse (Tawny)</i>	<i>Lemon (Indo-Pac)</i>	<i>Leopard /Zebra</i>	<i>Black-tip Reef</i>
Apr-12	0.647	0.018	0.055	0.014	0.004	0.084
Nov-12	0.667	0.007	0.005	0.000	0.000	0.038
Apr-13	0.632	0.003	0.002	0.003	0.004	0.143
Nov-13	0.687	0.001	0.008	0.000	0.012	0.024
Apr-14	0.592	0.013	0.001	0.000	0.019	0.016
Nov-14	0.440	0.001	0.009	0.000	0.005	0.026
Average	0.611	0.007	0.013	0.003	0.007	0.055

	<i>Grey Reef</i>	<i>Bull</i>	<i>Tiger</i>	<i>Scalloped Hammerhead</i>	<i>Great Hammerhead</i>	<i>Guitarfish</i>
Apr-12	0.192	0.061	0.001	0.161	0.000	0.001
Nov-12	0.801	0.001	0.000	0.319	0.000	0.000
Apr-13	0.211	0.026	0.005	0.006	0.000	0.000
Nov-13	0.468	0.001	0.000	0.018	0.000	0.001
Apr-14	0.224	0.000	0.001	1.159	0.001	0.002
Nov-14	0.648	0.017	0.000	0.442	0.000	0.008
Average	0.424	0.018	0.001	0.351	0.000	0.002



The most common sharks seen on Non-Feeding dives are White-tip Reef and Grey Reef Sharks.

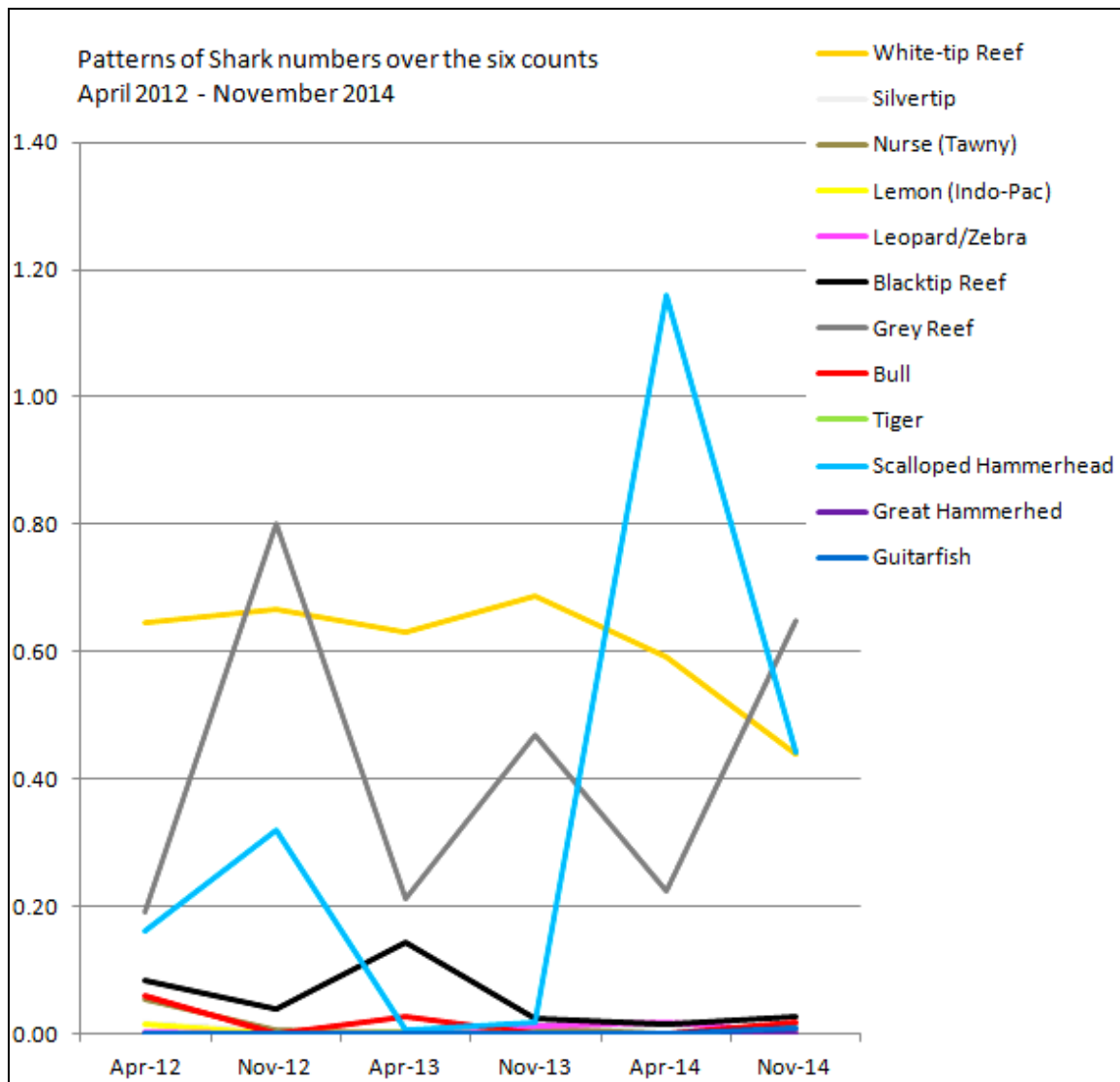
Large schools of Scalloped Hammerheads are regularly recorded in a single location, but are only occasionally seen elsewhere.

Other species seen uncommonly but reliably in certain locations are Black-tip Reef Sharks, Tawny Nurse Sharks, Leopard Sharks and Guitarfish.

Very occasionally encountered are Silvertip, Bull, Tiger and Lemon Sharks.

Great Hammerheads are very rarely confirmed.

Non-Feeding Dives: Shark Species across time

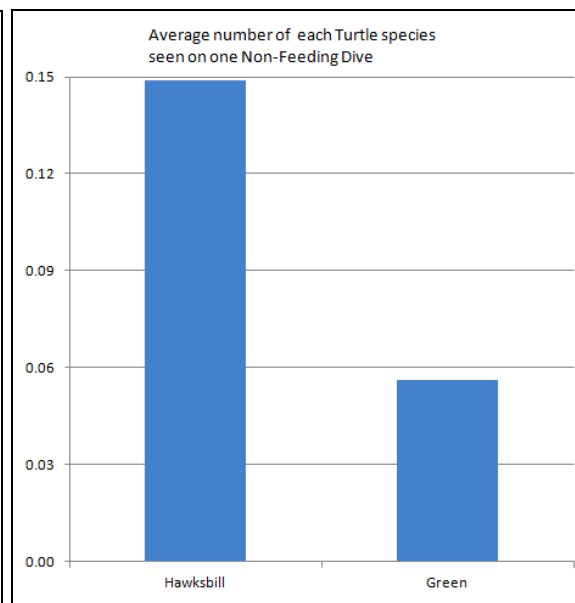
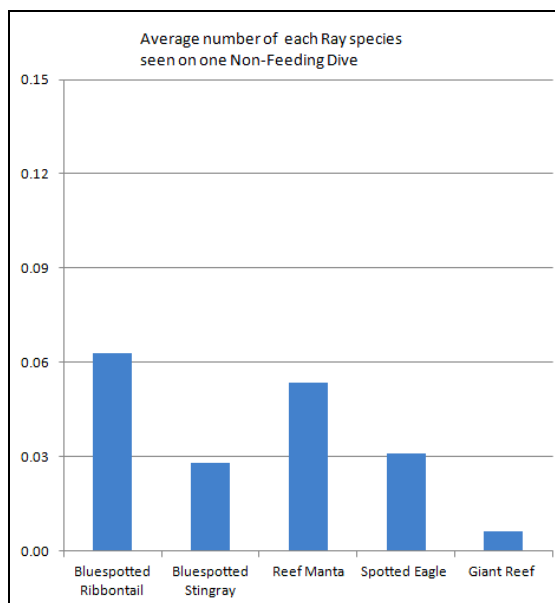
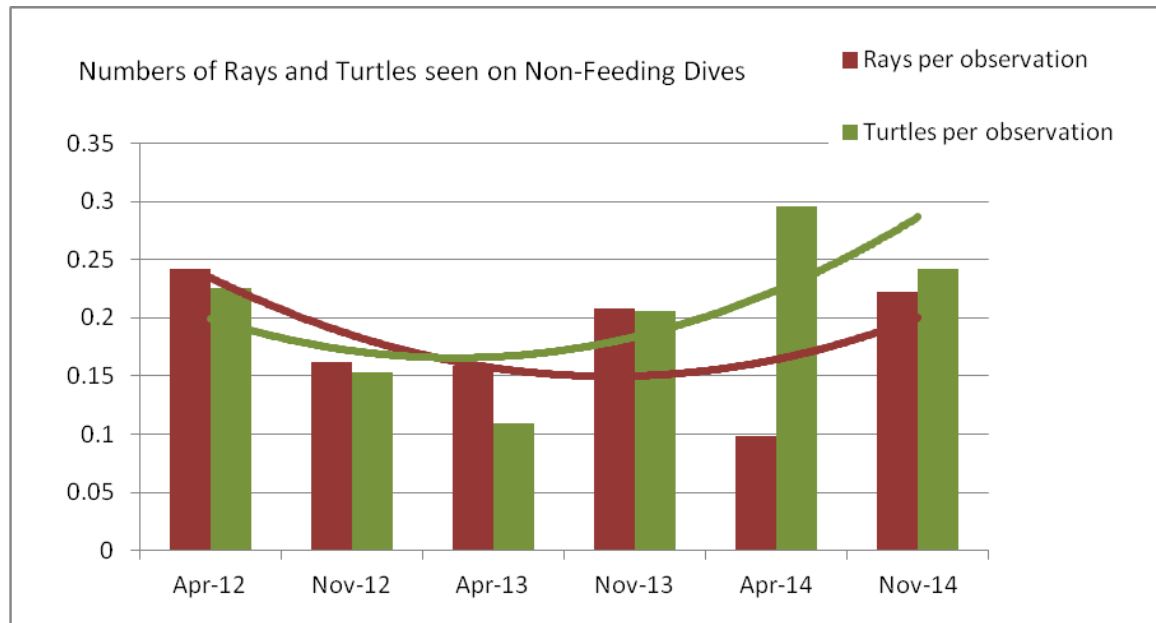


Grey Reef Sharks (dark grey line) show a pattern of higher numbers every November and lower numbers every April, which may be related to seasonal breeding activities.

White-tip Reef Shark (orange line) numbers appear to be slightly declining over the time of the surveys, particularly in 2014.

No other obvious patterns can be seen. Scalloped Hammerhead (light blue line) sightings are greatly affected by the number of dives done in their schooling location during the survey period.

Non-Feeding Dives: Rays and Turtles



No specific patterns or changes in species population over time were seen.

The most common Rays and Turtles seen on Non-Feeding Dives were:

1. Hawksbill Turtles
2. Bluespotted Ribbontail Rays
3. Green Turtles
4. Reef Manta Rays
5. Spotted Eagle Rays
6. Bluespotted Stingrays
7. Giant Reef Rays (uncommonly)

Three species not included in the survey lists were also recorded;

- Mobula Rays
- Tahitian Rays
- Leatherback Turtle.

Feeding (Baited) Dives:

Total number of Species seen

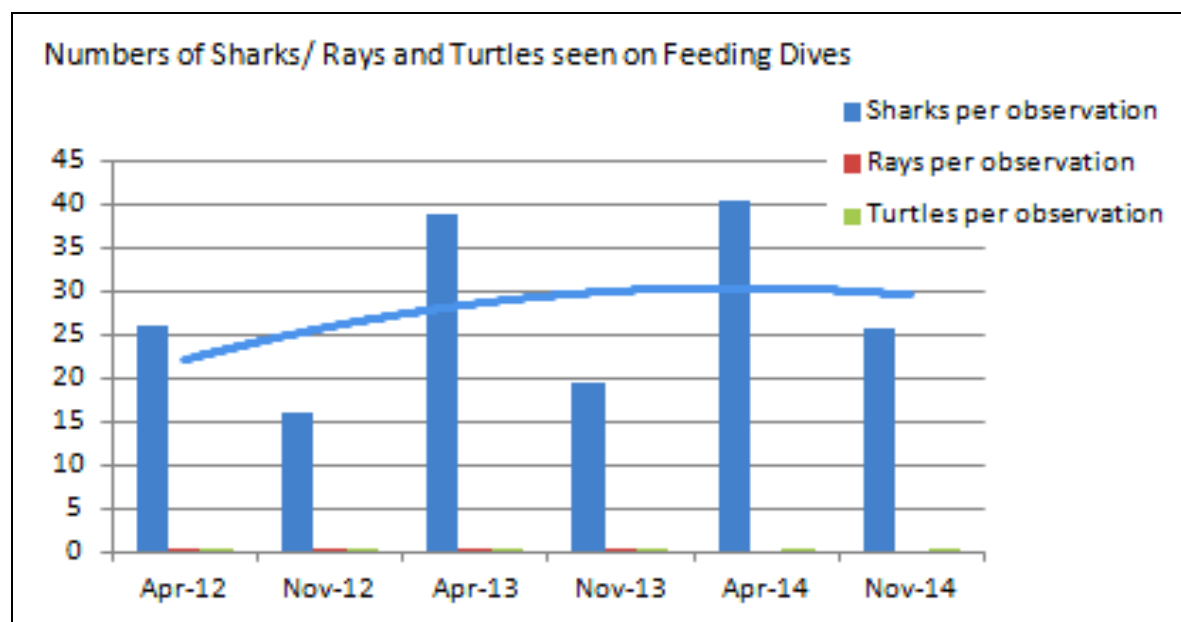
Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Number of Shark species	9	7	8	7	8	8
Number of Ray species	2	2	1	2	0	0
Number of Turtle species	1	2	1	2	2	2

Total Numbers of Animals seen

Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Total number of Sharks	7,876	5,813	14,930	9,049	22,651	11,896
Total number of Rays	10	18	2	11	0	0
Total number of Turtles	3	17	10	15	24	45

Average Numbers of Animals seen per Observation (per diver per dive)

Feeding Dives	April 2012	November 2012	April 2013	November 2013	April 2014	November 2014
Sharks seen per observation	25.91	16.10	38.68	19.59	40.38	25.53
Rays seen per observation	0.03	0.05	0.01	0.02	0.00	0.00
Turtles seen per observation	0.01	0.05	0.03	0.03	0.04	0.10



Shark numbers were ten times more than seen on non-feed dives.

Overall populations appear to be increasing slightly.

Many of the baited feeding dives in Fiji involve large numbers of Bull Sharks which are known to have seasonal breeding patterns, reflected in lower shark numbers every November and higher numbers every April.

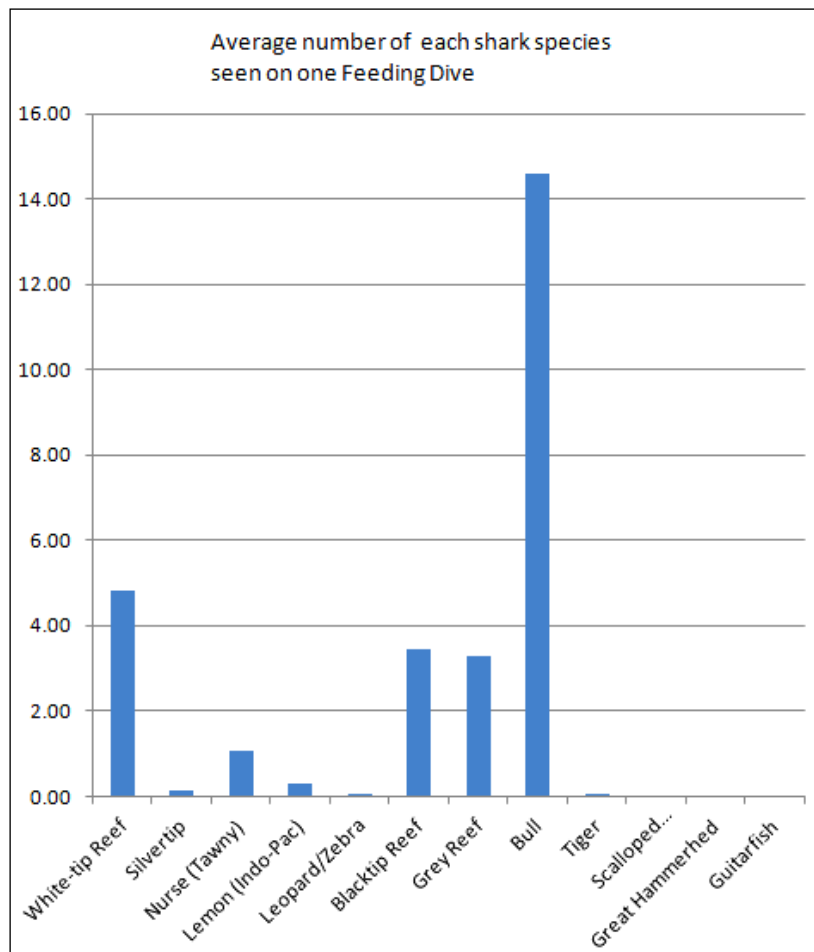
Ray and Turtle sightings on the feed sites are infrequent, and numbers generally low.

Feeding (Baited) Dives:

Shark Species most commonly seen Average numbers of animals per dive

	<i>White-tip Reef</i>	<i>Silvertip</i>	<i>Nurse (Tawny)</i>	<i>Lemon (Indo-Pac)</i>	<i>Leopard /Zebra</i>	<i>Black-tip Reef</i>
Apr-12	4.372	0.230	1.382	0.480	0.020	3.003
Nov-12	4.360	0.227	0.374	0.374	0.000	3.321
Apr-13	6.355	0.041	1.267	0.409	0.003	4.684
Nov-13	4.100	0.119	0.489	0.195	0.000	4.922
Apr-14	6.310	0.221	1.857	0.152	0.000	2.772
Nov-14	3.412	0.088	0.964	0.232	0.000	2.062
Average	4.372	0.230	1.382	0.480	0.020	3.003

	<i>Grey Reef</i>	<i>Bull</i>	<i>Tiger</i>	<i>Scalloped Hammerhead</i>	<i>Great Hammerhead</i>	<i>Guitarfish</i>
Apr-12	2.559	13.862	0.000	0.000	0.000	0.000
Nov-12	3.064	4.382	0.000	0.000	0.000	0.000
Apr-13	3.632	22.288	0.000	0.000	0.000	0.000
Nov-13	3.457	6.305	0.000	0.000	0.000	0.000
Apr-14	2.948	26.107	0.009	0.000	0.000	0.000
Nov-14	4.036	14.719	0.015	0.000	0.000	0.000
Average	2.559	13.862	0.000	0.000	0.000	0.000

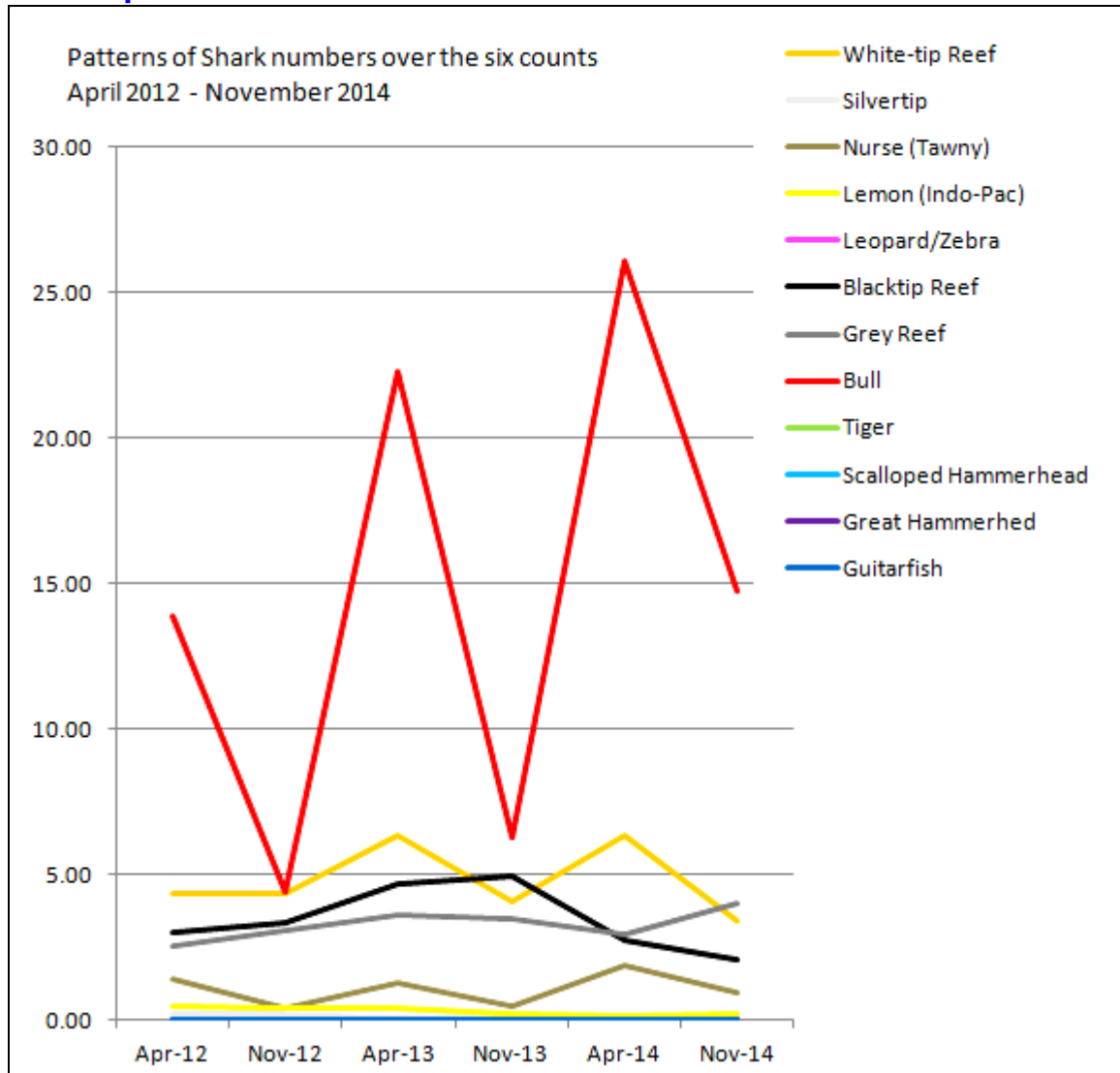


By far the most common sharks seen on feeding dives were Bull Sharks, followed by White-tip, Black-tip and Grey Reef Sharks.

Silvertip, Tawny Nurse and Indo-Pacific Lemon Sharks occasionally visit the feeds, and very occasionally a Tiger or a Leopard Shark.

Scalloped and Great Hammerheads and Guitarfish have never been recorded at a shark feed.

Feeding (Baited) Dives: Shark Species across time



Bull Sharks show a very obvious pattern of higher numbers in April and lower numbers in November, reflecting the breeding season when female Bulls are known to leave the feeding grounds to give birth in river estuaries.

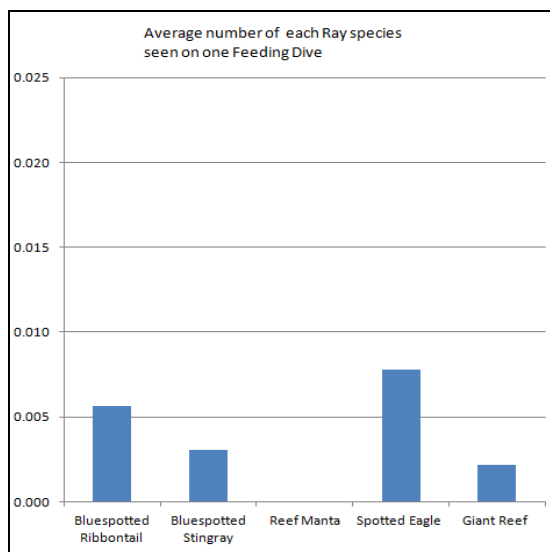
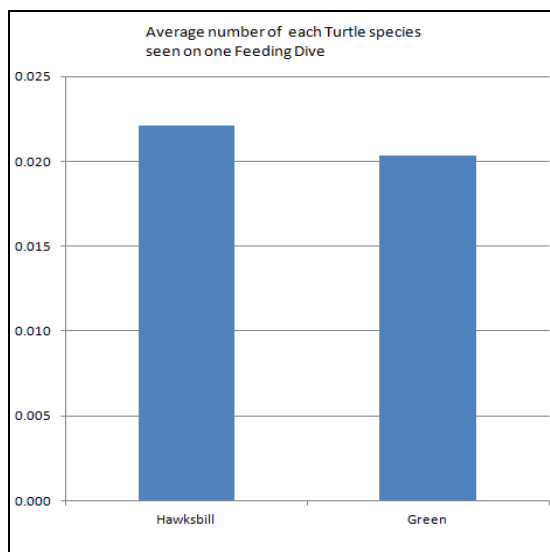
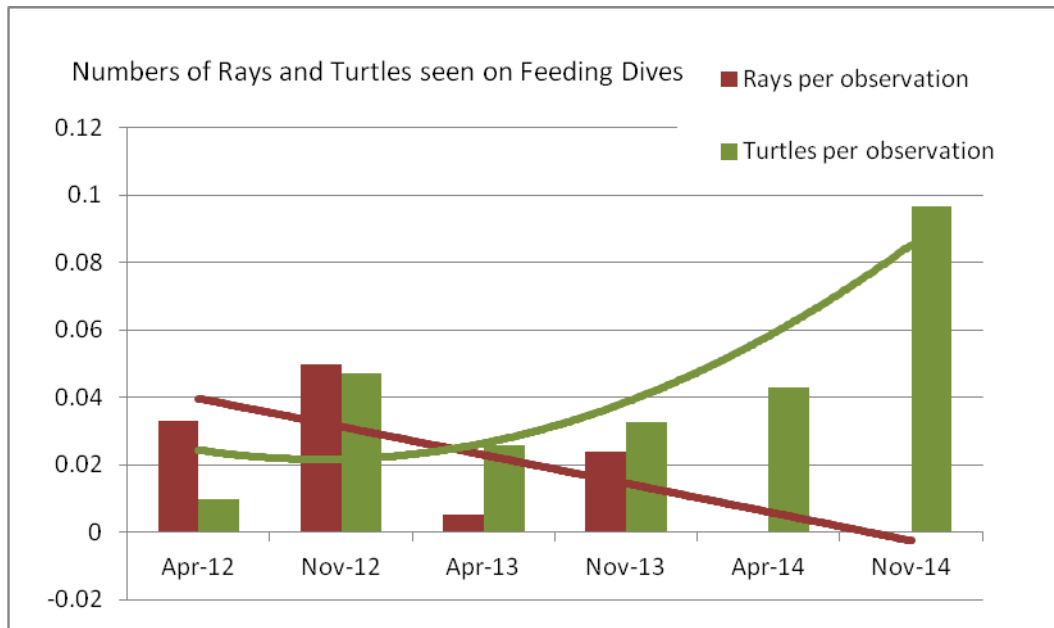
Bull shark populations appear to be increasing at both times of year, while other species are remaining stable or in slight decline.

A slight but similar seasonal pattern is seen in White-tip Reef and Tawny Nurse Shark numbers, which was not seen in the data from non-feeding dives.

There appears to have been a slight decline in numbers of Black-Tip Reef Sharks, particularly in 2014.

There are no other patterns apparent.

Feeding (Baited) Dives: Rays and Turtles



Rays and Turtles were seen very uncommonly on Feeding Dives, and numbers are only around a tenth of those seen on Non-Feeds. This may be due to the presence of large numbers of Sharks on Feeding Dives, or to the habitat types of the reefs selected for use as Feeds.

There is an overall suggestion that Ray numbers have declined and Turtle numbers increased over the past three years, but the sightings are so infrequent that these patterns are not reliable.

The most common Rays and Turtles seen on Feeding Dives were:

1. Hawksbill Turtles
2. Green Turtles
3. Spotted Eagle Rays
4. Bluespotted Ribbontail Rays
5. Bluespotted Stingrays
6. Giant Reef Rays (uncommonly)