

# Maldives Sharkwatch Report

## 2012-2013



Black tip reef shark © Adam Broadbent Scubazoo



# Maldives Sharkwatch Survey Report – 4<sup>th</sup> Year

July 2012 – June 2013

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## Summary

- The aim of Sharkwatch is to collect baseline data on the distribution and abundance of reef sharks throughout the Maldives and to monitor changes in populations following introduction of the reef shark fishing ban on 01 March 2009.
- Over the period July 2009 to June 2013, “Sharkwatch” surveys have been carried out by dive schools at resorts in Haa Alifu Atoll, Noonu Atoll, Baa Atoll, Lhaviyani Atoll, North and South Male’ Atoll, Rasdhoo Atoll, North and South Ari Atoll, Dhaalu Atoll and Laamu Atoll. Surveys have also been conducted by Lazy Gecko, an individual Dive centre based in N. Velidhoo.
- This report covers the fourth year of the programme, from July 2012 to June 2013, when a total of 4,971 Sharkwatch surveys were carried out at 286 sites.
- A total of 9,483 sharks were recorded during July 2012 – June 2013. The most frequently sighted species during this 12 month period were white tip reef sharks, followed by grey reef sharks.
- Sharks appear to be relatively widely distributed in the Maldives, occurring at 79% of the sites surveyed in 2009-2010 and 85% of the sites surveyed in 2010-2011. This abundance however decreased to 68% during the period of 2011-2012, which is a possible decrease due to difference in sites being surveyed. An increase number of sites where sharks were seen to occur was observed for the 4<sup>th</sup> year of the survey, with sharks being observed in 73% of the sites.
- On average 2.03 sharks were recorded per survey over the period July 2010- June 2011 and 2.18 over the period July 2009 – June 2010. An average of 2.14 sharks were recorded for 3<sup>rd</sup> year of the survey, while an average of 1.9 sharks were recorded for the current survey period
- As stressed in earlier reports, seasonal trends in shark sightings are difficult to establish due to reasons such as short survey time and different survey sites. This emphasizes the importance of continued monitoring of selected sites to assess changes to population and establish seasonal trends. It also reiterates the importance of participation by more resorts/dive centres, so as to enable the monitoring of a greater number of sites and increased survey effort

## Introduction

The biology of sharks, with slow growth, late maturity and low fecundity makes them very vulnerable to exploitation. Additionally, sharks play a key role in the ecosystem and are top predators in the marine food chain. Their biology and importance in the ecosystem makes it clearly evident that sharks should be conserved. Sharks have been heavily exploited in the Maldives, especially for their shark liver oil and fins. As a result of intense exploitation shark populations in Maldivian waters decreased over time, which led to legislation being implemented over a number of years in order to manage the fishery and conserve the resource. However, since initial measures to conserve the resource failed to serve the purpose, a fishery ban was implemented in 2009 for the reef shark fishery followed by a total ban on shark fishing within Maldivian waters. Ushan and Wood (2010) give details of all the legislation pertaining to the shark fisheries.

‘Sharkwatch’ was launched in July 2009 as part of the Darwin Reef Fish Project. The aim of the programme is to collect baseline information on shark populations and assess the effectiveness of the ban on shark fishing and trade of shark products in terms of changes to shark populations in Maldivian waters.

This report covers the fourth year of the Sharkwatch programme and details survey results for the period July 2012 – June 2013. It hence follows the same format as earlier reports (Ushan and Wood, 2010, Ushan, Sattar and Wood, 2011, Sattar, Wood, Ushan and Ali, 2014a). 12 resorts, 1 dive centre on an inhabited island and 1 safari vessel participated in the survey.

The survey form which is provided to all participating resorts/dive centres is shown in Appendix 1. The programme uses the Roving Diver Technique to survey and area. Ushan and Wood (2010) describe the sharkwatch methodology.

## Results

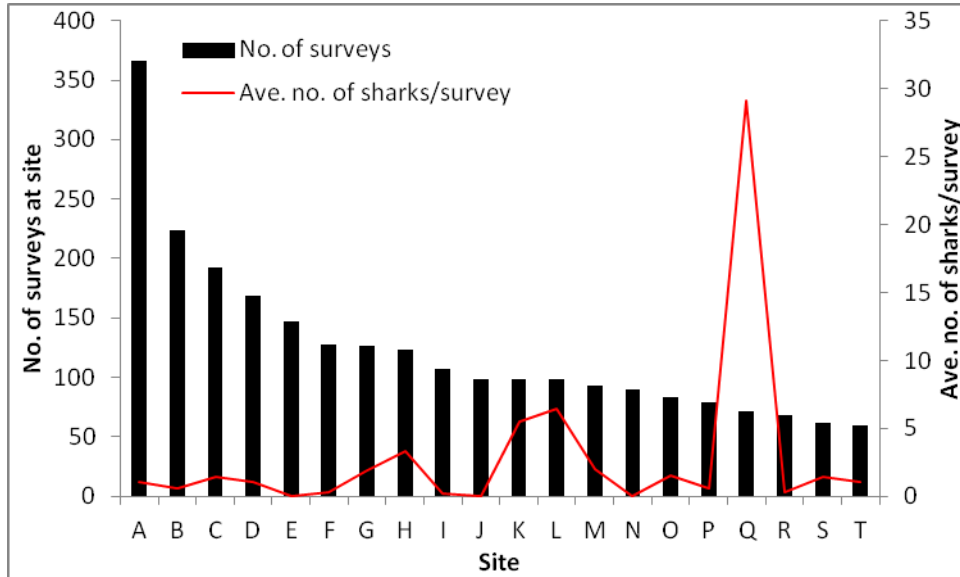
### *Sites surveyed*

A total of 4,971 surveys were carried out at 286 sites over the period of July 2012 to June 2013. Both the number of surveys conducted and sites surveyed are seen to be greater in number than that for the last two survey periods. While the number of participating resorts and dive centres has remained almost the same over the years, the increased survey effort is an indication of increased interest both in the programme and in shark watching as an activity. Furthermore, while surveys over the first 2 years of the programme were mainly conducted in the central Maldives, it should be noted that for the third and fourth years, surveys were also undertaken by resorts/dive centres in north and south of Maldives, thus increasing the geographic spread of survey effort. A map of areas where surveys were undertaken is shown in Appendix 2.

Figure 1 shows the number of surveys carried out at the top 20 sites surveyed during the period of July 2012 to June 2013. As noted, site designations A,B,C are not the same as in previous monitoring reports (Ushan and Wood, 2010; Ushan, Sattar and Wood, 2011, Sattar, Wood, Ushan and Ali, 2014a) as the top

twenty sites for the four periods were found to be different to some extent. However, 9 sites which fell into the top 20 category for the 3<sup>rd</sup> year of the survey period were also seen to fall into this category for the current (4<sup>th</sup>) year of the survey period.

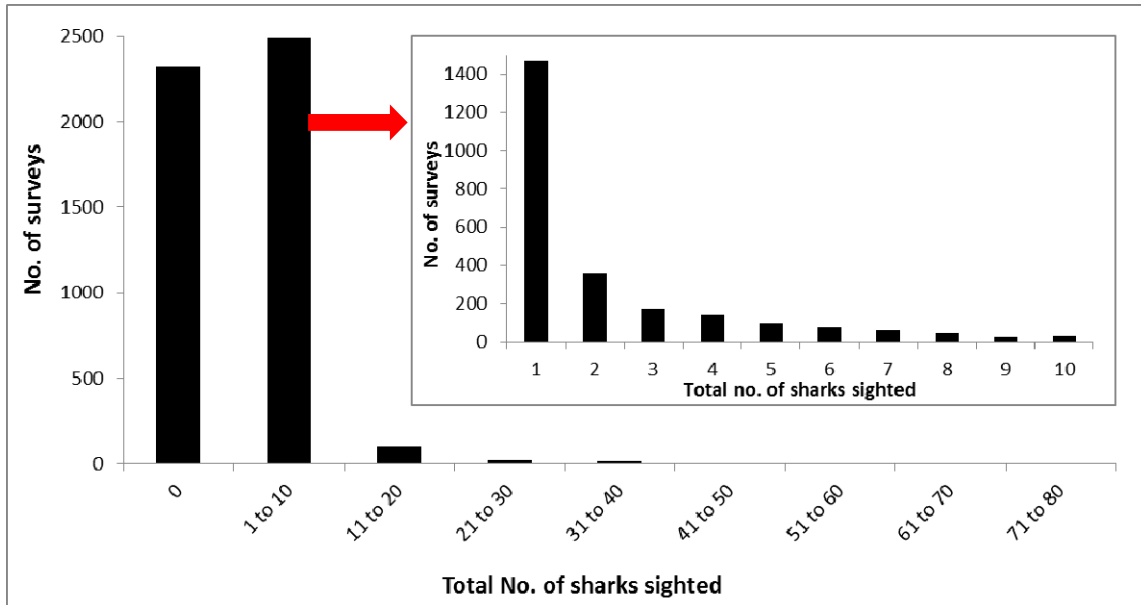
The highest number of surveys to be made at a single site during the 4<sup>th</sup> year was 366 surveys. Approximately 70% of the sites were surveyed up to 10 times, while 35% of all sites were surveyed only 1 to 2 times. Figure 1 shows the number of surveys made at the top 20 sites which were surveyed (black bars).



**Figure 1. Number of surveys carried out at the most frequently surveyed sites during the period July 2012 - June 2013 (note these sites have not been named at the request of the Dive Centers providing the data). Also note that the site designation A, B, C etc in this chart are not comparable with sites A,B,C in the previous reports**

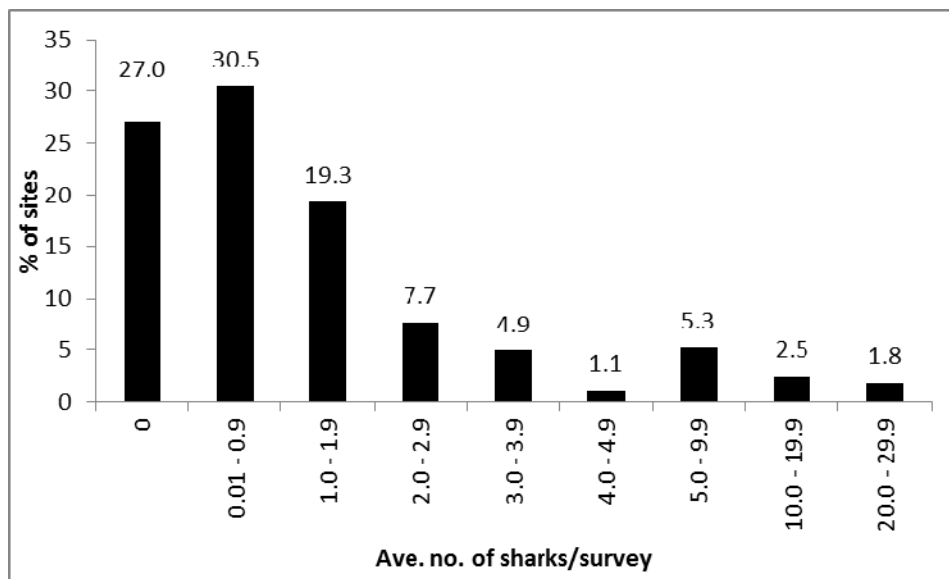
The average number of sharks seen per survey at these sites varied between zero sightings to as many as 29.11 sharks per survey (Figure 1). As emphasized in previous reports, participants in Sharkwatch were requested to carry out surveys at as many dive sites as possible and *not* just to select those that were recognized as shark sites. This explains the lack of correlation between the number of visits and the number of sharks seen. For example the most visited site had a very low density of sharks but was surveyed many times because it is a dive site that is close to a Dive Centre dedicated to shark watching and is on their regular diving itinerary.

Figure 2 shows the frequency distribution of total number of sharks seen on each survey. As depicted in the figure, 1 to 10 sharks were observed on the majority of all surveys (approximately 50% of surveys), while a breakdown of this category shows that 1 shark was observed on the majority of all surveys (30% of all surveys). No sharks were observed on approximately 47% of all surveys.



**Figure 2. Frequency distribution of total number of sharks sighted on all surveys. The smaller chart shows a breakdown of the category of 1 to 10 sharks sighted**

Figure 3 shows the average number of sharks/survey and percentage of sites which report these numbers.



**Figure 3. The average number of sharks seen per survey for the period between July 2012 and June 2013**

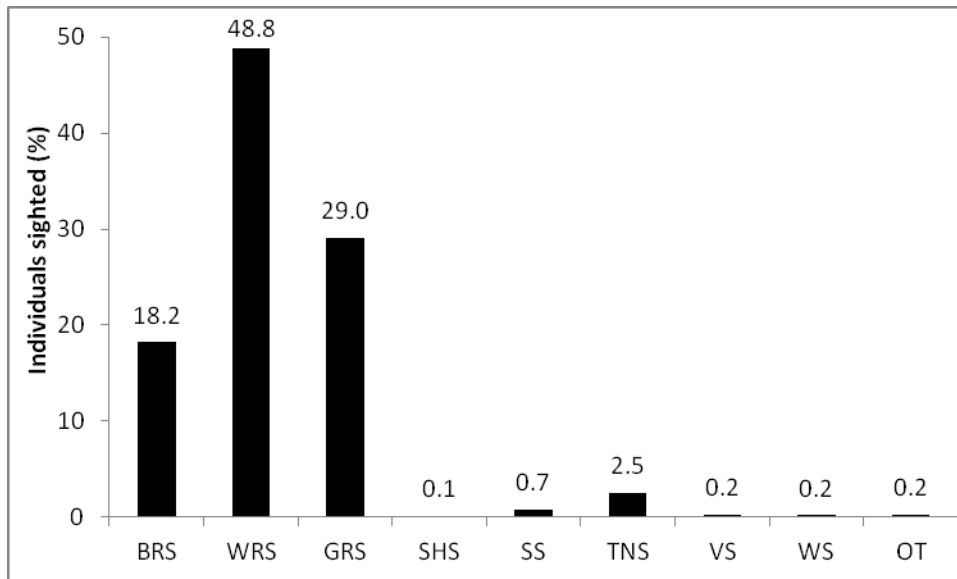
Sharks were seen at 73% of the sites, while 27% of the sites reported no shark sightings. On average 1.9 sharks were recorded per survey.

**Species and abundance**

A total of 9,483 sharks were recorded during the 12 month survey period from July 2012 to June 2013 (no. of surveys = 4,971). Figure 4 shows a breakdown of sharks recorded as per the species listed in the survey form and in table 1 below.

**Table 1. Species of sharks listed on the survey form**

Code	English name	Scientific name
BRS	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>
WRS	Whitetip Reef Shark	<i>Triaenodon obesus</i>
GRS	Grey Reef Shark	<i>Carcharhinus amblyrhynchos</i>
SHS	Scalloped Hammerhead Shark	<i>Sphyrna lewini</i>
SS	Silvertip Shark	<i>Carcharhinus albimarginatus</i>
TNS	Tawny Nurse Shark	<i>Nebrius ferrugineus</i>
VS	Variegated Shark	<i>Stegostoma fasciatum</i>
WS	Whale Shark	<i>Rhincodon typus</i>
OT	All other Sharks	



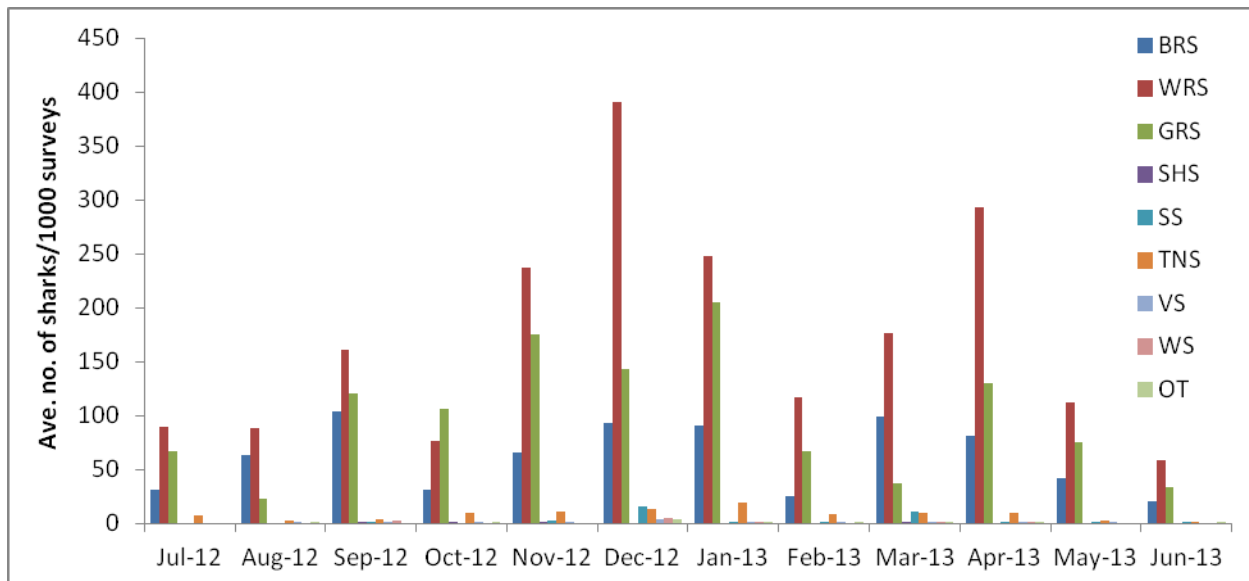
**Figure 4. Percentage composition of sharks by species observed between July 2012 – June 2013 (n = 9,483)**

The most commonly recorded species of shark for the period July 2012 to June 2012 is seen to be the Whitetip Reef shark, followed by the Grey Reef shark. This is in contrast to the previous survey period (2011 to 2012) but is similar to the two earlier survey periods (2009 to 2010 and 2010 to 2011) when the Whitetip Reef shark was the most commonly observed species. The percentage contribution of Whitetip Reef shark to the total is comparable to that of the last survey period (with an increase by 5%), while there is a marked decrease in the percentage of Grey Reef shark recorded. There is also a marked increase in the percent composition of Blacktip Reef shark over the past year.

The site with the highest recordings of Grey Reef sharks for the previous surveys was also amongst the top 20 sites for the current survey period. However, the number of surveys conducted at the site during the current period was about 30% fewer than the number of surveys conducted at the site during the survey period of 2011-2012. This could be a contributing factor to the decreased number of Grey Reef shark sightings. However, the same site had the highest number of average sharks seen per survey, indicating that abundance at the site was consistent over time.

**Abundance by species and month**

Analysis of shark sightings by species and month of sighting shows Whitetip Reef sharks to be the most commonly sighted species for all months, with the exception of one (October 2012), with a peak in December. Grey Reef sharks are seen to follow in dominance. A comparison of shark sightings by species and months will be carried out in the overview of the survey.



**Figure 5. Average number of individual sharks seen per 1000 surveys (all sites combined) on a monthly basis from July 2012 – June 2013**

**Discussion**

This report presents the results of the 4th year (July 2012 to June 2013) of the Sharkwatch survey programme, which was started in June 2009. Results show that by far the largest number of surveys were undertaken over this period since the start of the programme, with a total of 4,971 surveys carried out at 286 sites. A total of 12 resorts, 1 Dive Centre and 1 safari vessel participated in the survey over the year and a total 9,483 sharks were recorded.

Although a total of 286 sites were surveyed over the one year period, about 35% of these sites were surveyed only once or twice. However, on the other hand there were sites which were surveyed as many as 366 times. As stressed in earlier reports, the greater survey effort at the sites is likely to be

connected to the dive schedules of the participating centres whereby some sites are visited on a very regular and sometimes daily basis. Some observers filled in Sharkwatch data forms every time they dived, rather than perhaps doing one Sharkwatch survey a week, and so this easily explains the large number of reports for some popular dive sites (which are evidently not necessarily good shark sites).

In terms of species sightings, Whitetip Reef sharks were the most commonly observed species, followed by Grey Reef sharks. Whitetip Reef sharks were the most commonly observed species in the first 2 years of the survey (July 2009 to June 2010 and July 2010 to June 2011), while the Grey Reef shark was the most commonly observed species in the last survey period (July 2011 to June 2012). While similar sites were surveyed over the past two survey periods, survey efforts at some sites were less for the current survey period. This fact again stresses the need for longer term monitoring and comparisons between different sites.

An average of 1.9 sharks were recorded per survey which is slightly less than that for the previous survey periods (2.03, 2.18 and 2.14) (Ushan and Wood, 2010 and Ushan, Sattar and Wood, 2011, Sattar, Wood, Ushan and Ali, 2014a). This could be due to the large number of surveys conducted at some sites where shark sightings were always low. Overall sharks seen per survey ranged between no sightings to as many as 29.1 sharks per survey. The percentage of surveys where sharks were not observed at all was 47%, which is 7% higher than that for last survey period.

Sharks sightings were a common occurrence for the majority of sites, with sharks being sighted at 73% of the sites surveyed. This is approximately 4% greater than number of sites where sharks were sighted in 2011 to 2012.

Seasonal trends in shark sightings are difficult to establish due to reasons such as short survey time and different survey sites. This emphasizes the importance of continued monitoring of selected sites to assess changes to population and establish seasonal trends. It also reiterates the importance of participation by more resorts/dive centres, so as to enable the monitoring of a greater number of sites and increased survey effort.

A combined analysis of 4 years' data (duration of the Darwin Reef Fish Project) will also be undertaken shortly and we hope results of all these reports will be an incentive for participation by others to continue monitoring the effect of shark ban on shark populations. It is only through such monitoring that we can show the positive effect of a properly enforced ban on the fishery so as to ensure that the ban on shark fisheries is sustained in face of protests by fishermen.



## **Acknowledgements**

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**Coco Palm Dhunikolhu**  
**Cocoa Island**  
**Four Seasons Explorer**  
**Four Seasons Maldives at Kuda Huraa**  
**Four Seasons Maldives at Landaa Giraavaru**  
**Gili Lankanfushi Maldives**  
**Hilton Irufushi**  
**Kuramathi Island Resort**  
**Lazy Gecko Dive Centre (N. Velidhoo)**  
**Royal Island Resort and Spa**  
**Six Senses Laamu**  
**Velassaru Maldives**  
**W Retreat and Spa Maldives**

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## References

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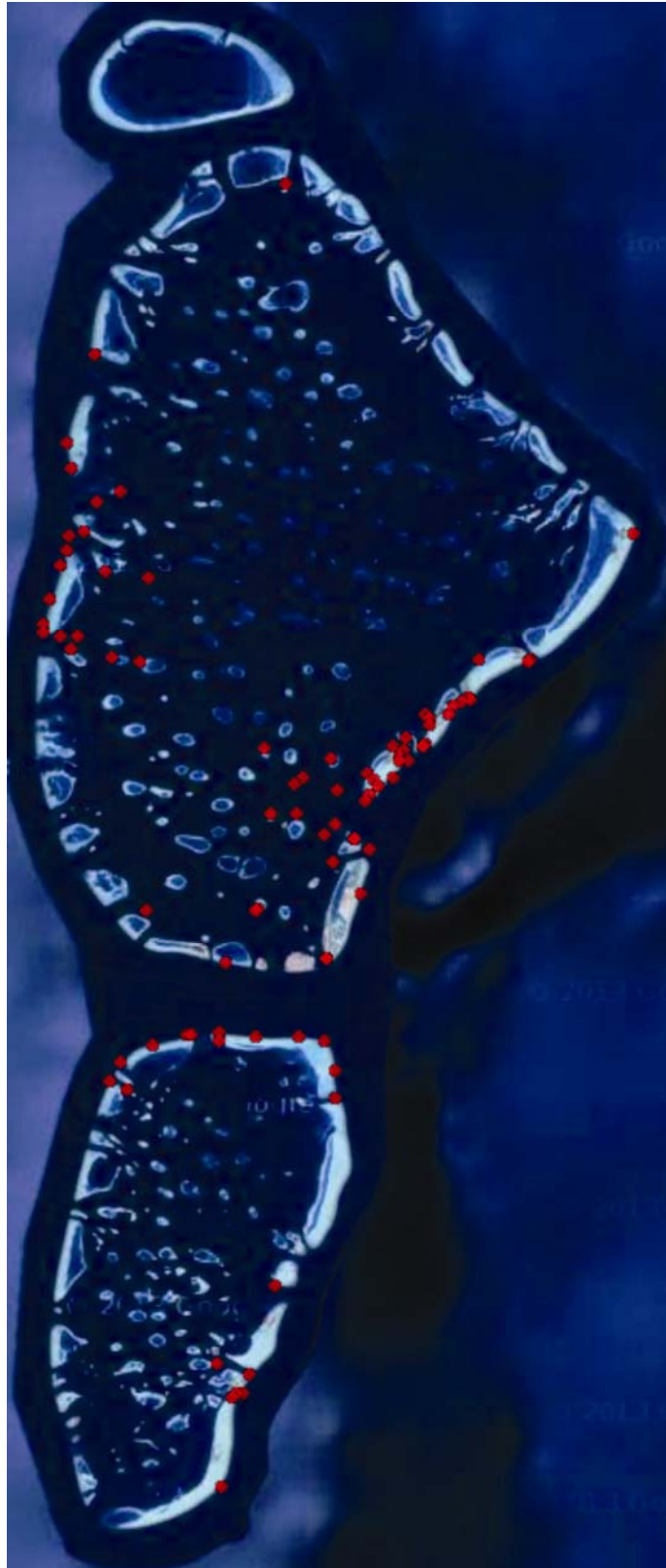


**Appendix 2 – Map of survey areas as reported by participating resorts (Maps created on a google aerial map, using GPS visualizer, [www.gpsvisualizer.com](http://www.gpsvisualizer.com)) \*Note: 52 sites not plotted, as we were unable to get coordinates from resorts**

Survey areas in the northern atolls

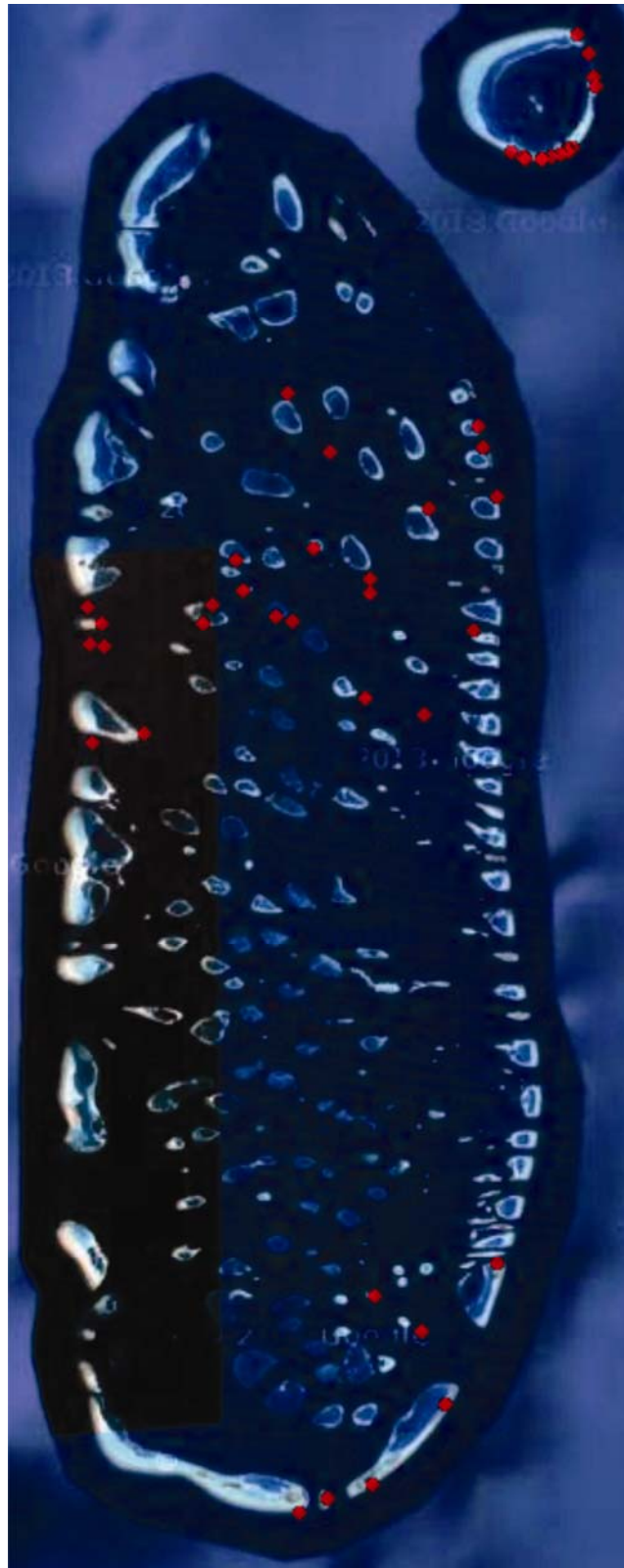


Survey areas in North and South Male' atoll





Survey areas in North and South Ari atoll



Survey areas in Laamu atoll

