

# SHARKWATCH MALDIVES

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## INTRODUCTION

Sharks are top predators in their food chain. They play an important ecological role in the marine environment, particularly on coral reefs. Due to their biological characteristics of slow growth, late maturity and low fecundity, sharks are very vulnerable to over-exploitation and stock recovery in such instances is very slow.

The fishery for sharks in the Maldives intensified in late 1970s due to the realization of the export value of shark products, such as dried shark fin and salted shark meat. Shark liver oil which was previously used in the boat building industry started contributing towards exports in the mid 1980s.

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

## METHODOLOGY

- 'Sharkwatch' uses the 'Roving Dive Technique (RDT)' (Schmitt et al.2002); a quick and effective method used by divers to collect shark abundance data.
- Data collection:
  - Species-wise counts of 8 species most likely to be encountered (Table 1 and Figure 1); additional species are counted under 'others'
  - Environmental data: current strength, visibility and depth.

Table 1: The 8 most commonly found shark species in Maldives

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



(a) Shark liver oil ; (b) Salted shark meat ; (c) Shark jaw; (d) Drying shark fin (Photos: Marine Research Centre)

Figure 1: Form used to record observations on Sharkwatch surveys

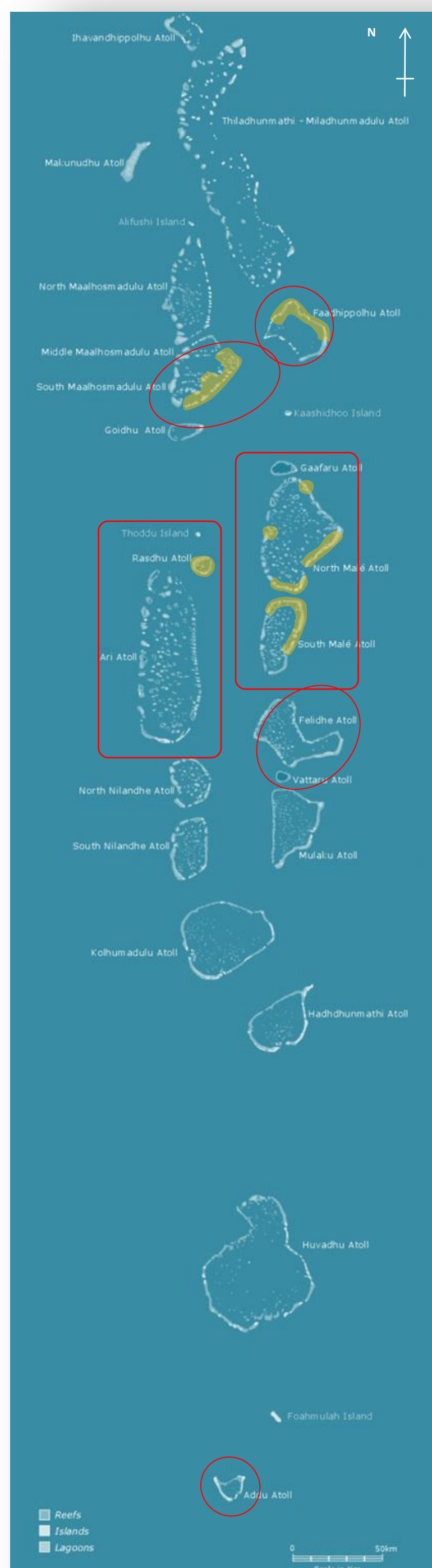
## PARTICIPANTS AND THEIR TRAINING

- Dive school staff and marine biologists.
- Training includes a half-day classroom session followed by an underwater session.
- On completion of training, surveys are conducted on their normal dives.



Dive school staff being trained at Banyan Tree Maldives (Photo: Ahmed Najeeb)

## LEGISLATIONS RELATED TO SHARK FISHING AND TRADE



Map of Maldives: Areas highlighted in yellow are where survey sites are located. Areas outlined in red are atolls where shark fishing was banned under the 10 year moratorium

- 1998: 10 year moratorium on all types of shark fishing inside and within 12 miles from the rim of 7 major tourism atolls in the Maldives (Baa, Lhaviyani, Kaafu, North Ari, South Ari, Vaavu and Seenu).
- 24th June 1995: Whale shark (*Rhincodon typus*) declared a protected species under Article 3 of the Fisheries Regulation of Maldives
- 1st March 2009: Ban on killing, capture or extraction of any species of sharks within 12 miles from the outer rim of all Maldivian atolls
- 15th March 2010: Ban on kill, capture and extraction of any shark species within the Maldivian waters, inclusive of the Exclusive Economic Zone
- 21st July 2011 : Ban on trade of shark products under the Environmental Protection and Preservation Act .



Greyreef sharks at Orimas Thila Noonu Atoll (Photo: M. Mohamed Saeed)

## RESULTS

- July 2009 – June 2010:**
  - A total of 1,661 surveys carried out at 196 sites.
  - 3,629 sharks observed.
- July 2010 – June 2011:**
  - A total of 2,121 surveys carried out at 181 sites.
  - 4,372 sharks observed.

**Most abundant species:** Whitetip reef shark followed by grey reef sharks and blacktip reef sharks(Figure 2).

Average number of sharks per site by species

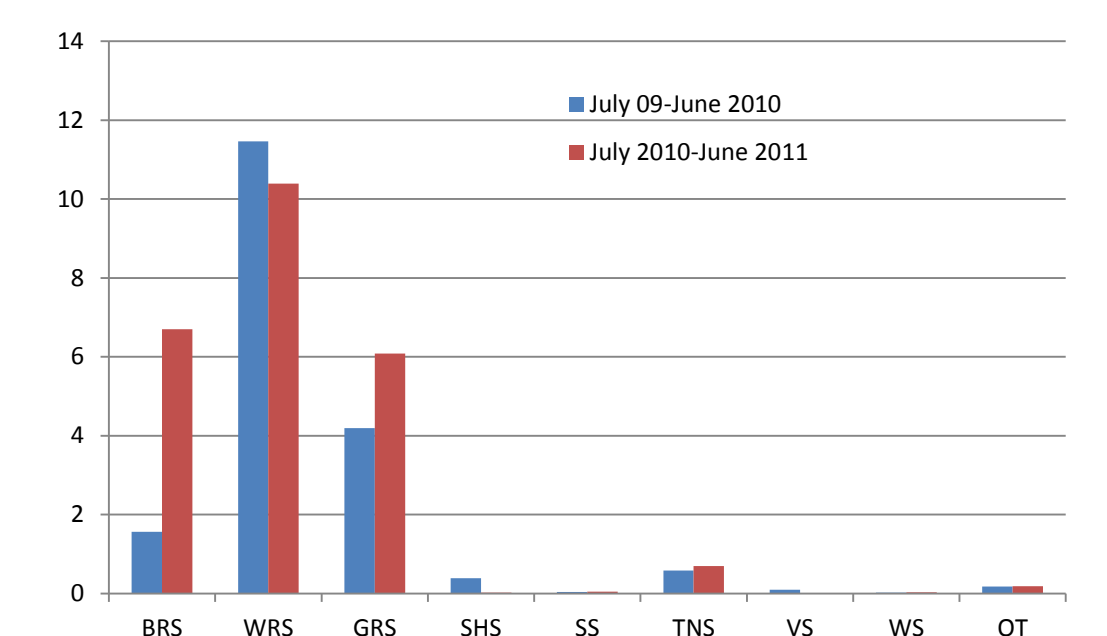


Figure 2: Average number of sharks recorded by species per site during the periods June 2009 to July 2010 and July 2010 to June 2011

Abundance of whitetip reef sharks increased in the 1<sup>st</sup> year, until a peak in February 2010, followed by a gradual decrease (Figure 3); not repeated in the 2<sup>nd</sup> year (Figure 4).

No obvious pattern in shark abundance is found for other species (Figures 3 and 4).

High numbers of grey reef sharks were recorded during July 2009 (Figure 3) and June 2011 (Figure 4); possible sampling anomaly or could reflect seasonal changes in distribution.

Average number of sharks observed - July 2009 to June 2010

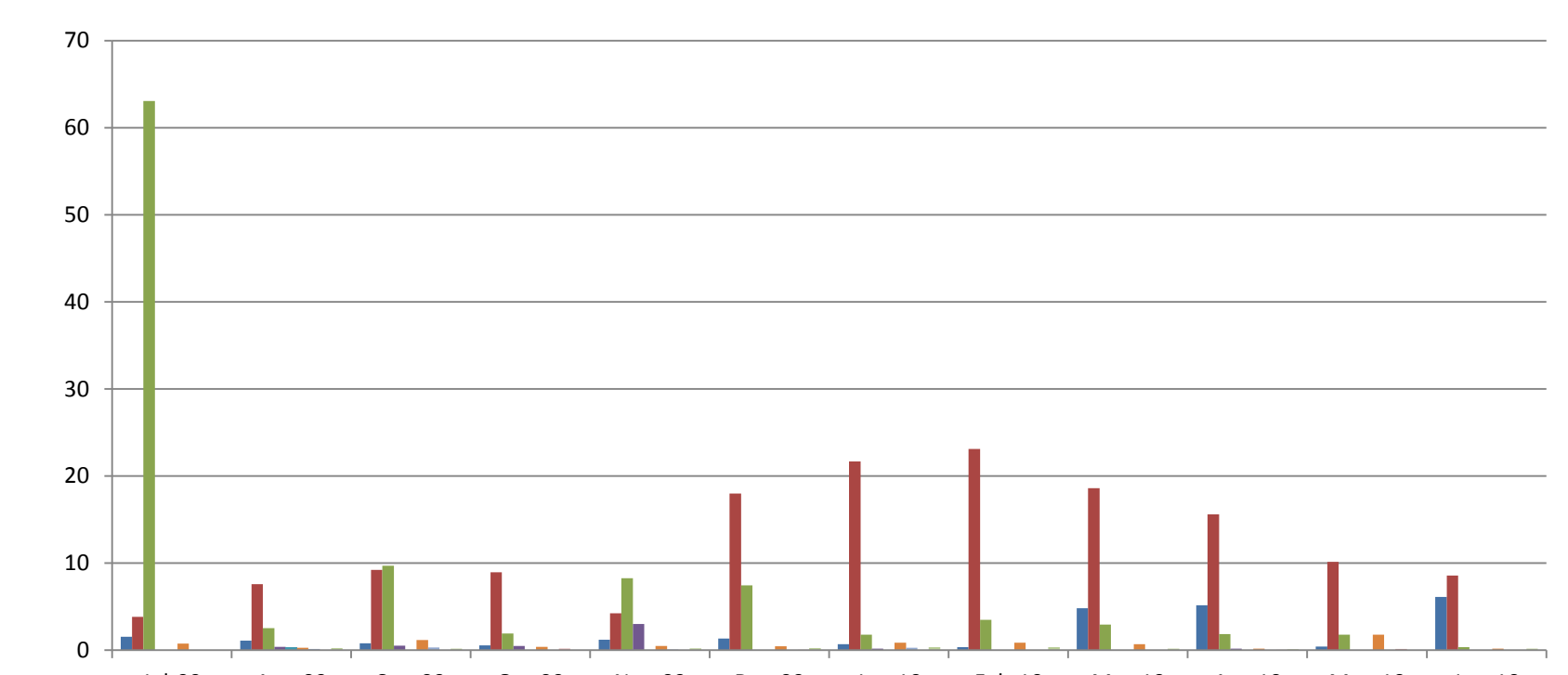


Figure 3: Average number of sharks seen per 10 surveys (all sites combined) on a monthly basis from July 2009 – June 2010

Average number of sharks observed - July 2010 to June 2011

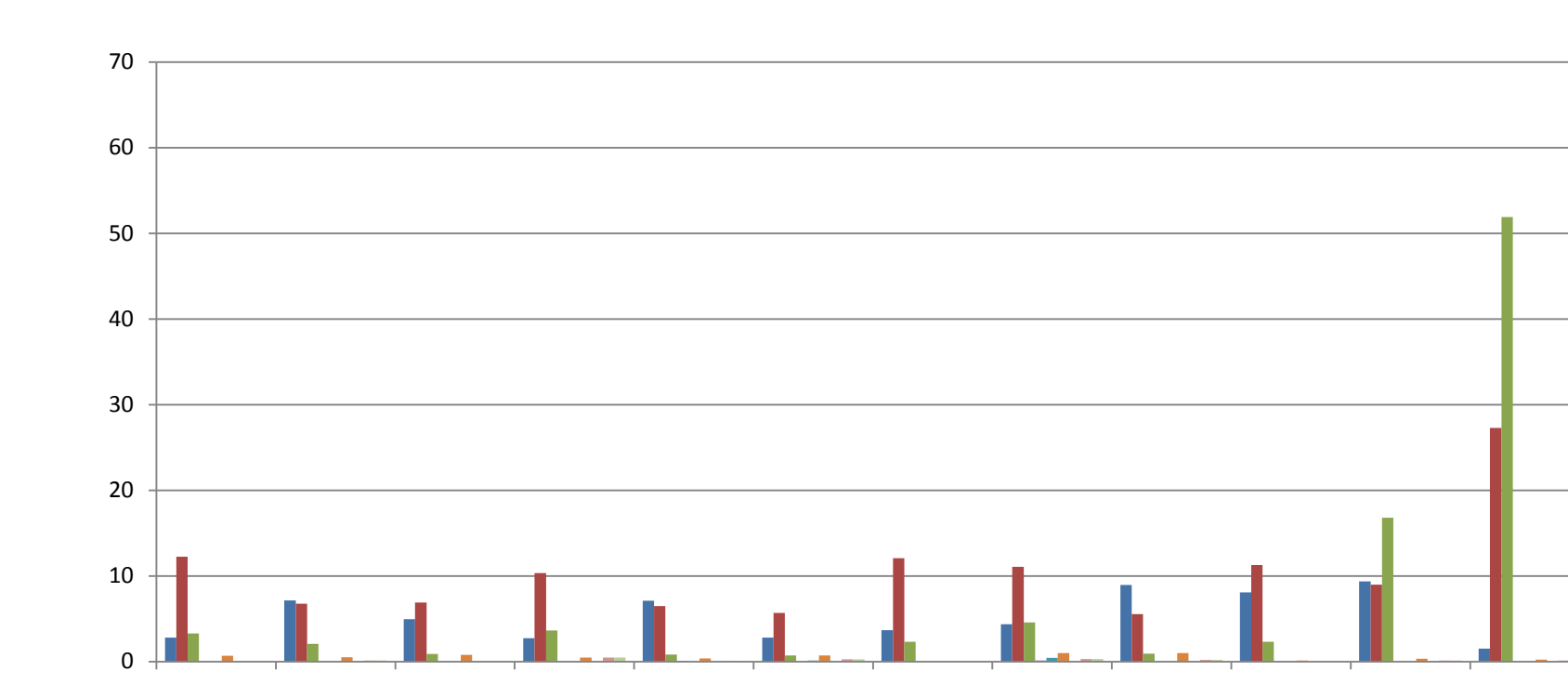


Figure 4: Average number of sharks seen per 10 surveys (all sites combined) on a monthly basis from July 2010 – June 2011

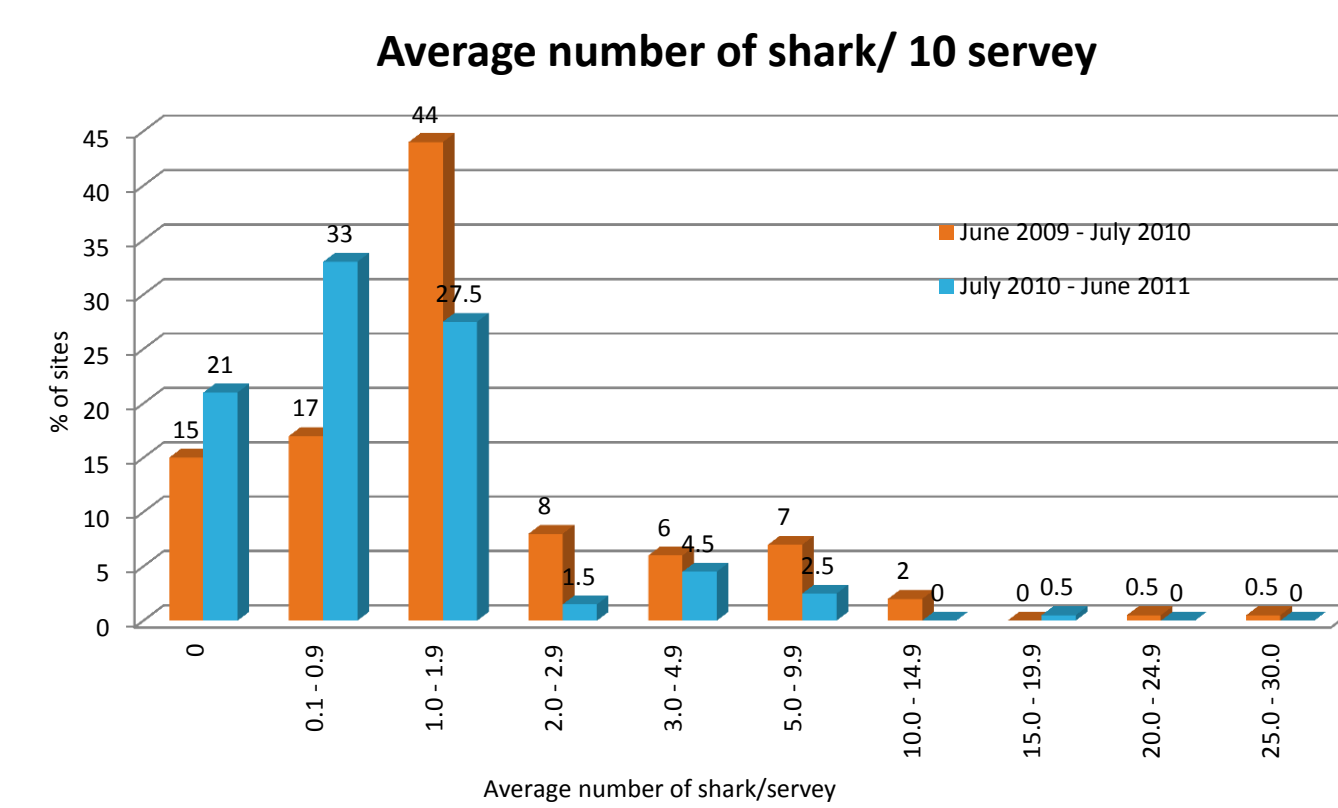


Figure 5: Chart showing the average number of sharks seen per survey during July 2009 – June 2010 and July 2010 – June 2011 across the sites covered by Sharkwatch.

- July 2009 – June 2010:**
  - Sharks were seen in 85% of the sites surveyed.
  - 17% of sites had an average of 1-2 sharks recorded per survey (Figure 5).
- July 2010 – June 2011:**
  - Sharks were seen in 79% of the sites surveyed.
  - 33% of sites had an average of 1-2 sharks recorded per survey (Figure 5).



A diver from MRC conducting a Sharkwatch survey (Photo: Nishan Thaufeeq)

## DISCUSSION

Effectiveness of the ban can only be assessed by long term monitoring; enable the identification of seasonal trends in shark populations and differentiation between increases due to seasonal trends and true increase in shark population numbers .

Participation by resorts across Maldives is crucial to assess effectiveness of the ban as well as to establish trends in shark populations in the Maldives.



A scallop hammerhead shark swimming near "Maizan Neru" of L. Atoll (Photo: Mohamed Ali)



A blacktip reef shark on the house reef of Banyan Tree Maldives-North Male' Atoll (Photo: Nishan Thaufeeq)

## REFERENCES

- Anderson, R.C. and Ahmed, H. (1993) The Shark fisheries of the Maldives, MOFA, Male' and FAO, Rome. 73pp.
- Anderson, R.C. and Waheed, Z. (1999) Management of shark fisheries of Maldives. Pp367-401. In: R Shotton (ed) Case Studies in the management of elasmobranch fisheries. FAO Fisheries Technical Papers 378 (parts 1 & 2). FAO, Rome. 920pp
- MRC (2008) Status of Maldivian Shark Fisheries 2 (In Dhivehi), Marine Research Centre, Ministry of Fisheries, Agriculture and Marine Resources, Male', 33pp
- E.Schmitt, R.Sluka, and K.Sullivan Sealy.2002. Coral Reefs, 2002, Volume 21, Number 2, 216-223 pp
- Ushan M and Wood E.M. (2010) Maldives Sharkwatch Report 2009 to 2010, Marine Research Centre, Marine Conservation Society, 16pp