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UK (British Indian Ocean Territory) National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2016

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National Report submitted to the IOTC Secretariat in 2016, final data for the 2015 calendar year must be provided to the Secretariat by 30 June 2016)	YES 12/05/2015
In accordance with IOTC Resolution 15/02, provisional **longline data** for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2016, preliminary data for the 2015 calendar year was provided to the IOTC Secretariat by 30 June 2016). **REMINDER:** Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2016, final data for the 2015 calendar year must be provided to the Secretariat by 30 December 2016).	NO
If no, please indicate the reason(s) and intended actions: The UK (BIOT) Administration does not operate a flag registry, BIOT does not have a fleet of commercial fishing vessels, and there is no commercial port in BIOT. The waters of the Territory were declared a Marine Protected Area (MPA) on 1 April 2010 and from 1 November 2010 became a no-take MPA to commercial fishing. An MPA exclusion zone covering Diego Garcia and its territorial waters exists where pelagic and demersal recreational fisheries are permitted. The recreational fishery catches some tuna and tuna like species.	

EXECUTIVE SUMMARY

UK (BIOT) waters have been a Marine Protected Area (MPA) since April 2010. Diego Garcia and its territorial waters are excluded from the MPA and include a recreational fishery. UK (BIOT) does not operate a flag registry and has no commercial tuna fleet or fishing port. The United Kingdom (BIOT) National Report summarises fishing in its recreational fishery in 2015 and provides details of research activities undertaken to date within the MPA against its Interim Conservation Management Framework.

The recreational fishery landed 12.35 tonnes of tuna and tuna like species on Diego Garcia in 2015. Principle target tuna species of the industrial fisheries (yellowfin, bigeye and skipjack tunas) contributed 17% of the total catch of tuna and tuna like species of the recreational fishery. Recognising that yellowfin tuna are currently overfished and subject to overfishing in the Indian Ocean and that Resolution 16/01 seeks to address this, UK(BIOT) will require the live-release of all yellowfin tuna caught in the recreational fishery. It is anticipated that this will be effective from 2017. Length frequency data were recorded for a sample of 165 yellowfin tuna from this fishery. The mean length was 70cm. Sharks caught in the recreational fishery are released alive.

IUU fishing remains one of the greatest threats to the BIOT ecosystem but a range of other threats exist including invasive and pest species, climate change, coastal change, disease, and pollution. During 2016 the BIOT Environment Officer continued to take forward the BIOT Interim Conservation Management Framework and progress to date is presented. In 2016 Recommendations of the Scientific Committee and those translated into Resolutions of the Commission have been implemented as appropriate by the BIOT Authorities and are reported.

Contents

1. BACKGROUND/GENERAL FISHERY INFORMATION

The waters of the British Indian Ocean Territory (BIOT) were declared a Marine Protected Area (MPA) on 1 April 2010 and from 1 November 2010 became a no-take MPA to commercial fishing. An MPA exclusion zone covering Diego Garcia and its territorial waters exists where pelagic and demersal recreational fisheries are permitted. The recreational fishery catches some tuna and tuna like species. Permitted recreational fisheries also include visiting yachts that fish outside the exclusion zone within the waters of the MPA, but not within Strict Nature Reserves. Such fishing must be for consumption within three days. Yachts must apply for a permit to moor in designated areas.

The UK (BIOT) Administration does not operate a flag registry, BIOT does not have a fleet of commercial fishing vessels, and there is no commercial port in BIOT.

2. FLEET STRUCTURE

N/A: As stated above, UK (BIOT) does not have a flag registry and fleet of commercial fishing vessels. The recreational fishery is described in Section 4.

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

N/A: As stated above, UK (BIOT) does not have a flag registry or a fleet of commercial fishing vessels.

4. RECREATIONAL FISHERY

A small recreational fishery occurs in Diego Garcia. A total of 12.35 tonnes of tuna and tuna like species were caught in 2015 representing 53% of the recreational catch (the remainder are reef associated species). The principle tuna species (yellowfin, bigeye and skipjack tunas) contributed 17% of the total catch of tuna and tuna like species of the recreational fishery (Table 1).

Recognising that yellowfin tuna are currently overfished and subject to overfishing in the Indian Ocean and that Resolution 16/01 seeks to address this, UK(BIOT) will require the live-release of all yellowfin tuna caught in the recreational fishery. It is anticipated that this will be effective from 2017.

Table 1: Catches of tuna and tuna like species landed from the UK (BIOT) recreational fishery during the period 2011-2015.

Year	Estimated catch of tuna and tuna like species (kg)										TOTAL (kg)		
Species	Blue marlin	Dolphinfish	Kawakawa	Rainbow runner	Sailfish	Wahoo	Dogtooth tuna	Skipjack tuna	Yellowfin tuna	Other tuna nei	Tunas	Tuna like spp	All
2011	363	113	1050	144	104	10757	406	24	8386	0	8815	12532	21347
2012	181	102	1182	138	249	5359	370	80	3132	0	3582	7211	10793
2013	0	64	464	135	363	6844	317	101	3635	0	4052	7871	11924
2014	0	97	444	126	0	7259	290	106	1670	0	2067	7926	9992
2015	0	27	977	152	73	9005	197	179	1741	0	2118	10233	12351

Length data have been collected for yellowfin tuna (*T. albacares*) from the recreational fishery since June 2009. A total of 165 fish were measured in 2015. The mean length of the *T. albacares* sampled was 70cm. For comparison, observer programmes on purse seiners (2005/6) and longliners (2003/4) operating in BIOT recorded mean lengths of 98cm (n=378) and 123cm (n=2385) respectively.

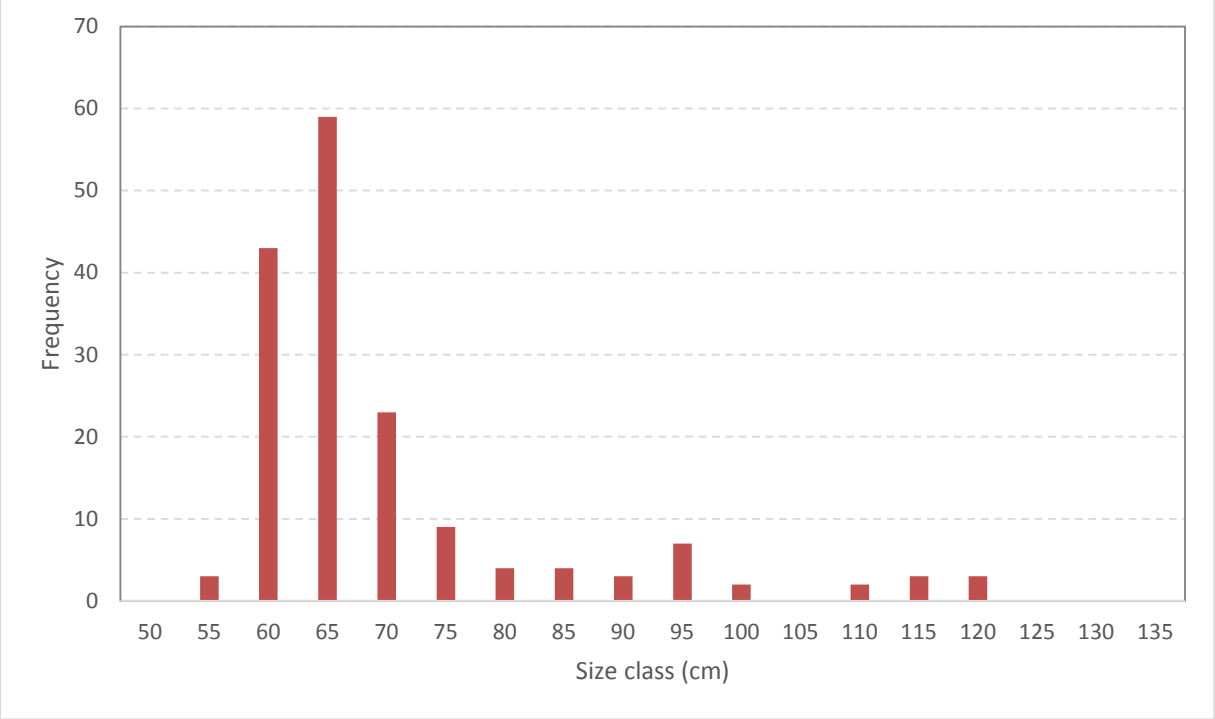

Figure 1: **Yellowfin tuna length frequency plot using data from the recreational fishery in 2015 (n=165)**

5. ECOSYSTEM AND BYCATCH ISSUES

The BIOT zone, excluding territorial waters around Diego Garcia, is a no-take MPA closed to commercial fishing. The recreational fishery on Diego Garcia is monitored.

The current ecosystem threats relate to illegal unreported and unregulated fishing of which a number of events have been detected by the BIOT Patrol Vessel and have resulted in a number of successful prosecutions. This information is reported separately to the Compliance Committee.

In particular, IUU vessels target oceanic and reef associated sharks with longlines and gillnets (some of which are greater than 2.5km in length contrary to IOTC Resolution 12/12), including IOTC prohibited species (oceanic whitetip and thresher sharks, see Moir Clark et at, 2015, IOTC-2015-WPEB11-48). The surveillance strategy of the BIOT Patrol Vessel is based on a combination of ecological risk assessment and intelligence on IUU activities. Beyond the blanket protection of all species through the declaration of the MPA, there are currently no separate national plans of action in place for individual species or species groups. However, in its recreational fishery, all sharks caught must be released alive, and the BIOT Administration will implement the live-release of yellowfin tuna from 2017.

Other threats to the ecosystem that have been identified and include invasive and pest species (e.g. introduced by visiting vessels), climate change (including weather changes; coral bleaching and mortality, sea level rise, likely increasing rates of erosion or inundation events; and oceanic chemical composition change), coastal change, disease (particularly of corals), and pollution (including discarded fishing gear and abandoned or lost fish aggregating devices, causing inter alia hazards to nesting turtles and ghost fishing).

5.1 Sharks

Sharks must be released alive when caught in BIOT's recreational fishery.

Reef and black tip reef sharks continued to be caught illegally by IUU vessels in BIOT waters in 2015/6. However since reporting to the Working Party on Ecosystems and Bycatch in 2015 (IOTC-2015-WPEB11-48) no IOTC prohibited species have been observed.

Research, including tagging of sharks in BIOT waters is referred to in Table 2

5.2 Seabirds

Seabird bycatch does not occur in the recreational fishery and has not been observed in IUU fisheries.

5.3 Marine Turtles

No turtle bycatch / interaction was reported in the BIOT recreational fishery in 2015. The BIOT area includes undisturbed and recovering populations of hawksbill and green turtles. Island sweeps are conducted as part of the normal monitoring programme, where part or entire islands are inspected and regularly encounter and record turtle nesting tracks. Research into the location and frequency of turtle nesting is currently in progress with over half the islands surveyed in 2016 (See Table 2)

5.4 Other ecologically related species (e.g. marine mammals, whale sharks)

No incidental mortality / annual catches on other ecologically related species such as marine mammals and whale sharks has been observed in the recreational fishery. From the BIOT Patrol Vessel, opportunistic data is collected on sightings of marine mammals by the Senior Fisheries Protection Officer.

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification (including date commenced and status of implementation)

Logbook data collection for the recreational fishery is completed by the vessel charterer for each trip conducted. The system was introduced in 2006 and provides 100% coverage of all boat based recreational fishing activity. Prior to that a system of logbooks to be completed by fishers was utilised but proved less effective and did not achieve 100% coverage. A similar fisher based system has been introduced in 2016 for shore based recreational fishers, although they tend not to catch tuna and tuna like species. Any relevant recorded shore based catches will be reported in future in Section 4.

6.2. Vessel Monitoring System (including date commenced and status of implementation)

As there are no vessels flagged by the BIOT Authorities and no commercial vessels are licensed to fish inside the BIOT MPA, the BIOT VMS is currently not operational.

6.3. Observer programme (including date commenced and status; number of observer, include percentage coverage by gear type)

Length frequency data collection was initiated for the recreational fishery on Diego Garcia in June 2009.

6.4. Port sampling programme [including date commenced and status of implementation]

NA. BIOT has no commercial port

6.4. Unloading/Transhipment [including date commenced and status of implementation]

As BIOT has no commercial ports there is no unloading or transhipment allowed. Transhipment by foreign fishing vessels is not permitted anywhere within BIOT waters.

7. NATIONAL RESEARCH PROGRAMS

In 2014 the BIOT Administration developed an Interim Conservation Management Framework (ICMF), (BIOT, no date). The BIOT Environment Officer is tasked with working on the next steps of the ICMF, and acting as an anchor for scientific expeditions to the Territory, ensuring that they reflect BIOT's needs. The ICMF was intended to cover the period up to approximately December 2015 pending the outcome of policy reviews by the UK and BIOT Governments, and until those reviews and consultations with Mauritius[1] are concluded the ICMF remains in place. A summary of progress against the ICMF is provided in Table 3.

The ICMF sets a strategic approach to the implementation of environmental monitoring and research within the MPA and defines the immediate monitoring needs. Due to the isolated nature of BIOT, most research activities occur in conjunction with an expedition. Expeditions include a number of 'projects' that relate primarily to the first two activity areas of the ICMF (understanding and interpreting the ecosystem; and, conserving wildlife and habitats). The Chagos Information Portal (ChIP, http://www.cct-chip.org/, accessed 29 July 2016) lists the expeditions conducted to 2015 but does not provide details of the research projects conducted under, or outside of, each expedition. Table 2 indicates the activities undertaken during research expeditions in 2016.

[1] In its ruling on the legal challenge to the BIOT MPA brought by Mauritius through ITLOS, the Permanent Court of Arbitration found that UK should have consulted more with Mauritius, but took no view on the substantive quality or nature of the MPA (18 March 2015).

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Table 2. Summary table of national research programs: Scientific Expeditions to the British Indian Ocean Territory during 2016

Project title	**Period**	**Institutions involved**	**Objectives**	**Outcomes (results, publications, future work)**
Pelagic Expedition	2nd- 29th February	**Zoological Society of London**, University of St Andrews, Plymouth University, University of Western Australia, Manta Trust. Stanford University.	**Overall objective**: to document the temporal and spatial patterns of pelagic species in the BIOT MPA. **Specific objectives** 1. To deploy mid-water stereo baited remote underwater video camera systems to study the ecology and behaviour of pelagic fish assemblages. 2. Collect information on fish and shark prey field distribution, enabling the interpretation of the observed patterns of fish and megafauna distribution and make conclusions on habitat suitability. 3. Measurements of conductivity, temperature, density (CTD) and turbulence to provide information critical to interpret observations resulting from objectives above. 4. Tagging of manta rays to track movements inside and outside the MPA. 5. Monitor the diversity, abundance, movements and distribution of seabirds.	**Post-expedition report provided to the BIOT Administration.** **One publication resulting from the 2015 pelagic expedition:** Letessier, T.B., Bouchet, P. & Meeuwig, J.J. (2015) Sampling mobile oceanic fishes and sharks: implications for fisheries and conservation planning. *Biological Reviews*, **DOI:** 10.1111/brv.12246 **Key achievements** 1. 160 mid-water Baited Remote Underwater Video Systems(BRUVS) deployments with concurrently run acoustics surveys allows the quantification and characterisation of fish populations (including sharks) and mid-water prey fields at six locations in BIOT. 2. First integrated analysis of 3D multibeam documenting fish distribution (particularly sharks) and characterising seamount habitat with mid-water BRUVS. 3. First mapping of the unique 'manta alley' habitat and first acoustic observation of manta ray using a 3D multibeam in Egmont atoll. 4. 5178 birds of 17 seabird species were recorded. One species of seabird that had not been previously documented in BIOT was identified and photographed in the Small Boat Basin of Diego Garcia, a Lesser Black-backed Gull *Larus fuscus*. 5. Deployment and recovery of oceanographic mooring on Swart

				seamount, and in Egmont Atoll to further enable the characterisation of water masses, and the description of interactions between tidal regimes, stratification, and topography on coral islands and seamounts. 6. Tagging of 6 reef mantas using acoustic and miniPAT tags
Coconut Crab Expedition	2nd February – 21st March	Dartmouth University	To assess the behavioural ecology of coconut crabs on Diego Garcia.	TBC
BIOT Consortium Expedition	20th March - April 17th	**Stanford University, Zoological Society of London**, Swansea University, University of Western Australia, Bangor University, University of Oxford, University College London, and the Natural History Museum	**Overall objectives:** To use electronic tag technology to study the residency and connectivity of pelagic fish, sharks and mantas, within and around BIOT. To assess levels of coral bleaching. To monitor species ecology, including birds and turtles. **Specific objectives** 1. Install 40 additional acoustic receivers and undertake routine maintenance on the existing array. 2. Deploy acoustic tags on reef fish, sharks and rays. 3. Sample tissues for isotopic analyses to provide information on the trophic ecology and habitat use of species within BIOT and understand patterns of connectivity of reef fish, sharks and rays across the Indian Ocean. 4. Collect water samples to analyze for environmental DNA (eDNA) signatures, which present a non-invasive method to detect the genetic signature of organisms throughout the MPA 5. To collect previously deployed sensor instruments (temperature and oxygen), and redeploy additional units for collecting environmental data that will complement the on-going research activities.	**Post-expedition reports provided to the BIOT Administration.** **Key achievements**: 1.**Mid-water Baited Remote Underwater Video Systems (BRUVS) deployed** in the nearshore (<50-200 m). 2. **Over half of the islands surveyed for turtle nesting activities** and beach habitat via aerial surveys (30 islands) and coastal surveys (28 islands), providing the most complete nesting data record since surveys in 1999. Turtle satellite tracking data were used to validate existence of a foraging green turtle population on the Great Chagos Bank, revealing an extensive seagrass meadows of *Thalassodendron ciliatum*. Seagrass samples were preserved in preparation for the first peer-reviewed publication on seagrass in BIOT and to contribute to a regional seagrass health assessment of the Indo-Pacific. 3. **The expanding breeding range of both the Red-footed and Brown Booby in Peros Bahnos Atoll were documented**. The first ever tracking of a seabird in the Archipelago was completed; with a breeding Red-footed booby making a remarkable 425km, 38 hour foraging trip. 4. A **total of 248 tags on 153 animals were deployed**: (49 grey reef sharks , 69 silvertip reef sharks, 1 blacktip reef shark (, 1 whitetip reef shark, 26 manta rays and six species of teleosts including yellowfin tuna, kawakawa, black saddled grouper, dogtooth tuna, sailfish and blue marlin.) 5.**63 acoustic receivers** (VR2, VR4-UWM, VR4G) in the existing array were serviced and downloaded. Downloads of the receivers resulted in **99,814 detections from 92 animals**. We deployed **30 new receivers** to expand the array to cover additional habitats and regions of the archipelago. The array now includes a total of 93 acoustic receivers deployed across the archipelago

				6. **To study reef processes and seawater chemistry** - 117 water samples taken across the archipelago. 7. **The first SeaFet long-term pH logger was installed in BIOT** to track changes in ocean chemistry and help detect and quantify ocean acidification. 8. **Instruments are designed to record data on environmental physics and chemistry for a full year were installed**, including 13 temperature sensors, 2 pressure sensors, 1 salinity/temperature sensor, a pH logger, and an Acoustic Doppler Current Profiler (ADCP). 9. **17 key reef sites surveyed, covering c.2000 m2 of reef**, using a mixture of photography and videography to allow analysis of the 3D structural complexity, composition and function of the shallow reefs. 10.Detailed data were collected from 14 coral reef sites across the archipelago to **record the incidence of bleaching and disease on reef-forming coral communities.** 11. First twilight reef surveys (reefs slopes deeper than 30m) conducted in BIOT since the 1980s.
Pangaea Expedition.	4th-12th May 2016	University of Western Australia, Plymouth University.	**Overall objective**: to document the status of reef fish assemblages within BIOT MPA, in particular the status and ecological function of reef sharks. Additional work to assess the intertidal ecology of reef flats of Diego Garcia using towed underwater sleds. **Specific objectives:** 1) Baited underwater video systems (and diver operated (DOV)) to determine abundance, size structure and condition of the shark and fish assemblage; 2) Acoustic tagging to determine animal residency and behaviour 3)Tissue sampling to determine variation in diet and genetic structure 4) Benthic monitoring of the intertidal flats to quantify biodiversity levels.	**Post-expedition report provided to the BIOT Administration** **Key achievements** 1. 160 BRUVS deployments with 90 in the southern half of the lagoon and 70 in the northern half of the lagoon 2. At each Maestro station (n=12), a vertical profile was obtained with respect to salinity, temperature, depth, oxygen and fluorescence (as a proxy for chlorophyll containing algae). 3. Two conventional Conductivity (salinity), Temperature and Depth (CTD) profilers in vertical tandem, at the seabed and at the surface for a period of 24 hours. Finally, sediment cores were obtained at 4 locations with 3 replicates at each to determine particle sizes, organic matter content and infauna diversity. 4. 101 fish sampled at approximately 35 sites within Diego Garcia. These individuals represented 25 species and 8 families, and on average 14.4 fish sampled per day, to assess condition of fish with respect to individual weight at a given length.
Seabird Ecology on	21st June – 13th July	**Zoological Society of**	**Overall objective**: To understand the breeding ecology of red-footed, masked and	**Post-expedition report provided to the BIOT Administration.**

Diego Garcia		**London**	brown booby and their spatial use of the BIOT MPA. **Specific objectives**: 1. To test field methodologies, including; red-footed booby (RFB) nest monitoring, RFB capture/ restraint and tail-mounted GPS loggers. 2. Document at-sea movement patterns and foraging grounds of breeding RFBs from Barton Point and Cust Point colonies during the SE monsoon season. 3. To explore if RFB morphometric measurements in the field can be used to determine sex.	90 adult RFBs were caught and marked (with individually numbered alloy British Trust for Ornithology issued leg rings) and a set of morphometric measurements taken along with breast feathers for DNA sexing. Of these, 46 were classed as breeding birds and caught on a nest, while the remainder were non-breeding birds. 39 of the breeding birds were fitted with tail-mounted GPS loggers (IGotU GT-120, Mobile Action Technology Inc.) to track their at-sea movements. These tags were deployed for between three and 10 days before being recovered. Thirty-eight of the 39 tagged RFBs were recaptured and 35 viable tags were recovered. Preliminary examination of the tracking data revealed that RFBs were typically conducting foraging trips of one to three days, covering 100-600km, to the North-East of Barton Point. None of the tracked birds entered or crossed the Great Chagos Bank. These are the first tracking data from any seabird species from BIOT. The next step will be to repeat this fieldwork in December 2016 during the NW monsoon season.
Indigo Expedition	10th- 27th July	University of New South Wales.	**Objectives:** 1. Environmental toxicology studies on harmful algal blooms 2. Virology studies inside/outside atoll lagoons 3. Collect plastic particles in the water 4. Measure ocean pH for acidification studies 5. Photo-quadrats of coral condition post-bleaching.	TBC

Table 3. Summary of progress against the Interim Conservation Management Framework to November 2016

Action	Target / Indicator	Progress	Lead(s)
1. Understanding and interpreting the ecosystem			
Commence programme to evaluate impact of no-take MPA on tuna stocks, in collaboration with IOTC	Evaluation plan and protocols developed and implemented. IOTC buy-in secured.	**Completed** research was indicated in this Table in 2015. No update since IOTC-2015-SC18-NR30 (Mees, 2015) and further collaborative progress **pending**; No extant IOTC closures.	MRAG
Monitor status of reef sharks and fish assemblages to evaluate the impact of no-take and IUU controls, in a range of representative habitats	Select from existing study areas key monitoring locations. Protocols developed and implemented. Biological changes linked to environmental variables and management measures.	**Ongoing:** See Table 2, 'BIOT Consortium expedition' and Pangaea Expedition'	UWA, ZSL, Stanford University.
Monitor the status of pelagic sharks and fish (e.g. tunas) to evaluate the impact of no take and IUU controls	Establish key monitoring locations. Protocols developed and implemented. Biological changes linked to environmental variables and management measures.	**Ongoing:** See Table 2, 'BIOT Consortium expedition' and 'Pelagic Expedition''	UWA, ZSL, , St. Andrew's University, Plymouth University
Monitor movements of elasmobranchs (sharks, manta rays) within BIOT to understand connectivity and behaviour with recovery of these populations	Connectivity between atolls quantified as movements increase as abundance and size of animals increase. Focal species: greys (as reef example), silvertips (as quasi reef/oceanic) and tigers.	**Ongoing:** See Table 2, 'BIOT Consortium expedition' and Pelagic Expedition'	Stanford, ZSL, Manta Trust
Initiate survey programme for marine mammals	Establish monitoring plan and protocols. Initiate monitoring.	**Pending**: Pilot data collection by SFPO has occurred during this period. Opportunistic sightings are insufficient for 1) comprehensive cetacean survey (species inventory and spatial distribution) and 2) generating baseline information on cetacean abundance and density. This suggests that a dedicated research programme beyond the BPV and SFPO is required to address this. Next steps are to explore collaborative ideas with research community and identify grant funding opportunities.	MRAG
Develop remote, satellite-linked, monitoring/enforcement units	Data collected on species abundance, diversity and environmental variables. Deterrent to, and ancillary to monitoring of, IUU. Baselines and surveillance coverage improved.	SMART (Spatial monitoring and reporting tool) being evaluated. 19 animals were satellite tagged as part of the 'BIOT Consortium Expedition' – see Table 2.	ZSL / UCL/ BIOTA
Review protocols for data collection of confiscated illegal catches	Improved understanding of species and morphometrics of poached species. Lab analysis of parameters such as stable isotopes, xenobiotic accumulation etc.	**Pending**: UWA completed advisory protocol. Programme to be implemented in accordance with 'Guidance on the handling of fishing vessels and crews	UWA (?) / MRAG

Action	Target / Indicator	Progress	Lead(s)
		suspected of IUU fishing' and initiation of sample collection through Environment Officer and SFPO.	
Establish detailed baselines for assessing coral disease prevalence	Key monitoring locations established and initial analyses undertaken.	**Ongoing**: See Table 2 'BIOT Consortium expedition'	Warwick Uni, CC, DF (Oxford University in 2016)
Monitor coral cover	Building on previously established baselines, indicators of reef health provided.	**Ongoing**: See Table 2 'BIOT Consortium expedition'	Warwick University / Oxford University
Monitor continuous sea temperature and ocean acidity to better understand risks from climate change	Enable ongoing assessment of temperature change and associated anomalies.	Ongoing monitoring occurs. Temperature loggers require recovery in 2016/17.	Warwick University
Commence discovery and documentation of deep-sea ecosystems.	Mapping of representative sea-mounts and island/plateau slopes. Description of associated benthic ecosystems, including sessile marine species and demersal communities. Multi-frequency acoustic studies of DSL interaction with seamount and archipelagic slope systems to examine bentho-pelagic coupling	Mapping of seamounts started; see 'Pelagic Expedition'	ZSL
Establish detailed baselines for assessing island geomorphological change, with an aim to informing management actions	Baseline maps for DG and northern atolls completed.	**Completed** 'A Half-Century of Coastline Change in Diego Garcia' Paper published in 2016	BIOTA, US, academics
Monitor diversity, abundance, movements and distribution of seabirds	Diversity and abundance of seabirds increases with habitat rehabilitation; distance for foraging decreases with increasing abundance of bait schools and tunas. Management actions informed.	**Ongoing**: See Table 2, BIOT Consortium expedition' and 'Pelagic Expedition'	
Establish detailed baselines for terrestrial environments, including poorly studied taxa and vulnerable habitats (including mangrove)	Biodiversity interests and priorities identified. Terrestrial Management Plan informed.	**Ongoing**. Darwin funding obtained to undertake data collection to inform a Terrestrial Action Plan (see also Activity area 2 of the CMF, CAREX). Expedition April 2017. CCT-US Scholarship related to this project	
Monitor sea turtle populations, incubation conditions, foraging behaviours, genetic characteristics and migration.	Conservation and management actions informed. Contribution to global research needs.	**Ongoing:** See Table 2, 'BIOT Consortium expedition'	Swansea University
Review ecological character of Ramsar site in Diego Garcia	Management actions, if/where necessary, informed. Obligations under Ramsar met.	Ongoing. A review of the legislative provisions protecting the Ramsar site has been completed and management measures amended accordingly. Ongoing monitoring of pressures is required. Current evidence has informed a response from Defra to the Ramsar Secretariat indicating obligations are being met.	BIOTA, DEFRA
Video-document key terrestrial and marine habitats	Complete visual baselines for key monitoring locations, to complement ongoing scientific programmes. Open	**Data collected.** See http://catlinseaviewsurvey.com/surveys/indian-	Jon Slayer, Google, Catlin

Action	Target / Indicator	Progress	Lead(s)
	source data made available for ongoing research and communications.	ocean/chagos	Seaview
2. Conserving wildlife and habitats			
Develop terrestrial management plans for each island, including identification and recommendations for ongoing or future restoration or ecological improvement	Terrestrial conservation work informed and prioritised according to ecological need.	**Ongoing**. See Table 2: Darwin Plus Chagos Atoll Restoration Expedition (CAREX), April 2017, to develop a Terrestrial Action Plan	BIOTA/CCT/ ZSL/ RBG Kew/ RSPB/ IUCN
Undertake field-based review of habitat restoration projects underway on DG	Production of management plans / guidelines for habitat restoration.	**Ongoing**. An interim habitat restoration management plan for the Plantation on DG has been drafted. Data collection to inform future management is ongoing.	
Intervene, where necessary to protect or preserve terrestrial biodiversity	Vulnerable species and/or habitats protected in the immediate term, prior to implementation of terrestrial management plan. Proposed interventions subject to peer review.	**Ongoing**. Enforcement of regulations protecting wildlife and biodiversity undertaken. Conservation work at the Southern Restoration Site continued.	
Complete planned rat eradication project on Ile Vache Marine in August '14	Absence of rats, as determined by follow-up surveys after 6 and 12 months. Inform plans for broader rat eradication.	**Completed**. The 'Île Vache Marine rat eradication project' has ended but monitoring for presence of rats continues through routine BritOps – no presence detected in early 2016.	Peter Carr / BIOT
Produce official list of 'pest' species	Removal policies for invasive species informed and peer-reviewed.	**Ongoing**. See 'Creating a Terrestrial Action Plan for the Chagos Archipelago' Table 2	
Continue monitoring and habitat management of wetlands in Diego Garcia and consolidate into Ramsar action plan	Biodiversity and ecosystem goods and services of DG's wetlands secured.	Requires action.	BIOTA, Chief Science Adviser, DEFRA
3. Reducing threats			
Review and develop a new enforcement strategy for the MPA, including review of legislative options available with reference to UNCLOS and other relevant international agreements.	Reduction in resource loss through illegal exploitation, with reduction in secondary risks. Strategy to be informed by comprehensive baselining of the incidence and patterns of illegal exploitation. Use of all available data and capabilities, civilian and military, to support this, and inform continuous surface picture compilation.	MRAG review **completed** 2014. Maritime Analysis and Enforcement Adviser field-tested a number of enforcement tools during 2015/16. **Ongoing**: Evaluation of a range of enforcement tools; Evaluation of novel enforcement techniques and intelligence / heat-maps continually update live enforcement strategy	BIOTA/HQ, MRAG
Undertake socio-economic study of drivers for illegal exploitation	Enforcement strategy informed, and full range of options for reducing drivers of illegal exploitation considered.	MSc study MRAG / Kings College, 'Socio-economic reliance on shark fisheries in a developing country and the implications for conservation and management' (Collins, C 2013) **completed**; BIOT-A currently reviewing options. NAFSO (Sri Lanka) have undertaken a review of drivers in 2016.	

Action	Target / Indicator	Progress	Lead(s)
Work with regional partners, bilaterally and through IOTC, to promote understanding and effective prevention of illegal exploitation.	Regional ownership of a regional threat. Effective coordination of associated efforts leading to reduction in resource loss and secondary risks throughout BIOT and the broader Indian Ocean.	**Ongoing**: Bilateral relationship development with Sri Lanka and India. Engagement with Seychelles through BSFC. Diplomatic engagement with India, continued presence at CoC.	BIOTA, MRAG
Undertake a strandline survey of beach debris.	Environmental impacts identified, to inform action plan.	Completed/ongoing. Strandline survey completed in accordance with the Race for Water methodology in 2015/16. Results submitted to R4W and awaiting publication. Bi-monthly data on broad debris types collected from a regular beach clean-up, collated on an ongoing basis.	BIOTA
Continue beach clean-ups in Diego Garcia	Minimal adverse environmental impact, targeted towards turtle nesting areas, supported by volunteer participation.	Ongoing. In addition to the above, a number of other standalone beach clean-ups occur on DG during a year, (forthcoming 18/11/16). A new initiative to 'Adopt-A-Beach' is underway which will assign areas of coast to groups for regular clean-up.	BIOT HQ
Refresh protocols for documenting and recording observations of FADs, discarded or abandoned fishing gear and other significant floating debris	Protocols and templates for recording information on incidences of fishing gear found in the water and during beach clean-ups revised and included in database. Data summarised annually.	**Pending**: Procedure in place to record all sightings and recovery of FADs and other abandoned fishing gear in database. BIOT signed up to ghost gear initiative. Beach clean-ups also in progress although no data yet received. Policy Brief on FADs **completed**. Informal discussions with fleet managers on FAD recovery. Final FAD policy **pending.**	MRAG/ SFPO
4. Managing human uses			
Enforce controls and regulations designed to protect the environment of the Territory	Ecological integrity maintained, and adverse anthropogenic impacts minimised. Protection of vulnerable sites and species, including those listed under Ramsar and IBA designations.	Ongoing. Spot checks of permits required prior to entry the DG Restricted Area (which broadly overlaps the Ramsar site) undertaken. Review of the legislation pertaining to recreational fishing completed (2016) and management actions in progress, including additional spatial restrictions	BIOTA/ HQ
Monitor water quality in DG lagoon	Phosphates and nitrates decline over time.	Initiated. BIOTA have commissioned a project specification for water quality monitoring from CEFAS. Expected to commence 2017.	BIOTA (US, Cefas)
Undertake a detailed assessment of all legal non-commercial fisheries	Undertake a creel survey to describe in detail the fisheries around DG and the northern atolls, including numbers of fishers, gear, catch and locations, in order to inform future regulation or management.	**Ongoing**: Survey forms developed and circulated to all personnel on DG. Infrastructure implemented to allow the anonymous return of completed forms. Interview-based creel survey on DG undertaken in Feb 2015 and September 2016.	BIOTA, MRAG
Refresh reporting requirements for recreational fishery, and fishery from visiting yachts	Accurate and compulsory recreational fisheries monitoring (re-)established across all fishing categories (boat and shore based). Maximum amount of biologically useful information extracted from	**Ongoing**: Data received on a monthly basis from MWR (catch and LF data) and tuna submitted to IOTC. All catch data presented at BSFC. Data from yachts sporadic.	BIOTA/HQ, MRAG, MWR

Action	Target / Indicator	Progress	Lead(s)
	recreational fishing; impact assessments enabled. Appropriate mechanisms for ensuring or incentivising reporting are investigated.		
Assess / monitor ecological impact of treated wastewater effluent on reef conditions in DG.	Impact minimised through effective mitigation measures	Initiated. Incorporated within the scope of work BIOTA have commissioned from CEFAS.	BIOTA/HQ, US
Assess landfill sites for signs of leaching	Identify nature of hazard (if any).	Initiated. As above.	
Review and, if necessary, revise protocol for disposal of confiscated illegal catch	Minimal impacts on environment and human health.	Completed. Illegal catch to be disposed of offshore.	BIOTA/HQ
Maintain the highest standards of environmental controls with regard to construction and engineering projects in Diego Garcia	Environmental impacts minimized.	Ongoing. BIOT HQ is routinely consulted for commentary and approval of infrastructure and development projects on DG. A watching brief is required to ensure full consultation occurs.	BIOTA/HQ, US
Assess current approach to reducing risks of shark-human contact on Diego Garcia	Maximise safe access to nature for personnel, with improved information to reduce risks.	Ongoing. Recreational swimming areas are regularly monitored for the presence of sharks and entry to the water prohibited where sharks are sighted. Additional advice requested on an ad hoc basis to address specific risks. A dedicated swimming area (where recreational fishing is prohibited) has been identified.	BIOT HQ / MWR
Re-assess protocols for waste disposal by visiting yachts.	Reduced environmental impact from excess waste on northern atolls.	Initiated; permits indicate need for offshore disposal. Enforcement requires consideration.	BIOTA
Refresh /enforce regulations around anchorage	Minimal benthic damage; reduced risk from sediment plumes.	Ongoing; all permits for anchoring now specific anchorage coordinates.	BIOTA, BPV
Review and refresh BIOT environmental regulations.	Environmental regulations aligned with international obligations and best practice. Dedicated MPA legislation enacted, which consolidates and updated existing legislation.	BIOTA do not intend to implement changes to the legislative framework which underpins the MPA, until consultations with Mauritius are completed.	BIOTA, DEFRA
Commence programme to evaluate impact of no-take on fishing fleet dynamics in collaboration with IOTC	Evaluation plan and protocols developed and implemented. IOTC buy-in secured	PhD. MRAG/Imperial College, **completed**. No further uptake at level of IOTC since details reported in 2015. Paper submitted to PLOS1 Disentangling the effect of area closures on fishing location in a tropical tuna fishery". Tim K Davies; Chris C Mees; E.J. Milner-Gulland (2016)	MRAG
5. Coordinating and communicating conservation management activities			
Develop and implement active communications plans for conservation and environment, including information signage and outreach on DG and the outer islands	Maximised engagement and education of personnel in Diego Garcia, and visitors to the outer islands.	Initiated. Project proposal requesting external funding to support production of brochures, leaflets and audio-visual materials received funding from UN BEST. Development of a 'snorkel trail' in progress.	BIOTA, BIOT HQ
Facilitate involvement of DG-based personnel in conservation and management efforts.	Maximised engagement and education of personnel, with increased benefits for morale and welfare. Maximised capacity for DG-based activities (habitat	Initiated. Over 100 volunteers have engaged in voluntary invasive species clearance in the terrestrial restoration sites during 2015/16. Turtle surveys and beach clean-ups	BIOTA / HQ, MWR

Action	Target / Indicator	Progress	Lead(s)
	restoration, beach cleaning, turtle and bird monitoring).	are undertaken on a bi-monthly basis. Volunteers have also assisted in collecting benthic habitat data and in a 'citizen science' approach collecting data on coconut crab populations in the Salomon atoll.	
Assess options for centralised data store for environmental information on BIOT	Improved sharing of, and access to, cross-cutting value on environment in BIOT.	An open CCT run portal offering this solution (see Table 2, Chagos Research Portal) will be linked to from the BIOTA website when operational	BIOTA, CCT
Determine and enforce data-sharing protocols for those working in BIOT	Improved sharing of, and access to, cross-cutting value on environment in BIOT.	Review currently being implemented	BIOTA
Recruitment of temporary resident environmental officer on Diego Garcia.	Effective attainment of DG conservation goals, through liaison with interested parties. Governing standards and environmental regulations implemented. Science and conservation projects communicated to local and visiting personnel.	Environmental Officer now appointed.	BIOTA
Launch BIOTA website	BIOT's unique environmental value broadcasted; management lessons communicated; key resources provided.	Completed. July 2016.	BIOTA
Produce and implement standardised protocols / documentation for science visits	Clarity for all parties on roles and responsibilities, with bureaucratic burden minimised. Ease of doing business maximised.	Ongoing. . BIOTA are currently auditing procedure and personnel to produce guidance for scientists. 'Handbook' expected before Christmas 2016.	ZSL, BIOTA
Routine scrutineering of science equipment stored in Diego Garcia	Kit degradation minimised, and outlays for replacement / repair reduced.	Ongoing. A scope of work to secure kit against damage and/or unauthorised removal has been submitted to the contractor on Diego Garcia. Works are expected in December 2016..	BIOT HQ

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8. IMPLEMENTATION OF SCIENTIFIC COMMITTEE RECOMMENDATIONS AND RESOLUTIONS OF THE IOTC RELEVANT TO THE SC.

Table 9. Scientific requirements contained in Resolutions of the Commission, adopted between 2005 and 2016.

Res. No.	Resolution	Scientific requirement	CPC progress
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	Not applicable as BIOT has no flag registry or fleet of vessels.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	BIOT submits all mandatory statistical reports, including null reports
15/05	On conservation measures for striped marlin, black marlin and blue marlin	Paragraph 4	Not applicable as BIOT has no flag registry or fleet of vessels.
13/04	On the conservation of cetaceans	Paragraphs 7– 9	Not applicable as BIOT has no flag registry. Cetaceans are not associated with the recreational fishery
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	Not applicable as BIOT has no flag registry. Whale sharks are not associated with the recreational fishery
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	Not applicable as BIOT has no flag registry and releases all sharks alive from the recreational fishery.
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	BIOT releases all sharks alive from the recreational fishery
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	Not applicable as BIOT does not have a flag registry.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Parts relating to flag vessels are not applicable as BIOT does not have a flag registry. Nesting sites in BIOT are monitored on island visits.
11/04	On a regional observer scheme	Paragraph 9	Not applicable as BIOT does not have a flag registry.
05/05	Concerning the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 1–12	No sharks are retained in BIOT. Sharks caught in the recreational fishery are released alive. Sharks caught by IUU fishing vessels are reported in communications to the Compliance Committee.
16/06	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraph 1	As set out in this report, BIOT does not operate a flag registry, nor have a fleet of commercial fishing vessels, but a small recreational fishery exist on Diego Garcia that catches tuna and tuna like species. BIOT consistently fulfils all reporting obligations in a timely manner in respect of this fishery. Sharks caught in the recreational fishery are released alive. In 2016 steps were taken to improve data collection for catches taken by shore-based fishers, though it is not anticipated this will include significant catches of tuna or tuna like species. Reference to this information will be included in the Annual Report of Implementation.

9. LITERATURE CITED

BIOT (no date) Interim Conservation Management Framework (CMF), 10 pages

Davies, TK; CC Mees; EJ Milner-Gulland (in review). Disentangling the effect of area closures on fishing location in a tropical tuna fishery". Paper submitted to PLOS1, October 2016

Moir Clark, J, Duffy, H, Pearce, J and Mees, C.C (2015), Update on the catch and bycatch composition of illegal fishing in the British Indian Ocean Territory (UK(OT)) and a summary of abandoned and lost fishing gear, IOTC-2015-WPEB11-48 10 pp http://www.iotc.org/sites/default/files/documents/2015/08/IOTC-2015-WPEB11-48_-_UKOT_illegal_bycatch.pdf

Letessier, T.B., Bouchet, P. & Meeuwig, J.J. (2015) Sampling mobile oceanic fishes and sharks: implications for fisheries and conservation planning. *Biological Reviews*, **DOI:** 10.1111/brv.12246

Mees, CC (2015) UK (British Indian Ocean Territory) National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2015, IOTC-2015-SC18-NR30, 15 pp
http://www.iotc.org/sites/default/files/documents/2015/11/IOTC-2015-SC18-NR30_-_UK_OT.pdf

Purkis, Sam J.; Gardiner, Robert; Johnston, Matthew W.; Sheppard, Charles R. C. (2016) 'A Half-Century of Coastline Change in Diego Garcia' Geomorphology, Volume 261, p. 282-298
http://adsabs.harvard.edu/abs/2016Geomo.261..282P