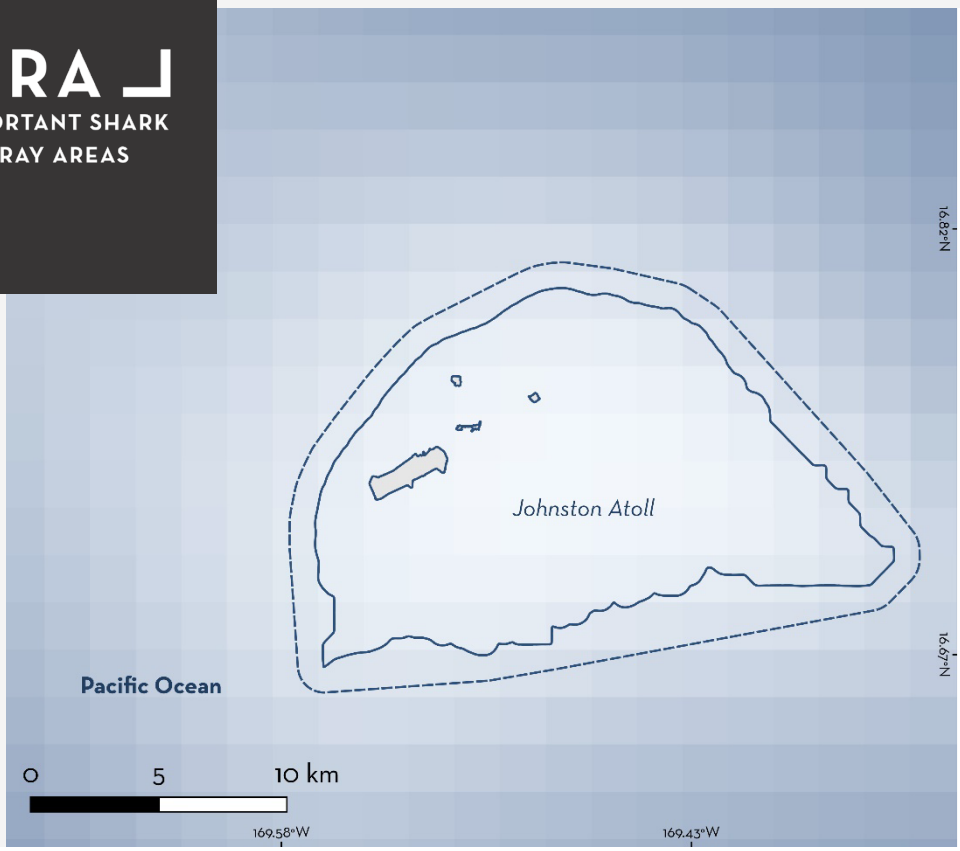
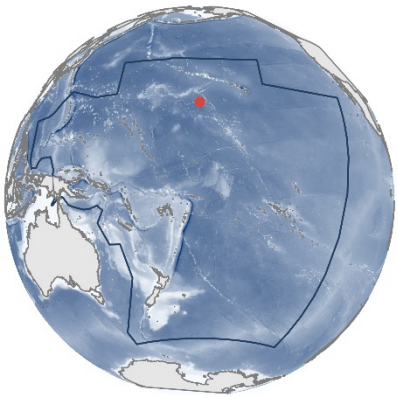
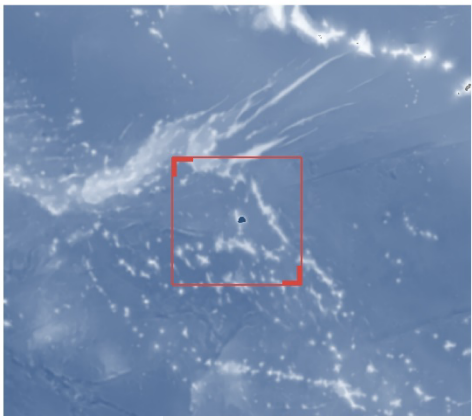
ISRA
IMPORTANT SHARK AND RAY AREAS







Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

JOHNSTON ATOLL ISRA

New Zealand & Pacific Islands Region

JOHNSTON ATOLL

0–50 metres

207 km²

SUMMARY

Johnston Atoll is an isolated atoll in the North Pacific Ocean and is part of the United States of America Minor Outlying Islands in the Pacific Remote Islands Marine National Monument. It is characterised by four islets: Johnston Island, Sand Island, Akau, and Hikina. The atoll has a semicircular barrier reef on the northern and western sides, while the reef is submerged on the east and south sides. The area overlaps with the Johnston Atoll Marine Key Biodiversity Area and two protected areas. Within the area there are: **threatened species** and **undefined aggregations** (Grey Reef Shark *Carcharhinus amblyrhynchos*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C5 – Undefined Aggregations

DESCRIPTION OF HABITAT

Johnston Atoll is an isolated atoll in the North Pacific Ocean, located ~804 km off the French Frigate Shoals in Hawaii. It is part of the United States of America Minor Outlying Islands and the Pacific Remote Islands Marine National Monument. The area is situated on a reef platform and includes four islets: Johnston Island, Sand, Akau and Hikina (Lobel 2003). The atoll has a semicircular barrier reef in the northern and western sides while in the east and south sides, the reef is submerged (Lobel & Lobel 2008, 2018; Lobel et al. 2012). Sea surface temperatures range from ~23°C in February to ~29°C in August (Brainard et al. 2017). Johnston Atoll is mostly influenced by the North Equatorial Current that, in combination with the geomorphology of the atoll, produces eddies and strong currents in the boreal winter (Lobel & Lobel 2008, 2018).

The area overlaps with the Johnston Atoll Marine Key Biodiversity Area (KBA 2024). In addition, it overlaps with the Johnston Atoll National Wildlife Refuge and with the Pacific Remote Islands Marine National Monument (UNEP-WCMC & IUCN 2024).

This Important Shark and Ray Area is pelagic and is delineated from inshore and surface waters (0 m) to 50 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

One Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occurs in the area. This is the Endangered Grey Reef Shark (Simpfendorfer et al. 2020).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Johnston Atoll is an important area for undefined aggregations of one shark species.

Historical data from surveys conducted between 1992–1995 highlight the presence of Grey Reef Shark aggregations in this area (Randall et al. 1985, Economakis & Lobel 1998). This species was also reported as common in outer reefs and shallow lagoons of Johnston Atoll (Randall et al. 1985). Visual surveys from the beach were conducted at least once per week and were focused exclusively on counting Grey Reef Sharks. These surveys showed that aggregations of Grey Reef Sharks are common in Johnston Atoll between March–May with up to 160 individuals observed in a single day in multiple aggregations (Economakis & Lobel 1998). Aggregations were regularly observed during the day around Sand Island and in flat habitats without coral coverage. Larger aggregations coincided with the maximum water temperatures. Observations made by snorkelers revealed that all individuals observed were females (Economakis & Lobel 1998). Between 2001–2003, 25 Grey Reef Sharks (15 males and 10 females) measuring 56–135 cm total length (TL) were also captured in the area showing that males also occur there (Skomal et al. 2007). Of these, five measured 56–76 cm TL and were considered young-of-the-year as the reported size-at-birth for this species is 45–64 cm TL (Ebert et al. 2021).

Diving surveys and visual surveys conducted from the beach have revealed that Grey Reef Shark aggregations continue to regularly occur in the area (Nadon et al. 2012; CREP-PIFSC 2017; Brainard et al. 2019). Towed dive surveys (undertaken up to 30 m depth and covering ~2.5 linear km in ten five-minute segments; Brainard et al. 2019) conducted biennially in January between 2004–2012 and

in 2015 recorded aggregations of up to 27 Grey Reef Sharks (Nadon et al. 2012; CREP-PIFSC 2017; Brainard et al. 2019). Individuals with estimated sizes of 88–225 cm TL (average = 110 cm TL) were mostly sighted in forereefs on the northern side of the atoll at depths 5–20 m. Occasionally, they were also sighted in backreefs and lagoon habitats (Brainard et al. 2019). Between 2004–2012, Grey Reef Sharks were observed in 34 of 98 towed dive surveys (2004: 7/25; 2006: 7/24; 2008: 7/11; 2010: 9/21 and 2012: 4/17) conducted in the area. Aggregations were recorded in all years (2004: 3; 2006: 4; 2008: 3; 2010: 3; 2012: 1) and ranged from four to 27 individuals (CREP-PIFSC 2017; Brainard et al. 2019). Between 2004–2010, Johnston Atoll held the fourth largest density (2 individuals/ha) of Grey Reef Sharks in all the US Pacific (Nadon et al. 2012). During 2015, no Grey Reef Sharks were recorded in towed dive surveys which agrees with the apparent decline of piscivore biomass recorded in that year in Johnston Atoll (Brainard et al 2019). However, in 2015, Grey Reef Sharks were recorded in five of the 31 stationary point count dive surveys (25 m transect lines during a timed five minute with four replicates). These are small-scale surveys that cover small areas and were aggregations are not well captured (Brainard et al. 2019). The presence of Grey Reef Sharks in those surveys confirms their contemporary presence and suggests that aggregations still occur in the area. Since 2015, no additional surveys have been conducted in the area. Additional information is required to determine the nature and function of these aggregations.

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QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
Carcharhinus amblyrhynchos	Grey Reef Shark	EN	0–280	X						X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.

REFERENCES

Brainard R, Acoba T, Asher M, Asher J, Ayotte P, Barkley H, DesRochers A, Dove D, Halperin A, Hungtington B, et al. 2019. Johnston Atoll. In: Brainard R, Acoba T, Asher M, Asher J, Ayotte P, Barkley H, DesRochers A, Dove D, Halperin A, Hungtington B, et al. eds. *Coral Reef Ecosystem Monitoring Report for the Pacific Remote Islands Marine National Monument 2000- 2017. PIFSC Special Publication, SP-19-006f*. Honolulu: United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, 1-98. https://doi.org/10.25923/xber-0g95

Coral Reef Ecosystem Program - Pacific Islands Fisheries Science Center (CREP-PIFSC). 2017. Pacific Reef Assessment and Monitoring Program: Towed-diver Surveys of Large-bodied Fishes of the U.S. Pacific Reefs from 2000-09-09 to 2012-05-19 (NCEI Accession 0163744). NOAA National Centers for Environmental Information. Available at: https://www.ncei.noaa.gov/archive/accession/0163744 Accessed September 2024.

Ebert DA, Dando M, Fowler S. 2021. *Sharks of the world: A complete guide.* Princeton: Princeton University Press.

Economakis AE, Lobel PS. 1998. Aggregation behavior of the grey reef shark, *Carcharhinus amblyrhynchos*, at Johnston Atoll, Central Pacific Ocean. *Environmental Biology of Fishes* 51: 129–139. https://doi.org/10.1023/A:1007416813214 Accessed August 2024.

Key Biodiversity Areas (KBA). 2024. Key Biodiversity Areas factsheet: Johnston Atoll Marine. Available at: https://www.keybiodiversityareas.org/site/factsheet/31017 Accessed August 2024.

Lobel PS. 2003. *Marine life of Johnston Atoll, Central Pacific Ocean*. Oregon: Natural World Press.

Lobel PS, Lobel LK. 2008. Aspects of the biology and geomorphology of Johnston and Wake Atolls, Pacific Ocean. In: Riegl BM, Dodge RE, eds. *Coral reefs of the USA*. Berlin: Springer Science, 655–691.

Lobel LK, Lobel PS. 2018. Current status of the US military atolls in the Pacific: Johnston and Wake. In: Sheppard C, ed. *World seas: an environmental evaluation. Volume II: the Indian Ocean to the Pacific, Second edition.* London: Academic Press, Elsevier Ltd.

Lobel PS, Schreiber EA, McCloskey G, O'Shea L. 2012. *An ecological assessment of Johnston Atoll.* Princeton: Washington Group International.

Nadon MC, Baum JK, Williams ID, McPherson JM, Zglinczynski BJ, Richards, BL, Schroeder RE, Brainard RE. 2012. Re-Creating missing population baselines for Pacific reef sharks. *Conservation Biology* 26: 493–503. https://doi.org/10.1111/j.1523-1739.2012.01835.x

Randall J, Lobel PS, Chave E. 1985. Annotated Checklist of the Fishes of Johnston Island. *Pacific Science* 39: 24–80.

Simpfendorfer C, Fahmi, Bin Ali A, Utzurrum JAT, Seyha L, Maung A, Bineesh KK, Yuneni RR, Sianipar A, Haque AB et al. 2020. *Carcharhinus amblyrhynchos. The IUCN Red List of Threatened Species* 2020: e.T39365A173433550. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39365A173433550.en

Skomal GB, Lobel PS, Marshall G. 2007. The use of animal-borne imaging to assess post-release behavior as it relates to capture stress in Grey Reef Sharks, *Carcharhinus amblyrhynchos*. *Marine Technology Society Journal* 41: 44–48. https://doi.org/10.4031/002533207787441999

UNEP-WCMC & IUCN. 2024. Protected Planet: The World Database on Protected Areas (WDPA) and World Database on Other Effective Area-based Conservation Measures (WD-OECM) [Online], February 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Accessed August 2024.