CRITICAL HABITAT FOR SEA TURTLES IN THE IOSEA REGION

A Guide for Signatory States and the IOSEA Secretariat

(Prepared by the Advisory Committee)

Contents

1. Introduction

This document defines and explains the term and concept of "Critical Habitat" which appears in the IOSEA Conservation and Management Plan (CMP) (Objective 2) and more specifically which is used in the IOSEA Work Programme 2020-2024 (Action 2.1, 30,31,32). In diverse writings about conservation and management, the term "Critical Habitat" is frequently used, but it is often applied in very different contexts and with different meanings, most commonly for a wider range of species or for administrative purposes (see Appendix 2 for examples). The common use of this term frequently results in misunderstandings and confusion, which in turn complicates, and often hinders, the development and execution of conservation initiatives. This IOSEA document provides proposed terminology and guidance on the definition and use of the term for the purposes of sea turtle conservation across the IOSEA region. It employs the term "critical habitat" consistent with other conservation and management documents that are widely accepted.

2. The Term "Critical Habitat" in Existing IOSEA Documents

The IOSEA Conservation and Management Plan (CMP) specifically mentions "critical habitat" three times, always under CMP Objective 2:

> *Objective 2 Protect, conserve and rehabilitate marine turtle habitats.*
>
> *2.1 Establish necessary measures to protect and conserve marine turtle habitats.*
> - *a) Identify areas of critical habitat such as migratory corridors, nesting beaches, inter-nesting and feeding areas*
> - *b) Designate and manage protected/conservation areas, sanctuaries or temporary exclusion zones in areas of critical habitat, or take other measures (e.g. modification of fishing gear, restrictions on vessel traffic) to remove threats to such areas*
> - *c) Develop incentives for adequate protection of areas of critical habitat outside protected areas*

Note: The concept of "critical habitat" is not defined or explained anywhere in the CMP.

To meet Objective 2.1 of the Conservation and Management Plan, three actions were proposed in the IOSEA Work Programme 2020 -2024 (WP). Action item #30 falls within the remit of the Advisory Committee: "*Define criteria for identifying habitats critical for marine turtles (e.g. proportion of population, core areas)*" while the other two are actions for the Signatory States.

Table 1 Excerpt from table of actions from Work Programme 2020-2024

2.1 Establish necessary measures to protect and conserve marine turtle habitats	**Subject**	**Actors**
30. Define criteria for identifying habitats critical for marine turtles (e.g. proportion of the population, core areas)	Habitat protection	AC
31. Geographically identify critical habitats for each turtle stock and life stage, such as nesting beaches, inter-nesting habitats, migratory corridors, foraging habits and oceanic dispersal areas	Habitat protection	Sigs
32. Protect and adequality manage already identified critical habitats	Habitat protection	Sigs

3. IOSEA Definition of "Critical Habitat" for Sea Turtles

The Proposed definition was developed by the IOSEA Advisory Committee by combining the key elements of several existing definitions to form a comprehensive version that most suits the intent of the IOSEA purpose and existing documents.

The proposed definition does not alter any previous identified critical habitat under other criteria.

> *Critical habitats are recognisable areas that are essential for the maintenance and recovery of sea turtle Management Units, with consideration of ecological function, evolutionary processes and scientific, social or cultural values.*

4. Guidance for Identifying Critical Habitat

Critical habitats should include those areas required at any time during the sea turtle life cycle that are essential for the maintenance of the Management Units (MU)[1] or the species.

Defined recognisable areas could include one or more:

- foundational or primary habitat (e.g. various reef systems, seagrass meadows, algal communities, soft bottom communities, epipelagic waters, contact areas for different water bodies or stable sandy beaches that turtles rely on at any particular part of their life cycle
- any other areas important for activities such as foraging, breeding, dispersal, resting and migration.
- areas key to maintain genetic diversity and evolutionary development (eg. extremities of the nesting range)
- compromised areas that are required for the recovery of Management Units (eg areas that have depleted turtle populations but have historic significance and are believed to be part of any potential recovery process).
- areas that support Management Units that are particularly vulnerable to anthropogenic pressures such as climate change, exploitation habitat perturbation, coastal development.
- areas that have decadal data sets and monitoring programs that are essential for understanding how the MU are trending
- areas that are particularly important for multiple management units or multiple species, such as open ocean aggregation areas, feeding areas, nesting sites
- areas predicted to be of future significance in the next 100 years given current climate change modelling, including areas at the higher latitude margins of the Management Units,
- areas that have significant social, economic or cultural importance to local communities in relation to sea turtles.
- Areas of scientific importance and include areas of long time series data that inform the health and status of the stock.
- Areas already assessed within other administrative mechanisms that have emphasis on sea turtles, e.g.
    - certain areas that are part of the IOSEA Site Network.
    - Marine Parks with sea turtles as a Key Performance Indicators.
    - RAMSAR site supporting with sea turtles or sea turtle habitats
    - Conservation initiatives that depend on sea turtles.
    - Fisheries areas with emphasis on sea turtles and or sea turtle habitat.

Specific Guidance for Life Stages of Each Species

Guidance for identifying critical habitat for each species is provided below. This is a dynamic table that can be updated as MU in the IOSEA region are identified and more information becomes available to potentially develop a table specific MU.

Table 2. Guidance to determine critical habitat for each life stage and species.

Life Stage	Species	Guidance
Mating	All species	Often unknown but may include areas that are adjacent or near to nesting beaches. Variation may

[1] Management units can be based on molecular studies as per Moritz et al. 2002 and Dethmers et al. 2006, etc., such that they are genetically distinct. The term is used synonymously with genetic populations and genetic stocks.

Life Stage	Species	Guidance
		occur across species and MU's and mating areas can be occur on route to the nesting beaches.
Nesting		Sandy beaches and associated habitat, intertidal areas and dune systems. Consideration should be made for adjacent impacts such as artificial light that may impact adult and hatchling turtles on the nesting beach.
Inter-nesting	All species	Areas used by female turtles between successive nesting attempts within the nesting the nesting season.
	Green	Suggested radius from nesting beach - 20 km (DoEE 2017)*
	Loggerhead	Suggested radius from nesting beach - 20 km (DoEE 2017)*
	Hawksbill	Suggested radius from nesting beach - 20 km (DoEE 2017)*
	Olive Ridley	Suggested radius from nesting beach - 20 km (DoEE 2017)*
	Leatherback	Suggested radius from nesting beach - 20 km (DoEE 2017)*
	Flatback	Suggested radius from nesting beach - 60 km (DoEE 2017)*
Inshore hatchling dispersal	All Species	The waters used by hatchlings during for the first three days after leaving the nesting beach. Knowledge for this is often scant but waters immediately adjacent to the nesting beaches could be considered.
Post hatchling/ Neonate	All species, except flatback	Neonate turtles will most likely be in offshore waters and may include Signatory State (Territorial) waters or the waters of high seas. These may be unknown for most MU's.
	Flatbacks	Neonate flatback turtles are considered to be mostly confined to the Australian-New Guinea continental shelf and NOT to have an oceanic stage. In recent years, 1-3 year old flatback turtles have been found foraging in inshore surface coastal areas.
Juvenile foraging / developmental habitat	Green	Juvenile and adult green turtles may have similar or different foraging habitats. Following an oceanic stage, green turtles commonly seek shallow habitats once they reach approximately 35 to 45 cm curved carapace length. Habitats commonly include seagrass beds, rocky and coral reefs supporting algae or seagrass, mangroves and associated shallow water habitats. These habitats may occur along the coastal and inshore or around offshore islands.
	Loggerhead	Juvenile and adult loggerhead turtles may have similar or different foraging habitats. Juveniles can inhabit oceanic waters or enter neritic habitats at about 65cm curved carapace length. Diet in neritic waters can be similar to that of adults and include gastropod and bivalve molluscs, crabs, sea cucumbers, jellyfish and

Life Stage	Species	Guidance
		sea urchins. These habitats may occur along the coastal and inshore or around offshore islands.
	Hawksbill	Juvenile and adult hawksbill turtles may have similar or different foraging habitats. Hawksbill turtles commonly seek shallow water habitat once they reach approximately 30 cm curved carapace length. Habitats commonly include rocky and coral reef, seagrass communities, mangroves and associated shallow water areas. These habitats may occur along the coastal and inshore or around offshore islands. Turtles may move to different habitats as they increase in size. Diet includes encrusting invertebrates such as sponges and soft corals and algae and minor items such as seagrass.
	Olive Ridley	Juvenile and adult habitats include both pelagic and inshore waters. Pelagic feeding behaviour appears to include feeding in both the water column and benthic feeding down to 200m. Inshore areas include soft bottomed habitats with diets including gastropod molluscs and crabs.
	Leatherback	These areas are commonly pelagic habitat where jellyfish and other soft-bodied prey are the primary food source. Prey concentration is often seasonal.
	Flatback	Juvenile and adult flatback turtles may have similar foraging habitats. Both juveniles and adult turtles have been found in inshore continental shelf waters of northern Australia & New Guinea. In a Western Australian case, both juvenile and adult turtles were recorded eating jellyfish. In Queensland the diet is likely to contain planktonic and benthic soft-bodied invertebrate prey.
Adult foraging	Green	Habitats commonly include seagrass beds, rocky and coral reefs supporting algae or seagrass, mangroves and associated shallow water habitats. These habitats may occur along the coastal and inshore or around offshore islands.
	Loggerhead	Adult diet includes gastropod and bivalve molluscs, crabs, sea cucumbers, jellyfish and sea urchins
	Hawksbill	As for juvenile hawksbills
	Olive Ridley	As for juvenile olive ridleys
	Leatherback	As for juvenile leatherbacks
	Flatback	Adult feeding habitats include inshore areas less than 20 m depth and less than 5 km form shore and mid-shelf areas approximately 20 to 100m in depth which can be more than 200 kilometres from shore. Flatback diet is still not fully understood but includes items such as jellyfish, sea pens and soft corals.
Migration	All species	Migration routes may be diverse, and their specific locations may be obtained through tag returns, satellite telemetry or local knowledge. Knowledge of

Life Stage	Species	Guidance
		migration routes can link courtship and mating areas, nesting beaches, inter-nesting areas and foraging grounds.

** DoEE 2017 'Recovery Plan for Marine Turtles in Australia, Commonwealth of Australia 2017'. Australian Government, Canberra.*

5. How Will Critical Habitat be Used by IOSEA

Each Signatory State can use this guidance document for their own purposes to assist in identifying and documenting critical habitat for sea turtles in their jurisdictions. The Advisory Committee will not be assessing each signatory state's critical habitats for the purpose of the MOU.

The MOU may use critical habitat information to assist in conservation planning and identifying where knowledge gaps may exist or where additional assistance or focus may be needed.

a) Informing the IOSEA of Critical Habitat

It is proposed that each Signatory State could provide a list (and perhaps GIS shape file) of the areas they define as critical habitat for each management unit (or species) in their national area. For many countries these may already exist for shared and multiple purposes (e.g RAMSAR sites, marine parks, community protection areas, IOSEA Site Network Initiatives).

b) The relationship with the IOSEA Site Network

The Site Network uses the term critical habitat within one of 18 criteria used for assessment for inclusion in the IOSEA site network (CMS 2013). Therefore, the identification of critical habitat does not make it automatically a Site within the IOSEA Site Network. However, Sites within the network, will mostly likely, if not always, include information on Critical Habitats.

c) The relationship with IUCN Important Marine Turtle Areas (IMTA)

In 2021, the IUCN developed criteria for defining Important Marine Turtle Areas (IMTA) (https://www.iucn-mtsg.org/imtas). Under the IUCN criteria IMTAs are discrete areas within existing marine turtle regional management units (RMUs) that are of particular biological significance for the persistence of marine turtles, and/or where the contributions of marine turtles to traditions and cultures of local people are particularly significant. The identification of these areas has not yet progressed.

Similarly to the IOSEA Site Network, Critical Habitat will form part of the criteria used to define IMTAs. Therefore, a signatory state may have many defined critical habitats but only some may become IMTAs.

6. References

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Appendix 1 – Critical habitat or other terms as defined by other organizations

The following are examples of how Critical Habitat is defined by some other organizations.

Table 3 Examples of critical habitat terminology used across jurisdictions and organizations.

Term and Organization	Detail
Important Marine Turtle Areas - IUCN	The goal of identifying IMTAs is to provide a robust, globally consistent framework to support conservation and management of areas that are important for marine turtles at multiple scales. The MTSG defines IMTAs as "discrete areas within existing marine turtle regional management units (RMUs) that are of particular biological significance for the persistence of marine turtles, and/or where the contributions of marine turtles to traditions and cultures of local people are particularly significant." Although the biological and cultural significance of any area where a marine turtle is present might deem it important, IMTAs are intended to reflect the areas of most significant importance for each RMU.
IFC 2018	Critical Habitat is a description of the areas of the planet of highest biodiversity conservation. It takes into account both global and national priorities and builds on the conservation principles of 'vulnerability' (threat) and 'irreplaceability' (rarity/restricted distribution).
Critical Habitat IFC 2012	Any area of the planet with high biodiversity conservation significance based on the existence of habitat of significant importance to critically endangered or endangered species, restricted range or endemic species, globally significant concentrations of migratory and/or congregatory species, highly threatened and/or unique ecosystems and key evolutionary processes. Critical habitats are any area of the planet with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.
Critical Habitat IFC 2006	Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value3 , including habitat required for the survival of critically endangered or endangered species;4 areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or which are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic or cultural importance to local communities. From IFC 2006 Performance Standard 6 Biodiversity Conservation and Sustainable Natural Resource Management

Term and Organization	Detail
Critical Habitat NOAA Fisheries	Specific areas within the geographical area occupied by the species at the time of listing that contain physical or biological features essential to conservation of the species and that may require special management considerations or protection; and….. Specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. https://www.fisheries.noaa.gov/national/endangered-species-conservation/critical-habitat#Definition%20of%20Critical%20Habitat
European Investment Bank (EIB 2018)	An area that supports any of the following features, and is needed to sustain them in a viable state: Highly threatened or unique ecosystem; Population of critically endangered, endangered or vulnerable species, as defined by the IUCN Red List of threatened species and in relevant national legislation; Population, range or distribution of endemic or restricted-range species, or highly distinctive assemblages of species; Habitat required for the survival of migratory species and/or congregatory species; Biodiversity and/or ecosystem with significant social, economic, or cultural importance to local communities and indigenous groups; Habitat of key scientific value and/or associated with key evolutionary processes
European Bank of Reconstruction and Development (EBRC 2014)	The most sensitive biodiversity features, which comprise one of the following: (i) highly threatened or unique ecosystems; (ii) habitats of significant importance to endangered or critically endangered species; (iii) habitats of significant importance to endemic or geographically restricted species; (iv) habitats supporting globally significant migratory or congregatory species; (v) areas associated with key evolutionary processes; or (vi) ecological functions that are vital to maintaining the viability of biodiversity features.
Inter-American Development Bank IADEB (2015)	Critical natural habitats are: (i) existing protected areas, areas officially proposed by governments for protection, or sites that maintain conditions that are vital for the viability of the aforementioned areas; and (ii) unprotected areas of known high conservation value.
Asian Development Bank ADB (2012)	Critical habitat includes: areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities.
African Development Bank ADBG (2012)	Habitats that have high biodiversity value including: (i) habitats of significant importance to critically endangered and/or endangered species; (ii) habitats of significant importance to endemic and/or restricted-range species; (iii) habitats of significant importance to globally significant concentrations of migratory species and/or congregatory species; (iv) regionally significant and/or highly threatened or unique ecosystems; (v) areas that are associated with key evolutionary processes; and (vi) areas that are important to species that are vital to ecosystems, such as keystone species.

Term and Organization	Detail
Habitat Critical EPBC Act 1999 Australia	'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community. Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act
Habitat Critical Marine Turtle Recovery Plan Australia Commonwealth of Australia (2017) Appendix 4.	The guidelines define 'habitat critical to the survival of a species' as areas necessary: · for activities such as foraging, breeding or dispersal · for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species) · to maintain genetic diversity and long term evolutionary development · for the reintroduction of populations or recovery of the species.
Biologically Important Areas Marine Turtle Recovery Plan Australia Commonwealth of Australia (2017)	Biologically important areas for marine turtles in Australia Biologically important areas (BIAs) are areas where protected species display biologically important behaviour, such as breeding, foraging, resting and migration. All of the identified 'habitat critical to the survival of a species or ecological community' areas will be included in the BIA database. BIA's were originally identified for marine turtles through a rigorous and robust process as part of the Commonwealth Bioregional Planning Process and are referenced in Commonwealth Marine Bioregional Plans. They represent areas where a specific behaviour is known to occur. The absence of an identified BIA does not mean that an area is not important habitat, just that it wasn't known. This is because BIA maps reflect the best available information at the time of publication.
IOSEA Site Network (appendix 3)	The overarching goal of the Site Network is to promote the long-term conservation of sites of regional and global importance to marine turtles and their habitats. The network serves as a mechanism for sites to operate more cooperatively and synergistically, both ecologically and administratively, rather than working in isolation with minimal coordination. The use of robust criteria to evaluate sites nominated for inclusion in the network aims to prioritise the most critical sites needed to secure the future of marine turtle species/ management units.