

**ANNEX 14**

**RESOLUTION MEPC.268(68)  
(adopted on 15 May 2015)**

**DESIGNATION OF THE SOUTH-WEST CORAL SEA AS AN EXTENSION OF THE GREAT BARRIER REEF AND TORRES STRAIT PARTICULARLY SENSITIVE SEA AREA**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

BEING AWARE of the ecological, social, cultural, economic and scientific attributes of the south-west Coral Sea, as well as its vulnerability to damage by international shipping activities and the steps taken by the Government of Australia to address that vulnerability,

NOTING the *Revised guidelines for the Identification and Designation of Particularly Sensitive Sea Areas* (PSSA Guidelines), adopted by the Assembly by resolution A.982(24), and the *Revised Guidance Document for submission of PSSA proposals to IMO* (MEPC.1/Circ.510),

RECALLING resolution MEPC.133(53), by which the Torres Strait (TS) was designated as an extension of the Great Barrier Reef (GBR) Particularly Sensitive Sea Area (PSSA),

HAVING CONSIDERED the proposal made by the Government of Australia to extend the GBR and TS PSSA to include the south-west part of the Coral Sea,

HAVING AGREED, at its sixty-eighth session, that the criteria for the identification and designation of a PSSA provided in resolution A.982(24) are fulfilled for the extension of the GBR and TS PSSA to include the south-west part of the Coral Sea,

HAVING NOTED that the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR), at its second session, approved the establishment of two 5 nautical mile wide two-way routes and a new area to be avoided in the south-west Coral Sea as associated protective measures for the application to extend the GBR and TS PSSA to include the south-west part of the Coral Sea to improve the safety of navigation and the protection of the marine environment,

1 DESIGNATES the south-west part of the Coral Sea, as defined in annex 1 to the present resolution, as an extension of the Great Barrier Reef and Torres Strait PSSA pending the final adoption of the associated protective measures for the PSSA, as set out in annex 1 of document NCSR 2/23;

2 INVITES Member Governments to recognize the ecological, social, cultural, economic and scientific attributes of the Coral Sea area, set forth in annex 2 to the present resolution, as well as its vulnerability to damage by international shipping activities, as described in annex 3 to the present resolution;

3 FURTHER INVITES Member Governments to note the associated protective measures established to address the area's vulnerability, the details of which are contained in annex 4 to the present resolution, which are expected to enter into force following final adoption by the ninety-fifth session of the Maritime Safety Committee, on a date to be circulated by the Organization to all Member Governments, and request ships flying their flag to act in accordance with such measures.

ANNEX 1

**DESCRIPTION OF THE GREAT BARRIER REEF, TORRES STRAIT AND CORAL SEA  
PARTICULARLY SENSITIVE SEA AREA<sup>1</sup>**

**Description of the Particularly Sensitive Sea Area**

To minimize the risk of damage from ship groundings and pollution damage by international shipping activities and the destruction and degradation of this unique, diverse, and significant habitats and ecosystem, mariners should exercise extreme care when navigating in the area bounded by a line connecting the following geographical positions which is designated as a Particularly Sensitive Sea Area:

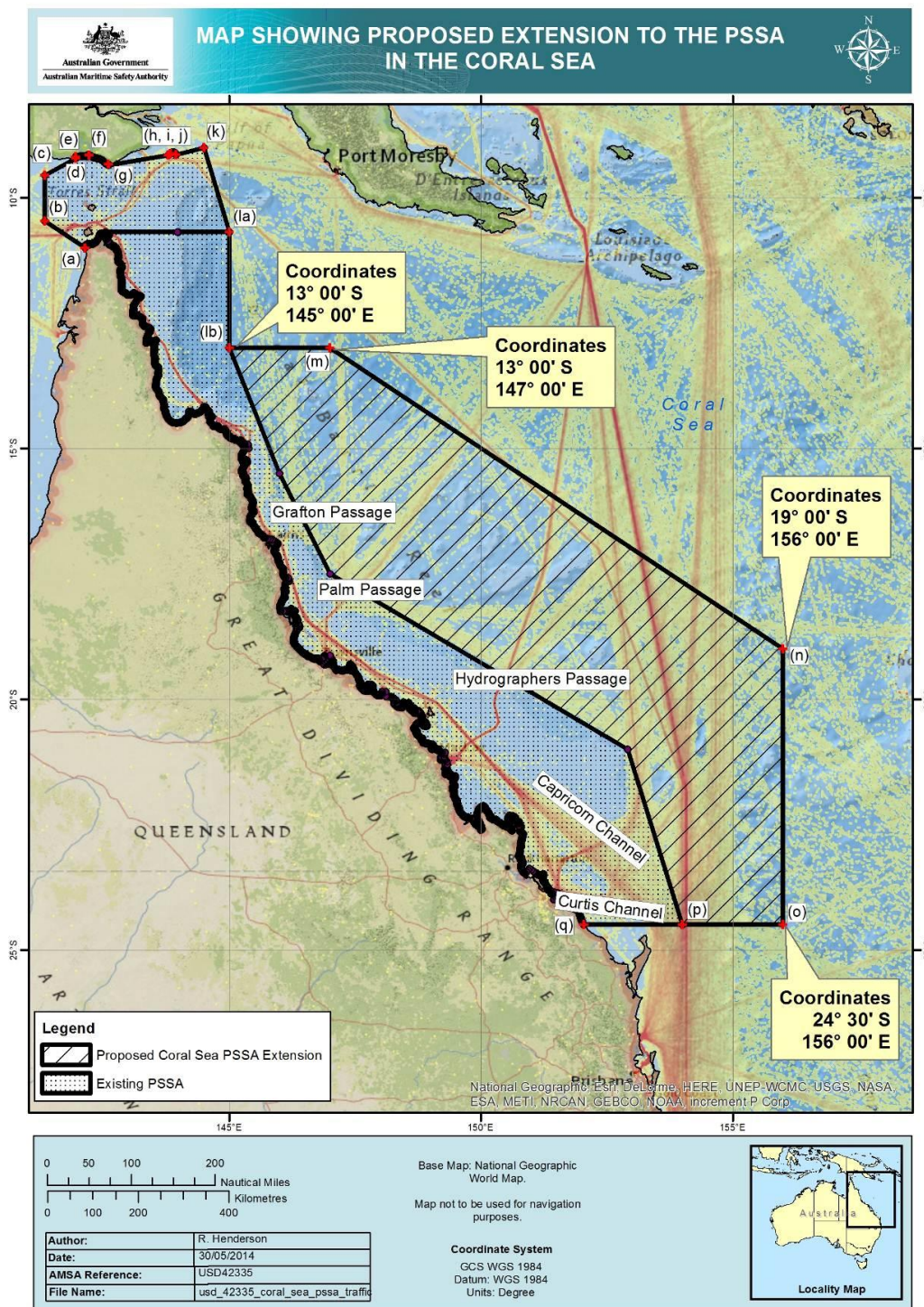
- (a) commencing at a point on the coast of Australia in latitude 11°00' South, longitude 142°08' East;
- (b) running thence north-westerly along the geodesic to the point of latitude 10°28' South, longitude 141°20' East;
- (c) thence north along the meridian of longitude 141°20' East to its intersection by the parallel point of latitude 9°33' South;
- (d) thence north-easterly along the geodesic to the point of latitude 9°13' South, longitude 141°57' East;
- (e) thence north along the meridian of longitude 141°57' East to its intersection by the southern coastline of the island of Papua New Guinea at low water;
- (f) thence generally easterly along the southern coastline of the island of New Guinea, that is along the low water line on that coast and across any river mouth and in the case of the mouth of the Mai Kussa River along the parallel of latitude 9°09' South, thence along the southern coastline of the island of New Guinea, that is along the low water line on that coast and across any river mouth to its intersection by the meridian of longitude 142°36' East;
- (g) thence south along that meridian to its intersection by the parallel of latitude 9°21' South;
- (h) thence north-easterly along the geodesic between that point of intersection and the point of latitude 9°09' South, longitude 143°47'20" East;
- (i) thence along the outer limit of the three-mile territorial sea of Black Rocks, so as to pass to the north-west of Black Rocks, to the point of intersection of that limit by the outer limit of the three-mile territorial sea of Bramble Cay;
- (j) thence along that outer limit, so as to pass successively to the north and east of Bramble Cay, to the point of latitude 9°08'30" South, longitude 143°55'57" East;
- (k) thence north-easterly to the point of latitude 9°00' South, longitude 144°30' East;
- (l) thence generally southerly along a line joining the following geographic positions:
  - a. 10°41' S 145°00' E
  - b. 13°00' S 145°00' E
- (m) thence easterly to a point of latitude 13°00' South, longitude 147°00' East;
- (n) thence generally south-easterly to a point of latitude 19°00' South, longitude 156°00' East;
- (o) thence south to a point of latitude 24°30' South, longitude 156°00' East;
- (p) thence westerly along the parallel of latitude 24°30' South to its intersection by the coastline of Queensland at low water; and
- (q) thence generally northerly along that coastline at low water to the point of commencement.

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<sup>1</sup> The text in this annex is taken from Australia's submission contained in document MEPC 68/10/1.

**Note:** The geographic positions from sections (a) to (k) inclusive are those in resolution MEPC.133(53), adopted in 2005 to define the Great Barrier Reef and Torres Strait Particularly Sensitive Sea Area.

All coordinates are based on the WGS84 datum and are depicted in the diagram in the chartlet below.



## ANNEX 2

### **ECOLOGICAL, SOCIO-ECONOMIC, AND SCIENTIFIC ATTRIBUTES OF THE PSSA EXTENSION AREA: SOUTH-WEST CORAL SEA**

(Note: More detailed descriptions of the ecological, socio-economic and cultural, scientific and educational criteria are contained in paragraphs 17 to 80 of document MEPC 68/10/1.)

#### **1 Ecological criteria**

##### ***Uniqueness or rarity***

1.1 The Coral Sea is considered one of the most distinctive and undisturbed natural systems in the world and is internationally recognized for its rich biodiversity, unique species and important heritage values.

1.2 In the area of the Coral Sea to be covered by the PSSA, three large-scale unique ecological features that support distinct or important ecological communities at a regional scale are present. The Queensland and Marion Plateaux, together support over 20 coral reefs and cays, which provide complex habitats with diverse and abundant invertebrate and fish communities. Similarly, the northernmost parts of the Tasmanid Seamount Chain contain a diverse range of habitats, including deep-water sponge gardens and near-pristine tropical coral reef systems. Collectively these are known to be biological hot-spots, with significant species diversity.

1.3 Over millennia, the geological and oceanographic history of the region and its warm and cool current patterns have prevented the migration of species, prompting the development of flora and fauna that evolved, adapted and spread in isolation. Localized currents can act as a barrier to dispersal; as a result the area has high levels of species endemism.

1.4 The area contains some of the world's most unique and globally significant marine species, such as the leatherback turtle (*Dermochelys coriacea*), humphead Maori wrasse (*Cheilinus undulatus*) and nautilus (*Nautilus pompilius*).

1.5 The Coral Sea provides migratory corridors for cetaceans, sharks, fish, turtles and seabirds, many of which are of conservation concern. Successive research efforts have highlighted the significance of the Coral Sea in patterns of dispersal, whereby the reefs provide a series of dispersal stepping-stones from the western Pacific towards the GBR.

1.6 Deep, cold water troughs and abyssal basins are habitat for an array of benthic species, many of which are a protected matter under Australia's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or international agreement or are unique to the area, including 18 endemic species of deep-water sharks, rays and chimaera fish.

1.7 The remoteness and challenging environment of the area means much of its biodiversity remains undescribed and new species found nowhere else are routinely discovered. Surveys in the deeper reef habitats at Osprey Reef have revealed prehistoric six-gilled sharks, giant oil fish and many crustaceans and unidentified fish at depths of 1400 metres. A unique, dwarf speciation of *Nautilus pompilius* was also identified on Osprey Reef. This species evolved isolated from nautilus in the nearby Coral Sea and GBR, and is a reflection of the endemic nature of ecosystems within the area.

1.8 The north-western Coral Sea hosts the only confirmed spawning aggregation of black marlin (*Makaira indica*) in the world. This species migrates throughout the Pacific Ocean, but only uses the Coral Sea to spawn.

1.9 The few detailed surveys undertaken have shown that as many as 405% of the invertebrates inhabiting seamounts in the area are new to science while up to 34% of the species may be endemic. Scientists expect that research into the lesser known, deeper areas of the region will uncover many new species.

### ***Critical habitat***

1.10 The area contains outstanding examples of reef communities and a diverse array of isolated sandy cays, islands, deep-sea plains, seamounts and canyons. Collectively, these areas provide foraging, breeding and nesting grounds for a rich array of marine species, including 341 species that are recognized for their conservation significance under the EPBC Act and under international agreements. This includes 26 species of cetaceans, 219 species of corals, 21 species of fish, 46 species of sharks and rays, five species of marine turtles and 24 species of birds. Many of these species are listed as threatened or migratory species, or both, and, whilst over half of these species show declining population trends worldwide, many are still found at healthy levels in the Coral Sea.

### ***Dependency***

1.11 The reefs of Coral Sea provide stepping-stones for the dispersal of species between the GBR and the greater Pacific Ocean region. Maintaining the overall integrity and resilience of these reefs is therefore necessary to ensure that they can function effectively as stepping-stone habitats.

1.12 The Coral Sea also provides migratory corridors for cetaceans, sharks, fish, turtles and seabirds, many of which are of conservation concern. There are likely to be further important areas for feeding, breeding, migrating and resting that have yet to be clearly identified, and which may act as critical habitat for many species.

1.13 Thousands of species rely on the ecosystem processes within the Coral Sea region to provide opportunities for foraging, breeding and migration. These processes are largely driven by the availability of energy within the system, which in turn is dependent upon the unique interactions between the region's oceanographic and topographic features.

1.14 Localized turbulence in the lee of reefs, islands and seamounts influences biological communities by creating patches of high to intermediate productivity in the nutrient-poor open-water environment. These sites of enhanced productivity are important aggregators for a range of pelagic species including small fish, mid-trophic predatory fish and large predators. They are also known to attract a range of species of conservation concern including marine turtles, marine mammals and seabirds.

1.15 Cays in the area offer important habitat for seabirds to roost and nest, and turtles to lay eggs above the high tide mark. Seabirds provide the main source of energy on these cays, through their nutrient-rich guano, eggs and carrion, which support food webs of terrestrial and intertidal invertebrates and over time facilitate the development of soil and organic matter, which in turn provides habitat for more complex plant communities.

1.16 The species assemblage and trophic structure of the region relies on the highly interlinked web of local oceanographic patterns, topography and energy inputs. An impact on any one of these can disrupt this web, destabilizing ecosystem processes and the species that rely on them.

### ***Representativeness***

1.17 The reefs, cays and herbivorous fish of the Queensland and Marion Plateaux and the northern extent of the Tasmanid Seamount Chain highlight the biological significance and ecological value of the region.

1.18 The Queensland and Marion Plateaux are considered important for aggregations of marine life and the high levels of biodiversity they support. The reefs and islands of these plateaux are approximately 200–400 kilometres from the coast and provide for diverse and abundant invertebrate (e.g. sea cucumber) and fish communities.

1.19 These reefs of the Queensland and Marion Plateaux are known for their particularly high densities of shark species, and Osprey Reef in particular is also recognized for its populations of the iconic humphead Maori wrasse and nautilus. The lagoons of these reefs are important nursery sites for sharks and predatory fish, while the island areas support critical nesting sites for the green turtle and a range of seabird species. The plateaux also abut two significant deep-water regions: the Queensland Trough, which separates the Queensland Plateau from the GBR, and the Townsville Trough, which separates the two plateaux from each other. These troughs contain canyons and gullies that are likely to support unique deep-water ecosystems.

### ***Diversity***

1.20 The reef systems in the Coral Sea are dominated by spectacular sponge gardens, and support high biodiversity. Approximately 745 species of molluscs (shellfish, squid and octopus) have been found, including several that are considered rare. Six hundred and twenty eight species of fish are known to occur in the Coral Sea. The small islets and cays of the Coral Sea are important nesting places for many species of seabirds.

1.21 Reefs in the area provide a habitat mosaic for diverse and abundant invertebrate and fish communities. A diversity of hard and soft corals, sponge gardens, crustaceans and molluscs are found in the area, as well as a distinct Coral Sea reef fish community that includes many unique species.

1.22 Significant variation in water depth and sea floor features are contributing factors to the high levels of species diversity in the area. Sections of the continental shelf have a mosaic of rocky reefs and soft sediments and support species from a diverse range of taxonomic groups. The extensive seamount systems of the Coral Sea contain a large variety of sponges, corals, gorgonians, sea squirts and crinoids, the latter of which can grow unusually large and are frequently very long-lived, often exceeding several hundred years.

1.23 Abyssal regions are yet to be fully explored, but there is evidence of biologically important systems likely to contain a vast reservoir of undiscovered species.

### ***Productivity***

1.24 The pelagic environment of the area is akin to a vast desert with small oases of biodiversity and productivity. These areas of primary productivity influence the spread of algae, one of the area's most abundant and diverse life forms, covering a greater region than corals and forming an important part of the food chain. Areas with a high biomass of algae

increase planktonic activity and create high levels of prey abundance, attracting aggregations of higher order herbivorous and apex predator species. These localized productivity hot spots in an otherwise nutrient-poor environment provide habitat, migration and dispersal corridors for many iconic and endangered species.

1.25 Marine species and seabirds can journey hundreds or even thousands of kilometres to breed in the Coral Sea, or to travel through en route to breeding areas beyond the region. Areas of high productivity such as the seamounts are therefore critical "stepping stones" within the barren open ocean and are important aggregators for a range of species including lantern fish, albacore tuna, billfish and sharks. These species rely on foraging opportunities supplied by productivity hot spots in the Coral Sea to sustain them on their journey. Large marine mammals journey many kilometres to breed in the Reserve, or to travel through en route to breeding areas.

1.26 It is also thought that the organic particulates contained in nutrient-rich intrusions in the area are responsible for the settlement and sustained growth of coral reef ecosystems, which have the highest gross primary productivity of all ocean ecosystems. These waters carry organic matter into the region where they contribute significantly to the overall productivity of the system.

### ***Spawning and breeding grounds***

1.27 The area contains critical habitat features used by numerous species to spawn and breed and which are therefore essential for their survival.

- .1 The waters over the Queensland and Townsville Troughs appear important for attracting aggregations of large pelagic species, either to feed or spawn.
- .2 Extensive seabird rookeries within the small islets and cays of the area are of global and national importance.
- .3 The area is a major feeding and breeding location for six of the world's seven species of sea turtles, all of which are listed on the IUCN Red List of Threatened Species.
- .4 Particularly sheltered regions, such as lagoons, are thought to be important nursery sites for sharks and predatory fish, while other species, such as the dwarf minke whale, the hawksbill and leatherback turtles and the endangered Herald petrel, forage in these calmer areas.
- .5 The northern extension of the Tasmantid Seamount Chain, where the seamounts extend to the surface and are capped by islands and reefs, provide feeding and breeding grounds for open ocean species including billfish, marine turtles and marine mammals.
- .6 Each year from September to December, black marlin aggregate in the area to spawn. This is the only known spawning location for black marlin in the world.

### ***Naturalness***

1.28 The Coral Sea is considered one of the most distinctive and undisturbed natural systems in the world.

1.29 The area is not directly threatened by land-based sources of pollution and has relatively low levels of fishing. It is one of the world's last tropical oceanic regions containing high biodiversity coral reefs that are virtually pristine, and where large populations of pelagic predators have not been severely depleted. The topography of the area has also contributed to its pristine nature, with recent surveys identifying deep-sea ecosystems which have remained largely unchanged for millions of years.

1.30 The Coringa Cays and Lihou Islets contain important bird and turtle nesting sites that are almost totally free from anthropogenic disturbances such as lighting, beach use, pollution, feral animals, and boat traffic compared to nesting sites throughout the GBR. These areas, therefore, are reference sites to determine the impacts of such disturbances on breeding success within the populations.

### ***Integrity***

1.31 The extension area covers a large area, and encompasses parts of six provincial bioregions identified in the Integrated Marine and Coastal Regionalisation of Australia Version 4.0 (IMCRA v.4.0). These bioregions contain a wide variety of interconnected habitats, and also provide important "stepping-stone" links between the GBR and the wider Pacific Ocean.

1.32 The integrity of the area is in part due to its remote nature, with the nearest point to a mainland coast over 60 kilometres away, and the furthest point 1100 kilometres.

1.33 The area therefore demonstrates the characteristics of an isolated, effectively self-sustaining ecological unit, as evidenced by the high proportion of endemism both within the region, and between individual reef communities.

### ***Fragility***

1.34 Although the Coral Sea contains a number of critical shallow reef and terrestrial habitats, these represent less than 1% of the total area. Their small size, isolation from each other and high exposure to cyclones and storms make them more vulnerable to catastrophic impacts of natural disturbances than the contiguous reef systems of the GBR. These precarious conditions increase the area's ecological fragility and the risk of local extinctions. A high proportion of pelagic and deep-water species are particularly vulnerable to anthropogenic impacts.

1.35 While the isolation of the area's ecosystems has ensured a great deal of diversity and endemism between communities and populations, it also means these systems can be particularly fragile and susceptible to external factors with potentially catastrophic, long-term cascade effects.

1.36 The area's deep-sea organisms are generally slow growing, long-lived, late-reproducing species with few offspring, and as a result can take a significant amount of time to rebuild populations. The cold coral reef systems take thousands of years to develop even in areas with stable conditions. They are fragile and extremely susceptible to damage as recovery rates are immensely slow.



### ***Bio-geographic importance***

- 1.37 A number of biologically important areas are located within, or intersect with the area:
- .1 Seasonal migration routes and feeding sites for cetaceans including the humpback whale occur throughout the region. The humpback whale is also known to breed and calve in the area.
  - .2 Migration routes and foraging and feeding sites for 13 species of seabird listed under the EPBC Act as threatened, endangered and/or migratory are located in the area.
  - .3 The green turtle breeds in the area, with the Coringa-Herald-Lihou area particularly important for nesting and inter-nesting activities.
  - .4 In spring and summer, whale sharks aggregate to feed around Bougainville Reef and white sharks use the south west Coral Sea, adjacent to the Swain Reefs, as they move between nursery areas and for opportunistic feeding.
  - .5 The minimal impacts on the area and its relative lack of disturbance mean that its various ecosystems provide a representation of what the geographic distribution of organisms would naturally resemble in comparable, but more highly impacted marine ecosystems around the world.

## **2 Social, cultural and economic criteria**

### ***Social or economic dependency***

2.1 Commercial fisheries have a relatively small presence in the south west Coral Sea compared to other marine regions around Australia. Commonwealth and Queensland state managed fisheries occur in the area, including line, hand collection, trawl, purse seine, trap and net fisheries.

2.2 Almost all tourism activities that occur in the south west Coral Sea are nature-based and reliant on an intact Coral Sea ecosystem. They include charter fishing, snorkelling, scuba diving, whale watching and cruising.

2.3 Known scuba diving and snorkelling hotspots in the Coral Sea region include the Osprey and Shark Reefs, for their significant populations of shark. These activities also occur in the Coringa Islets, Herald Cays and at Lihou Reef, although the extreme isolation of these locations means that they are not often visited. They also take place off other islands and shallow water seafloor features in the Coral Sea region, albeit on a limited basis.

2.4 Scuba diving and snorkelling are predominantly eco-tourism or heritage-based tourism activities with participants preferring locations that offer near-pristine marine environments or dive wrecks of interest. Some commercial and educational organizations offer science-based tourism opportunities where divers and snorkelers participate in experiments or surveys. Cruise ships also frequent the region, some regularly visiting Willis Island.

### ***Cultural heritage***

2.5 Like the GBR and Torres Strait, the Coral Sea is also of indigenous cultural and social significance to island and coastal communities. Many Aboriginal and Torres Strait island people undertake traditional use of marine resource activities to provide traditional food, practice their living maritime culture and to educate younger generations about traditional and cultural rules and protocols.

2.6 The area contains a large number of historic shipwrecks, including the wrecks of the *Cato* and **HMS Porpoise**, which are located in protected zones established under Australia's *Historic Shipwrecks Act 1976*. The region was significant in the Battle of the Coral Sea during World War II.

## **3 Scientific and educational criteria**

### ***Research***

3.1 Given the scale and location of the proposed extension area to the PSSA, large-scale oceanographic features are well known and documented. However, there is a lack of knowledge of finer-scale hydrodynamics linking habitats within the Coral Sea. Further, the potential impacts of climate change on the Coral Sea are yet to be understood.

3.2 In spite of the relatively few detailed studies on the area, it remains one of high scientific interest. The remote location of the area, and its reputation as one of the most distinctive and undisturbed natural systems in the world, offers researchers a rare opportunity to study a biota over an area of significant scale that has not been markedly impacted by fishing and which is likely to remain undisturbed.

3.3 Domestic and international research institutions are actively undertaking research in the area. In addition to research institutions, tourist operators and volunteer organisations maintain active monitoring programs.

3.4 The occupied meteorological facility on Willis Island has been providing data to Bureau of Meteorology scientists and others since 1921. Automatic weather stations are located on Bougainville Reef, Cato Island, Flinders Reef (Flinders Coral Cay), Frederick Reef, Holmes Reef, Lihou Reef (Turtle Islet), Marion Reef and Moore Reef. Observations from Willis Island and the automatic weather stations are important for climate analysis and numerical weather prediction models, for fine-tuning forecasts and warnings, and are particularly important for early warning of tropical cyclones.

### ***Baseline for monitoring studies***

3.5 The extension area to the PSSA is remote and considered a relatively undisturbed natural system. Although its location has meant that detailed studies of the area are limited, the Coral Sea is a known habitat for many protected species, and spawning aggregations and nesting locations have been identified. The area also provides migratory corridors for a variety of important species, and as such provides suitable baseline conditions for future monitoring studies.

## ANNEX 3

### VULNERABILITY TO DAMAGE BY INTERNATIONAL SHIPPING ACTIVITIES<sup>2</sup>

(Note: A detailed description of the characteristics of the maritime traffic, the transport of harmful substances, and the threats from maritime incidents, including a description of the hydrographical, meteorological and oceanographical conditions may be found in paragraphs 81 to 109 of document MEPC 68/10/1.)

#### 1 Vessel traffic characteristics

##### *Operational factors*

1.1 There are two major shipping routes in the region – the Inner Route and the Outer Route of the GBR. While the Inner Route lies relatively close to the Queensland coast within the GBR and Torres Strait PSSA, the Outer Route begins at the north-eastern limit of the Torres Strait (the Great North-East Channel), continues southwards through the Coral Sea and re-joins the Queensland coast near Sandy Cape (south of Gladstone) (see figure 1 of appendix 3 of document MEPC 68/10/1).

1.2 The Outer Route experiences south-east trade winds and heavy seas for about nine months of the year. A vessel suffering serious propulsion or power failure in the Coral Sea will be many hundreds of kilometres from towage assistance and could drift on to one of the numerous reefs or cays in the Coral Sea before any towage assistance can arrive. Anchoring is impractical due to the precipitous depths that prevail up to the edges of these reefs.

##### *Vessel types*

1.3 There is a wide variety of vessel types operating in this area. Ships entering and leaving Queensland coastal ports are primarily dry bulk carriers (most notably carrying coal) and, increasingly, liquefied natural gas (LNG) tankers. Oil and chemical carriers calling at Australian east coast ports mainly choose to use the Outer Route. Other ships transiting through the south west Coral Sea trading between Asia and other east coast Australian ports, such as Brisbane, Newcastle, Sydney and Melbourne, transport a variety of cargoes including containerized, dry, liquid, vehicular and general cargoes.

##### *Traffic characteristics*

1.4 In addition to ships using the Outer Route to transit between Torres Strait and east coast Australian ports, the Outer Route converges in the south western Coral Sea with the north/south route used by ships transiting between Asian ports via Jomard Entrance (Papua New Guinea) and major Australian east coast ports such as Newcastle, Sydney and Melbourne, and commodity exporting ports in Queensland.

1.5 Ships bound to and from Queensland ports are also a major consideration in terms of the risk to the ecosystem from international shipping activities in the south west Coral Sea. There are four main passages through the GBR that result in a corresponding concentration of traffic in the south west Coral Sea. These are Grafton Passage (near Cairns); Palm Passage (near Townsville); Hydrographers Passage (near Mackay); and through the Capricorn and Curtis Channels in the south.

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<sup>2</sup> The text in this annex is taken from Australia's submission contained in document MEPC 68/10/1.

1.6 These shipping routes and passages can be identified in the Automatic Identification System (AIS) vessel traffic density information provided in appendix 2 of document MEPC 68/10/1.

1.7 Shipping activity in the Coral Sea is expected to increase in the coming years. The expansion of the Australian resources sector, which includes other east coast bulk ports such as Newcastle and Port Kembla (most ships en route to and from these ports use the north/south route through the south west Coral Sea), is the major factor in the expected growth of 81% in the total national traffic at sea by 2020.

### ***Harmful substances carried***

1.8 A wide variety of vessels carrying a range of potentially harmful substances operate in this area. The Outer Route is generally used by oil and chemical tankers visiting Australian east coast ports, while there is increasing LNG tanker traffic entering and leaving Queensland ports.

## **2 Natural factors**

### ***Hydrographical***

2.1 There are some areas immediately around Coral Sea cays, reefs and islets where the depth of water, surveyed bathymetry quality and/or final charted product scale pose some navigational risk for larger vessel types. These areas are clearly marked on nautical charts and, in general, such areas should be well avoided by commercial shipping. Shipping should always navigate with due regard for charted data, chart scale and stated reliability of data within the area of interest.

2.2 Generally, all areas within the PSSA (apart from the proposed area to be avoided (ATBA), discussed below) are too deep to offer any anchoring opportunity.

### ***Meteorological***

2.3 Parts of the area are subject to the highest frequency of tropical cyclones in eastern Australia, creating a high disturbance regime for its ecological communities, resulting in increased diversity due to the frequent regeneration of reefs following storm events. In the last 100 years, cyclones have become less frequent but more intense, and in the last 12 years the region has experienced four extreme cyclones (category 4 or 5).

2.4 In general, during winter months, the predominant winds are from the south-east with small southerly and easterly components. Summer months exhibit an increased easterly component in addition to the south easterly winds.

2.5 Winds in these areas may produce shallow surface currents in addition to those deeper currents described below.

### ***Oceanographic***

2.6 Oceanographic processes play a significant role in the biological patterns across the Coral Sea region. There are three main currents that affect the region; the South Equatorial, Hiri, and East Australian currents. The South Equatorial Current moves west toward Townsville and Cairns from offshore waters to the east. As it moves toward the coast it splits into the north-flowing Hiri Current and the East Australian Current. Geomorphic features interact with these ocean currents to create variable speeds and directions.

2.7 A slow and deep (>100 m) clockwise eddy, originating from the East Australian Current, circulates around the Marion Plateau. A similar gyre system of ocean currents exists atop the Queensland Plateau. The flow of these localized features is thought to create a barrier to larval dispersal that contributes to the high species endemism and localized distribution of species in the region.

2.8 The geomorphic characteristics of the coral reefs and cays reflect the constant exposure to high energy wind and wave conditions. The East Australian Current and its associated eddy fields are large scale, spatially predictable, ecologically important pelagic features represented in the region.

***Other information***

2.9 The Coral Sea's ecology is largely shaped by physical forces such as climate and weather patterns, the direction and strength of currents, the shape of the underlying seabed, and the interaction between water movement and seafloor topography. These forces affect the distribution of species, the availability of nutrients and prey, the levels of disturbance experienced by ecological communities and their ability to recover from natural and human pressures and impacts.

2.10 In addition to the shipwrecks mentioned in annex 2, there have also been a number of incidents and near misses in the region in recent years that demonstrate the potential risk of environmental harm by ships that conduct their passage through the waters of the PSSA extension. Several case studies on near misses in recent years are provided in appendix 3 of document MEPC 68/10/1.

## ANNEX 4

### **ASSOCIATED PROTECTIVE MEASURES FOR THE GREAT BARRIER REEF, TORRES STRAIT AND CORAL SEA PSSA**

Recommendatory Associated Protective Measures (APMs) are:

- .1 An area to be avoided (ATBA) encompassing the reefs, shoals, and islets that lie generally to the north-east of the GBR, between Palm and Hydrographers Passage. Keeping transiting SOLAS ships clear of this area will mitigate the risk of groundings and allow more time for intervention, in case of developing situations (e.g. a ship suffering breakdown of its propulsion machinery) (see appendix 3 of document MEPC 68/10/1 for further information);
- .2 Two 5 nautical mile wide two-way routes – one in Diamond Passage and the other to the West of Holmes Reef in the south-west Coral Sea.
  - .1 The two-way route in Diamond Passage extends from approximately 25 nautical miles south of Diamond Passage through to approximately 35 nautical miles north of the passage.
  - .2 The two-way route West of Holmes Reef extends for 32.5 nautical miles approximately north west of Holmes Reef and 20.5 nautical miles approximately south west of Holmes Reef; and
  - .3 The proposed two-way routes aim to reduce the risks of collision and grounding of ships by separating opposing streams of traffic, whilst ensuring ships avoid the shoals, reef and islands that lie close outside the two-way routes. The two-way routes also aim to allow ships to follow well-defined lanes, thereby enhancing the safety and efficiency of navigation through effective passage planning. (see appendix 4 of document MEPC 68/10/1 for further information).

The APMs are new ships' routing systems under SOLAS regulation V/10 and are provided in full in appendices 3 and 4 of document MEPC 68/10/1 and depicted in the chartlets below.

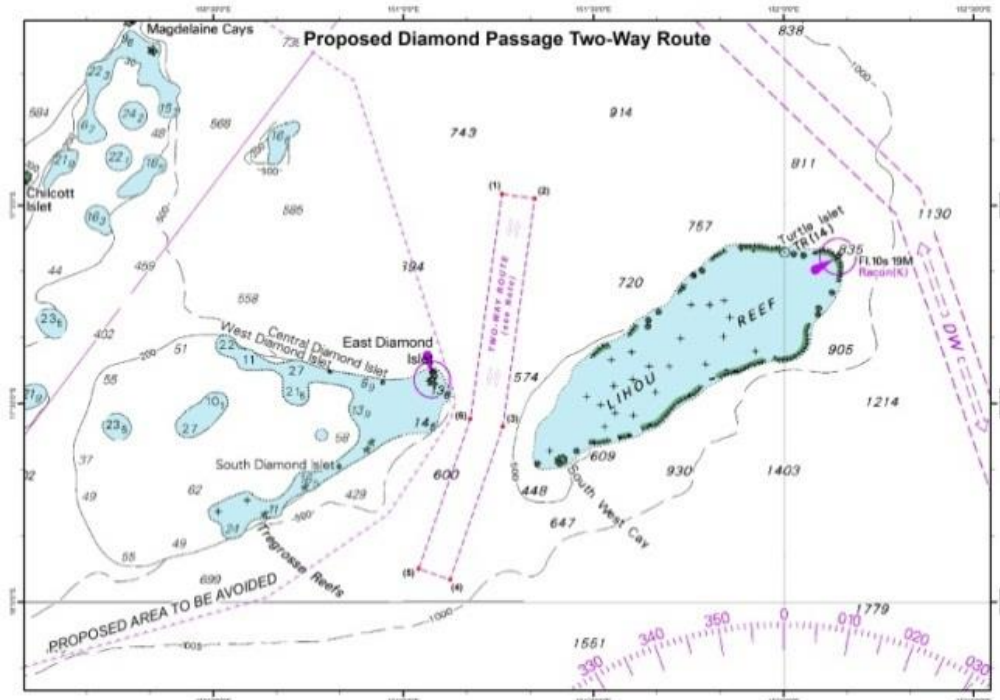
#### **DESCRIPTION OF THE TWO-WAY ROUTES AND ASSOCIATED CHARTLETS IN THE CORAL SEA**

The ship routing systems consist of two recommendatory two-way routes in the south-west portion of the Coral Sea, each being five nautical miles wide.

##### **Diamond Passage**

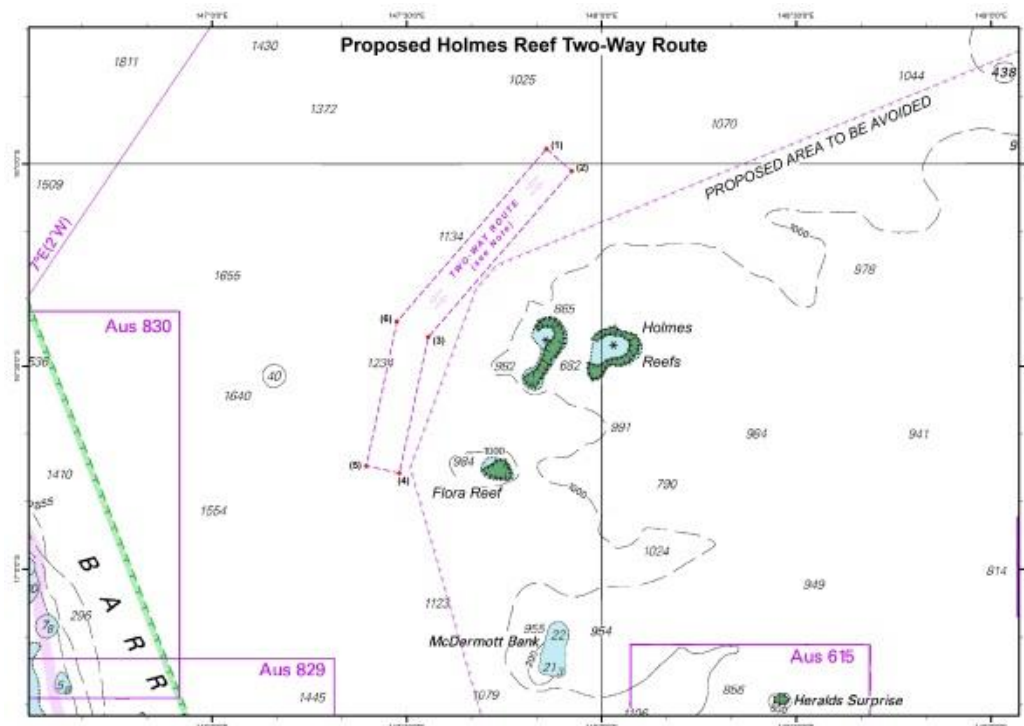
The Diamond Passage two-way route starts approximately south east of South Diamond Islet and extends on a bearing of 019-199 degrees for 24.5 nautical miles. It then changes to a bearing of 008-188 degrees for 35 nautical miles.

From the two-way route's centreline, the closest distance to the 100 metre bathymetric contour is approximately 6.9 nautical miles in both east and west directions. This means that the passage width between those contours, at its narrowest, is approximately 13.8 nautical miles.



### West of Holmes Reef

The Holmes Reef two-way route commences west of Flora Reef and extends along a bearing of 012-192 degrees for 20.5 nautical miles. The bearing changes to 040-220 degrees for 32.5 nautical miles. Holmes Reefs and Flora Reef are over 10 nautical miles from the eastern limit of the two-way route.



## NAMES, NUMBERS, EDITIONS AND GEODETIC DATUMS OF THE REFERENCE CHARTS

### Diamond Passage

<b>Names</b>	<b>Number</b>	<b>Edition</b>	<b>Datum</b>
Diamond Passage	AUS614	Ed 2	WGS84
Willis Islets	AUS617 Pt 1	Ed 2	WGS84
South West Islet to Magdelaine Cays	AUS617 Pt 2	Ed 2	WGS84
Mackay to Solomon Islands	AUS4621 (INT621)	Ed 4	WGS84

### West of Holmes Reef

<b>Names</b>	<b>Number</b>	<b>Edition</b>	<b>Datum</b>
Flinders Reefs	AUS615 Pt 1	Ed 2	WGS84
Flora Reef and Holmes Reefs	AUS615 Pt 2	Ed 2	WGS84
Percy Isles to Booby Island	AUS4620 (INT 620)	Ed 6	WGS84

## GEOGRAPHICAL COORDINATES OF THE RECOMMENDATORY TWO-WAY ROUTES

A list of the geographical coordinates of the recommendatory two-way routes is provided below.

All geographical positions are based on WGS 84.

Individual coordinate numbering refers to those shown in figure 2 (Diamond Passage) and figure 3 (Holmes Reef).

### Diamond Passage

The Western limit is bounded by lines joining the following coordinates:

- (1) 16° 58.25' S 151° 15.56' E
- (6) 17° 32.32' S 151° 10.56' E
- (5) 17° 55.00' S 151° 02.41' E

The Eastern limit is bounded by lines joining the following coordinates:

- (2) 16° 58.95' S 151° 20.72' E
- (3) 17° 33.50' S 151° 15.68' E
- (4) 17° 56.64' S 151° 07.37' E

### Holmes Reef

The Western limit is bounded by lines joining the following coordinates:

- (1) 15° 57.78' S 147° 51.50' E
- (6) 16° 23.37' S 147° 28.48' E
- (5) 16° 44.76' S 147° 23.76' E

The Eastern limit is bounded by lines joining the following coordinates:

- (2) 16° 01.08' S 147° 55.42' E
- (3) 16° 25.69' S 147° 33.29' E
- (4) 16° 45.81' S 147° 28.86' E



## **CHARTLETS AND A GENERAL DESCRIPTION OF AREA TO BE AVOIDED IN THE CORAL SEA**

The area lies off the north-east coast of Australia, within the PSSA in the south-west Coral Sea (figure 1). It encompasses a multitude of reefs, shoals and islets that lie generally to the north-east of the Great Barrier Reef (GBR), between Palm and Hydrographers Passage (figure 2).

In order to reduce the risk of a maritime casualty and potential damage to the sensitive marine environment, transiting ships should not enter the ATBA. The ATBA will result in minor changes to the traffic pattern for ships that are required to conform to SOLAS requirements. Some of these ships (e.g. cruise ships) which demonstrate an operational need to visit a location within the ATBA and which have adequate risk mitigation measures in place may enter the ATBA.

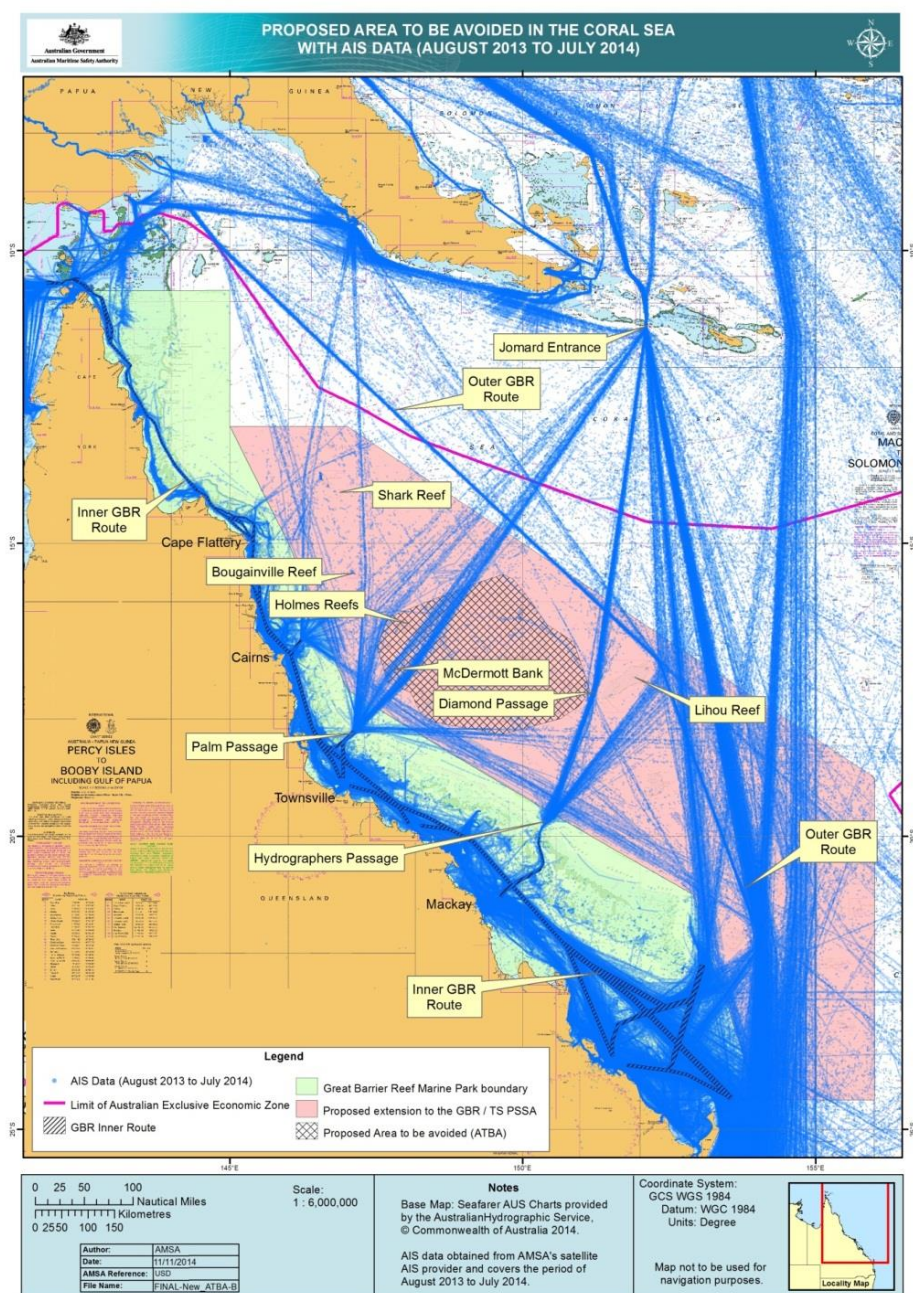
The ATBA is recommendatory in nature.

The ATBA extends over approximately 25,250 square nautical miles and encompasses many reefs, cays, islets, sandbars and shoal patches (figure 3). The 21 recognized, named and charted features that are within the ATBA boundary include:

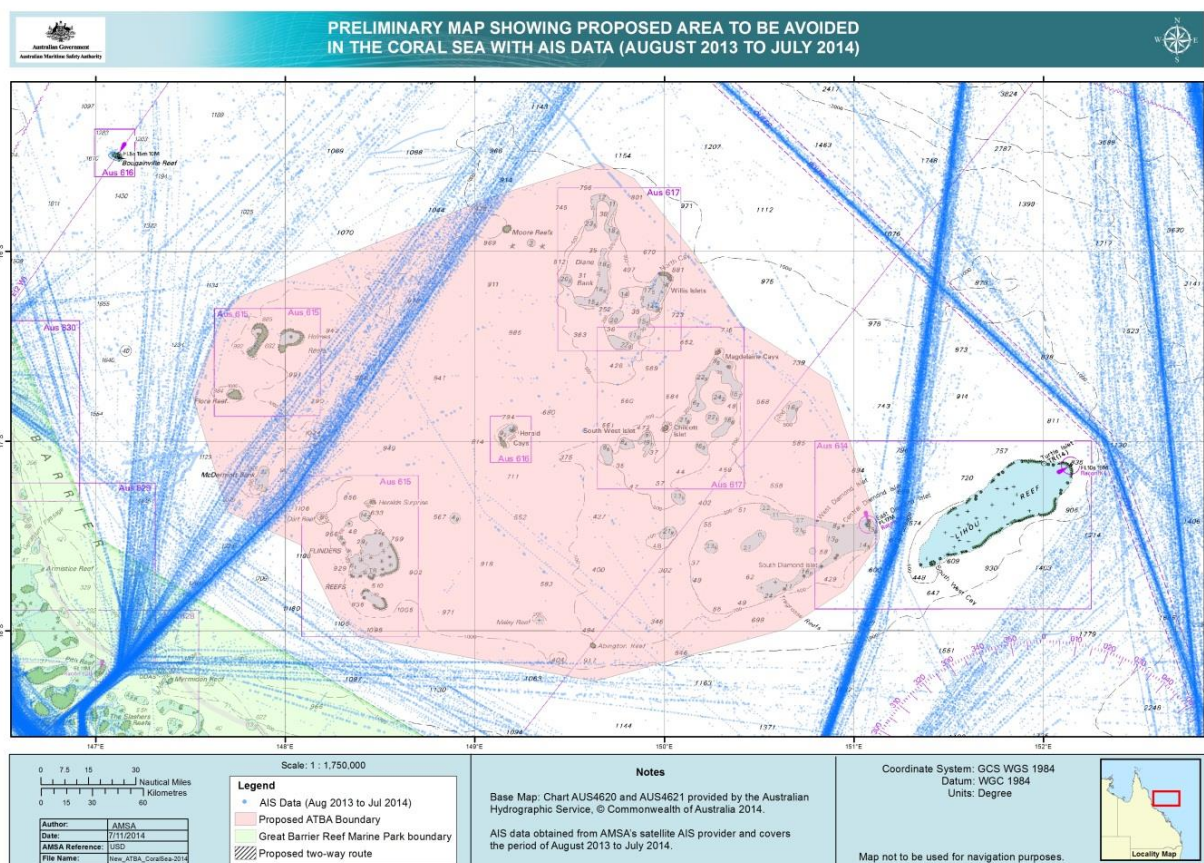
- Abington Reef;
- Central Diamond Islet;
- Chilcott Islet;
- Dart Reef;
- Diane Bank;
- East Diamond Islet;
- Flinders Reefs;
- Flora Reef;
- Herald Cays;
- Herald Surprise; and
- Holmes Reefs;
- Magdelaine Cays;
- Malay Reef;
- McDermott Bank.
- Moore Reefs;
- North Cay;
- South Diamond Islet;
- South West Islet;
- Tregrosse Reefs;
- West Diamond Islet; and
- Willis Islets.

**NAMES, NUMBERS, EDITIONS AND GEODETIC DATUMS OF THE REFERENCE CHARTS**

Name	Number	Edition	Datum
Diamond Passage	AUS614	Ed 2	WGS84
Flinders Reefs	AUS615 Pt 1	Ed 2	WGS84
Flora Reef and Holmes Reefs	AUS615 Pt 2	Ed 2	WGS84
Willis Islets	AUS617 Pt 1	Ed 2	WGS84
South West Islet to Magdelaine Cays	AUS617 Pt 2	Ed 2	WGS84
Percy Isles to Booby Island	AUS4620 (INT 620)	Ed 6	WGS84
Mackay to Solomon Islands	AUS4621 (INT621)	Ed 4	WGS84



**Figure 1: Location of the ATBA in the Coral Sea**



**Figure 2: Extent of the ATBA**

## GEOGRAPHICAL COORDINATES OF THE AREA TO BE AVOIDED IN THE CORAL SEA

The geographical coordinates of the ATBA (figure 3) are provided below.

All geographical positions are based on WGS 84.

Individual coordinate numbers in brackets refer to those shown in figure 3.

### Area to be avoided

An area to be avoided is established bounded by a line connecting the following geographical positions:

(1)	15° 42.48' S	149° 06.07' E	(11)	17° 59.43' S	150° 38.35' E
(2)	15° 31.87' S	149° 40.07' E	(12)	18° 15.94' S	149° 37.97' E
(3)	15° 36.90' S	149° 50.43' E	(13)	18° 01.91' S	148° 23.34' E
(4)	16° 01.16' S	150° 09.79' E	(14)	17° 55.49' S	148° 16.26' E
(5)	16° 23.25' S	150° 24.56' E	(15)	17° 32.90' S	148° 05.14' E
(6)	16° 40.91' S	150° 52.21' E	(16)	17° 22.27' S	147° 41.63' E
(7)	17° 28.26' S	151° 08.01' E	(17)	16° 45.01' S	147° 30.47' E
(8)	17° 30.71' S	151° 08.01' E	(18)	16° 18.56' S	147° 40.61' E
(9)	17° 32.59' S	151° 07.45' E	(19)	16° 15.00' S	147° 43.82' E
(10)	17° 46.83' S	150° 57.56' E			

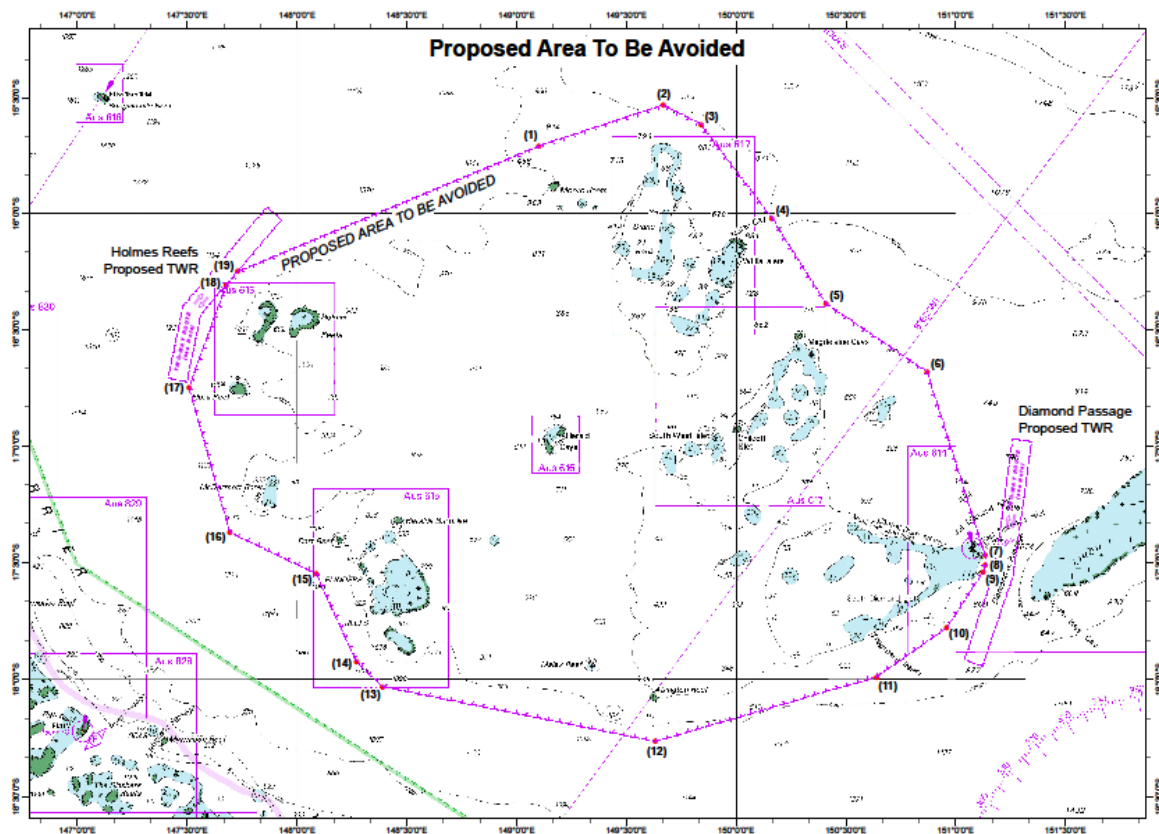


Figure 3: ATBA and two-way routes around it

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