Area Size

1 873 241 km²

Qualifying Species and Criteria

Eastern spinner dolphin – *Stenella longirostris orientalis*

Criterion B (2); D (1)

Pygmy beaked whale – *Mesoplodon peruvianus*

Criterion B (2); D (1)

Offshore pantropical spotted dolphin – *Stenella attenuata attenuata*

Criterion B (2)

Blue whale Eastern North Pacific – *Balaenoptera musculus musculus*

Criterion A; C (3)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera edeni, Physeter macrocephalus, Kogia sima, Ziphius cavirostris, Orcinus orca, Feresa attenuata, Pseudorca crassidens, Grampus griseus, Steno bredanensis, Tursiops truncatus, Stenella coeruleoalba, Delphinus delphis

Summary

The Eastern Pacific Warm Pool is home to a diverse and abundant array of tropical cetaceans, with at least 16 species regularly recorded in the

Eastern Pacific Warm Pool IMMA

Summary, continued.

area. The Warm Pool is defined oceanographically by sea surface temperature (>27.5 °C) rather than geographically (according to latitude and longitude boundaries) but it is typically located along the coasts of southwestern Mexico and northern Central America, extending west to 110° west longitude. It has been described as "an open-ocean biogeographic province with a distinct biological community". It represents the core range of the endemic pygmy beaked whale (*Mesoplodon peruvianus*) and is also on the migratory corridor of eastern North Pacific blue whales travelling to and from the Costa Rica Dome. In addition, it is home to globally important concentrations of pantropical spotted dolphin (*Stenella attenuata*) and spinner dolphins (*Stenella longirostris*); the latter comprising a locally endemic subspecies (*S. l. orientalis*).

Description:

Fiedler and Talley (2006) provide a thorough overview of eastern tropical Pacific (ETP) oceanography, which we briefly summarize here. The ETP is usually defined as the waters between the tip of Baja California and northern Peru, extending westward from Central and South America toward Hawaii. It is at the eastern end of a basin-wide equatorial current system, located between the North and South Pacific subtropical gyres, and at the terminus of two eastern boundary currents: the California Current and the Peru Current (Fiedler & Talley, 2006).The North Equatorial Countercurrent lies roughly between 4-10° N; it travels eastward to the coast of Central America where most of the water

veers north and continues westward as the North Equatorial Current. South of this system, the Equatorial Cold Tongue straddles the equator and is largely driven by equatorial upwelling and the flow of cooler water from the Peru Current. The productive Costa Rica Dome, nominally located at 9° N 89° W, is an upwelling center associated with the terminus of the Equatorial Countercurrent. An additional important source of productivity in the ETP is the seasonal shoaling of the thermocline ridge at the northern boundary of the Equatorial Countercurrent at about 10° N. Many tropical cetaceans in the ETP show a clear westward extension of high density along the 10° N line (Hamilton et al., 2009).

Located off the coast of southwestern Mexico and northern Central America, the Eastern Pacific Warm Pool is in the northeastern part of the ETP (Fiedler &Talley, 2006). It can be defined as the area with a surface temperature >27.5° C and has been described as "an open-ocean biogeographic province with a distinct biological community" (Lavín et al., 2006). The ETP has the most productive low-latitude offshore waters in the world due in large part to a persistent, strong, shallow thermocline, a feature that is most pronounced in the Warm Pool. In the ETP, due to this shallow thermocline and an extensive oxygen minimum layer, huge numbers of large yellowfin tuna (*Thunnus albacares*) forage near the surface in association with mixed species groups of pantropical spotted dolphins and spinner dolphins (*Stenella attenuata* and *S. longirostris*, respectively) and flocking seabirds (Ballance et al., 2006). These circumstances gave rise to the largest, surface yellowfin tuna fishery in the world and created the "tuna/dolphin problem," resulting in millions of dolphins being inadvertently killed by the fishery (Ballance et al., 2021). This area is notable for its high abundance and diversity of tropical cetacean species, including globally important abundances of pantropical spotted dolphin and the endemic eastern spinner dolphin (*S. l. orientalis*; Ballance & Pitman, 1998; Perrin, 2018a, b). In addition, the distribution centers for two endemic offshore cetaceans in the ETP are located primarily in this area.

Figure 1: Eastern spinner dolphin (*Stenella longirostris orientalis*), a subspecies endemic to the ETP. Photo: RL Pitman.

Criterion A: Species or Population Vulnerability

Although eastern North Pacific blue whales (*Balaenoptera musculus musculus*; Committee on Taxonomy, 2022) may be at pre-exploitation numbers and one of the healthiest blue whale populations worldwide (Sears et al., 2013, Monnahan et al., 2015), globally the species is still listed as Endangered (EN) by the IUCN Red List of Endangered Species (Cooke, 2018).

Figure 2: Northeastern offshore spotted dolphin (*Stenella attenuata attenuata*) captured in a purse-seine net in the ETP. Photo: NOAA.

Tuna purse seine fishermen in the ETP began setting their nets around dolphin schools to catch tunas in

Figure 3: Northeastern offshore spotted dolphin (*Stenella attenuata attenuata*), a subspecies endemic to the ETP. Photo: RL Pitman.

the 1960s, which resulted in the deaths of millions of dolphins, mainly offshore pantropical spotted dolphins (*Stenella attenuata attenuata*) and eastern spinner dolphins (*Stenella longirostris orientalis*). It was estimated that the fishing mortality reduced these dolphin populations to one-third and one-fifth of their historical numbers, respectively (Wade et al., 2007). Although a change in fishing gear and techniques reduced the number of dolphin deaths from an estimated high of 550,000 in 1961, to about 1000/yr now (Ballance et al., 2021), results from survey cruises through the year 2000 found that the populations were not showing signs of recovery, although the reason(s) for the lack of recovery was not clear (Wade et al., 2007). Results from additional surveys in 2003 and 2006 indicated that populations might be starting to recover (Gerrodette et al., 2008), but the results were inconclusive, and there have been no further survey cruises. Eastern spinner dolphins are still listed as Vulnerable (VU) under the IUCN Red List of Threatened Species (Hammond et al., 2012). However, the offshore pantropical spotted dolphin subspecies has not been assessed for the Red List.

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

The pygmy beaked whale (*Mesoplodon peruvianus*) is assumed to be endemic to the ETP because a large majority of the at-sea sightings have been in the vicinity of the Warm Pool (Pitman & Lynn, 2001; Hamilton et al., 2009), and all the known strandings except one (New Zealand: Baker & van Helden, 1999) have come from the eastern Pacific (Reyes & Van Waerebeek, 2018).

The entire world population of eastern spinner dolphins is located in the ETP and centered in the Warm Pool area (Hamilton et al., 2009; Perrin, 2018b).

Criterion C: Key Life Cycle Activities Sub-criterion C3: Migration Routes

Humpback whales (*Megaptera novaeangliae*) and blue whales are the only two cetaceans that seasonally migrate to and from the ETP, although humpbacks tend to migrate along the coast and

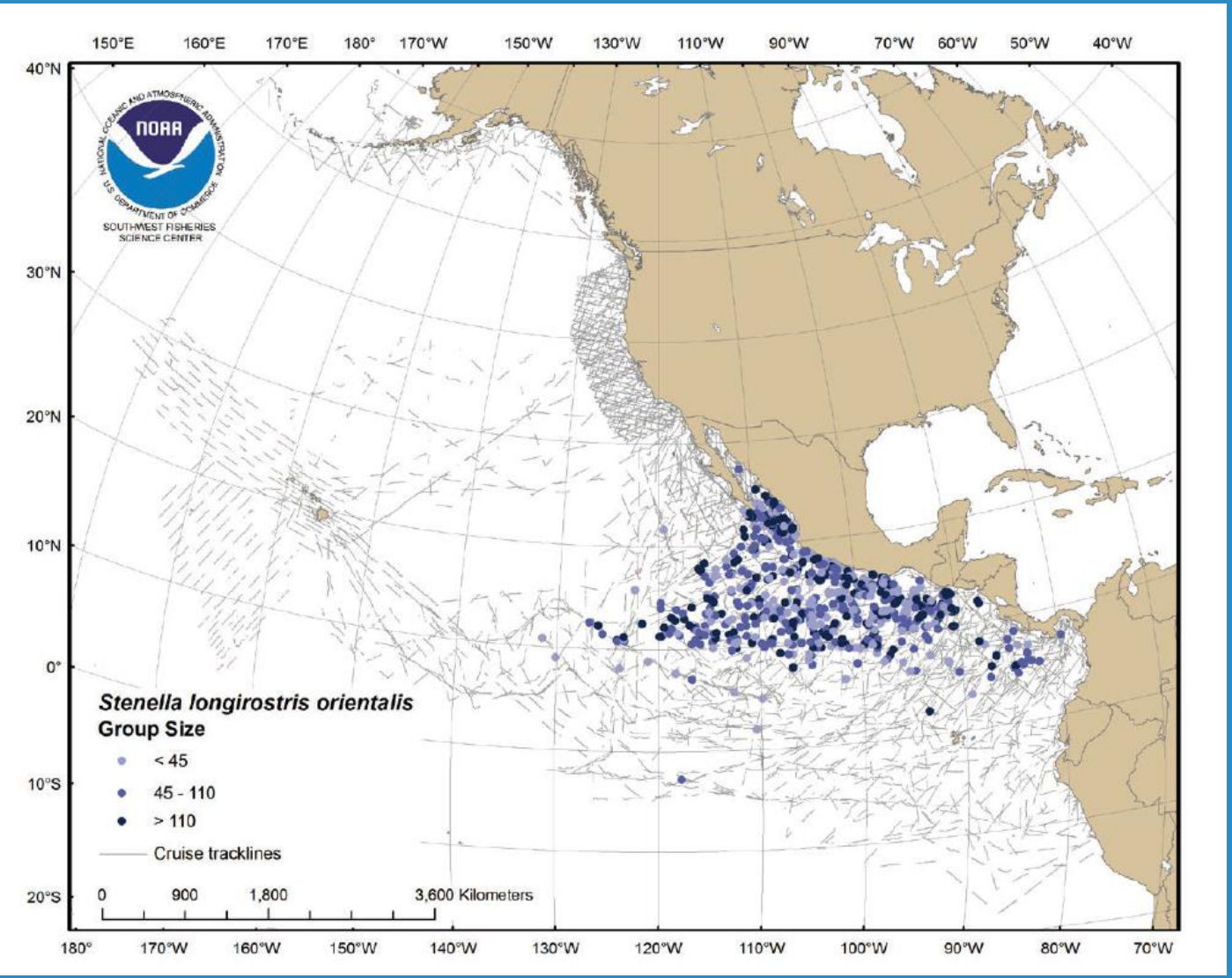

Figure 4: Distribution of eastern spinner dolphin (*Stenella longirostris orientalis*), a species endemic to the ETP. Source: Hamilton et al. 2009.

occupy nearshore winter habitats (Martínez-Loustalot et al., 2022). Blue whales from the eastern North Pacific spend the summer feeding in the California Current or further north and then migrate to winter feeding and nursery grounds in the Gulf of California or the Costa Rica Thermal Dome (Reilly & Thayer, 1990; Ballance et al., 2006; Hamilton et al., 2009; Busquets-Vass et al., 2021; Johnson et al., 2022), although a few can be found year-round on these putative 'wintering' grounds (Busquets-Vass et al., 2021). Most migrating eastern North Pacific blue whales travel off the west coast of Baja California, Mexico, where southbound whales then either turn north, into the Gulf of California, or continue south to the Costa Rica Thermal Dome (Johnson et al., 2022); the migration corridor of nearly all blue whales traveling to and from the Dome pass through the Warm Pool (Johnson et al., 2022).

Criterion D: Special Attributes
Sub-criterion D1: Distinctiveness

The pygmy beaked whale, with its distinctive and diagnostic adult male colour patterning, was first reported as an unidentified *Mesoplodon* in 1987 from multiple field observations in the eastern tropical Pacific (Pitman et al., 1987). *M. peruvianus* was independently described as a new species in 1991 based on 10 stranded and live-caught (fisheries) specimens from Peru (Reyes at al., 1991) but it was not until 2013 that these sightings and specimens were confirmed to be the same species, based on a

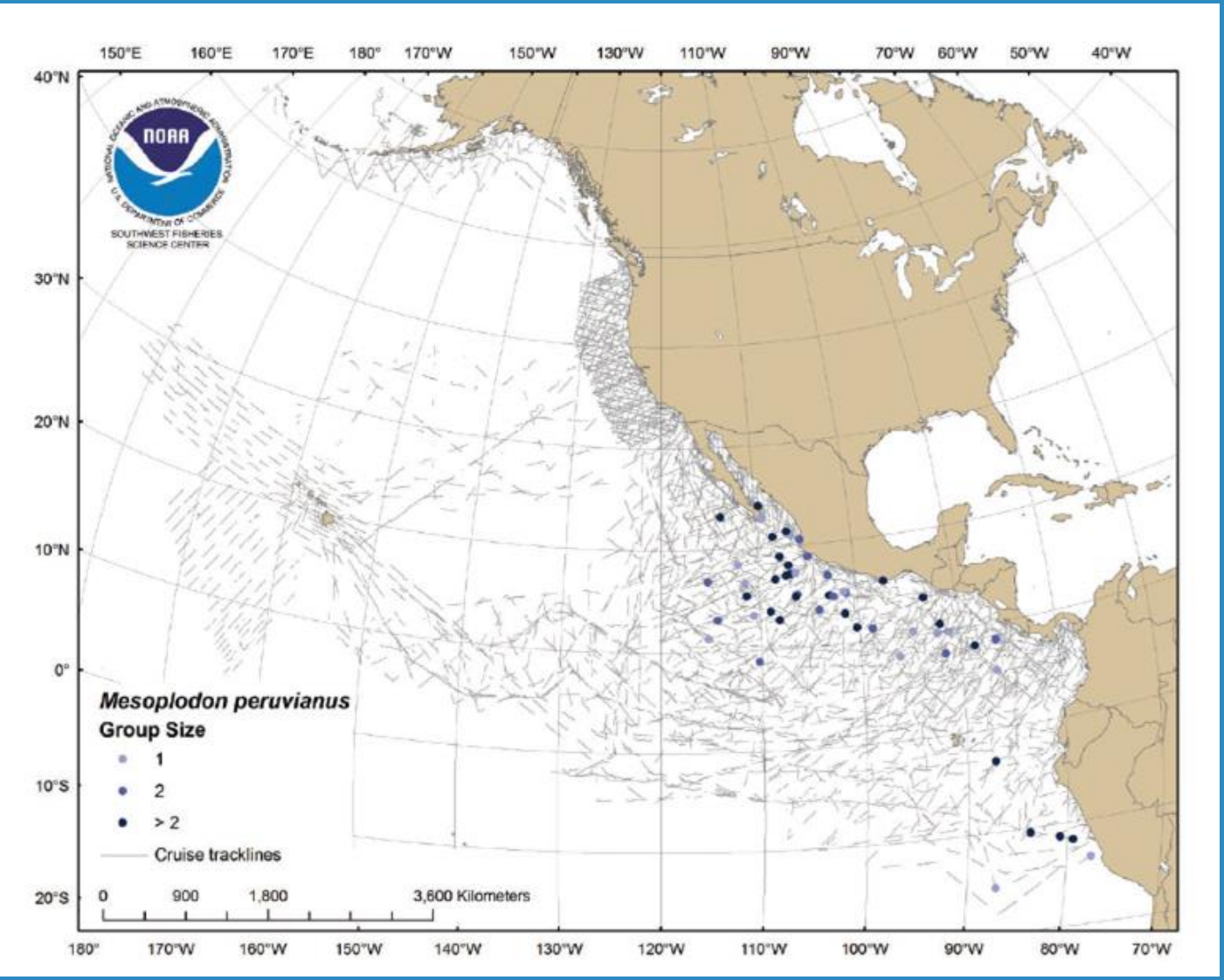

Figure 5: Distribution of pygmy beaked whale (*Mesoplodon peruvianus*), a species endemic to the ETP. Source: Hamilton et al. 2009.

genetic analysis of a stranded adult male from Mexico (Urbán et al., 2013). Since then, the only known record of this species outside of the eastern Pacific has been a stranded specimen from New Zealand (Baker & van Helden, 1999), possibly a vagrant. Strandings in the eastern Pacific have been reported as far north as Moss Landing, California (36˚47' N), and as far south as northcentral Chile (29˚17' S), and it has been suggested that there could be separate populations in the eastern and western Pacific, as well as in the Northern and Southern hemispheres of the eastern Pacific (Reyes & Van Waerebeek, 2018). Most at-sea sightings, however, have been in the core area of the ETP (Pitman & Lynn, 2001; Hamilton et al., 2009), which has led to speculation that this species is endemic to the ETP, including the southern Gulf of California (Pitman & Lynn, 2001; Jefferson et al., 2015).

Spinner dolphins occur worldwide in the tropics where they are often common. Globally, four subspecies have been identified (Perrin, 2018), including two in the eastern tropical Pacific: the Central American spinner dolphin (*S. l. centroamericana*), which occupies a very narrow zone along the continental shelfbreak of Central America, and the eastern spinner dolphin, which is much more abundant and widespread, but largely confined to the Warm Pool and adjacent waters (Hamilton et al., 2009).

Sub-criterion D2: Diversity

The high levels of productivity and the available prey base in the Eastern Pacific Warm Pool IMMA are instrumental in supporting a high diversity of cetacean species. In addition to the blue whales, spotted and spinner dolphins, and pygmy beaked whales that are described above, least 12 additional species are known to occur regularly within the boundaries of the IMMA (Ballance & Pitman, 1998; Hamilton et al., 2009). These include Bryde's whales (*Balaenoptera edeni*), Sperm whales (*Physeter macrocephalus*), and ten species of small- to medium-sized odontocetes associated with deep oceanic habitats.

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