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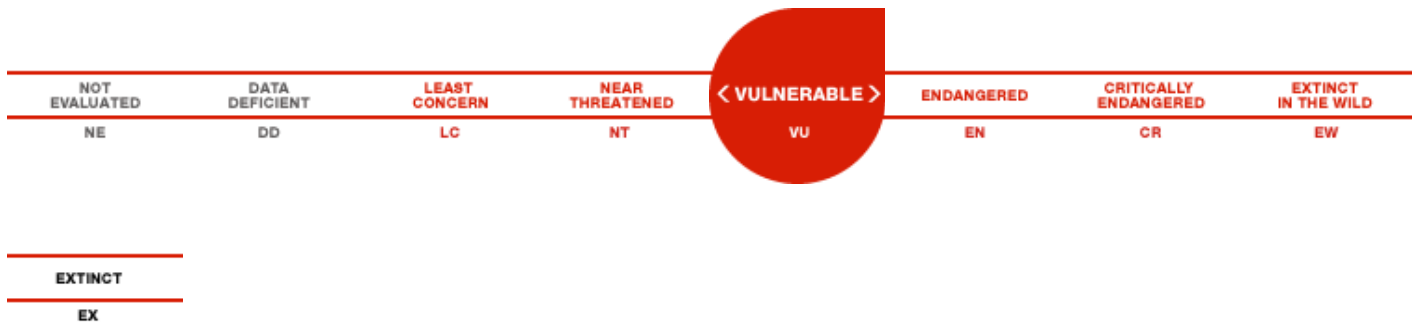
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Trichechus inunguis

Scope: *Global*
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Taxonomy [\[top\]](#)

Kingdom Phylum Class Order Family
 Animalia Chordata Mammalia Sirenia Trichechidae

Scientific Name: Trichechus inunguis

Species Authority: (Natterer, 1883)

Common Name(s):
 English—Amazonian Manatee, South American Manatee
 French—Lamantin D'Amérique Du Sud, Lamantin De L'Amazone
 Spanish—Lamantino Amazónico, Manatí Amazónico, Vaca Marina

Taxonomic Notes: Genetic diversity of *T. inunguis* has been found to be higher than any one of the three major clusters of *T. manatus* (García-Rodríguez *et al.* 1998, Vianna *et al.* 2002, Caballero and Giraldo 2004), possibly functioning as a panmictic population (Cantanhede *et al.* 2005).

Assessment Information [\[top\]](#)

Red List Category & Criteria: Vulnerable A3cd [ver 3.1](#)

Year Published: 2016

Date Assessed: 2016-02-28

Assessor(s): Marmontel, M., de Souza, D. & Kendall, S.

Reviewer(s): Morales-Vela, B., Castelblanco-Martínez, D.N. & Ortega-Argueta, A.
 Alves dos Santos, G., Carvalho de Carvalho, C., Denkinger, J., Funi, C., Guzmán Téllez, J.,

Contributor(s): Landeo, S., Maris Lazzarini, S., Leão, T., Lima, D.S., Silva Balarin, J., Sousa, M., Teran, A., Utreras, V. & de Almeida Coelho, A.G.

Justification:

Trichechus inunguis is here listed as Vulnerable based on a suspected population decline of at least 30% within the next three generations (assuming a generation length of 25 years) due primarily to ongoing levels of hunting throughout most of the region, coupled with increasing incidental calf mortality in the recent years, global warming trends and increased climate variability, along with increased economic and population growth, and habitat loss and degradation associated with fisheries and river traffic.

Previously published Red List assessments:

- 2008 – Vulnerable (VU)
- 2007 – Vulnerable (VU)
- 1996 – Vulnerable (VU)
- 1994 – Vulnerable (V)
- 1990 – Vulnerable (V)
- 1988 – Vulnerable (V)
- 1986 – Vulnerable (V)
- 1982 – Vulnerable (V)
- 1965 – Status inadequately known-survey required or data sought

Geographic Range [\[top\]](#)

Amazonian Manatees occur in northern South America, and are endemic to the Amazon Basin. Amazonian Manatees occur through most of the Amazon River drainage, in river and lake systems, from the headwaters, in Colombia (Domning 1981), Ecuador (Timm *et al.* 1986) and Peru (Reeves *et al.* 1996) to the mouth of the Amazon (close to the Marajó Island) in Brazil (Best and Teixeira 1982, Miranda 2014) over an estimated seven million square kilometres. However, they are patchily distributed, concentrating in areas of nutrient-rich flooded forest, which covers around 300,000 km² (Junk 1997), but are limited by troubled waters (rapids and falls) and aquatic vegetation (Best 1983).

Range Description: In Ecuador most records are from the extreme northeast, below 250 m altitude. From north to south there are records for the Güeppi river (tributary of Putumayo, in the border with Colombia), the Aguarico river and its Cuyabeno and Lagartococha systems, where most of the records come from (Denkinger 2010, Utreras *et al.* 2011a, Utreras *et al.* 2013) and in tributaries such as the Yanayacu, Cocaya and Zancudococha lagoon; in the Napo region they are found in the Añangu, Challuacocha and Yuturi lagoon systems, as well as in the Tiputini river and Yasuní basin, including the Jatuncocha and Tambococha lagoon systems (Utreras *et al.* 2011a). In Peru they occur in the Loreto region in the Samiria, Pacaya, Marañón, Pastaza, Ucayali, Huallaga, Purus, Tapiche, Yarapa and Yanayacu rivers, as well as in the lower Puinahua and Iricahua rivers in the Ucayali basin; their occurrence has been mentioned for the Nanay, Orosa, Yavarí, Yaguas and Putumayo rivers, and in the Reserva Comunal Tamshiyacu-Tahuayo, and in the Yanayacu-Pucate river (Silva 2010); in Colombia in the Putumayo, Amazon and lower Caquetá rivers; in Brazil they occur in most major river basins such as Solimões, Japurá, Juruá, Purus, Negro and Tapajós.

Although there are no records in the Guyana, the species may occasionally penetrate into southern Guiana close to the boundary with Brazil (Bertram and Bertram 1963). This possibility is enhanced by a Manatee rescue done by INPA in Takutu River border Brazil and Guyana (D. Souza pers. obs).

Countries occurrence: Native: Brazil; Colombia; Ecuador; Peru

Additional data: ♦ *Upper elevation limit (metres):* 300

Range Map: [Click here to open the map viewer and explore range.](#)

Population [\[top\]](#)

Most of the waters inhabited by Amazonian Manatees are very murky and, probably as an adaptation to the past and ongoing hunting pressure, Amazonian Manatees are extremely secretive. Tremendous research efforts have been made, but there are no reliable population estimates available, although numbers are almost certainly lower than historical figures due to centuries of hunting. Analysis of feeding patches, direct sightings of *T. inunguis* and interview surveys have been used to try to estimate population numbers with limited results, due to opportunistic sightings and small samples without standardized effort. Traditional mark-recapture studies are not appropriate due to the species' secretive nature. More recently there have been efforts to estimate populations with the use of rotary or side-scan sonars, but still with inconclusive results (Brice 2014, Francisco *et al.* 2015), which hinders the development of conservation strategies for the species. Magor empirically estimated a minimum population of 10,000 Amazonian Manatees for the Amazon basin (Husar 1977). Based on the analysis of mtDNA control region, Cantanhede *et al.* (2005) suggested a genetic estimate of the effective female population size of *T. inunguis* of approximately 455,000 individuals, indicative of a recent large population size. Genetic studies do not show a population structure throughout the region (Cantanhede *et al.* 2005).

In Colombia, due to conservation efforts with local communities, a reduction in hunting levels and an apparent increase in Amazonian Manatee population in specific sites has been noted in the last few years. In the Colombian Amazon, the population may have stabilized, but hunting continues on the Peruvian side of the river and this affects the Colombian population. During 2010-2015, Natütama registered 3 to 4 new calves every year in Colombia. Fishermen insist that there are more Manatees now, mainly because they see groups of 7 to 10 Manatees more often (Kendall *et al.* 2014). Systematic monitoring with former Manatee hunters recorded 364 sightings around Puerto Nariño in 2014, including five different calves (Castelblanco-Martínez *et al.* 2015).

A study conducted 1996-1999 in Cuyabeno Reserve (Ecuador) contradicted Timm *et al.*'s (1986) prediction of extinction in 10 years. However, relative abundance in Cuyabeno River was 0.01 animal / h effort and 0.007 animal / h effort in Lagartococha River. A total 40-49 animals were sighted in the Cuyabeno Reserve between 1996 and 1998, where they are considered rare (Denkinger 2010). The use of sonar produced estimates ranging from 0.8 to 3.0 individuals / 10 km in three sites (Parque Nacional Yasuni, Lagartococha and Cocaya lake systems); no animals were detected in 58 km of the Cuyabeno lagoon system (Utreras *et al.* 2013). Brice (2014), using side-scan sonar observed 24 individuals in 70 hours of sampling in the same region. In Ecuador the species is considered Critically Endangered (CR) according to IUCN criteria C2a(i), which indicates an estimated population of less than 250 mature individuals, and no subpopulation with 50 mature individuals (IUCN 2001).

Population: Guzmán (2014), also using a side scan sonar, recorded 14 Manatees in 65 km of rivers and lagoons, or 2.15 ind / 10 km in the Lagartococha river, on border Peru-Ecuador, an area partially surveyed by Utreras *et al.* (2013). Bodmer *et al.* (2006) believed the population in the Pacaya Samiria Reserve was stable due to a slight increase in counts between 2003 and 2006. However, Soto (2007) points out that the estimation method has not yet been proven.

In some sustainable development reserves (SDR) in Brazilian Amazon, hunting has been decreasing over the recent years. This is probably a reflection of the conservation actions that have occurred in the region, and the lack of interest among young fishermen for hunting the Manatee. The frequent records of sightings of adults and females with calves during the rainy and dry seasons in the Piagaçu-Purus SDR (Souza 2015) suggest that populations of *T. inunguis* may be stable or increasing in these regions.

Sixty two per cent of hunters interviewed by Calvimontes (2009) in Amanã SDR (Brazil) believed the population is decreasing, although they attribute this to Manatees having moved away (due to habitat alterations and increasing levels of noise) rather than hunting. Calvimontes also reported that most hunters are turning into farmers, which should decrease the pressure on the species. Seventy three per cent of interviewees in the Belém region (mouth of the Amazon) considered the Manatee population is decreasing, due to hunting, pollution, boat traffic and noise (Miranda 2014). Half of the respondents in Franzini *et al.*'s (2013) study believed Manatee numbers are declining.

Seventy per cent of interviewees in the Ucayali region of Peru believed the population is decreasing (Silva *et al.* 2014). In a preliminary survey of Manatees in the Lagartococha region, in 6.9 km of canoe transects Hidalgo (2010) observed 16 Manatees and 25 feeding patches, which lead him to evaluate that Manatees in the Lagartococha river basin may be stable due to the almost null human presence.

The progressive increase in the number of young calves arriving at rehabilitation centres in Brazil in the past five years has also led several researchers to suspect that the species may be undergoing some recovery, or that the increase is simply a reflection of the awareness campaigns implemented, with a

concomitant increase in the number of rescued calves (Rosas and da Silva pers. comm. 2005). Alternatively, it may also suggest that calf takes are on the rise.

Although Manatees are widespread through a large area, there is a high level of uncertainty about population size, as no reliable method for determining abundance has been defined so far. Whatever the current population size, the overall population trend is most likely to be decreasing, given the species' slow reproduction (sirenian populations grow at an annual rate of approximately 5-6%; Marsh *et al.* 2004, 2011) and levels of exploitation (Marmontel *et al.* 1992). In summary, although the population may be stabilizing in some parts of the Amazon region due to local awareness building and other conservation efforts, the overall trend is of a decreasing population.

Current Population Trend: ↓ Decreasing

Additional data:	◆ <i>Number of mature individuals:</i>	8000-30000	◆ <i>Continuing decline of mature individuals:</i>	Yes
	◆ <i>Extreme fluctuations:</i>	No	◆ <i>Population severely fragmented:</i>	No

Habitat and Ecology [\[top\]](#)

Amazonian Manatees inhabit environments in lowland tropical areas below 300 m asl, where there is a large production of aquatic and semi-aquatic plants; they also favour calm, shallow waters, away from human settlements. They are the only sirenians restricted to freshwater systems. *T. inunguis* occurs in waters with temperatures above 23°C (Gallivan *et al.* 1983), living in the three types of water in Amazonian rivers (white, black and clear), being more abundant in white waters, where there is greater primary production (Best 1984, Rosas 1994).

Habitat and Ecology:

Individuals engage in long seasonal movements, moving from flooded areas during the wet season to deep water bodies during the dry season (Arraut *et al.* 2010, Kendall *et al.* 2014). While the whitewater rivers (murky water) provide them with plentiful food, deep lakes function as refuges during the low-water season, where animals are less vulnerable to hunting.

Only one calf is produced at a time. Although no specific studies are available for the species in the wild, it is believed that the reproductive cycle is similar to the West Indian Manatee's, with a long gestation and lactation period (up to 24 months), and a birthing interval of 2 to 3 years (Best 1983); age at sexual maturity is suggested to be between 6 and 10 years (Rodrigues *et al.* 2002).

Generation length is 25 years, based on what is known for *T. manatus*.

Systems: Freshwater
Generation Length (years): 25
Movement patterns: Full Migrant
Congregatory: Congregatory (year-round)

Use and Trade [\[top\]](#)

The historical main use of *T. inunguis* was to obtain oil, skin and meat (Domning 1982). In remote areas of the Brazilian Amazon, it is estimated that approximately 140,000 Manatees were killed between 1935 and 1954, not counting subsistence hunting (Best 1983, Rosas and Pimentel 2001), which still persists in modern times.

Use and Trade: Currently, the main use of the species is for food. Manatee meat is highly valued, but all the other products are used as well (fat and skin are used in cooking and as medicine, bones are turned into utilitarian pieces and charms, and the skin produces very resistant leather). Medicinal uses are attributed to the fat being rubbed on the affected area (rheumatism and paralysis) and skin (helping the healing process of wounds and infections) (Miranda 2014). A Manatee is held for show to tourists in Puerto Alegria, Peru, upstream from Leticia (S. Kendall pers obs).

Threats [\[top\]](#)

The commercial large scale capture of Amazonian Manatee was the main reason for the reduction of the populations of the species. The main current threats for Manatees are hunting for meat consumption (Denkinger 2010, Brice *et al.* 2011, Utreras *et al.* 2013, Sandoval 2015), entanglement in fishing nets and habitat alterations.

Illegal hunting, for both subsistence and local use, is considered the main threat to Manatees in the Amazon. Manatee populations have supported a tremendous take in past centuries and, although not at commercial levels, hunting still takes place throughout the region (Barbosa *et al.* 2010a, b; Franzini *et al.* 2013; Silva *et al.* 2014; M. Marmontel pers. obs). Most hunting is practiced with the use of traditional harpoons, but in Ecuador Manatees may be caught in traps set for *Arapaima* (Hidalgo 2010).

Hunters usually sell products to neighbors and nearby communities, but the meat is sometimes sold in local produce fairs or markets in the interior, or by order directly with the hunter. Public markets in Brazil (Manaus, Manacapuru, Beruri, Novo Airão, Tefé, Silves, Itapiranga, Itacoatiara, Santarém, Belém, Monte Alegre and Almeirim, Benjamin Constant, Atalaia do Norte) and Ecuador also illegally offer the meat for sale. Meat is sold in natura, or as "mixira" or subproducts such as sausage. The mixira, which is the meat preserved in its own fat, is one of the products that prolongs the pressure on the species, since it commands a high price.

Take estimates are available only for a few sites where conservation and research projects are taking place. Between 2002 and 2004, 64 Manatees were estimated to have been killed in the Amanã-Castanho area (3,000 km²) of Amanã SDR (Calvimontes 2009), most of them adult males. Between 2011 and 2015, the hunt count for the same area was 42 Manatees. Some 195 Manatees were estimated to have been killed between 2011 and 2015 in the Uatumã River valley (Brazil) through the expeditions of Project Protecting Life in Uatumã (S.M. Lazzarini pers. comm. 2016). In the Urucu region of Brazil 20 Manatees were captured between 2004 and 2007, 14 harpooned and 6 entangled (Franzini *et al.* 2013). Pantoja (2015) estimated 92 Manatees hunted in the area of the lower Javari river, Brazil, between 1980 and 2014. Based on interviews conducted in the Piagaçu Purus SDR (Purus river, Brazil), approximately 460 Manatees were killed in the protected area between 2004 and 2014 (Souza *et al.* 2014). Based on 48 interviews, 36 manatees were captured in the Region of the Middle Madeira and Aripuanã Rivers (Amazon, Brazil) between 1986-2004: 89% poached and 11% entangled (Castelblanco-Martínez *et al.* 2007).

The Natütama Foundation, which has a year-round Manatee monitoring program in place since 2002, registered three Manatees hunted in Colombia from 2003 to 2013 (Kendall 2013) and more than six in Peru from 2010-2015. Manatees are still being hunted in the river Putumayo upstream from Tarapaca and above the mouth of the Igaraparana, according to interviews with local Colombian fishermen, who say most of the hunters are Peruvian (S. Kendall pers. obs.).

In the Pacaya Samiria Reserve (Peru), Soto (2007) estimated an average of 35 Manatees killed in the basins of the Punahua, Ucayali and Marañon rivers.

Incidental mortality, orphaned calves, and illegal captivity

In addition to specific gillnets to hunt Manatees, the high use of fishing nets in the Amazon has increased incidental calf mortality in the past few years. These events have been documented in all Amazonian Manatee range countries (Reeves *et al.* 1996, Orozco 2001, Franzini 2008, Souza 2015), and this is now a major threat for the species (Marmontel *et al.* 2012).

When calves survive drowning in nets, they may be kept alive for later sale as pets, kept in pools or areas close to water bodies, and sold or given to influential persons. The number of rescued calves every year has been increasing, but the number recorded represents a small sample of occurrences in the Amazon.

Between 2008 and 2010, in the Brazilian state of Pará, 28 stranded Manatees were rescued, of which only one was an adult (Sousa *et al.* 2010). An important threat in Pará is the use of fishing corrals, as they are usually built over submerged aquatic vegetation beds, where Manatees feed, and have already trapped a Manatee (M. Sousa, pers. com. 2016).

Major

Threat(s): Presently, several institutions in Brazil (Instituto Nacional de Pesquisas da Amazônia, Centro de Pesquisa e Preservação de Mamíferos Aquáticos, Mamirauá Institute and Zoofit) care for over 150 Manatees in captivity, mostly orphans. Between 2005 and 2015, INPA received an average of 10 calves per year. Of the 98 animals rescued during this period, 30% were accidentally caught in fishing nets (D. Souza pers. obs). In the past 10 years CPPMA received 39 calves for rehabilitation (S.M. Lazzarini pers. comm. 2016).

From 2010-2015, 3 calves died in nets or captivity in Peru (S. Kendall pers obs). It is estimated that two Amazonian Manatees are presently in captivity in Colombia (Castelblanco-Martínez *et al.* 2015).

Between 2007 and 2010, Centro de Rescate Amazónico (Iquitos, Peru) rescued 28 Manatees (Perea *et al.* 2011), and until 2013 successfully rehabilitated 25 individuals (Landeo-Yauri *et al.* 2013). Since 2011 the Centro released and monitored 11 of those rehabilitated animals (Landeo and Castelblanco-Martínez 2015, Velásquez Varela *et al.* 2015).

Habitat alteration and disturbance

Other anthropogenic actions have resulted in pollution, loss, alteration, degradation and fragmentation of habitats used by the Amazonian Manatee (Rosas and da Silva pers. comm. 2005, Kendall *et al.* 2014).

Changes in the aquatic environment as habitat degradation due to deforestation, pollution, contamination of the rivers by mercury for the gold exploration (Amorim *et al.* 2000), pesticides and heavy metals from agricultural waste and oil spills are potential hazards to the Manatee's food supply (Rosas *et al.* 1991). These elements are absorbed by aquatic weeds and may directly affect the staple diet of the species (Rosas 1994). Roots of floating and rooted aquatic plants (*Paspalum*, *Eicchornia*, *Salvinia*) have been shown to be important methylation sites (Guimarães *et al.* 2000). Over 300 dams are planned for the Amazon (Winemiller *et al.* 2016), two of which are mega-enterprises in Brazil (Madeira and Xingu rivers). The building of dams can interfere with habitat quality, altering water speed, nutrient load and dynamics of macrophyte production (Junk and Nunes de Mello 1987). Brazil has extensive plans for navigation (Fearnside 2001, Brazil, PR, 2011) with dams allowing the opening of the waterway in the Tapajos river (Fearnside 2015) planned for soy transport, giving access to the Amazon river and the Atlantic ocean (Brazil, PR 2011, Millikan 2011). Amazonian Manatees are very sensitive to noise, and intense boat traffic on the Amazonian rivers can affect their behaviour and habitat use.

Oil spills may be a particular problem in Ecuador (Brice *et al.* 2011, Utreras *et al.* 2013, Brice 2014), where oil exploitation has been permitted in important refuges for the species (Utreras *et al.* 2013). The use of fertilizers and weed control products in extensive monocultures (Utreras *et al.* 2013), incidental captures in fishing nets, the use of dynamite, the increasing use of motorized boats including in the Cuyabeno and Jatuncocha systems where there are nature tourism activities (Utreras *et al.* 2011a, b) are additional threats in Ecuador.

On the Peru-Colombia border, wood extraction activities are clogging lakes and stopping normal migrations of Manatees in the Atacuari area (S. Kendall pers obs).

Amazonian human populations are generally at low densities except in the large capital cities, but all of the issues above could be magnified by the increase in human population.

Tourism and transport are interfering more and more with low water resting places in the area around Puerto Nariño (Kendall *et al.* 2014).

Around the city of Belém and estuary of the Amazon River, boat traffic is intense and even ferries and cargo ships may interfere with Manatee movement (Miranda Leão *et al.* 2014).

Natural disasters, drought, climate change

Extreme droughts may help make the Manatee an easier prey item for hunters, by causing isolation and entrapment. During the 2010 drought in the Piagaçu-Purus SDR (Purus River, Brazil), 180 Manatees were estimated killed (Souza *et al.* 2014), but only a few cases of Manatees trapped by drought in the eastern Peruvian frontier area were recorded, and none in Colombia (S. Kendall pers obs).

Conservation Actions [\[top\]](#)

Manatees are protected by national laws in all countries of confirmed distribution (Brazil since 1967, Colombia since 1969, Peru since 1973 (Silva 2009) and Ecuador since 2002 (Tirira 2011)). Listed under Appendix I of CITES, signed by the four countries, also signatories of the Ramsar Convention on Wetlands. All but Colombia are parties to the Convention on Migratory Species.

Presently there are national management plans specific for the species in Colombia (Dirección de Ecosistemas 2005) and Brazil (Andrade *et al.* 2011) and for aquatic mammals (including Manatees) in Ecuador (Utreras *et al.* 2013). Management plans exist for two protected areas (Pacaya Samiria in Peru and Mamirauá Reserve in Brazil), and Puerto Nariño (Colombia) has informal local management agreement (S. Kendall pers. obs).

In 2014 the Biodiversity department of the Ministry of Environment of Ecuador included Manatee as a focal species for conservation, and relative abundance studies are planned for the Cuyabeno-Yasuni corridor in the Napo river basin between 2016 and 2018. The same department is attempting to have the corridor between the Cuyabeno Wildlife Reserve and the Yasuní National Park recognized as a RAMSAR site (V. Utreras pers. comm. 2016)

Amazonian Manatees have been recorded from two protected areas in Ecuador, three in Colombia, four in Peru and at least 53 in Brazil (D. Souza pers. obs). Unfortunately, hunting continues even within protected areas.

Some 90% of the possible area of distribution of Manatees in Colombia is outside of protected areas. In Colombia the conservation work has been greatly based on participation of local communities (Castelblanco-Martínez *et al.* 2015). Efforts include year-round conservation and monitoring by the Natütama Foundation in the key areas of the Colombian Amazon, with information network for nearby areas; intensive education program in the Colombian Amazon, with occasional visits to Tarapaca on the Putumayo river; release of calves by fishermen in the Colombian Amazon (Kendall 2013): 4 releases from nets from 2010-2015 by Natutama and associated fishermen (S. Kendall pers obs).

Conservation Actions: Ex-situ research at INPA captive setting (Brazil) and in Amazon Rescue Center (Peru) is providing the most information about the ecology and biology of the Amazonian Manatee, as reproductive hormone dosages, morphometric, allometric and growth studies of individuals, determination of nutritional parameters of milk in different states of lactation, evaluation of the animal health status, vocalization and acoustic ontogeny, among others.

Efforts of releasing rehabilitated Manatees back to the wild have been conducted by Mamirauá Institute (Marmontel 2012, 2015), INPA (Rosas and da Silva 2008, Souza *et al.* 2012), ICMBio (Luna *et al.* 2012) in Brazil, Amazon Rescue Center (Landeo-Yauri and Castelblanco-Martínez 2015, Sánchez-Babilonia 2015) in Peru, and Omacha Foundation in Colombia (Kendall *et al.* 2014). Release efforts have been coupled with intense educational campaigns. Post-release monitoring has shown that most of the releases were successful.

Recommended actions for the conservation of the species include:

- Estimate the population size and the effective range of the Amazonian Manatee, developing specific techniques for the sighting of the species
- Given the elusive manatee condition and the dark waters, other indirect methods need to be continue used for estimates, such as interviews, catch records, bycatch, and stranding records
- Set the migration routes across the distribution area of the species and understand the habitat use along the flood pulse of the Amazon rivers
- Elucidate the hybridization processes in the Amazonian estuary region with further studies on the chromosomal evolution of Manatee species
- Create a broad awareness and environmental education program with emphasis in the areas with pressure of intense hunting of *T. inunguis*
- Intensify the supervision and monitor the hunting activities within the protected areas in the long term
- Carry out the studbook of the captive Manatees to verify the consanguinity degree
- Improve the established protocols of reintroduction of rehabilitated animals and post release monitoring techniques
- Offer livelihood, economic alternatives or other incentives for stakeholders involved in Manatee conservation pressures, especially hunting

Classifications [\[top\]](#)

Habitats	Threats	Actions In Place	Actions Needed	Research Needed	Uses
5. Wetlands (inland) -> 5.1. Wetlands (inland) - Permanent Rivers/Streams/Creeks (includes waterfalls)					
suitability: Suitable season: resident major importance: Yes					
5. Wetlands (inland) -> 5.2. Wetlands (inland) - Seasonal/Intermittent/Irregular Rivers/Streams/Creeks					
suitability: Suitable major importance: Yes					
5. Wetlands (inland) -> 5.5. Wetlands (inland) - Permanent Freshwater Lakes (over 8ha)					
suitability: Suitable season: resident major importance: Yes					
5. Wetlands (inland) -> 5.6. Wetlands (inland) - Seasonal/Intermittent Freshwater Lakes (over 8ha)					
suitability: Suitable major importance: Yes					
5. Wetlands (inland) -> 5.13. Wetlands (inland) - Permanent Inland Deltas					
suitability: Marginal					
9. Marine Neritic -> 9.10. Marine Neritic - Estuaries					
suitability: Marginal					
13. Marine Coastal/Supratidal -> 13.4. Marine Coastal/Supratidal - Coastal Brackish/Saline Lagoons/Marine Lakes					
suitability: Marginal					
13. Marine Coastal/Supratidal -> 13.5. Marine Coastal/Supratidal - Coastal Freshwater Lakes					
suitability: Marginal					
15. Artificial/Aquatic & Marine -> 15.2. Artificial/Aquatic - Ponds (below 8ha)					
suitability: Marginal					

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