ZSL LET'S WORK FOR WILDLIFE

EDGE EVOLUTIONARILLY DISTINCT & GLOBALLY ENDANGERED

Survival Blueprint

Baird´s tapir, *Tapirus bairdii*

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1. STATUS REVIEW

1.1 Taxonomy:

Tapirs belong to the family Tapiridae, and together with the families Equidae (horses) and Rhinocerotidae (rhinos) comprise the order Perissodactyla or the odd-toed ungulates. Family Tapiridae consists of a single genus, Tapirus, with four extant species (Wilson & Reader, 2005): the Malay tapir (*T. indicus*) in South Asia, and three Neotropical species: the mountain tapir (*T. pinchaque*) and the lowland tapir (*T. terrestris*) in South America and the Baird's tapir (*T. bairdii*) in Central America and south Mexico.

Controversy about the systematics and phylogenetic relationships of living tapirs have led researchers to assign species to different genus. Grooves & Grubb (2011) recognizes three genera: the genus Tapirus, comprising two species *T. terrestris* and *T. pinchaque*, *Tapirus bairdii*, has been assigned to the genus Tapirella, and the Asiatic species, *Tapirus indicus*, which both Grooves & Grubb (2011) and Eisenberg et al. (1987) assigned to the genus Acrocodia. While Hershkovitz (1954) and Nowak (2005) recognized the two South American tapir species as belonging to the subgenus Tapirus, while *T. bairdii* was located in the subgenus Tapirella and T. indicus in the subgenus Acrocordia.

According to Ruíz-García, et al. (2012), all four *Tapirus* species are monophyletic, with the first diversification occurring 17 million years ago between *T. indicus* and the neotropical tapir species. The second split between *T. bairdii* and the clade *T. terrestris*-*T. pinchaque* occurred around 10.9 MYA and *T. terrestris* and *T. pinchaque*. split around 3.8 MYA.

Common names for *Tapirus bairdii* are: Baird´s tapir; tapir centroamericano; danto o danta; tapir, macho de monte (Panamá); and anteburro.

1.2 Distribution and population status: Baird´s tapir distribution ranges from south Mexico to north Colombia. Is extinct in El Salvador and its presence is uncertain in Ecuador. According to Schank et al. (2017), there are 25 tapir core areas distributed through its range and a population estimate of 175,000 individual tapirs spread across these 25 core areas. However, this result is more than an order of magnitude higher than other expert estimates that suggest there may be around 3,000 adult individuals in the wild (Castellanos et al. 2008; Garcìa et al. 2016).

1.2.1 Global distribution:

Country	Population estimate (plus references)	Distribution	Population trend (plus references)	Notes
Mexico	2600 individuals (Naranjo, 2009)	Presence limited only to sites with large remnants of tropical forest and wetlands in the states of Campeche, Chiapas, Oaxaca, Quintana Roo, Veracruz and possibly Yucatan	Decreasing (Naranjo, 2009)	
Guatemala	924-5,542 individuals (García, et al. 2008) 800-1,000 individuals (Jordan, et al. 2018)	Tapirs are present in at least 21 natural protected areas of the Guatemalan Protected Areas System. These areas are located in the departments of Peten, Izabal, Alta Verapaz, Quiche, Baja Verapaz, El Progreso and Zacapa (García, et al. 2008).	Decreasing (García, et al. 2016)	Population size was estimated based on density estimations published by Naranjo 2006. The most conservative population estimate (924 individuals) was calculated based on the lowest density which was 0.05 individuals/km^2. Meanwhile the highest population size (5,542 individuals) was estimated with the highest tapir density of 0.30 individuals/km^2.
Mayan Forest (including Mexico, Belize and Guatemala)	1,000-1,500 individuals (García, et al. 2016)	Mexico (Campeche and Quintana Roo, excluding Selva Lacandona) Guatemala (Reserva Biosfera Maya and Laguna del Tigre) Belize	Decreasing (García, et al. 2016)	This population is especially vulnerable to droughts and road collisions. For example, in Calakmul, at least 9 tapirs were found dead by the severe droughts that occurred in 2019. Road collisions are also continuously reported by the National Commission of Protected Areas (CONANP) Mexico in this same area.

Honduras and Nicaragua	500-600 individuals (García, et al. 2016) Honduras: 500-600 individuals (Jordan, et al. 2018) Nicaragua: 600-1,000 individuals (Jordan, et al. 2018)	Mozquitia region, shared by Honduras and Nicaragua (García, et al. 2016)	Decreasing (García, et al. 2016)	
Nicaragua, Costa Rica and Panama	600-800 individuals (García, et al. 2016) Costa Rica: >1,000 individuals (Jordan, et al. 2018) Panama: 600 individuals (Jordan, et al. 2018)	Nicaragua-Indio Maíz, Costa Rica and Panama (García, et al. 2016).	Some populations in Costa Rica may be stable. Nicaragua and Panama are decreasing (Meyer, et al. 2013, Jordan, et al. 2013).	

1.2.2 Local distribution:

We only include the regions where population size or density has been estimated.

Level of protection for each region was classified according to the percentage of tapir distribution area located inside protected areas: High (>75%), Medium (>25% to <75%), and Low (<25%). We only consider Schank, et al. (2017) for tapir distribution area.

Other factors that may positively or negatively influence the level of protection were not included: available funding and staff; conservation activities performed; available management plan; active conservation programs for the species; and infrastructure including vehicles, control points and reserve stations, etc. This has the potential to change the level of protection status.

* Possible errors in classifying the level of protection. See notes for each region.

Country	Region / province	Site	Level of Protection	Population size	Reference	Notes
Mexico	Campeche	Calakmul	Medium	800 individuals	Naranjo, 2009	At least 44% of tapir distribution in the Mexican Mayan Forest is located inside natural protected areas (Calakmul, Balam Ku, Balam Kin, Laguna Ik, Bala'an Ka'ax, Sian Ka'an, Yum Balam). Mexican Mayan Forest includes the states of Campeche, Yucatan and Quintana Roo.
Mexico	Quintana Roo	Mayan Forest	Medium	450 individuals	Naranjo, 2009	Quintana Roo is considered part of the Mayan Forest
Mexico	Chiapas	Lacandona rainforest	Medium	600 individuals	Naranjo, 2009	42% of tapir distribution is located inside natural protected areas (Montes Azules, Chanal, Bonampak, Chan-Kin, Naha, Lacan-Tun, Lagunas de Montebello, Metzabok, Yaxchilán, Parque Nacional Lagunas de Montebello.
Mexico	Oaxaca	Chimalapas	* Low (no % was estimated because there is not a “formal” reserve in Chimalapas. Probably this category should be Medium, but since it does not appear in the international lists of nature reserves, it was catalogued as Low).	450 individuals	Naranjo, 2009	Los Chimalapas region encompasses 594,000 ha of virgin tropical forests (of which 300,000 are still undisturbed). Called the Ecological Peasant Reserve (Reserva Ecologica Campesina), it is an alternative to a federal Biosphere Reserve. The owners of this reserve are indigenous Zoques who have managed to defend it for more than 300 years. In 1687 they had to buy their own land from the Spanish Crown to be the owners of this territory again. Various attempts have been made to transform it into a Biosphere

						Reserve, but its owners continue to defend their territory. The main cause of the environmental destruction of this region are territorial disputes over farmable land among indigenous Zoque community members from Chimalapas, with indigenous ejidatarios from Chiapas who have invaded the territories of the original inhabitants.
Mexico	Chiapas	Sierra Madre de Chiapas	* High	225 individuals 160 individuals (IC:133-232)	Naranjo, 2009 Rivero, et al. submitted	100% of tapir distribution is located inside natural protected areas. However, Schank, et al. (2017) tapir distribution is underestimated in this region and does not include tapir population from La Frailescana, La Sepultura and a large portion of El Triunfo.
Mexico	Chiapas	El Ocote	High	≤15 individuals	Naranjo, 2009	100% of tapir distribution is located inside the natural protected area.
Mexico	Oaxaca	Sierra de Juarez	* Low	≤15 individuals	Naranjo, 2009	Schank et al. (2017) underestimated distribution in this region and in their distribution map. Sierra de Juarez has some forested areas protected by communities (ADVC - áreas destinadas voluntariamente a la conservación) and are registered by CONANP. However, they do not appear in the international lists of nature reserves.
Mexico	Veracruz	Uxpanapa	* Low	≤ 30 individuals	Naranjo, 2009	Schank et al. (2017) underestimated distribution and in their distribution map. This region borders with

						Chimalapas, but this region is not protected by the government nor by community decree.
Mexico	Oaxaca	Chacahua	* Unknown	≤ 20 individuals	Naranjo, 2009	Last report of the species was in 2003 (Lira-Torres, et al. 2005).
Mexico	Oaxaca	Sierra Madre de Oaxaca	* Low	0.07-0.24 individuals/km^2	Lavariega-Nolasco, et al. 2016	Schank et al. (2017) underestimated distribution in this region and in their distribution map.
Mexico	Oaxaca	Totontepec Villa de Morelos	* Low	0.32 individuals/km^2	Botello, et al. 2017	Schank et al. (2017) underestimated distribution in this region and in their distribution map. Forested areas are protected by the community Totontepec Villa de Morelos, but it does not appear in the international lists of nature reserves.
Mexico	Oaxaca	Sierra Mixe	* Low	0.43-0.54 individuals/km^2	Vazquez-Camacho, 2018	Schank et al. (2017) underestimated this region. It does not appear in their distribution map. Sierra Mixe has some forested areas protected by communities (ADVC - áreas destinadas voluntariamente a la conservación) and are registered by CONANP. However, they do not appear in the international lists of nature reserves.
Mexico	Chiapas	El Triunfo	High	0.12 individuals/km^2	Carbajal-Bojorquez, et al. 2014	100% of tapir distribution is located inside the natural protected area El Triunfo Biosphere Reserve.
Costa Rica	La Amistad National Park	Valle del Silencio	High	2.93 individuals/km^2	Gonzalez-Maya, et al. 2012	100% of tapir distribution is located inside La Amistad National Park.
Colombia	Departamentos del Choco y Antioquia	Los Katios	High	1.02 |individuals/km^2	Mejia-Correa, et al. 2014	100% of tapir distribution is located inside natural protected area Los Katios.

1.3 Protection status:

Baird´s tapir has been catalogued by the IUCN (International Union for Conservation of Nature) Red List of threatened species as Endangered since 2002, because their populations continue to decrease mainly due to habitat loss and hunting. Although the species is not commonly trafficked, it is included in Appendix I of CITES (Convention on International Trade in Endangered Species).

Natural Protected Areas encompass between 40-45% (see table 1) of Baird´s tapir distribution range (García, et al. 2016; Schank et al. 2017). To estimate these percentages, we calculated distribution range separately from IUCN Red List (García, et al. 2016) and Schank et al. (2017). For the IUCN distribution range, we consider both, extant and possible extant categories mainly because some areas with tapir presence were excluded from the extant category, for example, Osa Peninsula in Costa Rica (see map 1). However, most areas from possible extant category are overestimated and currently there are no tapirs left in these areas.

Schank et al. (2017) distribution range was estimated based on presence/absence and presence only records. Although the modelling matched fairly well with the expected distribution for the species, there are some areas excluded from the model that have recorded the presence of the species, as is the case of la Frailescana and Sepultura Protected Areas in Mexico; but there was also overestimation of tapir distribution range, as in the case of La Encrucijada, Laguna de Términos, and in northern and western areas of Selva Lacandona in Mexico and Pixvae in Panamá (see map 2).

There are also important suitable habitat patches with no protected status in some countries like Mexico (Mendoza et al. 2012; de la Torre, et al. 2018), Belize (Waters and Ulloa 2007), Guatemala and Nicaragua (García, et al. 2016). Some of these habitat patches belong to indigenous territories or communal lands and some are national territories with no protection status (de la Torre, et al. 2018).

Table 1. Percentage of Baird´s tapir distribution range protected by some category of natural protected area through Mexico and Central America according to IUCN Red List (García et al. 2016) and Schank, et al. (2017).

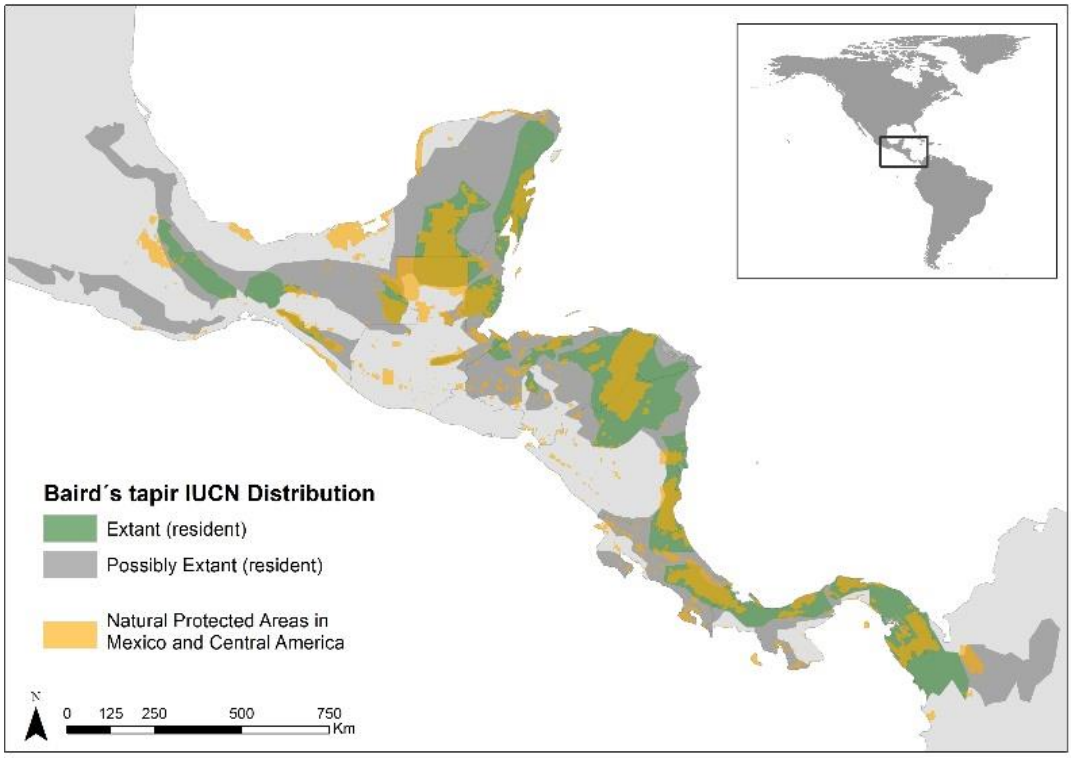
Source	Category	Total Distribution range (km^2)	Total distribution area protected (km^2)	Percentage of total distribution area protected	Total distribution area not protected (km^2)	Percentage of total distribution area not protected
IUCN – García et al. 2016	Extant (resident)	287, 316	114, 873	**40**	172, 444	**60**
	Possibly extant	330, 167	27, 666	**8.4**	302, 501	**91.6**
	Total	617, 483	142, 538	**23.1**	474, 945	**76.9**
Schank, et al. 2017	Tapir Core Areas	216, 528	99, 279	**45.9**	117, 249	**54.1**

Additional to the Natural Protected Areas, some country governments have developed national conservation programs/action plans for the species. These government programs are: 1) *Mexico*: Baird's Tapir Conservation Action Program (Programa de Acción para la Conservación del Tapir centroamericano; CONANP, 2009); 2) *Honduras*: National Plan for Baird's Tapir conservation (Plan Nacional para la Conservación del Danto; ICF, 2011); 3) *Colombia*: National Program for the Conservation of the Genus Tapirus in Colombia (Programa Nacional para la conservación del Género Tapirus en Colombia; MiAmbiente, 2005); and 4) *Ecuador*: National Strategy for tapirs conservation in Ecuador (Estrategia Nacional para la Conservación de los Tapires en el Ecuador; Tapir Specialist Group, 2011).

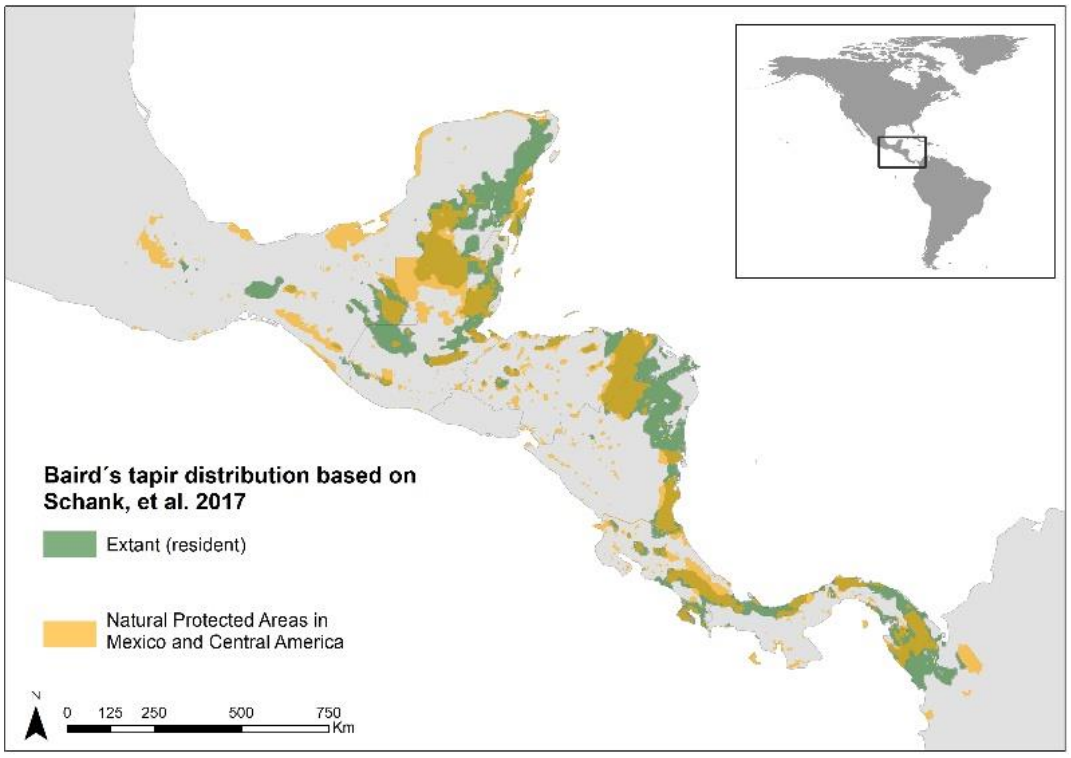
In addition to government programs, civil society, NGOs and/or researchers have developed independently species conservation programs both locally and nationally: 1) *Guatemala*: Conservation Program for Baird´s tapir and its habitat in Guatemala (Programa para la Conservación del Tapir y su Hábitat - initiative developed in colaboration with the Tapir Specialist Group-IUCN and the Data Center for Conservation (CDC) of the Center for Conservationist Studies (CECON) of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala (USAC); 2) *Belize*: Tapir Conservation Project (Foundation for Wildlife Conservation); 3) *Nicaragua*: Proyecto Tapir Nicaragua (Global Wildlife Conservation); 4) *Costa Rica*: Nai Conservation (Costa Rica Wildlife Foundation); and 5) *Panama*: Tapir Panama Project (Yaguará Panamá).

Most of the heads of these programs are part of the Tapir Specialist Group of the IUCN and the Baird´s Tapir Survival Alliance (BTSA). The latter is an alliance formed by different local organizations in each of the countries where Baird´s tapir is distributed, and its objective is to carry out local actions but with regional and/or global impact on tapir conservation.

However, despite the species' protection by national and international laws throughout its range, these laws are often not enforced in many areas and the species still faces severe threats.



Map 1. Baird´s tapir distribution modified from IUCN Red List Assessment (García et al. 2016).



Map 2. Baird´s tapir distribution modified from Schank, et al. 2017.

1.4 Ecology, behaviour and habitat requirements:

Baird´s tapir is the biggest mammal that lives in the Neotropics. It weighs around 300 kg (650 lb) and grows up to 2 meters long. They are forest dwelling animals that can be found in most vegetation types at elevations ranging from sea level to 3,600 m, including wet tropical rainforest, tropical sub deciduous forest and montane cloud forests, palm swamps, paramo, mangrove, riparian forest, and successional vegetation, as well as in narrow oak - forest strips covering the top of medium-altitude mountains (García, et al. 2016).

Tapirs are considered primitive for ungulates in various aspects of their behaviour. They are solitary and possess a defined home range. Tapirs can be found forming pairs, but this association is mostly made by a mother and its calf, or male and female. They do not possess intricate behaviour of dominance or submission displays associated with social hierarchy like in equids or artiodactyls (Janis, 1974).

Tapirs do not have a fixed breeding season, and their gestation period lasts approximately 400 days, giving birth to only one calf at a time (Pukazhenthi, et al. 2013). Described as a primitive mammalian behaviour, mother and calf lie down to allow the calf to suckle (behaviour only seen in suoids but not derived ungulates) and weaning occurs after one year (Janis, 1974). Offspring remain with their mother for one to two years. Young tapirs possess white lines and dots as camouflage to reduce predation from potential predators such as jaguars, with this pattern begininng to disappear at around 4 months (Pukazhenthi, et al. 2013).

Tapirs communicate through whistles or hiccups which are often made in response to fear, pain, appeasement to conspecifics, as a warning call, or during mating (Gómez-Hoyos, et al. 2018). Little is known about their longevity in the wild, but in captivity, they can live for around 30 years. In some areas, tapirs appear to be water dependent, since they spend long periods of time inside water bodies and are considered good swimmers (Janis, 1974). Tapirs defecate in water or on land at the so called “latrines” (Terwilliger, 1978). It is considered that latrines and spraying of urine onto vegetation and trees is associated with home range marking (Schaunberg, 1969).

Tapirs possess a short, mobile proboscis, which they use to bring food to their mouth. They are strictly herbivorous, feeding on relatively low cellulose content foliage, such as leaves, fresh sprouts, grasses and small branches. They also consume fruits and seeds, with the total amount of fruit eaten varying by habitat. Tapirs help to maintain the balance of the species´ populations they feed on (Terwilliger, 1978). They are able to disperse seeds over long distances through their excreta, especially large seeds (Fragoso, et al. 2003). Tapirs have also been shown to spend long periods of time in disturbed and degraded sites where they deposit seeds that help regenerate forests at these sites (O´Farril, et al. 2013).

1.5 Threat analysis:

Threat	**Description of how this threat impacts the species**	**Intensity of threat** *(low, medium, high, critical or unknown)*
Habitat loss (expansion of agricultural and livestock frontier)	Habitat loss is one of the foremost threats for Baird´s tapir survival. Between 2000-2005 Central America (CA) was catalogued by the FAO (2005) as the region with the highest tropical deforestation rate (losing 1.3% of its forests each year). Main drivers for deforestation in this region have been the creation and expansion of subsistence agriculture and cattle pastures, and in a lesser extent, agriculture and cattle ranches at large scales (Gibbs, et al. 2010). Deforestation has been driven mainly by migration and rapid growth of rural and marginalized populations in adjacent areas to rainforest. This phenomenon has been encouraged (especially in Mexico) by the welfare and poverty alleviation government programs that in an attempt to improve rural livelihoods, promoted (and still promote) the agricultural expansion into forest ecosystems (Carr, et al. 2006). Moreover, current livestock and agriculture practices are not underpinned by sustainable production, but rather focus on increasing the farming area, when the focus should be on improving output from existing areas. In contrast, large scale crops, as is the case of palm oil, although considered an important potential threat, constitute a relatively minor source of land use change (Vijay, et al., 2016). Only 6% of new plantations established in Central America were forested prior to palm oil (Furumo & Aide, 2017).	High
Habitat loss (narco-deforestation)	Drug traffickers are deforesting to illegally build landing strips and roads in “pristine” or protected rainforest. Mexico, Guatemala, Honduras and Nicaragua are the most affected countries by narco-deforestation. For example, in Honduras, 183 km^2 of rainforest was destroyed between 2007-2011, which coincides with the boom-period for drug trafficking in the country. The same pattern occurred in Laguna del Tigre National Park in Guatemala, where intensification of drug trafficking was associated with high annual deforestation rates (5%) and the establishment of narco-traffickers ranches (McSweeney et al., 2014). Meanwhile, Sesnie et al. (2017) estimated that forest loss associated with cocaine trafficking may account for between 15 and 30% of annual national forest loss in Nicaragua, Guatemala, and Honduras over the past decade. And 30% to 60% of this loss occurred within nationally and internationally designated protected areas.	Medium

	Moreover, drug traffickers are laundering their profits by converting rainforest to large cattle ranch pastures and oil-palm plantations, which also contribute with habitat loss (McSweeney et al., 2014). This problem is further exacerbated by the non-existent law enforcement, few park rangers and their lack of preparation and equipment to deal with drug traffickers.	
Habitat loss (Illegal logging)	The highest levels of poverty in Mexico and Central America are found mainly in areas adjacent to forests. Logging is one of the few means available to generate income, but people engage in illegal logging and timber trade due to lack of employment opportunities, corruption and lack of advice and support to carry out this activity legally (Brown, et al. 2008). Countries like Guatemala report that between 25 and 35% of annual commercial timber production was of illegal origin (Arjona, 2003). Or in Honduras, where it was estimated that from 1996 to 2000, between 75 to 80% of the country's hardwood production and 30 to 50% of its pine production occurred illegally (Brown, et al. 2008). And in Nicaragua it was estimated that in 2001, 45 to 50% of wood production came from illegal logging (Richards, et al., 2003; Cuadra et al., 2010). It is important to mention that logging is not a direct cause for deforestation, but it contributes directly to habitat degradation and in consequence to habitat loss.	Medium
Habitat loss (Fires)	Land use changes from forest to agricultural, burning of grasslands and forests for grazing purposes, poorly managed agricultural practices of slash and burn and fires on agricultural lands for cleaning, fertilization and pest control are the main sources of forest fires in Mexico and Central America (Martínez & Rodríguez, 2008). Estimations suggest that 43% of fires are caused by agricultural activity and are linked to poverty and to a lack of forest management (Rodriguez-Trejo, et al., 2011). In 2008, at least 2,300,000 ha of forest caught fire in the region, equivalent to 3% of the forest surface (with a mean forest surface burned of 291,205 ha by country; Martínez & Rodríguez, 2008). Forest fires in combination with other factors such as illegal logging, contribute to deforestation, pollution, global climate change among other negative impacts.	Medium
Habitat loss (Habitat fragmentation)	Habitat fragmentation can cause the reduction of habitat quality, an increased extinction risk which restricts recolonization from non-harvested source populations, or impedes individual movement between habitat patches, which can both lead to inbreeding and a loss of genetic diversity (Medici & Desbiez, 2012). Fragments are more accessible to hunters, yet the risk of being poached is higher.	High

Poaching	The extent of this practise varies by country and by local context. Poaching is illegal in all countries (except for some indigenous territories where national laws tolerate subsistence hunting by indigenous peoples). It occurs mainly in large, remote, protected forests where there is little to no government surveillance, low density of tourism and conservation activities. In most cases tapirs are hunted mainly for consumption, not for sale. And they are incidentally or opportunistically hunted, since tapir meat is not coveted like other species such as paca (*Cuniculus paca*) or peccary (*Tayassu pecari*).	Medium
Disease transmission	Although its impact, incidence and prevalence on tapir populations is not entirely known, some studies have identified parasites on tapirs associated only with domestic animals such as horses and cows and not in wild species (Cruz, et al. 2006; Terwilliger, 1978; Paras et al. 1996). Presence of these parasites in tapirs may be because the species coexist with equines and bovines in transition areas from pasture/farmland to forests.	unknown
Road collision	Highways in some places such as Calakmul in Mexico, Cordillera de Talamanca in Costa Rica and Central District in Belize have persistent tapir road collisions since these roads are close to or bisect natural protected areas. For example, in Costa Rica between 2010-2017, 23 tapir collisions on a 32 km route segment were documented (Brenes-Mora, 2018); and in Central Belize between 2008-2012, 14 tapir deaths were recorded in a 19 km segment (Poot, et al. 2018). Mitigation measures in these countries includes reflective wildlife crossing signs and awareness campaigns among drivers, however, specifically in Calakmul these measures have not been implemented.	Medium
Infrastructure projects	Construction of highways, dams and other structures may act as barriers for tapir populations. For example, in Mexico at least two projects (already approved by the government) are putting at risk the long-term conservation of the species. An upcoming project is the construction of a highway that is planned to bisect two the natural protected area La Frailescana, threatening the connectivity between the Sierra Madre de Chiapas. And the second is the construction of the Tren Maya (Mayan Train) that will cross through the Calakmul Biosphere Reserve (and adjacent reserves), running parallel to an existing highway. Main consequences for tapirs and wildlife could be: - Forest loss/habitat loss (clearing for its construction). - Wildlife and habitat alteration. Highway/train construction and constant flow of vehicles/train can modify wildlife behavior. - Water quality and availability. Since La Frailescana is part of a mountain range and is an important source of water retention. Therefore, the construction of the highway would bring the decline in water quality, damaging rivers and phreatic surface.	Low

	In contrast, Calakmul region has severe drought problems and water availability is very scarce because most of the water sources are underground. This train will bring thousands of new tourists and promote settlement and population growth of these areas, potentially exacerbating other threats to the region (see Climate change threat). - Road collisions. Can injure or kill animals and impact their behavior (see road collisions). - Exotic and invasive species. Proliferation of non-native species which can transmit diseases to local wildlife. - Increasing human access to forest. Can promote human invasions and settlements inside natural protected areas. - Connectivity loss between wildlife populations. New infrastructures may act as barriers that prevent genetic flow between populations.	
Climate change	Prolonged droughts as a result of climate change promote dehydration in tapirs and death. In Calakmul region, for example, at least 9 tapir individuals were reported dead from the severe droughts that occurred in 2019. Droughts can also make tapirs walk further looking for water sources, which in many cases are close to towns and highways, exposing them to other threats such as poaching, and in some cases, collision with cars when crossing roads (Reyna-Hurtado, et al. 2019).	Medium

1.6 Stakeholder analysis:

Country	**Stakeholder**	**Stakeholder's interest in the species' conservation**	**Current activities**	**Impact** *(positive, negative or both)*	**Intensity of impact** *(low, medium, high or critical)*
Mexico	CONANP-Natural Protected Areas administration	It is their responsibility to ensure conservation of natural protected areas and the species associated with them.	Law enforcement (Fire controls, illegal activities – poaching, logging, etc.) inside protected areas and buffer zones. Promote conservation programs financed by CONANP aimed at local communities to secure natural protected areas.	Positive	Critical
Mexico	Community leaders and/or landowners	Some of them are not interested in tapir conservation. However, some of them have been	They help to facilitate communication/ work with their community.	Both Positive. They can be great allies	Critical

		benefitted from projects to conserve the species. They have obtained data (e.g. Information from camera traps) to include in their reports to receive Ecosystem Services payments, and capacity building for the members of their community. Additionally, by having tapirs in their lands, they can apply for funds for conservation projects.	They give permission to work on their lands.	helping to get more people from their communities involved in conservation projects. Negative. If they are not convinced or happy with the activities, they can try to sabotage your work.	
Mexico	Universities (UNICACH, UNACH, UNAM, ECOSUR, etc)	They are not specifically interested in the species, but they do research about the environment and sustainable development.	Research about environment and sustainable development practices with communities.	Positive. Students can be integrated into tapir/ sustainable development research as part of their thesis, social service or professional practices.	Medium
Mexico	CONAFOR (National Forestry Commission)	They implement important programs for tapir habitat conservation, including PES (payment for ecosystem services) and reforestation. They are also in charge of giving logging permits.	Provide grants for reforestation programs to communities. Evaluate PES implementation. Authorize logging in the communities.	Positive	High
Mexico	SADER (Secretary of Agriculture and Rural Development)	None. They might see conservation projects as detrimental to their programs.	They promote livestock/ agricultural development which can put at risk forested areas (tapir habitat) and	Negative	High

			be subject to change in land use.		
Mexico	PROFEPA (Federal Attorney for Environmental Protection)	As the Baird´s tapir is an endangered species, they are responsible for compliance with environmental regulations and species and habitat protection	Provide resources for the creation of surveillance community committees.	Positive	Medium
Mexico	NGOs	Wildlife conservation and enforcement of natural protected areas.	Carry out environmental education activities and environment/ wildlife research.	Positive	High

1.7 Context and background information that will affect the success of any conservation action for this species:

	Description	Barriers to conservation	Opportunities for conservation
Socio-cultural effects and cultural attitudes	At least in Sierra Madre de Chiapas, tapirs are not an important species in social, cultural or economical terms. Communities do not consider tapirs as a threat, as in other places or countries, which are persecuted for damaging crops or as a common source of food. Although tapir hunting is carried out in the region, it occurs more as a result of incidental by-catch or opportunistic hunting, since tapir meat is not coveted like other species such as pacas or peccaries. When hunted, it is almost always for self-consumption and not for selling, therefore it is not an income source for the communities. Tapirs are not a cultural symbol like in Honduras, where the Tolupan indigenous group celebrate the traditional Toreada de la Danta, or in Belize where they are considered their national animal. Communities in Sierra Madre de Chiapas are very open to participate in conservation activities or programs since not many researchers and/or conservation NGOs work here. Moreover, the species is typically	Lack of information about the species or disinterest for the species conservation.	In general, communities living in Sierra Madre de Chiapas are very open to work with researchers or people from outside their communities. Moreover, tapirs do not have a bad reputation by communities, so it is easier to develop projects associated with the species. Plus, if a constant presence is established in the region, communities will become more confident to work on the species, and the researchers studying it.

	positively viewed as most people consider tapirs as "cute" or "nice".		
Economic implications	As mentioned, tapirs do not represent a direct income for communities in Sierra Madre de Chiapas. The area also lacks ecotourism projects like in Costa Rica, for example, where communities/private properties have managed to take advantage of the presence of the species to attract tourism and develop ecotourism centres. Monetary value of ecosystem services provided by tapirs have not been evaluated yet. However, researchers suggest that tapirs could play a key role for fighting against climate change. Since tapirs disperse large seeds of slow-growing trees with very dense wood that are also the most important for sequestering carbon.	Developing ecotourism activities requires time, money and experts to facilitate this business and their success (especially economic) cannot be measured in short periods of time. Therefore, communities could become discouraged and abandon the project.	Currently, communities are trying to develop ecotourism activities, so they have a positive attitude towards this work. On the other hand, many communities receive PES services and since tapirs are primary forest dependant species and because of their importance as a seed disperser, they can be used as an indicator to evaluate, measure and promote renewal and continuation of these payments.
Existing conservation measures	Sierra Madre de Chiapas is protected by two Biosphere Reserves, El Triunfo and La Sepultura, and the Natural Resources Protection Area La Frailescana. These reserves are managed by CONANP (National Commission for Natural Protected Areas). CONANP has conservation programs for the species (Protection and Restoration of Ecosystems and Priority Species Program -	Although natural protected areas cover around 40% (1,700 km^2) of tapir habitat in Sierra Madre de Chiapas, 23% (500 km^2) of tapir habitat is not protected, which could also encompass an important number of tapirs. However, these areas are not a priority for government and are very susceptible to human invasions.	To protect the 500 km^2 of unprotected areas there are different schemes that could be implemented such as payments for ecosystem services for the communal and private lands; and for National lands. It is important to keep pushing the government to implement these activities so they can be included within extant

	PROREST) and other projects to promote habitat conservation including productive sustainable practices (coffee and palm production, living fences, etc). Federal Attorney for Environmental Protection (PROFEPA) has a community monitoring and surveillance program in different communities. National Forestry Commission (CONAFOR) has the Payment for Environmental Services program and Reforestation programs.	Existing conservation programs are helping to encourage tapir and habitat conservation, however, the lack of consistency and continuation of governmental programs, as well as the lack of planning, promotes results not being as expected. For example, PES services only last for 5 years, at the end of the program communities stop receiving this compensation for conserving forest and they deforest these areas to transform them into agricultural or pasture lands. Similar to reforestation programs, which also last 5 years, and at the end of the project, because CONAFOR does not keep track of the project, communities set fire to reforested areas to transform them into pastures for cattle.	protected areas of the Sierra Madre de Chiapas. Mexico invests millions of Mexican pesos in several Federal programs to promote species and ecosystem conservation (PES, Reforestation programs, PROREST, etc.). Therefore, it is important to understand how these programs have impacted in the conservation of the Baird´s tapir (habitat) and in livelihood of communities in Sierra Madre de Chiapas. It is also important to focus on improving implementation of these programs to enhance conservation outcomes and identify the ways of using these types of projects to strengthen community's organization and direct them towards community-based conservation projects.
Administrative/political set-up	Mexico has different institutions and federal/regional programs for wildlife conservation and environmental protection. There is a National Action Plan for tapir conservation (Programa de Acción para la	There is no synergy between institutions. Although there is a strong set of laws and programs to protect the environment, there are other federal programs that	If there were greater collaboration between federal institutions for both social development and conservation, the use of resources could be maximized to reduce

	Conservación del tapir centroamericano - CONANP) and the species is catalogued as endangered by Mexican law. There are institutions present in the region in charge of the poverty alleviation and rural development programs which have significant power to mobilize the communities, which could hinder conservation activities. In Sierra Madre de Chiapas, much of the land tenure is under the control of the Ejidos. These Ejidos are a type of community-managed holding that peasants govern together as a unit. Therefore, decision making is based on a communal decision taken in assembly. Most of the conservation programs are addressed to these ejidos, since they live around the Natural Protected Areas. And much of the success of these programs depend on the acceptance/participation of the Ejidos.	promotes activities that may harm natural protected areas. For example, the SADER has different programs that encourage the creation of livestock areas, they have livestock credits programs, they promote the use of fertilizers and herbicides that pollute rivers, and although these programs are important for poverty alleviation, they should have a different implementation in communities associated with natural protected areas. Additionally, there are private interests in creating a highway in the region, that will cross and cut in two the Sierra Madre de Chiapas putting at risk the connectivity of the region. The main interest in constructing the highway is by the state government since it is the leading project commissioned by the new state governor, therefore, there could be a conflict between the state and federal governments.	poverty and strength conservation of natural resources.
Local expertise and interest	There are NGOs and universities working in Sierra Madre de Chiapas and some members	Because conducting biological research in the region is very	CONANP is trying to create links between NGOs and universities.

	of the communities have a real interest in conservation.	complicated due the very rugged topography, universities and researchers do not continue their projects to the disappointment of the local communities. Also, the Sierra Madre de Chiapas is not a priority conservation area, in contrast for example the five greatest forests of Mesoamerica, therefore, the amount of money invested in this area is very small and the biome does not get the same attention as other areas.	This can support partnerships or improve project output, avoiding duplicating efforts and promoting collaborations that help give sustainability and continuity to each of the projects.
Resources	Universities and communities can apply for governmental funds provided by CONANP or SEMARNAT (Secretary of Environmental and Natural Resources). Ejidos can also access resources for sustainable productive activities and rural development. Some communities have received capacity building workshops for monitoring and have been equipped with GPS, notebooks, camera traps backpacks, T-shirts, and other materials from different institutions and programs.	NGOs do not have many opportunities to apply for governmental funds. As mentioned before, there is no planning, continuity, guidance and support for communities that are developing conservation projects so in the end, they often end up failing.	Government is granting resources to communities and universities to develop conservation projects. NGOs can apply to international conservation funds.

2. ACTION PROGRAMME

Vision (30-50 years)	
Thriving population of Baird tapir in Sierra Madre de Chiapas under protection by socially and economically stable local communities	
Goal(s) (5-10 years)	
Ensure Baird´s tapir conservation in Sierra Madre de Chiapas by promoting sustainable community livelihoods and improved welfare	
Objectives	**Prioritisation** *(low, medium, high or critical)*
Promote reduction of habitat loss in communities of Sierra Madre de Chiapas	High
Promote reduction of poaching in communities of Sierra Madre de Chiapas	High
Develop scientific research to understand biological characteristics fundamental for Baird´s tapir and conservation of its habitat	Medium
Reinforce educational/awareness raising program at local, state and national levels	High
Promote synergy between government institutions, civil society, universities and communities	High
Update IUCN red list Baird´s tapir distribution range	High

Activities	Country / region	Priority *(low, medium, high or critical)*	Associated costs (currency)	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Objective 1: **Promote reduction of habitat loss in communities of Sierra Madre de Chiapas**								
Develop a community strategy to improve the management of the community's territory and the wildlife that inhabits those territories. Each community strategy will consist of two components: 1. Community land use planning. Design and development of a participatory land use planning protocol to generate a proposal to regulate the use of natural resources and contribute to directing the productive and social processes towards the sustainable development of the communities that live in the Sierra Madre de Chiapas.	Sierra Madre de Chiapas, Mexico	High	2,500 GBP/year	10 years	Community leaders and/or landowners, NGOs, CONANP	# Communities with land use planning protocol # communities organized (with a community action plan) # conservation/ poverty alleviation programs directed towards community-based conservation projects	Communities not interested in participating to develop action plans, land use planning and/or community-based conservation projects. Not enough resources to develop the activities. Lack of human resources to implement the activities.	Land/Water Management Livelihood, Economic & Other Incentives

2. Community Action Plan. Define the actions that must be implemented in the short, medium and long term to face each of the threats and needs that can affect the wildlife conservation, sustainable development and economic security of the communities of the Sierra Madre de Chiapas. This action plans will be design together with communities. Once the action plan and participatory land use planning are developed, define strategies to redirect poverty alleviation programs towards generating community-based conservation projects and improve implementation/planning of conservation programs to enhance conservation outcomes.								
Develop a connectivity model for Sierra Madre de Chiapas based on territorial planning and social mapping to direct the conservation/poverty	Sierra Madre de Chiapas, Mexico	High	2,000 GBP/year	5 years	NGOs, Universities, CONANP, CONAFOR	GIS with connectivity model for Sierra Madre de Chiapas based on territorial planning and social	Not enough data to develop the connectivity model.	Improving Knowledge Land/Water Management

alleviation programs towards areas that may have a greater impact on the connectivity of the region and on conservation of tapir habitat.						mapping (including possible conservation/ poverty alleviation programs that could help to promote/ enhance connectivity) Peer reviewed publications	Communities not interested in helping with social mapping workshops Difficulties to secure long-term funds for research activities in developing countries.	Livelihood, Economic & Other Incentives
Objective 2: Promote reduction of poaching in communities of Sierra Madre de Chiapas								
Strengthen existing community surveillance committees through capacity supporting increased workshops, equipment provisioning and salaries. Promote the creation of new community surveillance committees.	Sierra Madre de Chiapas, Mexico	Medium	5,000 GBP/year	10 years	NGOs, CONANP, CONAFOR, PROFEPA	# new and existing community surveillance committees # workshops directed towards community surveillance committees # persons equipped to carry out surveillance activities	Disinterest amongst stakeholders to create or strengthen community surveillance committees Difficulties to secure long-term funds for surveillance committees' salaries and equipment	Capacity Building
Promote sustainable livelihood associated activities in communities which promotes alternative sources of income and protein supply (instead of relying on bushmeat).	Sierra Madre de Chiapas, Mexico	Medium	2,200 GBP/year	10 years	NGOs, CONANP, SADER	# communities/ projects by communities developing sustainable productive activities	Communities not interested in developing sustainable productive activities Lack of resources	Livelihood, Economic & Other Incentives Capacity Building

Objective 3: Develop of scientific research to understand biological characteristic fundamental for Baird´s tapir and its habitat conservation								
Establish a tapir movement ecology research program.	Sierra Madre de Chiapas, Mexico	Medium	10,000 GBP/year	4 years	NGOs, Universities	Report Peer reviewed publication	Difficulties to secure long-term funds for research activities in developing countries. Insufficient tapir captured to GPS collar and track Collars do not work Insufficient information generated by the GPS collars	Improving Knowledge
Develop a long-term camera-trap monitoring program for the species in the three Natural Protected Areas. Monitoring program will be directed to evaluate mainly the actions related to the community surveillance activities, communities action plans, sustainable liv activities and educational program.	Sierra Madre de Chiapas, Mexico	High	3,500 GBP/year	10 years	NGOs, Universities	Monitoring protocol # camera traps active # locations # communities participating in monitoring activities	Robbery of equipment (camera traps) Accessibility to set up camera traps Not enough staff to place/check camera traps Difficulties to secure long-term funds to	Improving Knowledge Species Management

							operate a monitoring program	
Density and occupancy models for each reserve of Sierra Madre de Chiapas and non-protected areas.	Sierra Madre de Chiapas	High	1,000 GBP/year	5 years	NGOs, Universities	Report Peer reviewed publication	Insufficient information to perform the analysis	Improving Knowledge Species Management
Genetic studies to provide information about connectivity through meta-population, estimates of inbreeding depression, and population viability models.	Sierra Madre de Chiapas	High	8,000 GBP/year	4 years	NGOs, Universities	Report Peer reviewed publication	Difficulties to secure funds for research activities. Insufficient viable tapir genetic samples collected for analysis	Improving Knowledge
Evaluate connectivity between Sierra Madre de Chiapas and Ocote-Chimalapas reserve.	Sierra Madre de Chiapas and Ocote-Chimalapas, Mexico	High	6,000 GBP/year	2 years	NGOs, Universities	Peer reviewed publication	Insufficient information to perform the analysis Difficulties to secure long term founds for research activities in developing countries.	Improving Knowledge
Objective 4: Reinforcement of educational/awareness program at local, state and national levels								
Educational program implemented within focal communities.	Sierra Madre de Chiapas, Mexico	High	6,000 GBP/year	10 years	NGOs, CONANP	Environmental education program designed for the communities of the Sierra Madre de Chiapas	Difficulties to secure long-term funds for educational activities in developing countries.	Education & Awareness Capacity Building

						# communities/ persons involved in environmental education activities	Hard to build teachers capacity	
Coordinated actions of awareness/education at international level with BTSA.	Sierra Madre de Chiapas, Mexico	Medium	1,000 GBP/year	10 years	NGOs	# actions carried out in coordination with BTSA	Difficulties to secure long-term support of BTSA. Difficulties to reach international audience	Education & Awareness
Objective 5: Promote synergy between government institutions, civil society, universities and communities								
Through collaborative projects and meetings, promote integration between institutions to align government programs (conservation, poverty alleviation and rural development) to achieve common goals aimed at conserving and improving the livelihoods of communities.	Sierra Madre de Chiapas, Mexico	High	1,500 GBP/year	10 years	CONANP, SADER, SEMARNAT, CONAFOR	# projects jointly driven between institutions # annual meetings between institutions	Lack of political will to create alliances.	Law & Policy
Modify the guidelines and terms of reference of rural development and poverty alleviation programs so that for communities living in or near natural protected areas, any program implemented has a conservation component.	Mexico	High	1,000 GBP/year	10 years	CONANP, SADER, SEMARNAT, CONAFOR, Civil society	New guidelines and terms of reference for rural development and poverty alleviation programs	Lack of political will to modify the guidelines and terms of reference of the rural development and poverty alleviation programs.	Law & Policy

Objective 6: Update IUCN red list Baird´s tapir distribution range								
Update IUCN Baird´s tapir distribution range based on existing information and expert criterion.	Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama	High	0 GBP/year	2 years	Tapir specialist group (TSG), Baird´s tapir survival alliance (BTSA), Universities and NGOs	Map with updated Baird´s tapir distribution range. Peer reviewed publication	Lack of interest to gather information from Baird´s tapir distribution range.	Improving Knowledge

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