

Tamaraw Verification Surveys in the Upper Amnay Watershed Region, Mindoro

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Background

In 2017, only three tamaraw sub-populations were officially known to survive in Mindoro. They are all located in Occidental Mindoro. Mts Iglit-Baco Natural Park, in the center of the Island, holds the largest population with probably more than 400 animals. Mts Aruyan-Malati Tamaraw Reservation (Municipality of Sablayan) shelters a small population facing imminent threat of local extinction with no more than 15 animals according to the latest reports. Mt. Calavite Wildlife Sanctuary is a historical range of tamaraw, however, the species might already have been extirpated from this area since no sightings have been reported for several years.

These three sub-populations are officially recognized by local authorities and represent a total population of around 430 animals, as stated in the IUCN Red List Assessment (2016).

Yet, the inner mountainous range, dividing both Mindoro Provinces, has been producing regular reports of tamaraw presence for decades (Eagle Pass region and Mt. Halcon Range) suggesting there is still tamaraw outside of these official sub-populations. However, this remains only an assumption since no solid surveys have assessed possible populations in these areas. The Eagle Pass region was last surveyed by tamaraw rangers in the 1990s, with no recent information until now.

In January 2017, the Tamaraw Conservation Program (DENR TCP) received information from some Indigenous Peoples, about the persistence of tamaraws in a remote area at the border between Occidental and Oriental Mindoro, in the Upper Amnay Watershed Region. Thereafter, the TCP and the D'ABOVILLE Foundation (DAF) initiated some consultations

with the local communities in order to plan a verification survey.

Outlines of the series of field surveys

An initial verification survey was conducted in June 2017 by TCP rangers to reach the said area, progressing upstream the Amnay River from the point it crosses the Nautical Highway at Barangay Pag-Asa, Occidental Mindoro. The team was guided by local community chieftains of the residing Indigenous communities who are part the Mangyan Alangan Tribe. The mission was aborted after a week due to bad weather conditions. But the team was able to reach the supposed area of presence and collect some tracks. The mission confirmed the presence of tamaraw s in the Upper Amnay Watershed Region on the Municipality of Sablayan, Occidental Mindoro, near the border with Oriental Mindoro. Rangers estimated a minimum of 15 animals in the surveyed area according to indirect signs of presence.

Thereafter, new consultations were undertaken with residing community chieftains to plan and coordinate a series of more extensive verification surveys.

The verification survey conducted in February 2018 consisted of a complete crossing of the Mindoro Island from East to West. The headwater of the Amnay River watershed was surveyed up to the different summits of the mountain range demarcating the border between both Provinces. The team was able to evaluate the tamaraw area of occupancy on the occidental side of the surveyed zone. This area is a 3 to 4 day hike from the nearest lowlander non IP settlement, either Oriental (Barangay San Andres Putik, Municipality of Naujan) or Occidental (Barangay Pag-asa).

Two additional verification surveys conducted in June and September 2018 confirm that the tamaraw distribution is wider than previously thought, with signs observed only one days hike from the nearest road access on the Oriental side (Sitio Sido, Barangay San Andres Putik). This also substantiates the presence of the species in Oriental Mindoro, thus being qualified as the “rediscovery” of the species in the Province.

This series of surveys gives us a substantial understanding of the region, its social and natural context, as well as an estimate of the species range and population size. As a matter of fact, this finding proves the existence of a totally new tamaraw population in Mindoro.

The surveyed area encompasses the previous tamaraw capture site for the translocation of animals to the tamaraw breeding centre, the Tamaraw Gene Pool Farm. Two unsuccessful capture attempts were conducted back in 1986.

Survey teams were composed of TCP rangers, DAF representatives, Alangan guides and porters, as well as biologists from MBCFi during the last mission in September 2018.

Each survey was preceded and/or followed by consultations and exit meetings with local community representatives and local officials (LGUs, military outpost, DENR, NCIP). In July 2018, a turnover ceremony of the skull found during the third

survey was organized by the Provincial Government of Oriental Mindoro in presence of the Governor. Another multi-stakeholder meeting was conducted in Calapan Municipal Hall in September 2018, to present the results of the series of surveys and discuss their outcomes in presence of the Alangan Tribe’s representatives and NCIP.

Results and findings - observation

Method and equipment used

Due to the rough terrain and lack of knowledge about the natural areas to be surveyed, it was decided to use simple, non-prohibitive survey methods. Each survey team was equipped with a pair of binoculars, a GPS device and a photo camera.

Assessment method was based on three types of indicator: (a) direct observation (Fig. 1) , (b) hoof marks and dung (Fig. 2) and (c) estimates given by residing IPs living and using the area of presence of the species. Additionally, indirect signs of presence such as wallowing pools and resting places were also recorded.

These indicators were thereafter computed and reported on maps to evaluate the total species area of presence and estimate the number of animals in the region.



Figure 1. Tamaraw sighting in Mt. Gimparay (courtesy of MBCFi) Figure 2. Tamaraw hoof mark in forest undergrowth (E. Schütz)

The environmental knowledge of our local guides and porters was used as valuable inputs to select survey itinerary and comprehend the ecological context and animals' behaviors. Besides, estimates are based on the experience of the TCP rangers.

Physical and natural context of the surveyed area

The surveyed areas cover the two sides of the mountain range that demarcates both Mindoro Provinces, along the Provincial border in the Municipalities of Naujan and Sablayan. It includes the main following summits: Mt. Batu-Oy, Mt. Gimparay and Mt. Lamlamayan, reaching up to 1700m elevation. These mountains shelter the Amnay River headwaters, one of the major watersheds of Occidental Mindoro, as well as the headwaters of the Bucayao Grande River, one of the tributaries of the Magasawang-tubig River, the largest watershed in the Island.

This is also the demarcation between both of the climatic types of Mindoro. Most of the Amnay watershed up to 700m elevation experiences a Type 1 climate, with two pronounced wet and dry seasons during the year. This is the main climate type of Occidental Mindoro. On the other hand, the North-east side of the mountain range experiences an evenly distributed wet season with rainfall all over the year. Climate types reflect the ecosystems and vegetation types that can be found in the region.

Table 1. Actual tamaraw sightings and locations

Date	Feb 4, 2018	Feb 10, 2018	Sept 5, 2018	Sept 5, 2018
Area	Mt Batu-oy range	Mt Batu-oy range	Mt. Gimparay	Mt. Gimparay
Location	Tagnok	Kabagtuan	North-east side	West side
Bull	1	2	1	1
Cow	1	1	1	1
Other	1 juvenile	1 juvenile	1 sub-adult female	0
Total	3	4	3	2

The Bucayao Grande watershed in Oriental Mindoro is covered by dense tropical rainforest up to 1200m asl, while the Upper Amnay region shows dry seasonal tropical forest. Areas at higher elevation are covered by various mountain habitats including upper montane/mossy forest, creeping bamboo thickets, tropical sub-alpine forest and dwarf scrublands habitats.

Grassland type vegetation is predominant along both sides of the Amnay River up to the forest line, with extensive open areas being interspersed with patches of secondary dry seasonal forest.

On the Oriental side, numerous dipterocarp tree species (*Dipterocarpus ssp*, *Hopea ssp*, *Chorea ssp*), combined with other tropical trees observed along the trail, reflect the persistence of the tropical lowland evergreen rain forest that once covered most of the north-eastern great plain and hills of the Province.

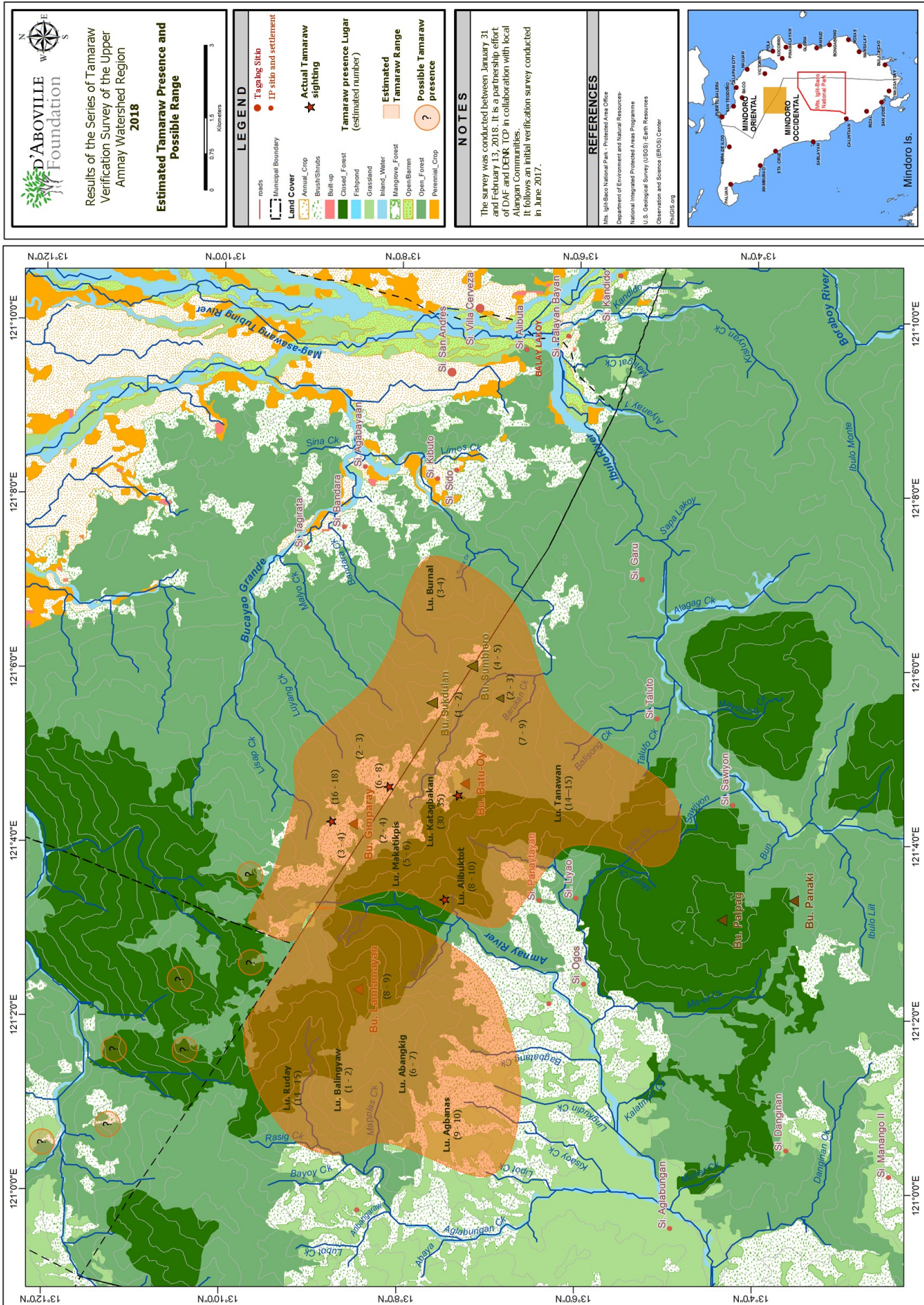
Tamaraw

Tamaraw distribution and population estimate

Signs of presence were collected in all habitat types, from 500m elevation up to summits. However, the species was predominantly assessed in semi open areas at higher elevation along the mountain ridge parallel to the Provincial boundary, on related habitats (Fig. 3). These are remote areas, hard to access with little or no human disturbance. Only four actual tamaraw sightings occurred in the four missions, with a total of 12 animals spotted (table 1).

A few tamaraw remains, including two old skulls, were found during the surveys. Cause of death is unknown but possibly natural.

Only one photograph of tamaraw was shot during the four surveys, by MBCFi biologist in Mt. Gimparay on September 2018.



In general, tamaraw range shows two distinct distribution blocks:

- The Mt. Batu-Oy and Mt. Gimparay range with contiguous tamaraw distribution on both sides of the Mindoro Provincial border. On the Oriental side, the closest tamaraw sign (Burnal Area) was collected at an elevation of 1100m, only a half day hike away from the last passable road in IP Sitio Sido. The area is located just above forested slopes with relatively limited land-use pressure. On the Occidental side, tamaraw are seen very close to upland community settlements (Sitio Liyao, Panaytayan, Ogos, Taluto), with evidence starting at 500m asl in valley area. However, animals are more often seen above the tree line, with limited evidence in open grasslands. These IP communities are located a two to three long days hike away from the last passable roads and lowland Christian settlements on either side of the Island.

According to the assessment of indirect signs and estimates from local communities, this area shelters between 100 and 116 tamaraws.

- Mt. Lamlamayan range, within Occidental Mindoro, with tamaraw signs collected in grassland areas dominated by cogon grass and talahib, seasonal tropical forest, montane rainforest and mossy forest up to 1600m asl. The population estimate is 38 to 43 animals. There are currently no IP settlements within the range of the species assessed there.

The estimate from direct observation and indirect signs of presence, combined with IP interviews, suggest that there are between 138 and 159 tamaraws in the entire surveyed region. The total confirmed area of tamaraw presence covers nearly 6000ha. However, these estimates have to be considered cautiously and must be corroborated using stronger scientific methods. Besides the verification survey stopped at the border with the Municipality of Baco in Oriental Mindoro, while

connectivity of the mountain range suggests that tamaraw signs could be found further North-East towards Mt. Halcon.

Tamaraw ecology and behaviour

Tamaraws that can be found in the Upper Amnay Watershed Region show natural history traits adapted to the climate, habitats and disturbance regime prevailing in this area. In a general manner, these tamaraws are focusing on forest resources and highland vegetation types with little access to lower grassland habitats.

Their diet is quite fibre rich as they are adopting a rather browsing behaviour in comparison to tamaraws found in Mts Iglit-Baco Natural Park. Interviews with our local guides and porters prove that animals forage on a large variety of shrubs, semi woody and woody species (more than 20 species reported during the mission). Those palatable species are abundant in local tropical forest undergrowth, glades or open highlands, but slightly less inside mossy forest habitats.

There is less evidence of the species in dense mossy forest, as well as forest with deep muddy soil as both biotopes seem to be avoided. More tracks can be seen in scrublands and open highlands.

According to our local guides and porters, animals roam the forest at night time but move up to summits and open areas on a daily basis to avoid occasional disturbance as well as to access specific resources and to get heat from the sun.

This pattern of home range use is in rattan rich forest areas where tamaraws cross rivers or change mountain sides to avoid disturbance caused by community members harvesting this natural resource at certain periods of the year.

Despite this fact, animals seem to have their own territory with little competition for food and space. Groups are below six animals. According to the TCP rangers, these tamaraws look stockier with larger front head and darker body colour

compared to tamaraws in MIBNP.

Other wildlife

Mindoro warty pig (*Sus oliveri*) is reported as quite common in the region by local IPs, which is corroborated by numerous signs of presence observed during the different surveys. The species can be found in all types of habitat but become less frequent, or even absent at higher elevation in mossy forest and thick vegetation.

Philippine brown deer (*Rusa mariana barandana*) seems to be rare and occupies forest areas of lower elevation. No signs of deer were collected during the surveys.

Besides, IP communities report the presence of the following fauna: Asian palm civet (*Paradoxurus hermaphroditus*), Malay civet (*Viverra zibetha*), monitor lizard (*Varanus bangonorum*), Mindoro hornbill (*Penelopides mindorensis*), bleeding heart pigeon (*Gallicolumba platenae*), imperial pigeon (*Ducula sp.*), long tailed macaque (*Macaca fascicularis*). IPs are also reporting the presence of large species of rodent and shrew types, including an animal that is likely to be a cloud rat species. Such assumption requests further investigation.

On a general perspective, it is likely that these mountains shelter far more biodiversity than what could be described at first glance. The variety of biotopes and remoteness of the area that preserve it from major disturbance makes it most probably one of the biologically richest and still to be surveyed regions of Mindoro.

Ethno-ecological and Socio-cultural context

Mangyan Alangan Ancestral Domain

The assessed tamaraw range is entirely located within the Ancestral Domain of the Mangyan Alangan Tribe of Mindoro (map.1 appendix.1). The Alangan Tribe has already achieved and retrieved its CADT (Certificate of Ancestral Domain Title). Their Ancestral Domain extends over most of the Amnay River watershed and nearby rivers in Occidental Mindoro, Municipalities of Sablayan and Santa Cruz and the Upper Bucayao Grande River in Oriental Mindoro, Municipality of Baco,

Naujan and Victoria

We can distinguish two blocks within the Alangan Tribe, which diverge in terms of land-use system, organization and connection with lowland Mindoro:

Communities living within the Amnay River watershed are mostly under influence and interaction with government offices of Occidental Mindoro (DENR, LGUs). They acknowledge the leadership of the legal Alangan representative, Mayor Junio Calamita, who resides in Barangay Pag-Asa at the junction of the Amnay River and the Nautical Highway. Over twenty five community settlements of various sizes are scattered along the Amnay River and its tributaries. Except for a few settlements that can be accessed during the dry season when motorbikes or tricycles can use the riverbed, most communities have no access to roads nor energy sources, therefore being isolated from the facilities and economical activities spreading along the nautical highway.

On the other hand, the Alangan residing in the Oriental side are nowadays predominantly living in a few permanent settlements in the lowland nearby other Mindoreño settlements. Sitio Sido in Barangay Balite hosts nearly 50 IP families and is accessible by road, thus connecting nearby IP sitios located along the Bucayao Grande River to lowland activities. According to them, there is no real Tribal Leader: Instead, Alangan people must rely on the decisions of Elders (Aplaki) and the leadership of the chieftain of each community. However, these communities seem to be under influence of non-IP people, claiming to be the messengers and accepted representatives to talk in the name of the Alangan people to LGUs, NCIP or Mining Company.

Upland IP communities that are located in the vicinity of the tamaraw range (Sitio Ogos, Panaytayan, Liyao, Taluto) are the most isolated among all Alangans. They are within the jurisdiction of Sablayan and leadership of Mayor Calamita. However and due to travelling distance, they are rather connected with lowland communities of Oriental Mindoro, thus being somewhat disconnected from initiatives and decisions taken in Sablayan

The Ancestral Domain is divided into numerous parcels that have been distributed between local chieftains and elders. They have control over those areas even so they are not living on it.

This overall situation creates some tension within the tribe which is reflected by issues in governance and leadership and conflicts of legal representation. Besides and due to the nearly pristine rainy forest that stretches along the mountain range, the oriental side contains more valuable natural resources, therefore putting this region under interest of non IPs.

Lifestyle, belief and land-use system

From a general perspective, the Alangan Tribe is well aware of the benefits they can get from the natural resources found in their Ancestral Domain and the importance of properly managing them.

Alangan communities residing in the rainy East side conduct a form of agro-forest farming system in the forested hills up to a certain extent and below 600m asl. Above this line, the forest is practically intact. They plant banana, cassava, sweet potato, gabi (taro), tobacco, as well as coconut trees and betel palm trees. Pest problems and cold weather limit the plantation of rice. Banana plantations suffer from typhoons during the rainy season. Rattan is an important resource being harvested for multiple uses.

Several animals are raised for use and consumption within communities, such as domestic pigs, chicken, ducks, goats, cows and carabao. Dogs are also common. Furthermore and besides the coconut that can be sold to lowlander non IPs (siganon), most crops are harvested for community consumption only. Contravention of this rule may result in bad harvest due to the wrath of the "Kapwan Bolod", the spirit who owns the mountains, forests, animals and water.

Communities living in the upper Amnay River region, near the border with Oriental Mindoro, benefit from the mixed ecological pattern and different biotopes found in that altitude and location. They conduct swidden agriculture with various crops. Families live in communal huts or group of huts nearby creeks

or rivers. Native domestic pigs (baboy allaga), chicken, dogs and cats are now common. Diet is based on local crops and natural resources, including freshwater fishes, eel, or crayfish.

Some community members go once or twice a month down to Barangay San Andres Putik in Oriental Mindoro (two to three days hike away) in order to make some earnings by selling craft products (hammock, rattan basket...) or honey (in April) at the Barangay Hall or by exchanging upland crops for other goods.

Items that are primarily purchased are, in order of priority: salt, tobacco, rice and canned food. Rice remains a very occasional food item in the diet of these upland communities.

Agoho pine tree (*Casuarina equisetifolia*) is very common in the Amnay Watershed region and represents an important resource to residing communities for making charcoal thanks to its property to produce high heat.

Alangan communities hunt all type of wildlife. Hunting season with traps (palakaya) occurs between the months of December and April. Spear traps are designed for large animals such as tamaraw (tambakon) and wild pig (pangilan) while snare traps are used to catch palm civet (alamid), rodents (daga), monitor lizard (bayawak), jungle fowl, python (sawa), long tail macaque (bakos) or wild pigs. Specific traps using nets are also set up to catch bats and birds, while small forest openings are used for hunting fruit bats.

Specific rituals (barongbong) must be practiced before hunting to please the Kapwan bolod and ensure a successful catch. Offerings (sula) of pigs or chicken are regularly needed to prevent the anger of the Kapwan bolod.

Alangan people fear tamaraw due to its aggressive behaviour. To avoid unfortunate encounters, they wear a special necklace (bayumbi) that produces noise.

Alangan still follow their own tribal customary law and use a range of punishment to solve internal problems and issues.

Alangan communities have collectively engaged into specific habitat management measures within their Ancestral Domain

in order to prevent unsustainable pressure on natural resources resulting from population growth and new needs created by the progressive modernization and lowlander lifestyle.

Nowadays, their farming system is restricted below the forest edge and in open areas, thus to avoid additional encroachment to upland forest habitats, to preserve natural resources, secure clean water production and reduce disturbance to tamaraw. Hunting of tamaraw is very restricted or prohibited. Many areas are barely used or visited, and many settlements or temporary huts are currently abandoned, emphasizing the progressive shift in land-use system and movement of the communities towards lower locations or in existing settlements.

From a general perspective Upland Alangan people are eager to break their secluded lifestyle and to become more connected with lowland communities in order to be part of government initiatives and to benefit from development programs.

Concerns and remarks of local indigenous communities

The different consultations conducted with local communities highlight several concerns:

The Alangan people of Oriental (sitio Sido) were afraid that the purpose of the missions was to capture tamaraws to be translocated in another location. This is in reference to the unsuccessful capture attempts that occurred in 1980s in the frame of the Gene Pool Farm establishment.

They also pointed out the fear of creating disorder within the Tribe with, on one side, IP members involved in DENR activities (hired as guides or porters or expecting to become future rangers) or having tamaraw confirmed in the land parcel they control, from IPs not concerned by tamaraw presence or involved in field surveys on the other side. In other words, all community members are looking to be involved in DENR activities in order to preserve equity inside the tribe and receive financial benefits from projects.

They were also concerned that the tribe would be affected by having strangers and field activities entering sacred places

inside the Ancestral Domain.

However, it is palpable that the field missions have created expectations among the communities, first through the expectancy to become rangers and receive compensation from DENR and secondly by raising hopes that the DENR would help the tribe to address the problem of illegal activities and intrusion of non-IPs (siganon) inside the Ancestral Domain.

Chieftains confessed that they are powerless on that matter.

Threats and pressure

Due to the remoteness of the area where tamaraws are found and the rough terrain, pressure is relatively low. However, local chieftains relate on several sources of threats and disturbance:

Tamaraw are still victims of traps used by residing IPs hunting local fauna. Besides, wildlife poaching from lowlander siganons and map problem, especially in Burnal area and Barukan creek area. Electric fishing is also reported to occur in these areas. Illegal activities are considered an important problem for the Alangans because it results in the violation of their CADT and abuse of local natural resources by other groups.

Community members report that tamaraw suffered from regular deliberate poaching incidents in the past decades but that this source of pressure dried up after main culprits (local officials) passed away. However, this means that poaching is a fluctuating human based source of threat that requires continuous protection efforts.

Furthermore, there is an ongoing road construction that will connect Barangay Pag-asa, Municipality of Sablayan in Occidental Mindoro, to Barangay Villa Cerveza in Municipality of Victoria, Oriental Mindoro. The itinerary runs on the left bank of the Amnay River, through the mountains, within the CADT of the Alangan Tribe. This road, when completed, is likely to become a major source of threat by opening this still preserved Inner Mindoro region to illegal activities or unsustainable developments.

Discussion

The recently confirmed tamaraw population of the Upper Amnay Watershed Region can be considered as a new official tamaraw sub-population in Mindoro. A total of seven different animals have been clearly observed, while assessment method through indirect signs of presence suggests that more than 65 animals are roaming these mountains and possibly more than 100 according to local communities. The second figure is similar to the number of tamaraw stated in the literature for the Mt. Halcon – Eagle Pass range in the 1980s (CRM-Fi 1990: n = 65).

Furthermore, the surveyed area suggests an area of occupancy of more than 6000ha. Despite the fact that these estimates remain unclear, it is de facto the second largest tamaraw population on Mindoro after Mts Iglit-Baco Natural Park in terms of size and the largest in terms of range. Besides, it confirms the “re-discovery” of the species in Oriental Mindoro.

This finding is therefore of major importance for the long term conservation of the species but implicates new responsibilities for local stakeholders and urgent needs to coordinate protection and monitoring efforts between agencies or other organizations.

Tamaraw are confined to mountain habitats from 500m asl up to 1700m asl, adopting browsing behaviour and a more fibre rich diet than the well-known rather grazing tamaraws of Iglit. This demonstrates the ecological flexibility of the species and its ability to survive in a large spectrum of habitats.

Furthermore, it shows that more natural areas of Mindoro could be considered as suitable for the species.

Nevertheless, and if the figures are correct, the overall density of tamaraw in the Upper Amnay Watershed Region is less than 2 heads for 100ha. In comparison, the core zone of the monitoring in MIBNP shows a density of 20 heads for 100ha in 2018.

This may suggest that the potential optimum density of animals in upland forests and mountain related biotopes is much

lower than what grassland and seasonal habitats of lower elevation can sustain.

This assumption must take into account that the Iglit population might already be reaching carrying capacity. Besides, and according to local communities, the population of tamaraw is increasing in the Upper Amnay Watershed Region, suggesting that this population is on a positive trend and has not yet reached (“back”) its optimal natural density.

Additionally, limited disturbance, accessibility to food resources and constant availability of water supply through rainfall, permanent creeks and wallowing holes, is likely to reduce intra specific competition. In other terms, the sub-population of the Upper Amnay Watershed Region might be a unique example where tamaraws are expressing the natural behaviour of the species.

Publicity that has followed the surveys and subsequent meetings, including through local media, have made people aware of the presence of a substantial number of tamaraw in the region, with exact location being communicated. This raises concerns of a possible sudden increase of poaching and illegal activities.

Alangan people have clearly expressed their consent to collaborate with the DENR and its partners for the protection of the tamaraw as far as the tribe is involved and has given consent to the proposed projects. Besides, they have highlighted their desire to increase official protection of the upland forest habitats where tamaraw are found. These matters were properly discussed with Alangan representatives during the Tamaraw Population and Habitat Viability Assessment and Action Planning workshop that was held in Mindoro in December 2018.

Conclusion and recommendation

The Upper Amnay Watershed Region shelters the second largest Tamaraw population of Mindoro in size and the largest in term of range. Tamaraws are confined to upland forest habitats at the border between Occidental and Oriental Mindoro. The assessed population is located within the Ancestral Domain (CADT) of the Mangyan Alangan Tribe.

In regards to the results, findings of the mission and context of the region, human pressure seems currently low with no apparent urgent actions needed. Nevertheless, the surveys have brought out expectations among the Tribe that seek to receive financial benefit by being involved into future activities. Besides, findings have generated excitement among the Provincial Government and DENR of Oriental Mindoro. They are eager to participate in protection actions.

Therefore, it seems important to properly engage into continuous discussion and collaboration with the tribe and concerned offices, but also to avoid inconsistent and precipitated intervention until broader plans are clearly elaborated.

First of all, additional surveys are needed to assess the exact range of the species and better estimate the population size.

Thereafter, it will be possible to design suitable conservation actions and landscape approach closely integrating the needs, claims and rights of the local Alangan communities. These plans have to be in line with the Ancestral Domain Sustainable Development and Protection Plan (ADSDPP).

This range of intervention must be properly coordinated by concerned agencies and seek for inputs and support from relevant partners and experts. The TCP seems currently the proper entity to undertake the work directly related to Tamaraw.

Therefore, its capacities must be enhanced accordingly it order to fulfil this task.

This tamaraw population is definitely of major importance and a crucial asset in the frame of the long-term conservation of the species. It will be a central element of the meta-population conservation and management strategy that will be properly elaborated in the upcoming Species Action Plan.

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