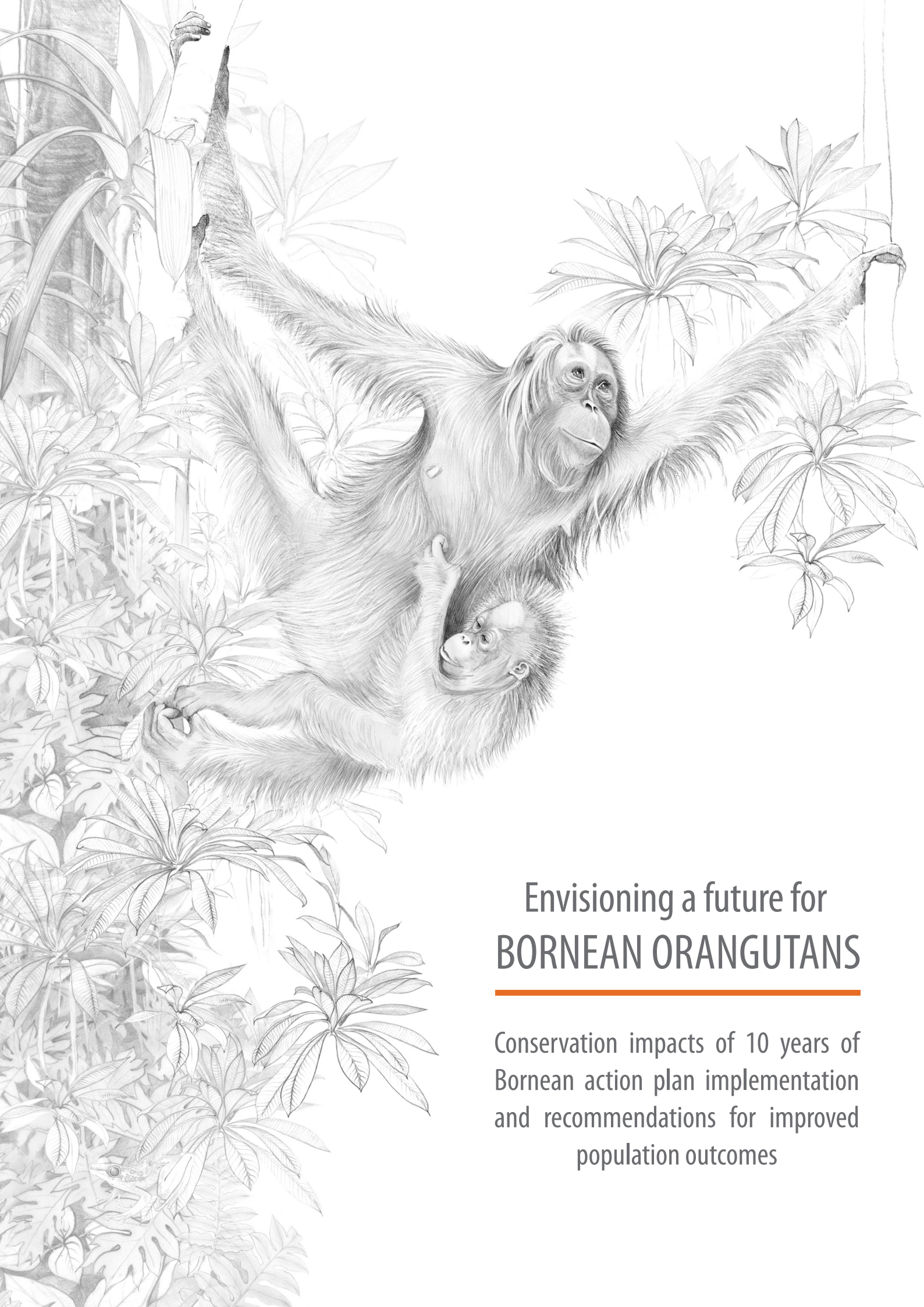

Envisioning a future for BORNEAN ORANGUTANS

Conservation impacts of 10 years of Bornean action plan implementation and recommendations for improved population outcomes

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BORNEO FUTURES
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EVALUATING BORNEAN ORANGUTAN CONSERVATION EFFECTIVENESS

There are three official action plans addressing the management of Bornean orangutans and their habitats.

- The Sabah Orangutan Action Plan (SAP), which covered Bornean orangutans in the Malaysian state of Sabah from 2012-2016.
- The Orangutan Indonesia Conservation Strategies and Action Plan 2007-2017 (SRAK 2007), which covered Bornean orangutans in Kalimantan (Indonesian Borneo) and the Sumatran and Tapanuli orangutans in Sumatra, Indonesia. An update of this plan for the period 2019-2029 (SRAK 2019) was recently published (KSDAE 2019).
- The Orangutan Strategic Action Plan for the Trans-boundary Biodiversity Conservation Area of Batang Ai, Lanjak-Entimau Wildlife Sanctuary and Betung Kerihun National Park (Transboundary Plan), which covers the areas of Sarawak, Malaysia and Betung Kerihun National Park in West Kalimantan Province, Indonesia for the period of 2010 – 2020.

The IUCN Species Survival Commission (SSC) Primate Specialist Group Section on Great Apes (IUCN SGA) and the United States Fish and Wildlife Service (USFWS) Great Ape Conservation Fund provided grant funding for Wildlife Impact and Borneo Futures to analyze the impacts of conservation action plan implementation on Bornean orangutans between 2007 and 2017, and to develop recommendations for strategic interventions based on evaluation results and best available science.

We developed and used a logic framework to consider how the three existing action plans addressed the range of conservation interventions affecting orangutans, what conservation impacts could be expected from those actions, and the risks and opportunities of each intervention type (Appendix 1). Conservation interventions were broadly categorized as:

1. research;
2. habitat protection (legal designation of protected habitat, community land reserve, habitat purchase);
3. patrolling and law enforcement;
4. community outreach, training, and policy (awareness raising, education, capacity building, policy development and advocacy);
5. orangutan rescues (intake into rescue facilities from illegal situations or for medical care, or removal from conflict situations for the purpose of translocation to another natural habitat), rehabilitation, and releases (reintroduction, translocation);
6. habitat restoration; and
7. organization management, salaries, buildings, vehicles, and other administrative costs.

We conducted in-depth analysis on four primary components of orangutan conservation action for which detailed data were available across the 10 year study period:

1. law enforcement;
2. orangutan rescue and release;
3. land cover change in orangutan range; and
4. orangutan population trends.

We also collected preliminary financial data on investments made into orangutan conservation for the latest available year (2016). We are currently conducting more in depth research on orangutan conservation cost effectiveness and will make resulting findings available in a subsequent report. Our preliminary financial analysis considered six stakeholder categories: government; multi-lateral agencies (agencies representing multiple countries, such as the United Nations Environment Programme); corporate (timber, oil palm, pulp and paper companies, carbon trade, other); orangutan rescue organizations; conservation non-governmental organizations (NGOs); and research organizations. Insufficient information was available on community management of orangutan habitats, and this stakeholder category was excluded from the analysis.

Data were gathered from direct communications with stakeholders (via email questionnaires, phone, email and in person interviews; see below), and review of published literature, unpublished data and from publicly available data sources. We collected data from newspaper articles by searching Prokal and TribunNews (Kalimantan), Jakarta Post (Indonesia), and Borneo Post, Star, Malay Mail, Daily Express, New Sarawak Tribune (Malaysia), and Borneo Today (Malaysia and Borneo regional) websites, using the search term "orangutan" (and also "orang-utan" in Malaysia, where this spelling is more commonly used) to capture any relevant news published between 2007 and 2018. Law enforcement data were compiled from published sources, CITES reports, newspaper articles, government reports and NGOs. Rescue and release data were collected from rescue centers' annual reports and tax filing or charity commission reports, and from websites and social media posts of NGOs and government rescue centers holding Bornean orangutans in Kalimantan, Sabah and Sarawak. We provided initial datasets to each rescue center for their review and input in June 2017.

All data were compiled to assess progress first against the three action plans' self-determined measures of success (plan indicators), and secondly in terms of their outcomes and impacts to orangutan populations and habitats.

Our aim is to seek improvement in the effectiveness of orangutan conservation activities, rather than to criticize the role of any individual actors or groups. Hence stakeholder inputs and publicly available data attributable to individual stakeholders were kept confidential and anonymous, with data collated by sector and strategy rather than by entity.

RESULTS

Plan implementation

Our reviews of the Plans showed that:

- The three plans covered most of the necessary actions to address the scope of threats to orangutan population and habitat. However, indicators in the Indonesia action plans and the Sabah SAP need to be improved to measure impact to orangutans and habitat. 136 (91%) of the 150 indicators in the SRAK 2007 were measures of process or implementation effort rather than impact on orangutans and their habitats, while the absence of clear performance indicators in the SAP make it difficult to quantify its delivery.

- Most actions described in the plans are still underway; several show local success in protecting, and, in a few cases, connecting orangutan habitats.

- However some of the most critical actions have been implemented only rarely (such as law enforcement for illegal possession of orangutans in Indonesia, and development and implementation of Best Management Practices for concession lands with orangutans) or not been implemented at appropriate scales to influence species' level population status and habitat availability (such as developing corridors to connect orangutan habitats and protection of High Conservation Value forests in concessions).

- Many commonly used actions appear to be based on outdated understandings of orangutan behavior and habitat use, notably lack of stakeholder recognition that orangutans to use some fragmented and disturbed habitat areas.

Stakeholder interventions

We sent questionnaires to 113 stakeholders from government, NGO (excluding orangutan rescue and rehabilitation centers as we collected data from these stakeholders through direct meetings, remote communications and review of publicly available documents and discussions) and industry. We received 32 questionnaire responses. We also interviewed staff in several orangutan organizations, including government, NGOs, research organizations, and industry. Strategies employed by stakeholders included reforestation, law enforcement support, fire suppression, alternative livelihoods development and ecotourism, among others (Table 1).The most common stakeholder activities were awareness raising, reforestation and forest protection (including patrols). Most stakeholders did not have or did not share empirical evidence of whether or how these activities were impacting orangutan populations and habitats. Only four respondents were aware of how their activities might impact the status of orangutan populations or threats to these populations as a whole. Overall, it appears that most efforts are locally focused and do not address orangutan conservation issues at wider scales.

Table 1. Primary type of activities performed by 32 stakeholder questionnaire respondents

Activity category	**Number of respondents conducting strategy**
Orangutan research activities	3
Orangutan monitoring	4
Creation of protected areas	3
Habitat protection (include patrolling)	7
Conservation management capacity and community outreach	6
Awareness	8
Land use planning	4
Reforestation and creation of corridors	7
Policy	3

Rescue and release

We are currently completing an in-depth analysis of Bornean orangutan rescue and release data from Kalimantan, which we will also share with orangutan conservation stakeholders. Here we briefly describe preliminary results.

The Indonesia SRAK 2007 had a stated goal of emptying all rehabilitation centers by 2015. In practice, Kalimantan rescue centers have maintained fairly constant numbers, with more than 1000 orangutans held in their facilities in 2017, nearly the same number as held there in 2007. The pace of intake into rescue centers continues to exceed that of releases despite several hundred orangutans being released since 2007.

We found 1285 detailed records on individual orangutans rescued in Kalimantan, more than half of which represent crimes, including killing, possession, harassment/injury, sale or trade of orangutans. Nearly all orangutans confiscated by authorities or surrendered (voluntarily handed over to a rescue center or government) were illegally held as pets. Many were kept in horrific conditions and needed urgent medical care from rescue centers. It is important to note that possession of an orangutan is illegal regardless of the state of the animal, and every orangutan taken from a private captor, even those who are healthy at the time of seizure or surrender, represents a crime. There were only a few reported instances wherein people reportedly encountered or were given an orangutan that they immediately turned over to law enforcement or rescue centers of their own volition (we did not consider these instances as crimes since the person did not seek to illegally keep the orangutan).

About half of the total orangutans rescued during the study period were wild orangutans captured for translocation to other natural habitats. Most of these translocated orangutans were found in situations where they were perceived to be in potential conflict with humans, or where there was a perceived risk to human safety, food crops or property. Some of the animals were rescued from urgent situations where their welfare was under direct threat from humans attacking or harassing them, or when they were starving, dehydrated, or seriously injured. Evidence of crop raiding was specified in only a small percentage of the rescue records. A larger number of orangutans were affected by fires set to clear lands, which rescue centers reported drive orangutans from forests into agricultural lands or villages where they could come into conflict with humans, or strand them in areas with no suitable food resources.

About 1400 individual orangutans were reintroduced into natural habitats in Kalimantan during the study period: 467 individuals were rehabilitated ex-captive orangutans that were reintroduced (or 39% of the total); 704 were wild orangutans translocated to other natural habitats (50%); while the rest were re-releases of previously released and recaptured individuals, and releases of unspecified type.

In total, more than half of ex-captive rehabilitated and reintroduced animals (excluding translocated animals) were adults 10 years or older that were captive for more than 10 years. While many reintroduced individuals appear to have adapted and some have reproduced successfully, there were also notable challenges. “Behavioral issues” and “difficulties in adapting to social and ecological conditions” were often reported, as were conflict among conspecifics and to a lesser degree conflicts between rehabilitants and wild orangutans. Many rehabilitated orangutans were recaptured and re-released, sometimes repeatedly because they were malnourished or starving, or had been reported as crop raiding or in other conflict with humans or other orangutans. Systematic post-release monitoring for longer than three years (the typical maximum life span of radio tracking implants) was rarely reported although some animals were recorded ad hoc by patrols or noted around feeding platforms. Many individuals were not seen again following release, regardless of monitoring schemes.

Orangutans are quite difficult to follow, although in some cases no attempts were made to locate animals released more than 1 – 3 years prior. Rescue centers tended to consider unseen individuals to be alive, but evidence to support this assumption was lacking. Some reports from a few longer term release sites in Kalimantan suggest that medium to long term survival rates for reintroduced orangutans in Kalimantan may in some cases be less than 20%, while other sites have reported much higher rates.

Between 2007 and 2017, hundreds of wild orangutans in Kalimantan were captured and moved from concession lands slated to be cleared, and from areas that rescue centers considered marginal habitat or with high likelihood of human-orangutan conflict. Orangutans were mainly captured from the wild to pre-emptively avoid potential conflicts, including when people reported only seeing the orangutan or fearing it, but without any physical conflict or reported damage to property (such as crop raiding). Crop raiding and other orangutan damage to human property was specifically reported in about one-fifth of the wild captures. Most wild orangutans were healthy at the time of capture. A small minority were in need of urgent intervention as they were found starving or malnourished, or were rescued from being harassed, attacked or seriously injured by humans. A significant proportion of these urgent welfare rescues were associated with fires set to clear land. Practitioners reported that orangutans entered anthropogenically modified areas as a result of fires in their natural habitats, and in some cases had to be moved from burned areas where no standing trees or other food resources were available. Approximately one-fifth of the wild orangutans captured for translocation between 2007 and 2017 were captured when no suitable release site was available. These animals were held in captivity for several years before release, although in a few cases this related to their recovery from human-inflicted injuries.

Researchers we interviewed reported that mitigating or managing a conflict situation in the field is extremely rare, and translocations are the default answer to people wanting orangutans out of their way. There were multiple instances of these translocations being requested by corporations to remove orangutans from lands slated for clearing, or to prevent orangutans in local forest patches from feeding in plantations. Anecdotal reports and available evidence of forest change in these areas suggest that these lands may have been rapidly cleared following removal of the orangutans. Notably orangutans are legally protected and thus are considered a species that cannot be moved or harmed under Indonesian conservation law UU 5 of 1990, so moving them to enable land clearing is illegal and violates certification requirements for sustainable timber and oil palm, which require that species of High Conservation Value are maintained in situ.

While several sites where translocated wild orangutans were released had been extensively studied prior to their approval, stakeholders we communicated with reported that other release sites appear to be selected ad hoc without the necessary wild orangutan population surveys, food availability and other assessments needed to comply with IUCN guidelines for reintroduction (Beck et al. 2007; IUCN/SSC 2013). Few data are available on short term survival, and essentially none on long term survival of wild orangutans translocated to new habitats. Available short term survival data on a few radio tracked wild captured and released orangutans show two-thirds were not seen again three years after release.

The state governments of Sabah and Sarawak, Malaysia, each operate rescue centers - Sepilok Orangutan Rehabilitation Centre (Sabah), and Semenggoh and Matang Wildlife Centers (Sarawak). Malaysian centers have rescued only a few orangutans annually during the study period. These rescues are almost exclusively infants. Both Sepilok and Matang release orangutans into the protected forests adjoining their rescue centers but Sepilok also used Tabin Wildlife Reserve, a fully protected forest Reserve that is twice the size of Singapore, as a release site for a dozen individuals. Few publicly available data were found on these activities. However it is highly likely reintroduction and translocation in Malaysia faces the same challenges as Indonesia (Robins et al. 2019).

Law Enforcement

Few orangutan-related crimes perpetrated in Kalimantan were investigated, prosecuted or convicted during the study period. The Indonesian authorities made less than 10 successful convictions of orangutan-related crime (less than 1% of all reported orangutan-related criminal activities) between 2007 and 2017. Indonesian authorities did not made any convictions in Kalimantan based solely on illegal orangutan possession between 2007 and 2017, although one person was convicted for local trade of a Bornean orangutan (Freund et al. 2017; Nijman 2017; Karokaro & Hanafiah 2019). Malaysia made less than five successful convictions of orangutan-related crimes between 2007 and 2017. Overall, conviction and prosecution of people keeping, harming or killing orangutans is extremely low, particularly in Indonesia, and is insufficient to provide deterrence. We are completing a case study on law enforcement related to Bornean orangutans, which we will also share with orangutan conservation stakeholders.

In Indonesia, the consistently high numbers of illegally owned orangutans taken into rescue facilities without accompanying investigation and prosecution of law breaking by owners, sellers or poachers has been identified as a systemic failure for many years (CITES/GRASP 2006; Freund et al. 2017; Nijman 2017). Orangutan killing rates in Kalimantan continue to be high, as most of the animals coming into rescue centers are in some way associated with killing (i.e. dependent infants recovered without their mothers) or outright injury (gunshot or knife wounds) to orangutans. It is obvious from newspaper reports and rescues that significant numbers of orangutans are being lost in this manner and that this is a threat that needs to be taken more seriously.

Moving orangutans from their habitat is also forbidden under Indonesian law UU 5 of 1990 unless this is needed to save the species or if the animal is a threat and could harm people. Nonetheless capture and removal of orangutans from industrial agriculture and forestry concessions is commonplace, and there is a lack of law enforcement for both illegal clearing and removal of orangutans from their habitats.

Very little information is available about smallholders and orangutans. Considering the small size of their plots smallholders rarely set aside protected forest patches in their fields. Orangutans are often perceived as a "pest" by most smallholders, and have been for a long time (De Telegraaf 1934), and most people prefer to not see an orangutan within their fields. Despite full legal protection of orangutans, many people who encounter orangutans on their land will either try to drive the orangutan away from their fields; ask a governmental or non-governmental organization to translocate the "problem" animals; or sometimes kill the animal (Davis et al. 2013; Abram et al. 2015). Considering that smallholders represent about 40% of the total surface area planted with oil palms across Borneo (Naylor et al. 2019), and acknowledging that several thousands of orangutans are found within oil palm landscapes (Meijaard et al. 2017), it becomes urgent to reach out to smallholders to shift their mindset and increase their tolerance toward orangutans. In particular, there is a need to work with them to identify peaceful mitigation options - including compensation - in case of conflicts; and to develop and maintain better connectivity in the landscape by considering an entire jurisdiction and ensuring management of all remaining forest areas, patches and corridors. Payments to communities who effectively protect local orangutan habitat and populations could also be considered.

Management of orangutans in concessions

Nearly 10,000 orangutans were estimated to live in areas on Borneo allocated to oil palm development (Meijaard et al. 2017). Our survey data indicate there is nonetheless limited implementation of Best Management Practices (BMPs) at the local level in industrial concessions. Stakeholders reporting use of deterrents to keep orangutans out of crop areas in Kalimantan was likewise uncommon. This lack of pro-active action on concession lands that could accommodate peaceful co-existence between people and orangutans represents an important missed opportunity to conserve orangutans and their habitats outside fully protected areas. Our analysis of the 2016 budgets of 145 organizations working on orangutan conservation showed that the private sector, mainly RSPO oil palm and FSC timber concessions, were the largest investor for managing orangutans and their habitat. For example, one of the concessions we interviewed is managing an area of approximately 3,000 hectares which is home to at least 150 orangutans. While a significant sum is spent by the company to maintain this forest (i.e. patrolling to prevent poaching, and suppressing fires), this nonetheless shows that investment by the private sector can play a significant role in orangutan protection.

Habitat loss and habitat protection

Within Bornean orangutan range, forests have declined since 2007 (Figure 1), but protected areas have increased, most notably within Sabah and Sarawak, Malaysia, and in Central Kalimantan. Sabah and Sarawak have decided to fully protect most of the orangutan range as a conservation strategy, and recent surveys showed the populations in these two states are becoming stable (Pandong et al. 2019; Simon et al. 2019), except in non-protected or fragmented forests. On the contrary Kalimantan's network of fully protected forests covers a much smaller part of the orangutan range.

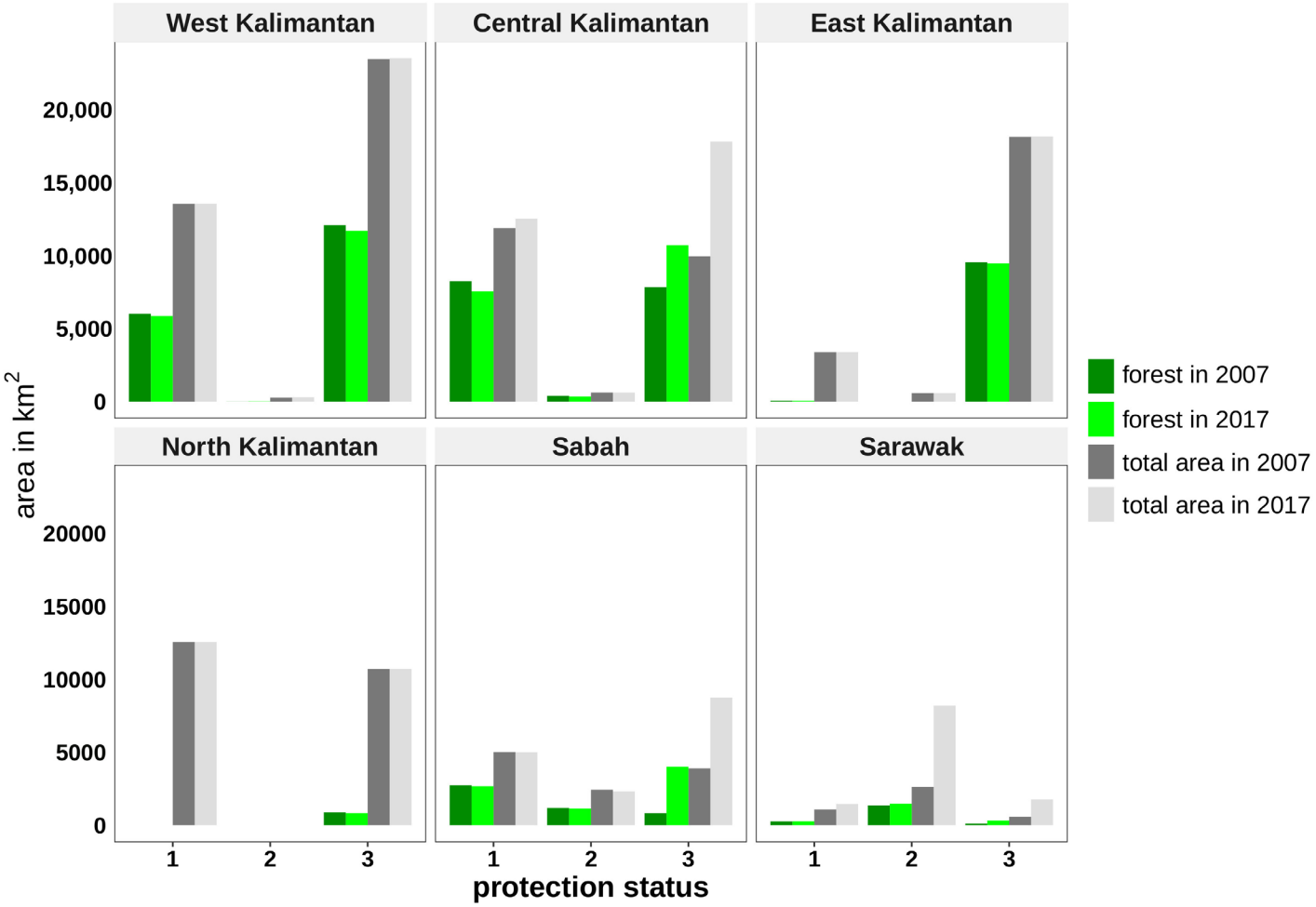
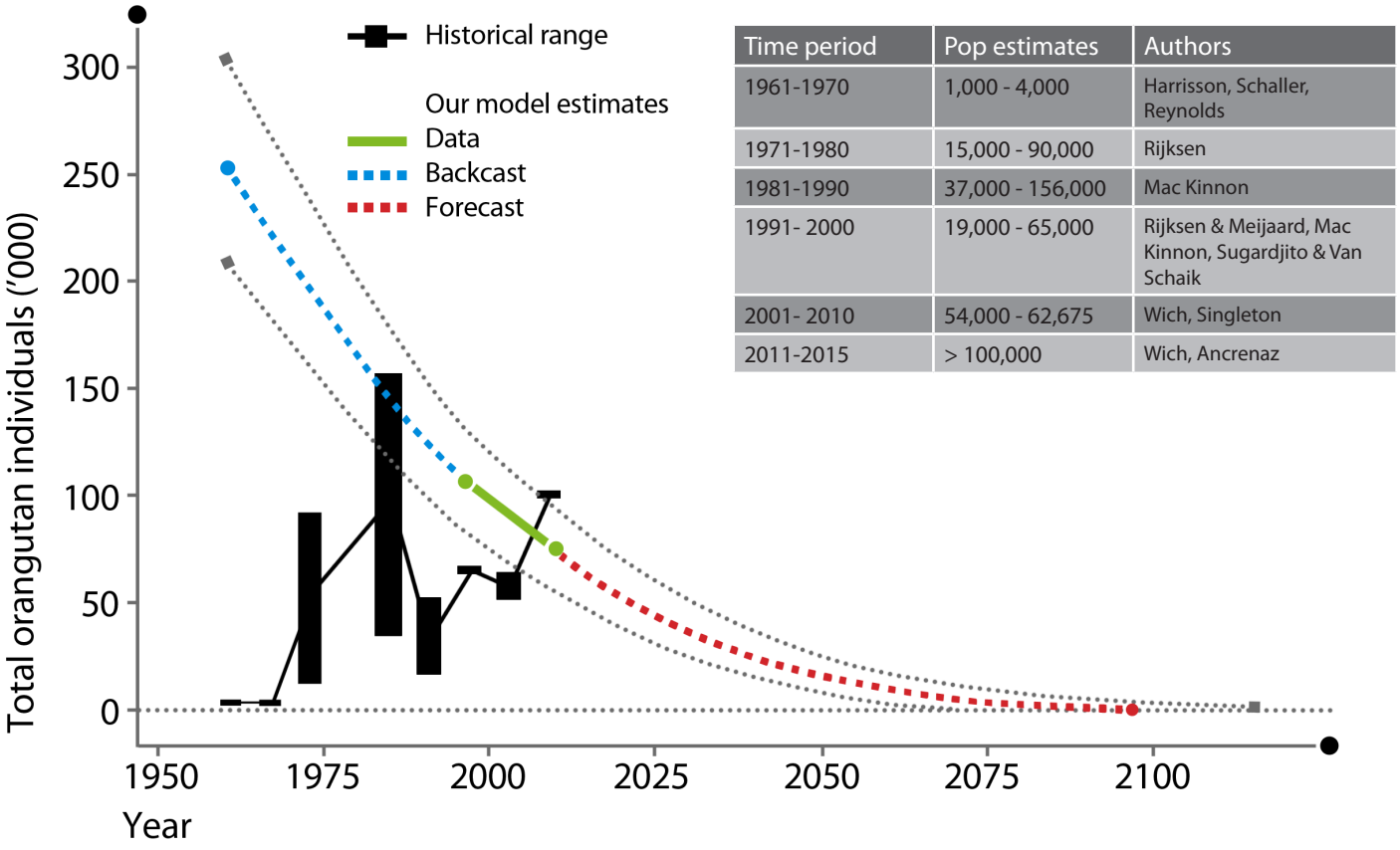


Figure 1. Change in forest area and total area under protection status by province, 2007- 2017.

Protection status 1 is IUCN category 1-3; status 2 is IUCN category 4-6, "not reported" or "not applicable"; status 3 are all other protection categories as included in Santika et al. 2017 (such as Hutan Lindung (Kalimantan) and permanent forest reserves, virgin jungle reserves and wildlife reserves (Sabah)).

Orangutan population trends

Recent studies have strongly indicated that actual (not estimated) population size has dramatically decreased over the past 200 years (Goossens et al. 2006; Meijaard et al. 2010), and that this decline has continued over recent decades (Santika et al. 2017; Voigt et al. 2018) (Figure 2).



Time period	Pop estimates	Authors
1961-1970	1,000 - 4,000	Harrisson, Schaller, Reynolds
1971-1980	15,000 - 90,000	Rijksen
1981-1990	37,000 - 156,000	Mac Kinnon
1991- 2000	19,000 - 65,000	Rijksen & Meijaard, Mac Kinnon, Sugardjito & Van Schaik
2001- 2010	54,000 - 62,675	Wich, Singleton
2011-2015	> 100,000	Wich, Ancrenaz

Figure 2. Forecast and backcast of the Borneo Orangutan population based on population trends analyses by Santika et al. (2017) and "expert"-guided population assessments, indicate that population size has been consistently underestimated but has declined dramatically and is projected to drop further unless orangutan conservation actions can address threats more efficiently.

Contrary to these findings by independent scientists, the Indonesia government has recently published monitoring data indicating a more or less stable orangutan population (Meijaard et al. 2018; KSDAE 2019). Some of the government monitoring data are from sites used for orangutan introductions or translocations (e.g., Bukit Baka – Bukit Raya National Park), implying that any net positive change in the monitored sites was inevitably preceded by at least an equally large negative change in non-monitored populations from which orangutans had been initially removed. All the government monitoring sites are within protected areas, whereas the majority of orangutans occur in non-protected lands in Kalimantan (Utami-Atmoko et al. 2017). It is thus scientifically unjustified to extrapolate population trends from these sampling sites to the total range of the species. Nonetheless the SRAK 2019 also uses these low population estimates for Kalimantan, listing 45,590 individuals as the total number of orangutans currently present. This estimate was reportedly based on the PHVA study in 2017, but this had an estimate of up to 55,538 individuals. We believe that both these figures underestimate the actual population in Kalimantan, which is estimated between 75,000 and 100,000 animals. The underlying reason may be that the PHVA and SRAK used expert-driven population estimates, which may have omitted the many small populations about which experts would have no knowledge. The higher estimates are based on modeling of actual habitat and extrapolated nest densities.

Threats to the orangutan populations

The key drivers of orangutan decline on Borneo appear to be killing – both historically and in recent times– and the loss of natural forest habitat. The loss of orangutans in primary and selectively logged forests between 1999 and 2015 accounted for between 67% and 83% of the total orangutan decline on Borneo, indicating that killing was an important driver of declines (Voigt et al. 2018). Deforestation and industrial oil palm and paper pulp plantations appeared to be responsible for about 9% of the total loss of orangutan abundance (Voigt et al. 2018). It is obvious though that the deforestation, plantation development and especially killing in conflict situations often go together (Santika et al. 2017). Whatever the annual off-take rates through killing, it is clear that significant numbers of orangutans are being killed, and that this threat needs to be urgently abated.

Orangutans in forest fragments

Across Bornean orangutan range, there are at least 6,620 km2 of forest fragments between 1 and 50 km2 in size. (Figure 3). Translocating orangutan from these small forest patches, particularly those in agricultural landscapes, is an increasingly common strategy to deal with these animals. The arguments practitioners make for this are that the forest patches are doomed anyway to be converted to non-forest, and that the resident orangutans would otherwise be killed. Our analysis of translocation outcomes and recent scientific studies on orangutan habitat use indicate that removing orangutans from forest patches that are still connected by vegetation types used by orangutan for dispersal, including mature oil palm and acacia plantations, undermines the metapopulation structure (see below).

Another problem with translocations is that once the orangutans are removed from a forest patch (or at least those animals that could be captured), the forest patch and its other remaining wildlife are more likely to be lost, because the forest patch has lost what little protection it received from containing orangutans as a High Conservation Value and legally protected species. The loss of the forest patch also means the loss of all other wildlife that was not rescued as well as loss of ecosystem services provided by the forest. Riparian forests in Indonesia and Malaysia need to be maintained by law and to comply with oil palm certification standards (Sabah Water Resources Enactment 1998; President Office Republic of Indonesia 2011; Barclay et al. 2018) but are nonetheless often converted to non-forest. These riparian forests provide habitats for a range of species, and maintain water quality and freshwater diversity, thus providing services to local communities (Abram et al. 2014; Mitchell et al. 2018; Sudrajat & Putro 2019). Similarly, forest patches in agricultural landscapes provide habitat for a range of mammals (including orangutans), birds, and insects that use these as stepping stones in mosaic landscapes (Lammertink 2004; Bernard et al. 2014; Lucey et al. 2014; Sudrajat & Putro 2019). Furthermore, forest patches and linear fragments play important roles in preventing floods (Wells et al. 2016).

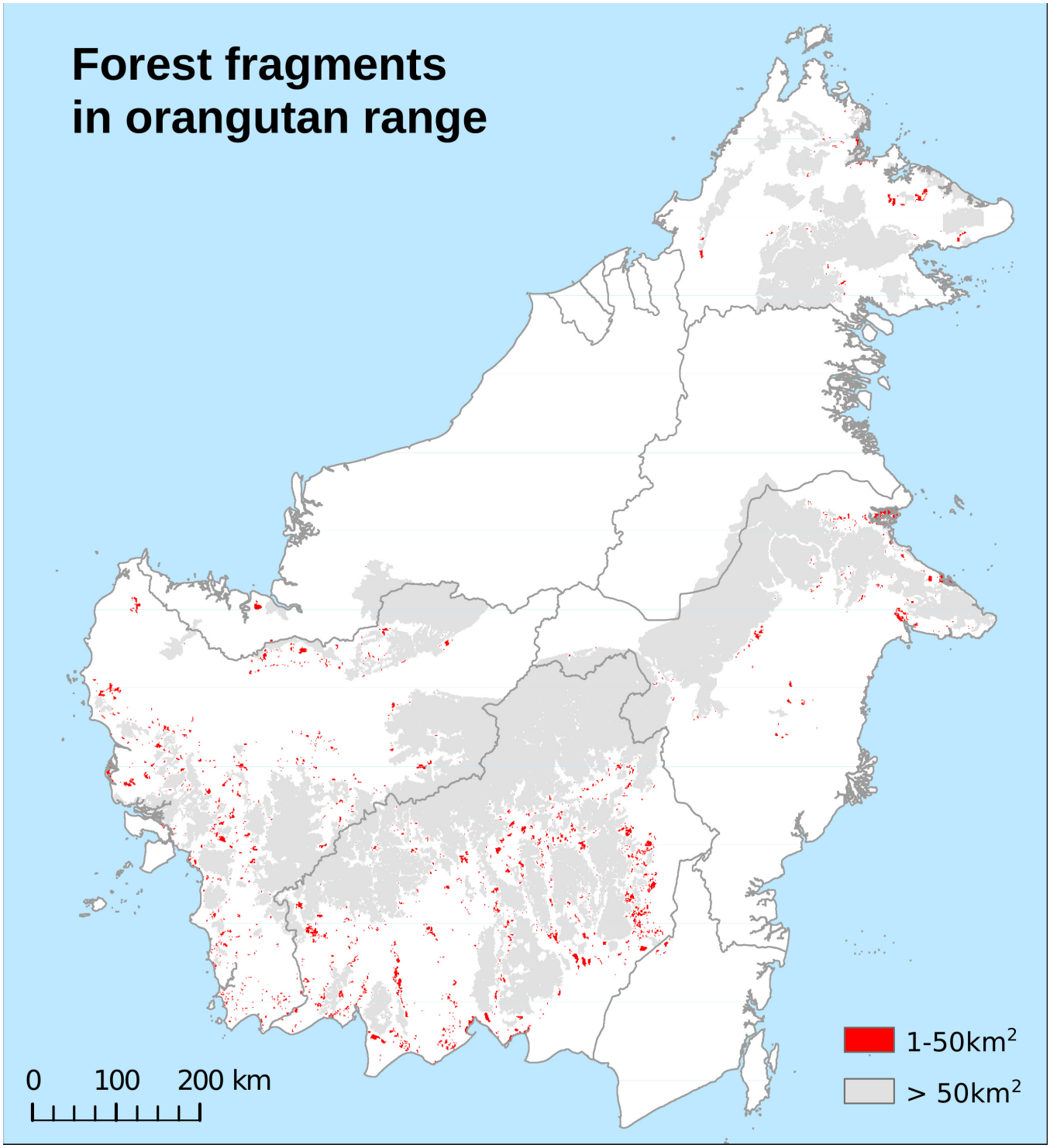


Figure 3. Orangutans in forest fragments. These fragments are essential links between the major orangutan populations in larger habitat areas (larger orangutan habitat areas are shown in grey). This map does not show fragments that are less than 1 km2, but these tiny fragments are also vital to sustain connectivity between isolated forests. There may be tens of thousands of such tiny fragments. Figure and analysis by Maria Voigt

Clear-cutting forest patches makes the overall landscape less and less suitable for orangutans and other wildlife. Where hunting is not an issue, orangutans can use an extensive oil-palm or forestry plantation landscape, but to do so they need patches of natural forest and forested corridors. If these small islands of forests are removed, the animals cannot use the landscape anymore and the population becomes extremely fragmented and not viable in the long-term. The long-term option would be to design landscapes that incorporate existing oil palm plantations and other crops, which could also accommodate orangutans. The goal for these mosaic landscapes should be saving natural habitat (whatever size the patches) that can help support orangutan populations, versus removal of individual animals at the cost of losing habitat for local wild orangutans.

Changed thinking – Orangutans in forest fragments are crucial elements of metapopulations

Orangutan habitat is often thought of as consisting only of intact native forest. However, wild orangutans are increasingly using forest fragments located in agricultural and silvicultural landscapes, especially in areas with low killing rates, such as Eastern Sabah. Those fragmented forests and surrounding agricultural land used by orangutans are becoming part of their habitat (which is any area the animals use). Further, the full extent of this varied habitat is what can be considered part of the orangutan metapopulation habitat. It is thus extremely urgent to recognize the value of small forest patches in large agricultural landscapes for orangutan conservation. Indeed, these patches can be used by resident female orangutans which in turn will attract dispersing males and maintain gene flow within the metapopulation (Figure 4): these animals provide connectivity within metapopulations. Removing and translocating animals found in these patches and destroying these fragments greatly jeopardizes the viability of the orangutan metapopulation as a whole. A paradigm shift is needed about how people view what characterizes orangutan habitat in the Anthropocene: when they are well designed agricultural landscapes can also play a role, along with fully protected areas, in sustaining the species.

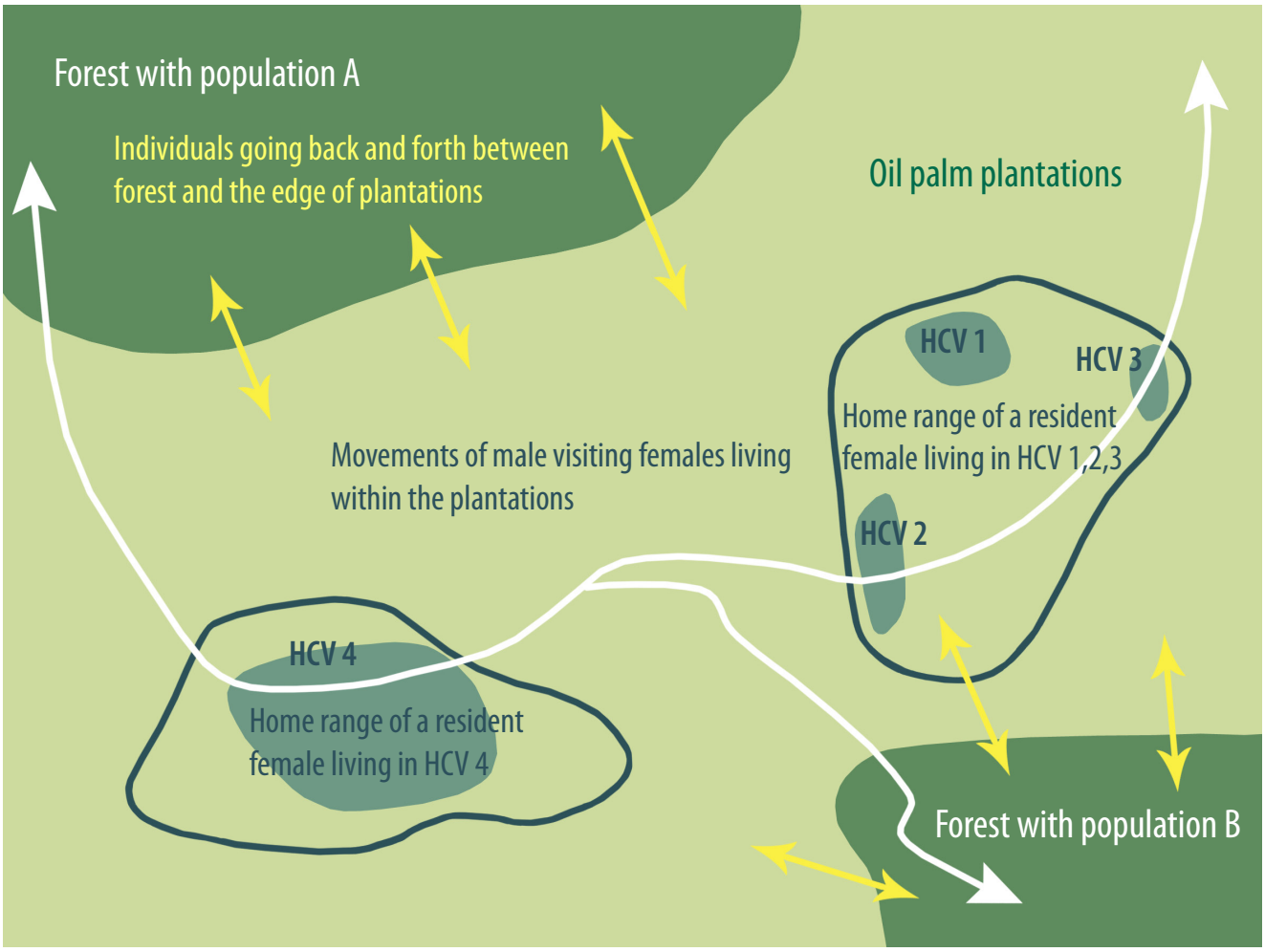


Figure 4. Movement patterns of orangutans in mosaic landscapes.
Data from HUTAN-Kinabatagan Orang-utan Conservation Programme.
Figure by Marc Ancrenaz 2019.

Reducing killing requires collaboration

Research findings indicate orangutans can survive in disturbed and human-dominated landscapes, meaning a key management focus should be to minimize the killings that often occur in landscapes where people and orangutans frequently meet. In the absence of killing, orangutans could survive in highly fragmented forest areas embedded in industrial agriculture dominated landscapes. Today, the large majority of orangutans on Borneo occur in areas where they frequently encounter people, and thus conservation solutions must incorporate these people. Effective conservation of Bornean orangutans is both necessary and feasible given the species' flexibility in habitat use, but will require refocused and renewed efforts by stakeholders.

DISCUSSION

A new paradigm for managing orangutans in concessions

While many see the corporate sector's role in orangutan conservation as primarily a threat and/or a source of conservation funding –"a moral duty to compensate for the destruction caused by the sector," as one rescue center manager expressed, we advocate that the role of the corporate sector should go far beyond mere financial support for conservation activities and payment for translocations. The private sector should become fully responsible for and engaged in the management of the protected resources found in their estates, including orangutans. This requires a shift where private estates would develop in-house abilities to protect, manage and monitor orangutans and other biodiversity elements (Ancrenaz et al. 2016). This also requires better collaboration between scientists, NGOs and companies, and for the private sector to consider orangutan presence as a business opportunity rather than a liability (Ancrenaz et al. 2016). Examples of direct engagement of concessions and estates in orangutan conservation have now been tested (e.g., Meijaard et al. 2016) and it is clear that the palm oil, pulp and paper, timber and mining industries have significant potential, as well as a legal duty, to contribute to the conservation of orangutans and other protected wildlife.

Certification offers a path for better management and production practices. Certification is far from being a silver bullet and is still considered by many to be extremely weak. However, the new set of Principles and Criteria (P&Cs) for certification by the Roundtable for Sustainable Palm Oil (RSPO) require "No Deforestation, No Peat Exploitation" as well as restoration of riparian areas and other HCVs that were previously destroyed. Implementing these P&Cs would greatly improve the current oil palm landscape by creating corridors and set asides, and by minimizing further forest conversion, hence securing some vital parts of orangutan natural habitat. Ultimately long-lasting success will depend on how serious the corporate world is about implementing and maintaining such sustainable practices.

Rational and effective enforcement of orangutan protection laws

Nijman (2017) and Freund et al. (2017) provide detailed recommendations to improve law enforcement for orangutans in Indonesia. We encourage the prompt adoption of these suggestions, which include firstly increased willingness on the part of government and rescue practitioners to enforce the law. On the part of government this means investigation and prosecuting every instance of orangutan trade (meaning the buying selling and keeping of the animals). Nijman (2017) recommends viewing this trade as an economic crime against society rather than crimes against each individual orangutan kept, sold or purchased, and charging perpetrators for other crimes additional to breaking species protection laws such as endangering public health (due to creating increased zoonotic disease risk from the orangutans), possession of weapons (traps, knives or guns used to hunt the animals), and violation of the penal code on animal welfare and mistreatment. We further note that sentencing guidelines should be structured to account for the prevalence of orangutan trade by local villagers, who may be extremely poor, as well as to address illegal clearing activities by large corporate concessions. Freund and others (2017) recommend stronger sentencing (fines and prison time) for concessions conducting clearing activities outside their boundaries.

On the part of rescue centers, Nijman (2017) and Sherman & Greer (2018) recommend their willingness to conduct rescues on behalf of the government should be explicitly dependent on the government agreeing to investigate and prosecute offenders which the rescue centers and government should then publicize widely to encourage deterrence. Continuing the current system of accepting hundreds of orangutans from owners with no prosecution may facilitate trade and appears to assure current and future perpetrators that they can conduct orangutan trade without consequence (Nijman 2017; Sherman & Greer 2018). We also recommend coordinated demand reduction campaigns that encourage protection of wild orangutans in situ, rather than current messaging from Indonesian authorities which focuses on alerting authorities so the animal can be removed (see for example: Prokal 2017). We suggest studies be conducted to test messages, tools and training that would foster human-orangutan conflict mitigation and mutual tolerance, including compensation for crop raiding and other orangutan related property losses. Ongoing studies on the anthropology of orangutan killing will be helpful to inform the kind of messages that could result in lasting perception and behavior change (Chua et al. in review).

The role of rescue, rehabilitation and reintroduction

Rescue of animals seized during law enforcement action, and provision of improved welfare for these animals, is an important role of rescue centers (Sherman & Greer 2018). Rehabilitation and reintroduction can likewise provide an opportunity to re-establish locally extirpated populations and reinforce populations below carrying capacity (Beck et al. 2007; IUCN/SSC 2013). Possibilities for responsible, well-managed releases that comply with IUCN reintroduction guidelines are constrained by the sheer number of orangutans in captive care, coupled with the limited available and accessible habitats with absent or sufficiently low resident wild orangutan populations that can be adequately protected from poaching and land clearing. Together with common practice that encourages hand over of pet orangutans to rescue facilities without any apparent connection to increased law enforcement or deterrence, this underscores that rescue and reintroduction should not be seen as the primary intervention to secure long-term viability of Bornean orangutans. Rather, it is an important tool to provide a chance for a relatively small numbers of psychologically, behaviorally, and physically suitable individuals to be readapted to semi-wild or wild conditions of life.

Rescue centers are well positioned to take a pivotal role in developing and implementing more effective conservation measures for Bornean orangutans. As organizations that are embedded in, and part of, their local communities, rescue centers can provide alternative sustainable livelihood options for local villagers, and could also play an essential role in working with local landowners and villagers to develop and implement effective solutions to orangutan conflict such that orangutans can be maintained on the lands where they are currently found. Further, the centers are hubs of awareness raising and outreach, which will need to be expanded and targeted to specific community needs to keep orangutans alive and healthy in situ without resorting to translocation.

Wild capture and translocation of orangutans

Wild-to-wild translocations are seen a solution for orangutans living outside protected areas in Indonesia and Malaysia. In both countries, rescue centers, industrial agriculture concessions and government authorities have been removing and translocating entire viable populations from agricultural mosaic landscapes where they could likely have survived in if properly managed. The single available survival estimate suggests the majority of the translocated animals have disappeared and may not have survived after a few years, which means these populations could be simply lost, and that individual welfare of released animals is not ultimately improved, and in many cases is undermined.

A better decision-making tool is needed to determine the best option between the two strategies of removing and translocating orangutans from isolated forest patches or investing in retaining these patches with their orangutans and other wildlife, and ecosystem services. Currently, given the hundreds of orangutan moved annually, the choice to translocate is taken relatively easily, but there is insufficient consideration of the impacts this has on the overall orangutan metapopulation, other wildlife and ecosystem services that are likely lost once orangutans are translocated. Translocation fosters the thinking that orangutans in the way of development can simply be moved elsewhere as a "win-win" for conservation and development, without consideration of the costs to overall conservation objectives and environmental health. This exclusion approach goes along with a land-sparing thinking and has recently been shown to not be the best strategy to secure a future for most wildlife in Borneo (Runting et al. 2019).

While there are isolated cases where capture and translocation is warranted, the practice of moving orangutans to prevent potential conflict may be creating the expectation that people need not accept living near these animals and that moving them out of the way is a positive outcome for orangutan conservation and people (see for example government statements in ProKal 2017). A new process is needed to prevent removal of wild orangutans except in the most extreme circumstances. The number of orangutans outside protected areas may be as high as 10,000 to 45,800 in Kalimantan alone (Utami-Atmoko et al. 2017). Removing this number is beyond the capacity of rescue programs, and suitable release sites do not exist to accommodate such numbers. It is therefore important to refocus efforts on protecting orangutans in forest patches outside of State Forest land (Indonesia) and protected lands in both Indonesia and Malaysia. This will require additional efforts on law enforcement and effective conflict mitigation, and increased buy-in from the government authorities to address in situ solutions. As discussed in the preceding section, rescue centers have a crucial role to play in addressing conflict mitigation and supporting local communities to implement effective solutions.

Need for Protected forests

While orangutans have the resilience to adjust to some levels of habitat modification, they still require natural forests to fulfil their ecological needs. However, a myriad of other forest dependent species are much less flexible: their long-term conservation is intimately related to the presence of sufficiently large natural forests.We thus need to acknowledge that protecting forest fragments could be beneficial to orangutan and other resilient species, but this strategy alone will still result in biodiversity loss and will not be able to sustain forest-dependent species. The cornerstone of tropical biodiversity conservation should be the full protection and effective management - including preventing illegal hunting and logging - of legally-designated protected areas. Large protected areas within Bornean orangutan range remain the strongholds of viable orangutan populations (Utami-Atmoko et al. 2017) and require constant vigilance to manage threats to species and habitats (Rabu 2013; Jakarta Post 2018).

In addition to the creation and adequate management of fully protected forests, our findings suggest that an approach focusing only on protected areas without addressing the orangutans in forest fragments and in concession lands will not be enough to secure the long-term conservation status of a species like orangutans.

Spatially-specific investment for orangutans

Building on our current research, we are conducting a two year follow-up study to develop a spatially-specific investment model for orangutans based on what strategies are most cost effective at protecting populations and habitat in which geographic areas. We want to take an optimistic and forward-looking approach to assess the potential for conservation gains and partial or full species recovery across the historic distribution of orangutans. This requires the identification and employment of the most effective strategies and much improved collaboration between governments, non-governmental organizations, industry, rural communities, donors, scientists, and other stakeholders, both from Indonesia and Malaysia, and from the international community.
We welcome your participation in this study, and will be sharing our results with stakeholders.

RECOMMENDATIONS

On the basis of our two-year study of the effectiveness of conservation action plans for Bornean orangutans, we provide the following key recommendations for improved orangutan populations outcomes:

- Concessions need to take responsibility for management of orangutan and orangutan habitat within their boundaries, rather than asking other partner organizations to remove the orangutans;
- Forest fragments in orangutan habitat range should be protected, restored, managed and connected;
- Enforcement of orangutan protection laws, especially in Indonesia, must be improved, and illegal land clearing, orangutan harm and killing, and sale, purchase or possession of orangutans should be investigated and prosecuted, and the consequences publicized to establish deterrence. Likewise intake of illegally held orangutans to rescue centers should be directly tied to enforcement actions of investigation and prosecution of perpetrators, and consequences should be broadly publicized;
- Strategies must be developed to help manage and mitigate human-orangutan conflict without removal of animals in multiple use landscapes;
- Rehabilitation and reintroduction should not be considered the primary means to ensure population viability,
- Wild-to-wild translocation is not an appropriate conservation strategy for orangutans; and
- Collaboration in orangutan conservation among all relevant stakeholders needs to be much improved.

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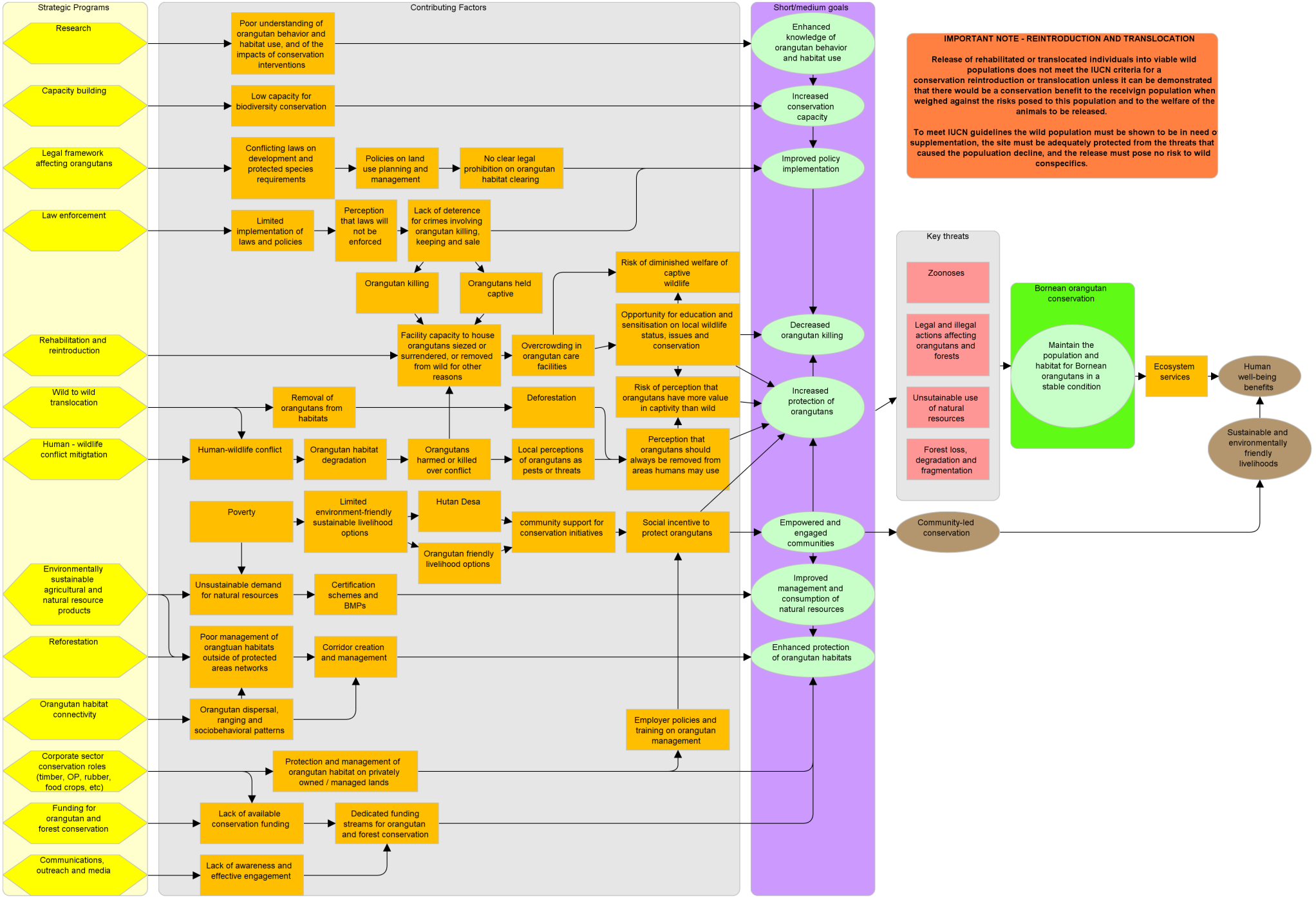

Key assumption:
Community projects are planned and conducted based on principles of Free, Prior and Informed Consent

Key Assumptions:
1. Confiscation of illegally held wildlife facilitates enforcement of laws forbidding killing, harm, possession and sale of wildlife
2.There is political will and capacity to implement habitat and species protections

Key assumption:
Sufficient habitat and population assessment surveys show that reintroduction or supplementation of exisitng wildlife populations is needed to re-establish new populations or supplement non-viable populations. Robust, independent pre-release analysis shows these releases will not place existing conspecific populations at risk of disease transfer or other harms.

Key Assumptions:
1. Increased community awareness of biodiversity and human impacts will lead to behavior change including more sustainable natural resource use and decreased illegal killing, possession, sale or purchase of orangutans
2. Communities receive financial, social or other well-being benefits from activities offered as alternatives to orangutan poaching or to reduce conflict with orangutans
3. Alternative livelihoods reduce unsustainable use of natural resources

Key Assumption:
Local communities will continue to rely on the environment for some or all of their energy, food and fiber needs, and for livelihoods based on forest products and eco- and cultural tourism