BOS Canada NEWS 2018

For the Protection of wild and rehabilitant orangutans & their native habitat

Borneo Orangutan Society Canada

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About BOS Canada

BOS Canada is an independent, registered Canadian charity founded to support orangutan conservation and raise awareness of the threats to orangutan survival. We are dedicated to protecting wild and rehabilitant orangutans and their native habitat. Activities in Canada focus on education and fundraising. The funds we raise mainly support orangutan protection in the field, in Indonesia and Malaysia, e.g., rescuing displaced wild orangutans, rehabilitating ex-captives to forest life, surveying and protecting existing orangutan populations and habitat, and conservation education. We operate entirely by dedicated volunteers to minimize administrative costs and ensure that the funds we raise reach the projects we support in the field.

From the Executive Director

Our News. 2018 brought more bad news for orangutans, notably, more human threats to the new, very vulnerable Sumatra species. Other primates face equally serious threats, so we now address some of them in our newsletter.

Orangutans in Kutai National Park. I spent seven months at our project in Kutai NP. Currently important work has been analyzing our long-term data to assess whether orangutans 'return' to areas they normally used before the recent El Niño drought, and how mothers cope with 2 offspring. On the conservation side, we have seen worse illegal logging than in previous years—probably because access to KNP has become easier with better roads and government regulations have made policing more difficult. On a positive note, we contributed to the IUCN project on reforestation for climate change, and resumed transplanting seedlings of orangutan food species into areas badly damaged by drought or illegal logging. We transplant only 20-30 seedlings at a time, but over time it adds up: this year, we planted about 500.

At home, Adam Bebko completed his PhD on KNP orangutans' spatial cognition, based on their travel patterns. Ryan Guild completed field work on his Master of Environmental Studies project, assessing orangutan habitat damage as a basis for planning conservation measures. Sarah Iannicello started a new job as Sustainability Coordinator for Earh Day Canada.

Sally, an adolescent female we met back in 2012, is now an adult with an infant son - who is probably an "El Nino" baby. The fruit abundance that follows El Nino droughts often enables female pregnancies, and Sally's son is just about the right age to be one. The good food abundance also contributes to his health.

Our members have also been active on other fronts. My Kutai NP field managers (Purwo Kuncoro, Dinda Prayunita) and I participated in the 2nd of two workshops (Feb., 2018) for an IUCN project to identify tree species for reforestation in Borneo that are likely to be resilient to climate change, especially those important to orangutans. Findings should be valuable to reforestation projects in Kutai NP. At the 2018 IPS conference in Nairobi, I gave a talk on the impacts of ENSO cycles on Kutai NP orangutans and Dinda attended, by invitation, as a participant in a pre-conference training workshop on the conservation of endangered primate species. Several of our members contribute actively to Story Book Farm Primate Sanctuary, Sunderland Ontario, which cares for primates rescued from illegal or inhumane captivity and retired from labs.

Donations. We received numerous personal donations, plus $2,000 USD from the Orangutan Conservancy and $50,000 USD from Indianapolis Zoo. The OC and IZ funds are designated for research and conservation work in Kutai NP, in collaboration with the Kutai orangutan project and the park office.

BOS Canada Conservation Grants. We are offering these small conservation grants again in 2018; see our announcement later in the newsletter.

Orangutans in Kutai National Park - 2018

Anne Russon, Purwo Kuncoro, & Dinda Prayunita

Orangutan Kutai Project & Glendon College, York University, Toronto

In 2018, our orangutan project in Kutai NP, East Indonesian Borneo, has still been dominated by the 2010-16 ENSO (El Niño Southern Oscillation) cycle - first severe El Niño droughts from mid 2014 through mid 2016, then two La Niña years of unusually heavy rainfall. Both had major effects on KNP's orangutans, largely through their effects on resident plant life.

RESEARCH

Our questions. Our current focus is understanding how ENSO affects KNP orangutans. ENSO, the irregular multi-annual cycle defined by El Niño and La Niña events, can cause extreme weather worldwide. It is especially important in East Borneo, where its impacts are the most severe. Effects of El Niño are well studied (severe drought followed by mass fruiting) but those of La Niña (heavy rainfall) and of entire cycles are less well understood.

Here we summarize our findings on changes in KNP orangutans' behavior, food availability, and reproduction related to rainfall changes within the 2010-16 ENSO cycle.

Background. ENSO cycles currently occur about every 5-7 years but their effects vary geographically. In Borneo, they affect orangutan habitat through rainfall variation. They are critically important to orangutans in E Borneo: E Borneo's forests are the poorest producers of orangutan plant foods and they experience the most severe ENSO effects.

The most important and best studied ENSO effects are El Niño droughts. For orangutans, these droughts cause prolonged famine but their end stimulates mass fruiting 'feasts'. In KNP, one probable result in our Bendili study area was that orangutans largely disappeared. El Niño may also affect orangutan reproduction. Adult females stop ovulating when their body is in poor condition and resume with weight gain. Where El Niño droughts are severe, the famine followed by mass fruiting leads to females stopping then resuming ovulating - effectively scheduling matings and births; these could, in turn, affect older offspring care. None of these effects has been systematically studied in KNP.

Also little understood are the effects of La Niña - high rainfall in KNP - and of entire ENSO cycles - high year-to-year changes in rainfall. Both should affect orangutans' food availability and habitat use; they may be very important in KNP, which is normally very dry.

We assessed changes in KNP orangutans' food availability, forest use and reproduction linked to rainfall changes within and between ENSO cycles. This year, following 2 El Niño droughts, we focused on (a) whether "our" Bendili orangutans returned to the Bendili area as forest conditions improved with rainfall and (b) El Niño's effects on KNP orangutans' reproduction (birth scheduling, offspring care).

Field Work 2018. We continued working in two areas, Bendili (our original research area along KNP's northern boundary) and the Prevab (established in the 1980s by Suzuki, ~8 km SE of Bendili) (Figure 1). Working in two areas helps track "our" Bendili orangutans in areas that are difficult to access from the north

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Laura Adams
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Elaine Belore
Dinda Prayunita
Sarah Iannicello
Purwo Kuncoro
Kate Maklan
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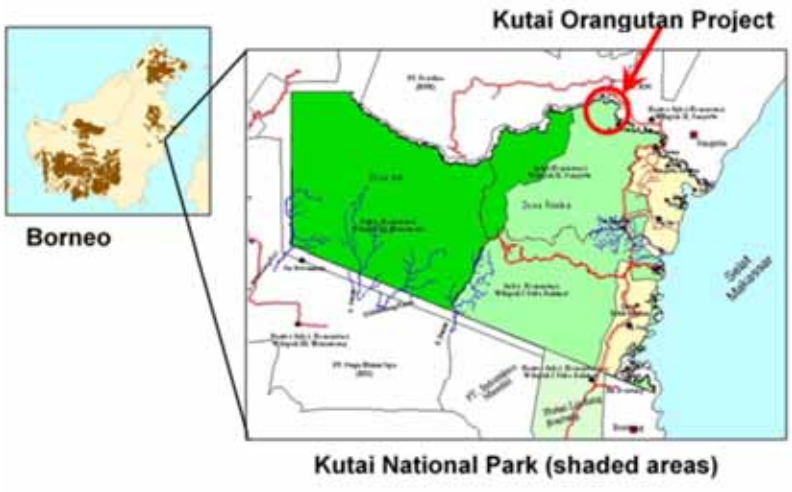
Continued… Kutai NP Orangutans 2018



and observe different orangutans.

At the Prevab, we concentrated on two adult females, both with a young infant born late 2015, to track reproduction scheduling. Most important are Labu and Putri, both with a juvenile plus an infant, so we can assess how long they support both and how threesomes cope with greater food needs.

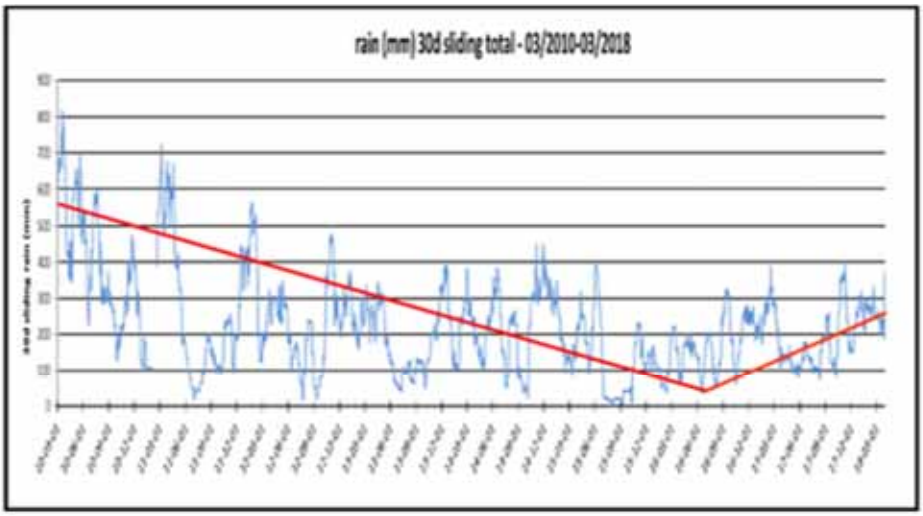
Finally, we verified all known infant birth dates to estimate birth timing in KNP.

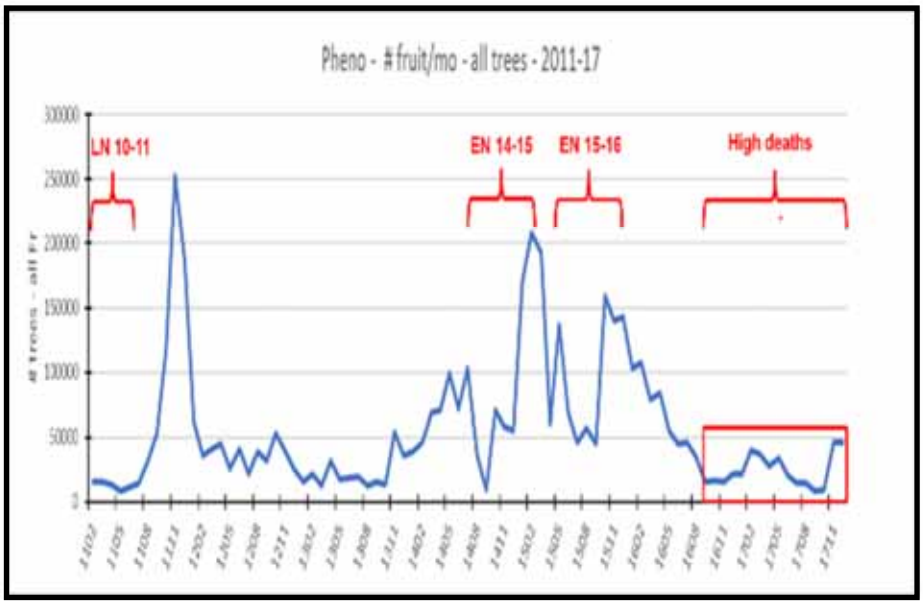
ENSO Findings 2010-18

ENSO, rainfall and fruiting in Bendili. The table below shows ENSO conditions, the right graph Bendili rainfall. There is a clear decreasing rainfall trend Jan 2010 to mid-2016, consistent with conditions changing from La Niña (LN) to neutral (--) to El Niño (EN), then a clear increasing trend as conditions changed from El Niño to La Niña.

The lower right graph shows fruit production 2010-17. Consistent with known El Niño effects, fruit production spiked, mast-like, after both 2014-15 and 2015-16 El Niño events; the 2015-16 fruit spike and fruiting through 2017 may have been low due to high tree deaths caused by El Niño droughts.

year	event	strength
2010-11	LN	Moderate
2011-12	LN	Weak
2012-13	--	
2013-14	--	winds/Haiyan
2014-15	EN	'Failed'
2015-16	EN	Very Strong
2016-17	LN	Weak
2017-18	LN	Weak

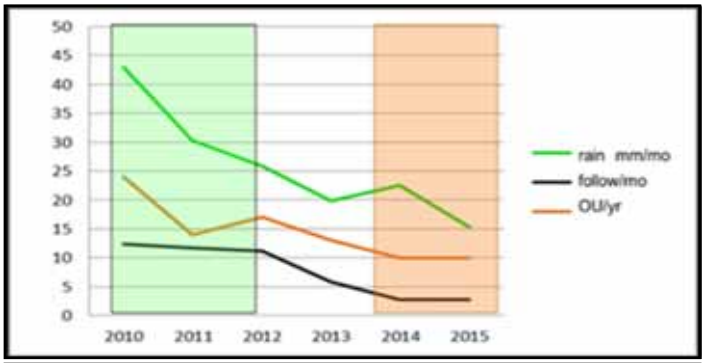




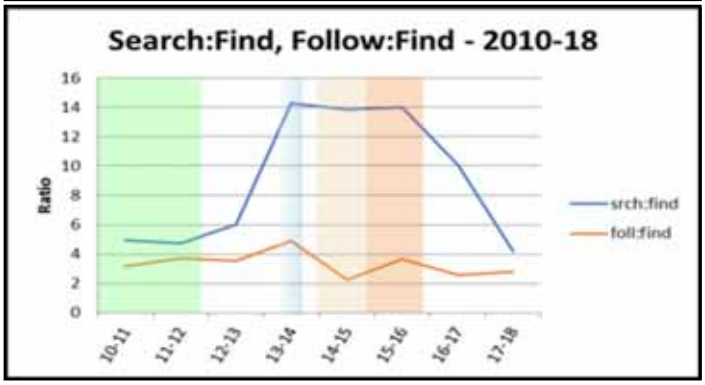
Continued... Kutai NP Orangutans 2018

ORANGUTAN BEHAVIOR:

Habitat use and travel. The graph to the right shows yearly changes for Bendili in *rainfall* (mm/mo) and our success in *finding* orangutans *(*orangutans/yr) and *following* them (follows/mo). Shaded periods represent ENSO conditions: green = La Niña (2010 - mid 2012), pink = El Niño (mid 2014 - mid 2016), no color = ENSO neutral. All three show clearly decreasing trends. When rainfall was high (La Niña years), orangutan numbers and days followed were high. As rainfall decreased (two non-ENSO years, 2010-13 and 2013-14, two El Niño years 2014-15 and 2015-16), both values correspondingly decreased. Findings are consistent with two known orangutan patterns when food availability worsens: they move away in search of better food resources, and they become less tolerant of companions.

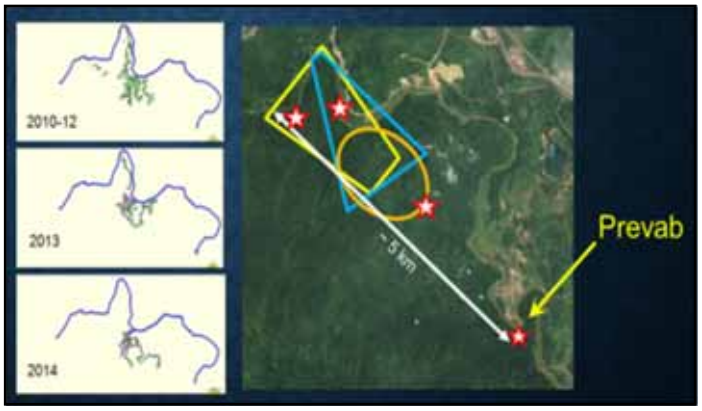


The lower graph on the right shows yearly search:find and follow:find ratios relative to ENSO conditions, i.e., average number of days we searched to find one orangutan, and average number of days we followed an orangutan after finding one. Green and pink shaded periods again highlight La Niña and El Niño conditions; the blue shaded period (Nov 2013) represents high winds from Typhoon Haiyan that caused extensive tree damage in Bendili. Search:find results again show orangutans were easy to find when rain was high to moderate (La Niña and 'normal') but extremely difficult to find after wind damage and during drought periods (El Niño). Our follow:find results suggest gradual improvement (more days/follow) until Typhoon Haiyan - consistent with normal habituation, then ups and downs consistent with food availability: poor (drought), then good (masting), then poor again (tree deaths, late 2015-early 2016).



CONSEQUENCES:

Orangutan Ranging & Survival - Food. A major question is where orangutans went after disappearing from Bendili. Adults are unlikely to have died, having survived the 1997-98 El Niño drought and fires that destroyed much of KNP. Our best evidence on where they went is for Putri, the adult female we have followed every year since 2010. The map images on the right show the areas she used when we followed her for 2010-2018. In 2010-12 (upper left image) she used N, W, and S-central parts of our Bendili area. In 2013 and 2014, she increasingly concentrated on S-central and SE areas (middle and bottom left images). In 2016, at the height of the El Niño drought, we found her ca 5km SE of Bendili - in the Prevab area (right image, lowest star). In 2017 and 2018 we found her in Bendili's west then central areas (right map, upper left then right stars). Putri's locations suggest she moved over time, in migration-like fashion. Some did die, probably due to drought-caused famine conditions : in 2018 we found a dead adult female (right photo); her emaciation suggests she died of starvation or its side-effects (parasites).



Female Reproduction: El Nino infants, offspring stacking. To explore ENSO effects on reproduction, we compiled all credible reports on KNP adult females and their young (births, dependants). Researchers, long-term field assistants, and long-term KNP staff reported 26 births in 11 adult females from 1984-2018.

Birth timing. El Niño is thought to affect female orangutan reproduction via the mast fruiting it generates: mast fruiting allows adult females to gain weight rapidly, resume ovulating, and then mate. The result predicted, where El Niño effects are strong, would be births concentrating ~1 year after an El Niño ends.

Based on these historical reports, 42% of KNP births occurred about 1year after an El Niño ended. ENSO cycle intervals currently

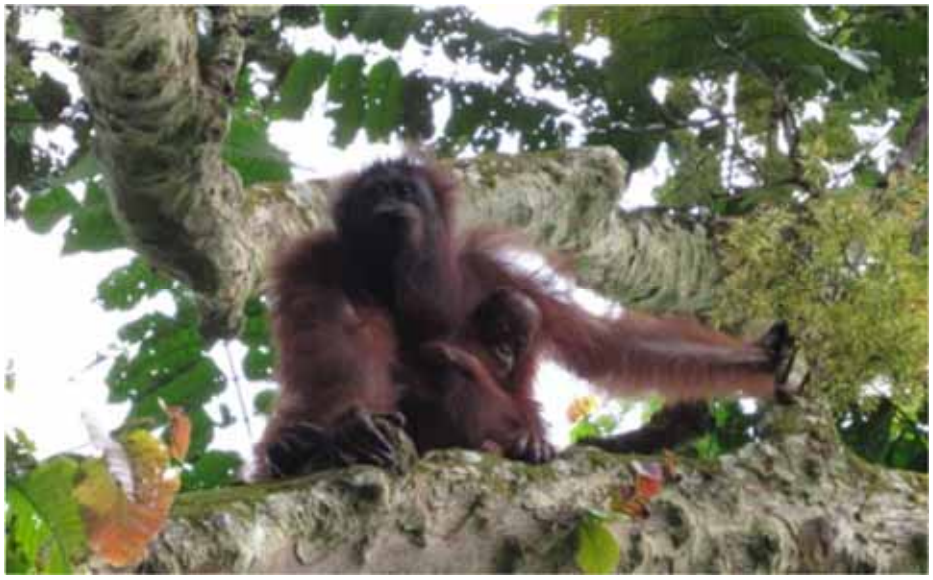
Continued… Kutai NP Orangutans 2018

average 5-7 years. So, if births are *not* related to El Niño effects, only about 20% of births should occur, by chance, after El Niño events. KNP birth rates after an El Niño is much higher than rates expected by chance, and suggest this concentration is caused by El Niño. The photo on the right shows an adult female at Bendili with an infant probably conceived after the 2015-16 El Niño.

Interbirth intervals (IBI). The current IBI estimate for all Bornean female orangutans is 6.9 years. IBI estimates for KNP females are 5.9 - 6.1 yrs, considerably shorter than the Bornean average and very close to the average ENSO interval of 5-7 yrs. The shortest IBIs for KNP in our historical reports were 1-3 years.

Offspring stacking (OS). Our research does not focus on reproduction, but we have noted patterns that seem unusual. Our field staff several times reported seeing an adult female with *two* dependent young, an infant and a juvenile. This is unusual because wild orangutan females are believed to support only one offspring at a time. It is impossible to estimate the number of these adult females, since different observers may have reported the same mother-offspring group.

We have good systematic data for two adult females, Putri and Labu, who both experienced offspring stacking. We consistently found Putri with her infant and her juvenile sons for at least 2.25 yr after the infant was born (i.e., until the juvenile was ~7-8 yr old). Labu has also consistently associated with both her infant and juvenile daughters (photo page 1) for over three years. Her juvenile is now ~8 years old, verging on adolescence. We do not record formal data on their interactions, but our experienced field observers report no overt signs of intolerance for the juvenile in either mother. Maternal intolerance is believed to be the impetus for mother-juvenile separation elsewhere.



SUMMARY

To date, most orangutan research concerned with ENSO has focused on El Niño effects (drought, masting). Our findings offer evidence for important effects of La Niña and entire ENSO cycles on KNP orangutans and their habitat. Very large vs. very small home ranges, migration-like habitat use, very short interbirth intervals, and multi-year offspring stacking are all probable examples.

Our findings illustrate why long-term studies in understanding modern wild orangutans: multi-annual climate changes affect their feeding ecology. ENSO cycles can cause major changes between years in their habitat's food productivity, these cycles vary themselves in duration and severity, and their impacts vary across the orangutan's range. Effects on KNP orangutans are major: our study found effects on their habitat use, survival, reproduction, and mother-offspring relations. Our findings illustrate how much E Borneans differ from orangutans elsewhere, even other parts of Borneo, and ENSO's role in orangutan geographic variation.

CONSERVATION

A major reason for our project is contributing to the conservation of KNP orangutans and their habitat. Our 2018 conservation efforts have included.

Forest enrichment The KNP office has OK'd our transplanting seedlings of native trees growing in KNP to other areas in the park, so we can enrich the forest on a small scale. We started this in our Bendili area in 2014, focusing on food species important to orangutans, and this year extended it to the Prevab area. We collect seedlings from suitable native trees in our study area, nurture them in a forest nursery near our post until they are large enough to transplant and then, in periods of adequate rainfall, transplant them in small numbers (ca 20-30 at a time) into suitable areas that need enrichment.

In 2018 we increased the intensity of collecting and planting seedlings: we have transplanted over 500 seedlings. Plans include transplanting seedlings to areas between Bendili and the Prevab, as soon as the 2018 dry season ends. In the 1970s, when KNP forest was near pristine, this area was important to orangutans, so helping its vegetation recover may help orangutans. Our regular presence their may also help deter poachers. The KNP office has also accepted our offer to fund building a tree nursery at the Prevab for their own use.

IUCN Climate change vulnerability assessment for Bornean forests. This project, commissioned by Indianapolis Zoo, aims to identify Bornean forest plants likely to tolerate climate change, especially those important to orangutans. Its findings could provide a valuable guide to species selection for KNP reforestation work.

Our team collaborated with IUCN staff leading this project (Climate Change Programme, Global Species Programme). We provided scientific data, e.g., all known orangutan plant foods, KNP orangutans' plant foods, KNP tree species that survived the 2014-16 droughts. From this and other information contributed by experts on Bornean forests, the IUCN team developed a preliminary list of 200 important plant species, held a first workshop in 2017 to assess their potential to tolerate climate change (e.g., habitat needs/sensitivities, growth patterns, threats, rain-drought tolerance), and a second in 2018 to finalize recommendations. I and my KNP project managers participated in both and helped prepare the final report. A later article in this newsletter summarizes its work.

Other. We continued regular patrolling for poaching and illegal logging and reporting problems to the KNP office. This year we found increased poaching. Our reports enabled KNP authorities to stop several cases of illegal logging and wildlife poaching.

WHY WE NEED LONG - TERM STUDIES ON ORANGUTANS

Three Reasons about Orangutans Themselves

Slow Life Histories.

Orangutans are very long-lived. Their lifespan is 55+ years in the wild, 60+ in captivity, and they are very slow to grow and develop. Offspring are infants, dependent on their mother for survival, until 5-6 years old. Next they spend 7-8 years as semi-independent juveniles then independent adolescents before they reach adulthood, i.e., begin to reproduce. In the wild, females first give birth at 14-15 years of age (on average). They give birth to only one infant at a time, interbirth intervals are typically 7-9 years, and conception often depends on the adult female's nutritional condition. So it should take many years to piece together a picture of their lives; it has already taken researchers decades to piece together this one, and it keeps changing.

Learning and intelligence.

Orangutans were once thought the dullest of the great apes, given their slow-moving and pondering style. Even if this were true, they are great apes as such they are among the most intelligent non-human species alive. And we now know orangutans are not at all dull: they are comparable to chimpanzees in intelligence. High intelligence also means they are learning species: they acquire their knowledge and skills based on experience and figuring things out — not by "instinct". Their intelligence also changes with age, as it does in humans, as their brain develops and they gain experience. The upshot is that their behavior changes, often year to year, as their brains develop and they learn more about how to cope with the physical and social challenges they encounter. Their behaviors also change because their challenges change, as they do through ENSO cycles. The upshot is that researchers may need years to appreciate the scope of their knowledge and skills and must keep updating their understanding.

"Dispersed" sociality.

For decades orangutans were famous as "the solitary ape". They were rarely seen congregating, other than mother-offspring pairs, brief male-female consortships once every 7-8 years or so, adolescent 'friends', and occasional brief fruit parties in large fruiting trees. We now know that their social lives are richer and more important than the 'solitary ape' scenario suggests. Independent females live in "clusters' with their female kin, i.e., they live in overlapping home ranges, and are 'tolerant' if not exactly friendly with their female relatives. And entire wild orangutan communities sustain simple cultures, i.e., learned behaviors shared within the community but absent or rare elsewhere. With sociality like this, researchers may need years to identify kin, other social relationships, the extent of the local community, and how orangutans interact. Researchers only figured out that wild orangutans sustain cultures in 2003, after having studied them for 30 years. Chances are good there's a lot we don't know yet. And if they have cultures they'll keep changing them, so even last year's understanding could well be out of date.

Three Reasons about Orangutan Habitat

Seasonality.

Orangutan behavior changes through the course of a year due to seasonality. An important reason (but not the only one) is that orangutans are primarily fruit-eaters: fruits are typically seasonal in their availability, so orangutans have to change their behavior accordingly. Seasonal changes in the availability of wild orangutan foods affect what fruits they eat, where and when they can obtain them, and where they can find the non-fruit "fall-back" foods they eat when fruits are not available. Seasonal changes are roughly annual but their timing is irregular, trees of the same species can grow in different areas and fruit at different times, and multi-annual cyles like ENSO cause even more variability in when and where fruit foods are available. The results? What orangutans eat, where they can be found, how "social" are, and when they reproduce all change repeatedly over time, but in different ways and in irregular cycles. A one year research study covers that annual seasonal cycle, but may not represent what happens in other years.

Climate Change.

World climate is currently changing in the direction of warming and perhaps drying (the wet-dry trend is unclear, to my understanding). For orangutans, who survive in tropical rainforests, climate change probably means some important plant species on which they now rely may die out. Other species may thrive, but whether they can support orangutans is unknown. The IUCN climate change specialist group recently ran workshops with botanical and orangutan experts to identify plant species important to Bornean orangutans and likely to tolerate climate change as it is currently understood. Analyses identified plant species now used by KNP orangutans that have traits making them vulnerable to climate change. For research, this means that our current understanding of wild orangutans' habitat usage may bear little relevance to their situation as climate changes in their habitat. Understanding their future needs requires long-term tracking of changes in their habitat and orangutans' responses.

Anthoprocene.

The Anthropocene is a proposed world epoch that started when human impacts on the earth's geology and ecosystems became significant. These human impacts include anthropogenic climate change, but are not limited to it. Human transformation of native orangutan habit and surrounding areas can have very rapid, often immediate effects on resident orangutans. Examples are large scale destruction of native habitat to make room for commercial plantations, e.g., oil palms, pulpwood, Consider these for starters: **http://www.anthropocene.info/**.

As with climate change, long-term research is needed to track human-made changes in orangutan habitat and orangutans' responses.

Re-Foresting for the Climate of Tomorrow

Selecting Trees for Orangutan Conservation
IUCN SSC–Climate change Specialist Group

A Lee, J Carr, B Ahmad, Arbainsyah, A Ferisa, Y Handoko, R Harsono, L Graham, L Kabangnga, N Kurniawan, P Keßler, P Kuncoro, D Prayunita, A Priadjati, E Purwanto, A Russon, D Sheil, N Sylva, A Wahyudi, W Foden

This multi-stakeholder IUCN project, funded by Indianapolis Zoo, aimed to identify and recommend tree species for reforestation projects in Borneo in light of impending climate change. Aims include improving climate change resilience in Kutai NP, especially for orangutan conservation. Here we summarize its progress to date for orangutans.

Overview.

Kutai NP is home to a great diversity of plant and animal species, plays an important role in regulating water supply to nearby human communities, serves as a valuable carbon sink, and attracts students and other visitors. Most importantly for us, it is home to East Kalimantan's largest population of the Critically Endangered East Bornean orangutan, *Pongo pygmaeus morio*.

KNP has long faced major threats, largely from human poaching and forest destruction for agriculture and mining. These two Google Earth images of KNP, in 2016 vs. 1984, show the degree of damage to its forest to date. Climate change is emerging as important new threat, probably in the form of higher temperatures and possibly (but less certainly) drier. For KNP, higher temperatures are likely to exacerbate droughts, which in turn increase the risks of forest fires and generate other negative effects on the park's biodiversity.

The KNP authority has already undertaken considerable reforestation work to help forest recover from damage, including enrichment planting in areas recovering from logging or burning. This is a valuable avenue for restoring biodiversity and other natural functions to degraded forest areas. These programs have successfully planted large numbers of seedlings, but little attention has been paid to assessing the vulnerability of KNP's biodiversity to probable climate change (i.e., warmer, perhaps drier conditions), to developing strategies to reduce its negative impacts, and to selecting tree species important to orangutan survival, .

There are important challenges regarding how to adjust reforestation strategies to consider climate change, and current practices, may not be the best options. Under future climates, the historic ecosystem may not thrive and predicting the new ecosystem under future conditions is highly uncertain.

Reforestation practices in KNP could nonetheless be adjusted to better promote forest integrity, improve conditions for resident species, and enhance climate change resilience. Doing so could increase the likelihood that the forests orangutans need to survive into the future will persist.

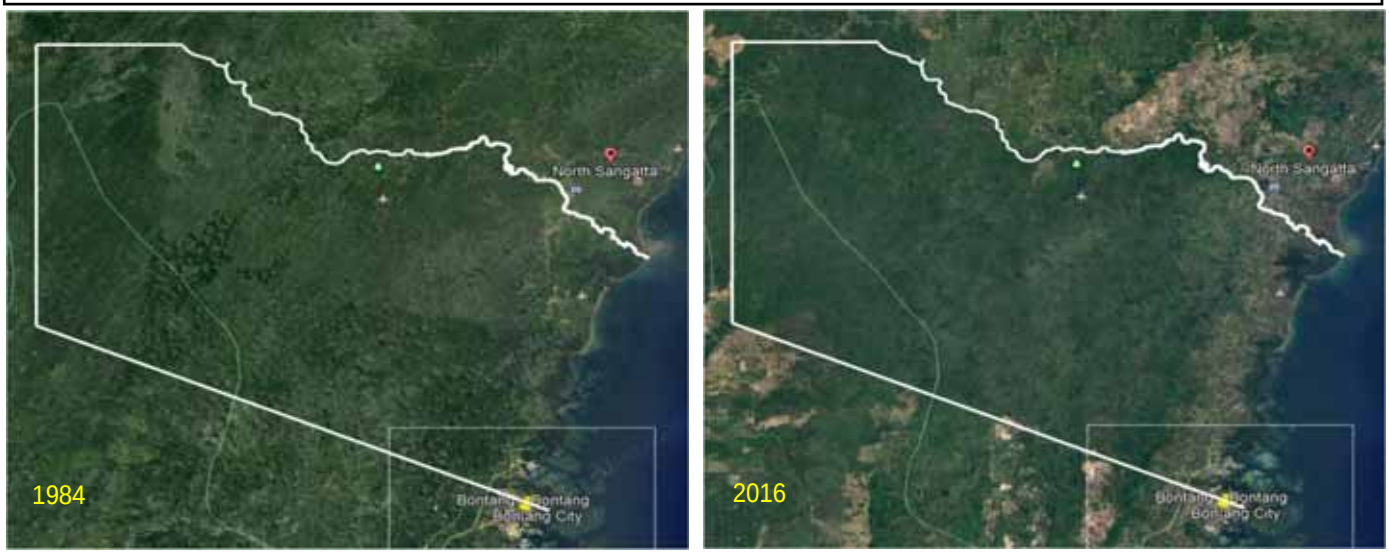
To provide guidance on climate change resilient reforestation practices, the IUCN's Climate Change Specialist Group collaborated with KNP authorities and experts on Bornean forests and orangutans to identify KNP tree species likely to be most resilient and most vulnerable to climate change. One focus was species that provide valuable resources for orangutans.

Selecting suitable tree species.

Assessing the suitability of tree species (resilience and vulnerability to climate change) was a complex, multi-stage process requiring input from international experts.

A first workshop in May 2017 had experts assess the climate change vulnerability

Changes in and around KNP (white outline) in the last 32 years (Google Earth images). Lighter areas represent habitat that has been cleared of its forest cover. Near pristine in the early 1980s, KNP is now surrounded by expanding industry and human settlements,



Continued… Reforesting for the climate of tomorrow

(CCV) of 247 candidate tree species, i.e., biological characteristics or traits linked to their sensitivity and/or capacity to adapt to anticipated climate changes and resulting altered fire regimes.

These 247 candidates were compiled from a KNP plant inventory (1,248 spp, 144 families), tree species in KNP phenology plots, lists of orangutan food and nest species (all known, in KNP, important), tree species used locally in reforestation, and additions suggested by tropical rainforest ecologists and botanists (e.g., species structurally or otherwise important). All 247 were also ranked for their importance to orangutans (food source, nesting) and to ecological, economic, and social purposes (e.g., iconic, old growth, commercial, locally threatened, ecologically important).

Experts then assessed each on three CCV dimensions: sensitivity, exposure to environmental change, ow adaptive capacity. From these assessments, an overall CCV score was generated for each taxon. Use of this process in KNP marks its first ever application in the context of forest restoration.

***What affects species suitability*?**

Species were identified as unsuitable for reforestation projects if they have traits that make them vulnerable to climate change effects and/or low in adaptability. CCV traits included factors such as: needing special wet-dry timing to fruit (e.g., wet then drought or drought then rain), depending on a fungal companion likely to suffer from higher temperature, requiring special habitats (e.g., freshwater, flooding, streams, riverine, flat terrain), and requiring specialist pollinators

Priorities also affected choices. For orangutans, e.g., priorities are food producing species - especially fruit foods, preferred nesting species, species that discourage vs. enable human encounters, and species that are fire-resistant.

Orangutan food species spanned the range of vulnerability scores so, fortunately, at least some should be climate change resilient. Eleven species were identified as good choices for KNP reforestation because they are likely to be climate change resilient and are used by orangutans (e.g., fire resilient species good in buffer zones).

***Limitations, what next, future directions*.**

Evaluations are limited by high levels of uncertainty about vulnerability traits and poor knowledge of East Kalimantan botany.

A follow-up workshop in Feb., 2018 also considered how the recommendations produced could be implemented and raised concerns about forest restoration in KNP. Among the concerns that foreigners could facilitate and/or fund are:

- improving availability of seed and source plants for important KNP plant species (e.g., collecting seeds/seedlings, nurseries)
- improving silviculture knowledge (e.g., partner with forestry/botanical experts)
- monitoring and protection post planting (> 3 yr, research evaluating success)
- preparing for climate change (education on resilient plants, educating nursery staff, 'climate smart' planting regimes)
- training/capacity building (in-house, silviculture/nursery)

The final report should soon be published; we will post it if possible

BOS Canada Conservation Grants 2018

BOS Canada is offering a second set of small grants in 2018 to support conservation research on orangutans or related projects, including conservation education. Projects involving direct conservation work must include a research component that evaluates the effectiveness of the conservation work proposed.

Award amounts range from $500 to $2,000 CAD.

Application deadline: December 15, 2018. For application forms see: ***http://orangutan.ca/grants/***

For questions, please contact us at boscanada@gmail.com

THE TAPANULI ORANGUTAN – 2018

Last year's stunning finding was that a tiny, isolated population of orangutans in the Batang Toru area of North Sumatra represents a new species, *P. tapanuliensis*. They differ physically, behaviorally, and genetically from all other known orangutan species and subspecies. Most importantly, they are more closely related to Bornean orangutans than to Sumatran orangutan in the nearby Leuser Ecosystem. Experts consider *P. tapanuliensis* represents the ancestral lineage from the two other species evolved.

The *P. tapanuliensis* population is estimated at only 800 individuals, so this species is *the* most critically endangered of all living great apes. Almost 85% of its habitat is protected, thanks primarily to the Sumatran Orangutan Conservation Programme's work over the last 12 years, but a hydroelectric dam and gold mine expansion are proposed in a sensitive area connecting unprotected forest that Tapanuli orangutans use. These projects could quickly have disastrous effects on this important, critically endangered species.

Despite this species' enormous importance and sensitivity, several parties have argued publicly in favor of this development on the grounds that its benefits outweigh its costs. It serves long-term needs in North Sumatra, it is environmentally friendly and relatively inexpensive since it uses renewable energy sources, and it contributes to optimizing N Sumatra's natural resource potential for local people. Supporters include the chairman of a Sumatran environmental NGO, although he argued that impacts could be further reduced and should be discussed.

In fact the hydroelectric project development is already underway.

Efforts are being made to protect these orangutans as the project progresses. Indonesia's Minister of the Environment and Forestry asked the Hydroelectric company to correct its environmental impact assessment document to better address issues of the existence and protection of Tapanuli orangutans and their habitat and to coordinate with the Ministry to jointly monitor their habitat and their condition within the project site. Requests to the company include: provide

***P. tapanuliensis* flanged male**
Photo Tim Laman:
morphobank.org/index.php/Projects/Media/id/435788/project_id/2591

implementing guidance concerning supervision of their infrastructure development's impacts on wildlife, especially Tapanuli orangutans; build posts to monitor movement of Tapanuli orangutans forced out of their habitat and then isolated in community plantations; and report progress to the Ministry's monitoring team.

On Oct. 17, 2018, the Ministry reported that more than a month's monitoring by its own team shows that the hydroelectric power plant does not disturb Tapanuli orangutans: the two can exist and live side by side. A top Ministry representative also reported having asked the plant developers to plant food trees for orangutans and to build arboreal bridges to connect habitat for orangutan populations, and that the Ministry's monitoring team remains in the field and continues to monitor and ensure orangutan conservation. The Minister also asked the company to develop 4 plans related to her efforts to ensure Tapanuli orangutans' survival, all within 0.5-2 months: (1) creating corridors connecting E and W blocks of the Batang Toru ecosystem, (2) enriching Tapanuli orangutans' food sources in a community plantation to link forest blocks, (3) a rescue plan for orangutans found in community areas (translocation), and (4) involving local communities in protecting and saving Tapanuli orangutans.

Overall, government responses provide and will hopefully enforce active help, but privilege human over nonhuman interests. Also of concern is advocating translocation, which is highly problematic as a conservation action. Orangutan conservationists consider that what it needed is a landscape approach to their protection.

Primary sources: (try Google Translate to read articles in Indonesian: it works well)

https://medanmerdeka.com/sumut/tapanuli-selatan/yel-dukung-proyek-plta-batangtoru-tapsel/

https://medanmerdeka.com/nasional/menteri-lhk-tegaskan-plta-batangtoru-tak-mengganggu-orangutan/

http://m.foresthints.news/minister-sends-letter-to-batang-toru-hydroelectric-company

Other sources (in English)

https://www.iucnredlist.org/species/120588639/120588662

https://jakartaglobe.id/business/will-1-6b-hydroelectric-plant-in-south-tapanuli-endanger-worlds-rarest-great-ape/

http://www.induschronicle.com.pk/latest-news-detail.php?Id=910

https://www.thestar.com.my/news/regional/2018/10/22/hydro-dam-threatens-rare-species-project-site-on-sumatra-island-is-the-only-known-habitat-of-the-tap/

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https://news.mongabay.com/2018/11/researchers-say-orangutans-are-declining-despite-indonesian-governments-claims/

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Are Orangutans Persons?

Kristin Andrews - Director, BOS Canada

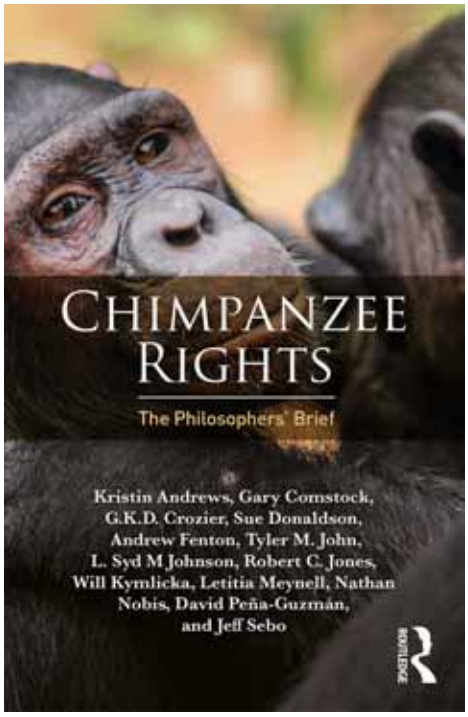
You may have met Tanjung, a grande dame in her 50s, largely retired after raising several offspring. She still visits her adult children and grandchildren. Her daughter Bayur seems annoyed when Mom comes around but Tanjung keeps visiting.

If you have met Tanjung and Bayur, you know they are orangutans. You also know they are individuals, with their own goals, interests, personalities, emotions. Given all that, does it makes sense to say that Tanjung and Bayur are also *persons*?

In law, a *person* is a rights-bearer, an individual who enjoys protection under the law. In philosophy, a *person* is an individual with autonomy who can determine their own actions. In Western societies, the legal idea of *person* is grounded in the philosophical idea of *person*. Tanjung and Bayur are individuals who determine their own actions, so they are metaphysical persons, and should be considered legal *persons*.

This is the basic argument behind the *Nonhuman Rights Project's* lawsuits in the USA asking that privately owned captive great apes be given their day in court. In Dec. 2013, the NRP filed its first petition for a common law writ of habeas corpus for a nonhuman animal on behalf of Tommy, a chimpanzee living alone in a cage in a shed in rural New York. Under animal welfare laws, Tommy's owners were doing nothing illegal. But Tommy's conditions were dire, and the NRP petition argued that since Tommy is an autonomous being keeping him in those conditions is deeply wrong, and demanded a hearing by the courts. The goal is to move Tommy into a sanctuary where he can live a richer life with other chimpanzees, and choose who he spends his time with and where he goes, within the confines of sanctuary.

The NRP has gone on to file several petitions on behalf of other chimpanzees. So far no judge has been willing to issue a writ of habeas corpus for any of them. Issuing such a writ would mean that the courts would have to address the question of whether the chimpanzees' rights were being violated by their confinement. Instead, judges have argued that chimpanzees cannot be bearers of legal rights because they are not, and cannot be, *persons*.



The debate is deeply philosophical, raising questions about the nature of personhood and of rights. For this reason, a team of 17 philosophers who have followed these cases wrote an *amicus curiae* brief in support of an NRP appeal in one of these cases. I was part of this team. After reviewing judges' responses, we noted they gave three arguments why chimpanzees like Tommy are not persons: (1) they are not human, (2) they are not able to enter into a social contract, (3) they are not part of a human community.

We pointed out that persons and humans are two very different concepts. Neanderthals, who are among our ancestors, were not human but were persons. Species is a biological category that helps us to identify populations, but there no moral properties are tracked by this population way of thinking. We also pointed out that not all humans can enter into social contracts, e.g., the very young or individuals with cognitive disabilities, but they are still persons under the law. And we pointed out that Tommy and other captive chimpanzees *are* part of our human community; like pets in human homes, they rely on and couldn't survive without humans.

The amicus brief helped convince one appeal judge, Eugene M. Fahey, that the court's failure to address these issues constitutes "a refusal to confront a manifest injustice." In a concurring opinion not to accept the appeal (it was rejected on technical grounds, not the case's merits), Judge Fahey wrote that the human treatment of apes creates "a deep dilemma of ethics and policy that demands our attention. To treat a chimpanzee as if he or she had no right to liberty protected by habeas corpus is to regard the chimpanzee as entirely lacking independent worth, as a mere resource for human use, a thing the value of which consists exclusively in its usefulness to others. Instead, we should consider whether a chimpanzee is an individual with inherent value who has the right to be treated with respect." This is a historic mark of progress, the first time in common law that a judge has stated that a nonhuman animal may be worthy of legal rights.

We philosophers who wrote the amicus brief expanded our arguments into a book, *Chimpanzee Rights: The Philosophers' Brief* (published by Routledge, Sept. 2018). Our arguments in favor of personhood status for Tommy, and for orangutans like Tanjung and Bayur, show that the ways in which we already think about great apes - as individuals with their own needs, interests, wants, and desires - means we already think about them as persons.

Scientific findings from observing wild apes in their natural habitats demonstrates that orangutans, chimpanzees and other great apes have their own cultures, and are rational, intentional, emotional beings. This important scientific work has helped make the argument that great apes should be considered legal persons and as such provided protections under the law.

Continued… Andrews - Great ape personhood

The philosophers' *amicus curiae* brief: https://www.nonhumanrights.org/content/uploads/In-re-Nonhuman-Rights-v.-Lavery-Proposed-Brief-by-PHILOSOPHERS-74435.pdf

Judge Fayey's opinion: http://www.nycourts.gov/ctapps/Decisions/2018/May18/M2018-268opn18-Decision.pdf

Chimpanzee Rights: The Philosophers' Brief https://www.routledge.com/Chimpanzee-Rights-The-Philosophers-Brief/Andrews-Comstock-GKD-Donaldson-Fenton-John-Johnson-Jones-Kymlicka-Meynell-Nobis-Pena-Guzman-Sebo-Gruen-Wise/p/book/ 9781138618664

https://www.amazon.ca/Chimpanzee-Rights-Philosophers-Kristin-Andrews/dp/1138618667

Misconceptions about Ape Reintroductions & Translocations

J Sherman, KH Farmer, EA Williamson, S Unwin, SM Kahlenberg, A Russon, SM Cheyne, T Humle, N Mylniczenko, EJ Macfie, S Wich

Editor's comment. At the 2018 Int'l Primatology Congress in Nairobi, I presented this paper for The Ape Reintroduction Committee (ARC). Its gist is below. We hope it helps supporters evaluate projects.

Reintroduction means returning ex-captive orphans to free life in native habitat once rehabilitated (i.e., helping them recover from injury or illness, develop, and acquire suitable ecological and social skills).

Translocation is human-managed removal of apes from one area and releasing them into another. "Wild to wild" translocation is the deliberate capture and movement of wild apes from one natural habitat to another; it was and remains popular with commercial concession holders for 'disappearing' apes causing 'problems'. In wild orangutan habitat, examples are oil palm plantations, pulp wood plantations, coal mines, and logging concessions.

The IUCN developed guidelines for ape reintroductions and conservation translocations, given risks of their extinction. For both, success entails establishing self-sustaining viable populations, improving the species' conservation status, ensuring the persistence of necessary traits and other benefits beyond individual welfare, and restoration of lost ecosystem function. All should follow the *precautionary principle*:

- do not endanger resident ape populations by communicable diseases, hybridization, social disruption, or exacerbating competition for habitat resources
- do not endanger other interacting native taxa or release area ecological integrity
- conservation of the species and resident wild conspecifics must take precedence over individual apes' welfare.

Ape reintroductions* and *translocations therefore require careful study, planning, execution, and follow-up. Neither is a simple process to be used without such preparation. The IUCN, e.g., requires:

- Assessing release feasibility and risks; relative cost-effectiveness and likely impact of release; and individual behavioral competence.
- Ensuring actions will support individual apes' health, welfare, and security.
- Undertaking a health-risk analysis and developing a management plan
- Ensuring staff health and security
- Developing plans for apes' transport, release, and intervention or rescue
- Monitoring during and after release.
- Release objectives should be conservation of wild apes; individual welfare benefits alone are not seen as a valid rationale for conservation release.

Common Misconceptions. There remain many misconceptions about translocation and reintroduction. Six common ones are:

- *Selecting suitable habitat is easy*, e.g., simple surveys (conspecifics, phenology) are enough. In fact, minimum information needed includes climate, key resources (food, water, nesting), forest structure, wild conspecifics' and other key species' abundance and habitat use; human activities and the socio-political-economic landscape.
- *Community support is not critical.* In fact, lack of their support can imperil reintroduction and translocation projects.
- *Areas with an existing target species population are good places to release*. In fact, existing populations typically fill existing suitable habitats to capacity, unless conditions prevent it, and conflicts can occur with resident conspecifics that imperil individuals released.
- *Any individual ape with good forest skills, physical health, appropriate behavior and good potential for social integration is a good release candidate.* In fact, many other factors are important as well, e.g., age, sex, temperament, socialization, human orientation and bonding.
- *Translocating apes from remnant forest in plantations to intact natural habitat reduces conflict and contributes to conservation.* In fact, translocations often enable more forest clearing, and create welfare and safety risks for individuals being translocated and for apes resident in the release area.
- *Long-term monitoring is useful but not essential.* In fact, poor monitoring results in poor understanding of the impacts of releases on the individuals released and the receiving community, so it may lead to maintaining ineffective of actively damaging practices.

Take Home Message. Reintroductions or translocations may not be properly conducted but are promoted as benefiting apes and conservation and, on that basis, donations or other support is solicited. My recommendation is to read and check carefully before supporting such projects, to ensure that you help vs. endanger the apes involved.

New Hope for Exotic Wild Animal Pets?

Rob Laidlaw,

Executive Director, Zoocheck – Director, BOS Canada

Editor's comment. Rob's article is highly a propos, since many wild female orangutans are killed in order to take their infants for sale in the illegal pet trade. Rescued pets fill many orangutan rehabilitation projects.

When I was a child I desperately wanted to order a squirrel monkey from my local pet store or through the mail. Monkeys were readily available back then, imany caught in the wild, so they were reasonably popular and inexpensive pets. Thankfully my parents never let me actually buy a monkey. I'm sure they thought it was crazy idea. Knowing what I now know, I am convinced that if I have acquired a monkey, that poor animal would have experienced immeasurable physical, psychological and social harm, even though I may have had the best of intentions.

Luckily, the wholesale and poorly regulated importation of primates for the retail pet trade, rampant just a few decades ago, is now largely a thing of the past. And while there are still private people and businesses who breed primates domestically for the pet trade and who advertise them for sale online, as the years go by their numbers dwindle. This has been fueled in part by greater knowledge of the biological, behavioral and social needs of primates, as well as increased awareness about the importance of animal welfare, concerns about emerging disease, public safety and other factors.

Sadly however, while pet primate numbers may be smaller than they once were, there are still thousands of primates, and millions of other kinds of exotic wild animals, kept as pets in North America and other regions of the world. And anecdotal evidence suggests that some animals, such as marmosets, wallabies and many reptiles, have experienced an increase in popularity and a growth in numbers, although we don't know whether that will be short-lived or not.

Exotic wild animal pets are certainly fascinating and often beautiful, so their appeal is understandable. And non-expert people who don't know anything about wild animals can easily be duped by the portrayal of these animals in public media and other fora into believing they make great pets. Today, millions of people watch YouTube videos featuring exotic wild animals, including many that show primates performing tricks, wearing clothes, eating meals at kitchen tables with human custodians and generally being made to act like imitation people. They find these scenes irresistible. Studies show this can lead to people wanting their own primate as a pet. And the erroneous claims of animal sellers and exotic wild animal pet proponents - that the animals make great pets and are easy to house and care for - may convince people that they should move forward with efforts acquire them.

Online videos may seem cute enough, but they are insidious and dangerous. They present animals in a misleading way and miseducate people about animal needs. In reality, there are no primates that make good pets. In fact, the needs of nearly all exotic wild animals are complex and difficult, if not impossible, to satisfy properly, even in the best of circumstances.

But when there is money to be made, the people who profit from exotic wild animals try to move their "product" and consistently ignore, dismiss or downplay the problems to their customers. Many sellers are even unaware of the problems. For example, the many behavioral indicators of discomfort, stress and suffering expressed by reptiles, amphibians and fish are unrecognizable to most hobbyists, sellers, and many wild animal pet trade "experts."

To address the multitude of issues posed by the exotic wild animal pet trade, wildlife protection charity Zoocheck recently embarked on a multi-year initiative to change Canada's exotic pet paradigm. In addition to studying what's going on in other parts of world, including how other jurisdictions, locally, regionally and nationally, are addressing exotic wild animal pet issues, and amalgamating critical resource materials for the policy-making, enforcement and public health sectors, Zoocheck presented three Exotic Pets in Canada training workshops in October. Co-hosted by World Animal Protection the first workshop took place in Moncton, New Brunswick and was followed by similar events in Vancouver and Toronto. The response was excellent and enthusiasm high.

The workshops covered a variety of topics including the husbandry and welfare needs of birds, reptiles and amphibians, public health issues, exotic pet regulatory programs and other issues. While the focus was on the smaller, often overlooked exotic wild animals, a great deal of what was discussed was applicable to mammals, as well as to the multitude of fish and invertebrate species in the exotic wild animal pet trade. The success of the workshops and the follow up activities that have resulted from them is the impetus for additional workshops being organized across Canada in 2019.

The landscape of the exotic wild animal pet issue has changed over the years. Today, enforcement personnel, public health officials and policy-makers across the country now seem to understand that big cats, bears, wolves, monkeys and apes shouldn't be kept as pets. And while efforts to finally end the trade and keeping of those animals should be redoubled, consideration should now be extended to all of the other kinds of exotic wild animals found in the pet trade, especially since science shows they share many of the same cognitive, emotional and social capabilities of their "so-called" higher counterparts.

Throughout the years I've encountered thousands of exotic wild animal pets and few that I've seen are faring well, primates included. It seems bizarre, in this day and age, that any intelligent thinking person who has done even a whit of research would want an exotic wild animal pet, especially one as problematic and difficult as a primate. Think about it. Many primates are quick moving and aggressive, with strong jaws and incisors that can inflict painful bites. They are highly active, extremely social animals that live in relatively stable, structured groups. A proper social environment is critical to their wellbeing. Space, physical stimulation in expansive, well-equipped enclosures, environmental conditions and species-appropriate diets are needed and are typically far beyond what can be provided in home situations. And these things are just as important to other kinds of exotic wild animals as they are to primates.

The exotic wild animal pet trade involves thousands of wild animal species, from large mammals to tiny invertebrates. It is an unnecessary, ecologically disruptive, environmentally destructive industry that causes the suffering of millions of individuals every year.

Pockets Warhol

Charmaine Quinn

Secretary, BOS Canada - Volunteer, Story Book Farm

Editor's comment. Charmaine, our BOS Canada Secretary, also works as a volunteer at Ontario's Story Book Farm Primate Sanctuary. Among her most important relationships is with Pockets, a capuchin who has become a world famous artist.

Just over 10 years have passed since a little monkey with the name of Pockets and a big personality arrived at Story Book Farm Primate Sanctuary in Ontario. Pockets is a white headed capuchin monkey, who came to the sanctuary as a former pet from BC. He would have been a commodity in the rampant, horrific trade in exotic animals - many of whom die in the process of capture, transport, and unsuitable care.

Through time, I have watched Pockets transition from his life as a companion pet to a sanctuary monkey. Capuchin monkeys are considered among the most intelligent New World Monkeys - in fact, among the most intelligent of all monkeys, with levels of intelligence close to those of great apes. In terms of caring for capuchins in a sanctuary, high intelligence poses challenges.

Through my volunteer work with primates abroad and in Toronto I have had the amazing opportunity of observing their intelligence, and knew that many primates in sanctuaries are offered paints as a form of mental and behavioral enrichment. I gave Pockets children's paints in the hope that he would find this interesting, and the rest is art history! He loved to paint and does abstract very well! I also noticed Pockets bore a resemblance to pop artist Andy Warhol, with his pink face and flash of white hair, prompting me to add Warhol to his name as a form of affection. And so he became known as "Pockets Warhol".

I choose specific colours for Pockets and name his paintings, many of which I see as tackling serious issues in the world such as "Planet on Fire", "Egomania" and "Material Things". He was offered an art exhibit in Toronto in 2011; that catapulted him to international fame and led to more art exhibits in Toronto and abroad, most recently collaborative work with famous Canadian artist, Anita Kunz OC.

Pockets himself, painting "Queen"

Pockets' painting "Fruit Salad" was recently the topic of an inaugural speech on Excellence in Education at the University of Utrecht in the Netherlands by Prof. Sofie Loyens (Psychology) and a discussion on the University of Cambridge radio station regarding his intellect.

Many of Pockets' paintings have travelled across the globe; some have landed in the hands of Dr. Jane Goodall, Ricky Gervais, and The Max Planck Institute. His painting "Queen" was included in a National Geographic Learning book that helps educate young learners on a global level.

Pockets is featured in an upcoming book by biographer Grant Hayter-Menzies on famous Canadian painter Emily Carr and her monkey Woo. Fifteen new pieces of artwork that he creates will be displayed in Emily Carr's home in Victoria, BC, as part of this book's release next spring,

Pockets' artwork sales has helped Story Book Sanctuary raise substantial funds to help provide care for its monkeys. Pockets was also instrumental in raising sanctuary funds via a signed guitar that Ricky Gervais, comedian and animal activist, donated to Pockets in appreciation for one of his special paintings. The signed guitar was sold at auction to Danny Young, a generous English musician, who will re-auction it in 2019 after having it signed by more celebrities—to date, Ricky Gervais, Jack Moore, Ricky Warwick, Bryan Cranston, Steve Cutts, Will Ferrell, Dhani Harrison (George's son), Peter Frampton, and Brian May.

This will be an exciting time for Story Book Farm Sanctuary. Some of the funds will be distributed back to the sanctuary, some to the "Save Me Trust" wildlife charity headed by Brian May of the band *Queen*. May has been instrumental is helping secure many signatures for the project.

Pockets continues to create paintings weekly, with me happily overseeing his creative process, and is still raising much needed funds for the sanctuary. I am so thankful that this sweet monkey can highlight the intelligence of his species and help educate the public on the issues surrounding the destructive exotic animal trade. Very importantly, perhaps most so, now Pockets enjoys a better life than he would have, given the deplorable hand of cards he was dealt by humans - life in captivity.

Pockets is now 26 years old. This is very old by wild standards - life expectancy is 15-25 years - but some have lived to 50 years of age. Pocket's health is good, and here he is happy (below).

Pockets, happy

Pockets has a Wikipedia entry and a website of his paintings:

https://en.wikipedia.org/wiki/Pockets_Warhol_(capuchin_monkey)

https://pocketswarhol.blogspot.com/2018/10/akumal-for-sale.html

Orangutans use treetop roads to travel do they know where they are going?

Adam Bebko, PhD
Website wizard, BOS Canada

Editor's Comment. Adam has been working on the complex, sophisticated analyses critical to these studies for several years, so we are very pleased to see his very interesting and valuable findings. These studies constitute the substance of his PhD dissertation, which he will be defending at the end of November this year. We look forward to celebrating his becoming Dr. Bebko in the very near future.

Orangutans depend on resources that are spread over long distances. Orangutans live in tropical rainforests, so resources like ripe fruit are more unpredictable than they are in temperate forests with well-defined seasons. We know orangutans can navigate efficiently between food patches and other resources and seem to track and predict when they will become available. They can tell when ripe fruit will be available better than local human experts! But we still don't know much about how they use their intelligence to do so.

In some other primate species, researchers have found that individuals and groups follow "road" networks in the trees, repeatedly traveling along the same paths from tree to tree. Researchers call these networks "habitual travel route networks". The fact that primates follow these habitual routes has led some researchers to propose that they have "mental maps" for storing information about locations of these routes and how they interconnect.

Unfortunately, it is very hard to study mental processes in animals, especially in the wild. In my Master's thesis, I discovered that orangutans at our Kutai National Park study site in Indonesian Borneo appear to use habitual route networks. This was a new discovery, so we knew nothing about why orangutans created their routes in certain spots over others, or what made them decide to follow particular routes.

For my PhD dissertation, I completed three studies on factors that may affect where these routes are formed and how these orangutans may use and navigate their route network.

Figure 1. Sally, a young female orangutan I met when was just starting to become independent. As she looks to the distance, I wondered, is she figuring out how to get there?

For the first study, I looked at features of their forest habitat that might influence where their routes were located. I found that intersections of their routes were almost always at huge fruit trees of species these orangutans seemed to like. I also found that the routes they took between these "intersections" passed by more resources than other routes they could have taken. This study suggests that orangutans are travelling towards big "target" trees of certain species, while making sure they pass by other resources that are less important but can be eaten along the way. An urban human analogy is driving to big supermarkets for main meals but making stops at small shops along the way for things like bread and desserts.

I also found that gaps and clearings in the forest may create travel "bottlenecks" for orangutans, since there are only a small number of possible routes going through these areas if they want to stay in trees. This is similar to humans trying to cross a river or railroad: there are a limited number of locations where we can cross, so heavy traffic at these locations.

Because these orangutans' major routes accessed their major resources, I concluded that local ecology and forest structure play major roles in where they form their routes. This first study helped me understand why these orangutans' routes were located in certain areas, but showed me little about how they use their route network from day to day.

My second study was designed to look at flexibility in how orangutans use their route networks: I examined instances where they tried to escape our research team. Our study area is only a few years old, so resident orangutans were still becoming habituated to human observers. As

is common at new study sites, unhabituated orangutans become upset and try to escape from observers. This is commonly treated as a nuisance, a hurdle to overcome until orangutans are sufficiently "habituated" to ignore researchers. Where many see a nuisance, we saw an opportunity: we assessed how these orangutans used their route networks to help them escape from us.

We found orangutans altered their behavior at least four hours before they succeeded in escaping. They spent more time travelling and less feeding; they also travelled faster as they got closer to a successful escape, compared to their behavior on normal days when they made no attempts to escape.

We also looked at where these orangutans escaped to. On normal days they typically travelled along their route network, but on escape days they targeted areas off their network - often areas where it was very difficult for us to follow them. This suggests they deliberately targeted areas they normally don't use and where we would be unable to follow them.

Since these orangutans changed their behavior hours before their escape and targeted areas where they don't normally travel, my results suggest that they planned their escapes in advance. We need more research to be certain, of course. At the very least, my results show these orangutans can use their route network even more flexibly, including travelling "off road". This suggests they have some knowledge about what lies off their networks. A human analogy might be criminals who plan an escape by driving fast along a main highway to get some distance between them and police, then run into a forest where police will have difficulty finding them.

My third study used satellite images to predict where orangutan route networks may be. This could be useful if we wanted to identify new regions beyond our study area that might be good spots to look for orangutans.

I used a new computer technology called *machine learning* (specifically *deep neural networks*) to train a computer program to "connect the dots" between our data on habitual route networks and Google Earth satellite images of the same forest area (see Figure 3 on the left). After several days of "training" itself, the computer program learned enough to identify our orangutan habitual routes, simply from the satellite image. Trying out different variations and data input, I was able to reach ca 80% accuracy in its predications.

This program can now be extended to make predictions about other areas, where we have good satellite images but don't have good data on orangutans' travel. This would be much faster and cheaper than field surveys of these areas.

If this method proves successful, we can use it to focus ground surveys on areas where the probability of finding orangutans is good. Although we still need more testing, in future this new method could help highlight areas that might be important for orangutan conservation as well as for research.

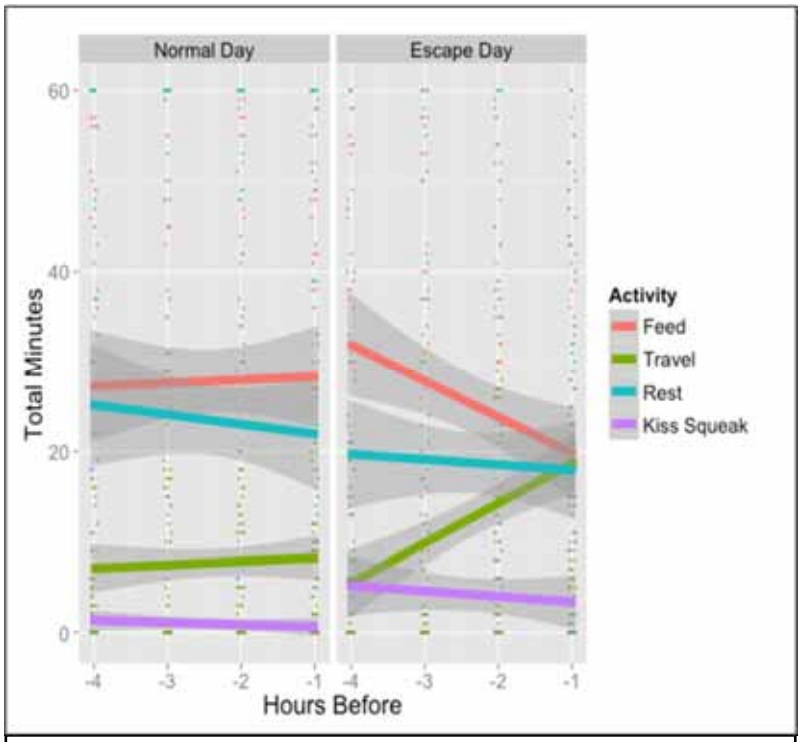


Figure 2. Changes in orangutan behavior in the 4 hours leading up to an escape (Right) compared to the same 4 hours on a normal day (Left). Behavior stayed consistent on normal days; in contrast, on escape days, time spent feeding steadily decreased, whereas time spent travelling steadily increased.

Figure 3. Google Earth Satellite image used to train the computer how to recognize orangutan habitual route networks

Adopt a wild Orangutan in Kutai National Park

(see www.orangutan.ca)

Adoption donations help protect wild orangutans in Kutai National Park, through the Orangutan Kutai (OIK) Project and Kutai National Park Authorities. The Orangutan Kutai Project (OK) has found over 50 orangutans at its field sites within the national park; those available for adoption are orangutans we find and observe relatively often.

What adoptions support.

These orangutans are wild, so adoption supports efforts to protect them and their habitat by helping to fund OK's collaborative work with Kutai NP authorities.


Darwin 2011

OK does not interfere with their lives beyond monitoring, and strives to minimize impact on the park itself. The project's regular work involves following these orangutans nest to nest, monitoring forest conditions (food availability, weather) that influence their health, habitat use and travel, and monitoring human incursions into Kutai National Park.

How OK activities support Kutai NP orangutans:

• ***Understanding***. Following and monitoring improves understanding of these orangutans' behavior, life patterns, preferences, and forest needs.

• ***Speaking out***. Publicizing findings to scientific, political, and public audiences raises awareness of the recovery of Kutai NP's orangutan population and habitat, their importance, and their unique qualities.

• ***Being there***. Field researchers are recognized to help protect orangutans and habitat by their regular presence and monitoring. OK field staff are continuously active in the park and have already helped reduce illegal human activities there by regularly monitoring and reporting.

• ***Enhancing conservation effectiveness***. The OK project applies its findings about KNP orangutans and habitat to develop more effective orangutan conservation and management programs around the park.

What we give back to donors:

We cannot guarantee to monitor each individual orangutan adoptee continuously - youngsters grow up and leave their mothers, and mature males are often transient visitors.

We will send an annual newsletter to active donors that reports the year's major orangutan events, new scientific findings and contributions to conservation, and updated photographs and stories on all the adoptees that could be found and monitored.

2018 Adoptee updates

We have better adoptee updates for 2018 than we have been able to provide for the last couple of years. The probable reason is that Kutai National Park's forest has been recovering with better rains following the 2015-16 El Nino drought, so orangutans have returned to our study area and are easier to find and to follow. Some orangutans that we saw very rarely from 2014-16 have reappeared, in good shape. Because we have seen all of our last year's adoptees this year, we made no changes to the orangutans we recommend for adoption this year.

Darwin

Darwin is a young independent male that we followed often in Bendili 2011-14. We found him rarely through the drought (2014-16) but in Oct. 2017 and June 2018 we found and briefly followed a lone young male our observers tentatively identified as Darwin.

He only occasionally kiss squeaked, suggesting he was used to our following him - as Darwin would be. He was also calm and tolerant of observers - as Darwin always was. In 2017, he got rid of our observers by disappearing into thick undergrowth - a technique that Darwin excelled in . In 2018 he was found near the end of the day and followed only till he nested.

If this was Darwin, he is now ca 15 years old (we estimated him to be ~8 yrs old in 2011),so nearing early adulthood. In 2017 and in 2018 he was alone, in line with his maturation.

Labu, Langit, and Luna. Labu is an adult female orangutan with two daughters, Langit (now ~ 8 years old) and Luna (~ 3 years old). We have been following Labu and her two young daughters with great interest to see how they manage the difficult job of finding enough food for all three of them and how long Langit will remain with her mother and baby sister. Up to Oct 2018, Langit is still "with" her mother Labu and baby sister Luna (< 50 m away, often in a different tree). Two orangutans within 50 of one another are considered to be 'associating', so Langit is still largely travelling with her mother and infant sister and has not established her own independent home range. Labu shows no signs of losing patience with Langit's presence - but perhaps because Langit knows how close she is now allowed to stay.

Tanjung

Tanjung is the grande dame of Kutai NP. She has lived for decades in the Prevab area. From historical records we know she is over 50 years old. The first I heard of her was in a 1989 research report by Dr. Akira Suzuki, who found and followed her in the 1980s in the Prevab area. In his report he described her as an adult female with a new infant (born Oct 1988) plus an older dependent son Dekong. Orangutan pregnancy is about 8 months long, females in Kutai NP give birth every 6-7 years, and wild female orangutans have their first infant at about 15 years of age (on average). Counting backwards, that means Tanjung must have been born in the mid 1960s or earlier. That makes her at least 52-53 years old today.

We also know Tanjung has had at least 5 offspring (Dekong, Danau, Bayur, Deng, a 5th infant born in 2006 who vanished in 2009). Bayur, her daughter, has had two young—Bumi (born 2010, disappeared) and Bulan (born 2015, still with her). We have occasionally seen Tanjung visit Bayur and Bulan for a few days. Bayur behaves as if she puts up with Tanjung's presence but doesn't welcome it. We have seen Tanjung trying to attract males in the last couple of years, but they don't seem to be interested. ,

At 52+ Tanjung has some disabilities. She is blind in one eye and moves slowly and carefully - but is otherwise healthy and active. She has survived three exceptionally severe droughts and the great fires of Borneo in 1982-83 and 1997-98. And she's among the oldest wild female orangutans known. For all these reasons, she is one of the most impressive wild orangutans alive.

We followed Tanjung early in 2018, sfill fine.

Putri & Pan

Putri is the only adult female we have followed every year in Bendili . We typically find her in riverine areas, March to Sept.-Oct. then rarely until Jan-Feb. She remains annoyed to see us, even though we have followed her for dozens of days and hundreds of hours. This year we found her several times, same paattern: appears Jan-Mar to Sept., riverine area, still annoyed.

She still travels with son Pan (~ 5 yr old) but not son Pur (who would be adolescent ~9 yr old). We last saw all three Nov 2015.

In 2018, we found Putri and Pan several times near our camp. Once Putri arrived when only two of us were in camp. I heard movement outside my office and thought it was macaques—till I heard kiss squeaks. I looked out and saw Putri, who became even more annoyed at being spotted. If she'd just kept quiet we might never have known… Pan finds us amusing.

Unfortunately we have no more recent photos of Putri and Pan.

Sally & Sule

Early in July 2017 our field team found and followed a young adult female with an infant near the eastern edge of our Bendili area. They think she may be Sally, who we first followed in 2011 in the same area. At that time, Sally was an older juvenile still travelling with her mother, Sissy, and Sissy's infant son. We followed Sally again in 2013, then an independent adolescent, also in the same area and travelling with an unflanged male. In 2017 and in 2018, we found Sally with an infant son (est. ~1 yr old in 2017: he ate and played a little by himself but only ~1 meter from Sally). Our observers found two more indicators that she is Sally: first, she was near an older adult female with an infant who, based on her age and proximity, was probably Sally's mother Sissy and second, Sally ate in the same pelai tree where we had seen her and Sissy eating in 2011. In Aug and Sept 2018, we found Sally and her infant son in the same area.

If this orangutan is Sally then, for us, it is a valuable discovery. We have found relatively few resident females in our Bendili study area, so she and her mother are important to orangutan survival in this area. Sally and her mother also both survived the severe droughts and bore infants, so we have further confirmation of KNP orangutans' resilience - plus two new infants in the population.

Dao

Dao is the relatively young flanged adult male who ranges in the Prevab area forest. He had a rough time in 2016 due to a wound he suffered in a fight that would not heal. We were able to arrange help for him from the Kutai NP authority and a BOS Foundation veterinary team. The veterinary team caught him then cleaned and medicated his wound. Within two weeks his wound had dried up and he was eating up a storm. Within 3-4 months, he was back to normal. We haven't followed him in 2018, but he's been sighted several times and is doing well.

We think he's a great orangutan for adoption. It's clear that orangutans in Kutai NP need help: they're surviving in area that is protected, but it is surrounded by human industry and settlements and suffers poaching. Dao could have had to fight because of increasing competition for dwindling forest resources.

But it is also due to humans who care about orangutans that Dao has forest in which to live, and care when he needed it.

Orangutans in the News – 2018

Voigt et al. (2018) Global demand for natural resources eliminated more than 100,000 Bornean orangutans. Current Biiology, 28:761-769.

Supermarket Iceland Christmas Ad - banned for being too political!
https://www.lbc.co.uk/news/watch-iceland-christmas-ad-banned/

Orangutan conservation's balancing act. UNEP,
https://www.unenvironment.org/news-and-stories/story/orangutan-conservations-balancing-act

WWF Living Planet Report—worldwide decline in wildlife of 60% in the last 40 years
https://www.wwf.org.uk/sites/default/files/2018-10/wwfintl_livingplanet_full.pdf

Orangutans in Sumatra learn to live in the wild
https://www.worldwildlife.org/stories/orangutans-in-sumatra-learn-to-live-in-the-wild

Red Ape: Saving the Orangutan.
https://www.bbc.co.uk/programmes/b0b2n9v0

This Orangutan Was Lucky to Be Saved From Conflict, But Others Might Not Be So Lucky
https://www.care2.com/causes/this-orangutan-was-lucky-to-be-saved-from-conflict-but-others-might-not-be-so-lucky.html

A Rare Look at the Secret Life of Orangutans (17 min.) (Jul 2, 2018) . National Geographic (Laman & Knott)
https://www.youtube.com/watch?reload=9&v=0fts6x_EE_E

Orangutans Use Plant Extracts to Treat Pain. Scientific American
https://www.scientificamerican.com/article/orangutans-use-plant-extracts-to-treat-pain1/

IUCN newsletter website, for updates on other species at risk of extinction
https://www.iucn.org/newsletters

Steve Cutts' animated video "MAN"
https://www.youtube.com/watch?v=WfGMYdalClU

Reforesting for the climate of tomorrow: Recommendations for selecting tree species for restoration that strengthen orangutan conservation and climate change resilience in Kutai National Park, Indonesia (2018).
Lee et al., IUCN Species Survival Commission, Climate Change Specialist Group.

*Several of our BOS Canada members and supporters work with **Story Book Farm**, a sanctuary for primates rescued form illegal captivity. Darwin - the famous Ikea monkey, and Pockets Warhol - the famous artist, are among them. The Sanctuary provides valuable and important contributions to animal welfare. Check out their website, consider a visit, and consider donating to help them provide good care for the primates they shelter.*

www.storybookmonkeys.org/

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Are We getting Ethically better?

On Nov. 27, 2018, The Toronto ***Globe and Mail*** published this story by Grant Robertson, Senior Staff Writer

Given a stay of execution, three lab monkeys face a new experiment: Normal life

Monkeys in Canada are routinely euthanized after medical research, even if they are healthy. But there has been an unprecedented reprieve: three lab monkeys were moved to Story Book Farm Sanctuary for "retirement" and rehabilitation. It raises the question: Do we owe animals life after the lab? Read the full story, at

https://www.theglobeandmail.com/canada/article-given-a-stay-of-execution-three-lab-monkeys-face-a-new-experiment/

BOS Canada Conservation Grants 2018

BOS Canada is offering a second set of small grants in 2018 to support conservation research on orangutans or related projects, including conservation education. Projects involving direct conservation work must include a research component that evaluates the effectiveness of the conservation work proposed.

Award amounts range from $500 to $2,000 CAD.

Application deadline: December 15, 2018. For application forms see: ***http://orangutan.ca/grants/***

For questions, please contact us at boscanada@gmail.com

BOS Canada Donation

I would like to make a tax-deductible donation of $ _____ to BOS Canada
to support orangutan protection projects.

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