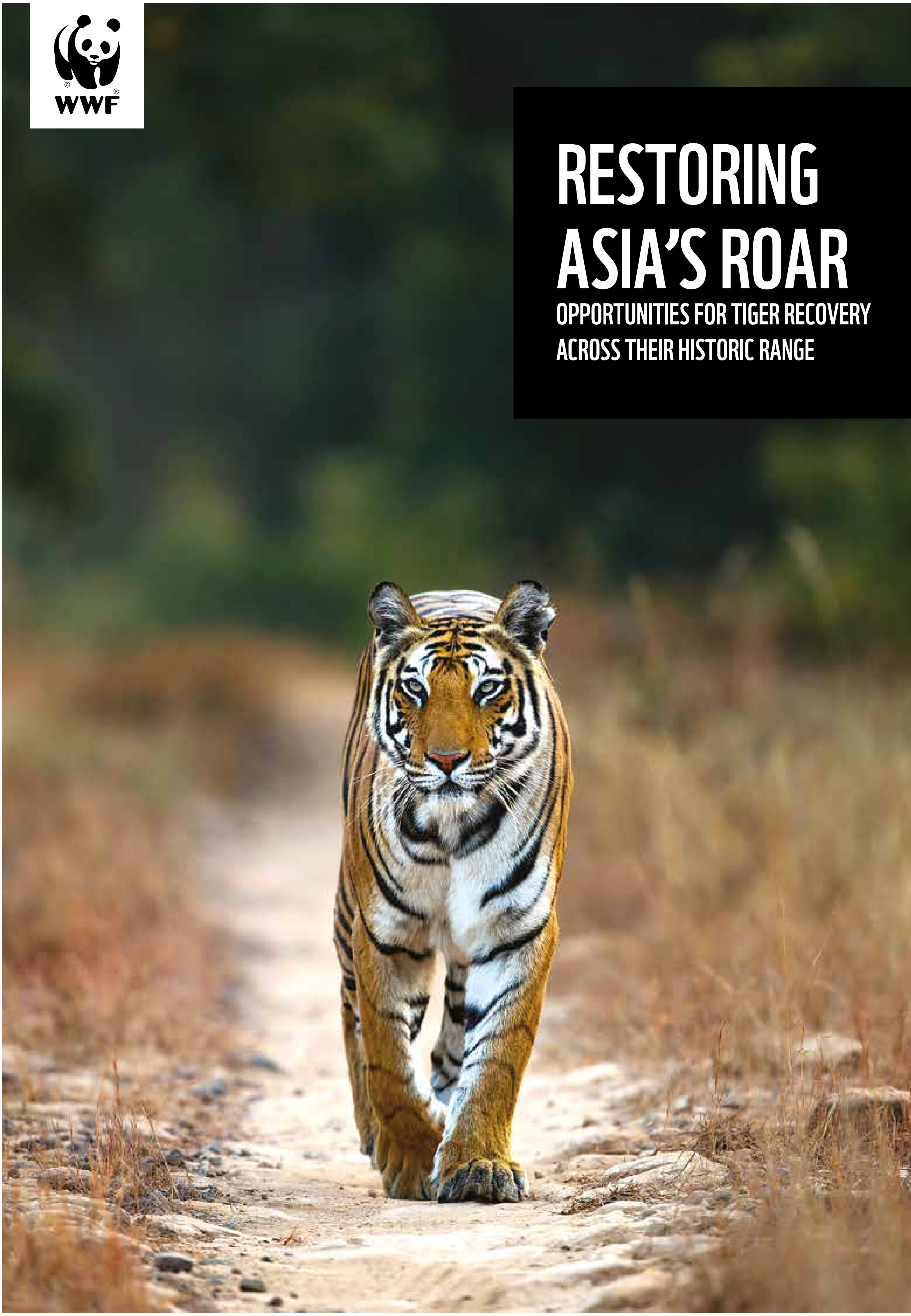

RESTORING ASIA'S ROAR

OPPORTUNITIES FOR TIGER RECOVERY ACROSS THEIR HISTORIC RANGE

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Acknowledgements

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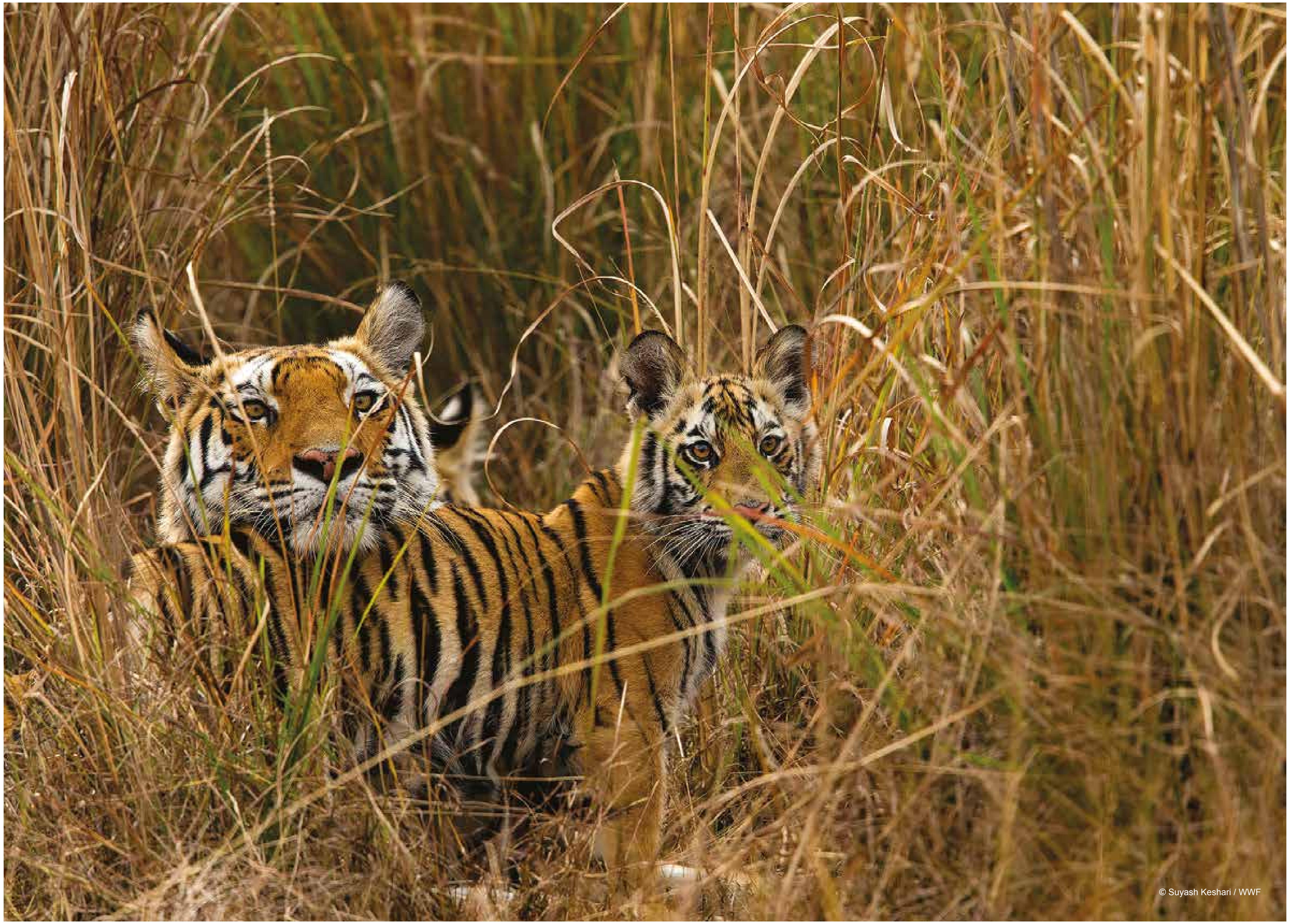
TIGER RANGE RECOVERY AREAS IDENTIFIED IN THIS ANALYSIS COVER 1.7 MILLION KM^2 ACROSS 15 COUNTRIES. TOGETHER, THESE AREAS REPRESENT A >250% INCREASE IN THE CURRENT TIGER RANGE.

ACRONYMS AND ABBREVIATIONS

30x30	Shorthand for plans to designate 30 per cent of the world's lands and oceans into protected and conserved areas by 2030
GTRP	Global Tiger Recovery Program
HMI	Human Modification Index
HTC	Human-tiger conflict
NGOs	Non-governmental organisations
OECMs	Other effective area-based conservation measures
PAs	Protected areas
UN	United Nations
UNEP	United Nations Environment Programme
WDPA	World Database of Protected Areas



INTRODUCTION

Wildlife conservation in the Anthropocene requires bold new solutions. For the past generation, humans have been the dominant force shaping life on this planet, with sobering effects. Over the past 50 years, the world's mammal, bird, fish, reptile and amphibian populations have dropped 68%,[1] and despite our efforts, global strategies to conserve the natural environment have largely failed.

Nowhere are the challenges more acute than in Asia, as exemplified by tigers, the continent's most iconic species. While tiger populations have increased in some countries over the last decade, these gains are fragile, and tigers remain the world's most threatened big cat. Today, there are approximately 4,500 wild tigers, and those that remain are restricted to less than 6% of their historic range.[2] Since 1850, tigers have been lost from at least 14 countries, and three of these extirpations (Cambodia, Lao PDR, and Viet Nam) occurred in just the last 25 years. As a result of poaching and the loss of important prey species, the reduction in tiger range continues; the area where tigers occur has declined by approximately 50 per cent since 1994.[2] In order to stem the decline, much more ambitious commitments and innovations will be required. These commitments should include high level goals to reverse the centuries-long decline in tiger range and return the species to sites, landscapes, countries, and ecosystems from which they are currently absent.

Tigers are a keystone species which require large expanses of suitable habitat to live and breed. As an apex predator, they help keep the balance between prey species and the surrounding vegetation, and play an important role in maintaining healthy ecosystems. With so few populations remaining, simply protecting existing fragments of habitat will not be sufficient to facilitate tiger population recovery. Successful conservation will also require expanding their occupied range through ecosystem restoration and rewilding — helping to restore important ecological processes. For tigers, this could take place naturally, as individuals from existing populations disperse into new territories. Or it could be driven by planned translocations and reintroductions of tigers into areas of their range from which they have been lost. Not only would restoring the tiger's historic range support any new conservation goals defined in the Global Tiger Recovery Program (GTRP) (2022-2034), but it would also generate significant benefits in terms of ecological functionality and ecosystem services, such as safeguarding watersheds, mitigating climate change, reducing disaster risk, and securing a range of human health benefits.[3]

This report analyses the geographic opportunities for tiger range recovery across 30 current and former range countries, based on the relationship between tiger presence and intensity of human activity. In 15 counties, expanses of currently unoccupied but potentially suitable tiger habitat remain. Partnering with local communities to secure and increase the protection of such areas is essential to sustaining tiger recovery in the long-term.

It is a critical moment for action. During the final months of 2022, the governments of tiger range countries will meet to define global tiger conservation goals for the next 12-year Lunar Year cycle (2022-2034). This comes 12 years after the St Petersburg Tiger Summit which formalised the global goal of doubling wild tiger populations (referred to as Tx2). In addition, 2021 began the United Nations (UN) Decade on Ecosystem Restoration (2021-2030) — a rallying call for the protection and revival of the planet's ecosystems. Through the High Ambition Coalition for Nature and People, more than 100 countries have also signed onto the vision of 30x30: a global commitment to protect 30 per cent of the world's terrestrial and marine ecosystems by the end of this decade. Tigers could be leveraged as a powerful symbol for these efforts. This is an important opportunity to catalyse proactive and inspirational conservation goals which move beyond defending current tiger space and allow tiger populations, and conservation successes, to expand.

1 WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.

2 Goodrich, J., Wibisono, H., Miquelle, D., Lynam, A.J., Sanderson, E., Chapman, S., Gray, T.N.E., Chanchani, P. & Harihar, A. 2022. Panthera tigris. The IUCN Red List of Threatened Species 2022: e.T15955A214862019. https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T15955A214862019.en.

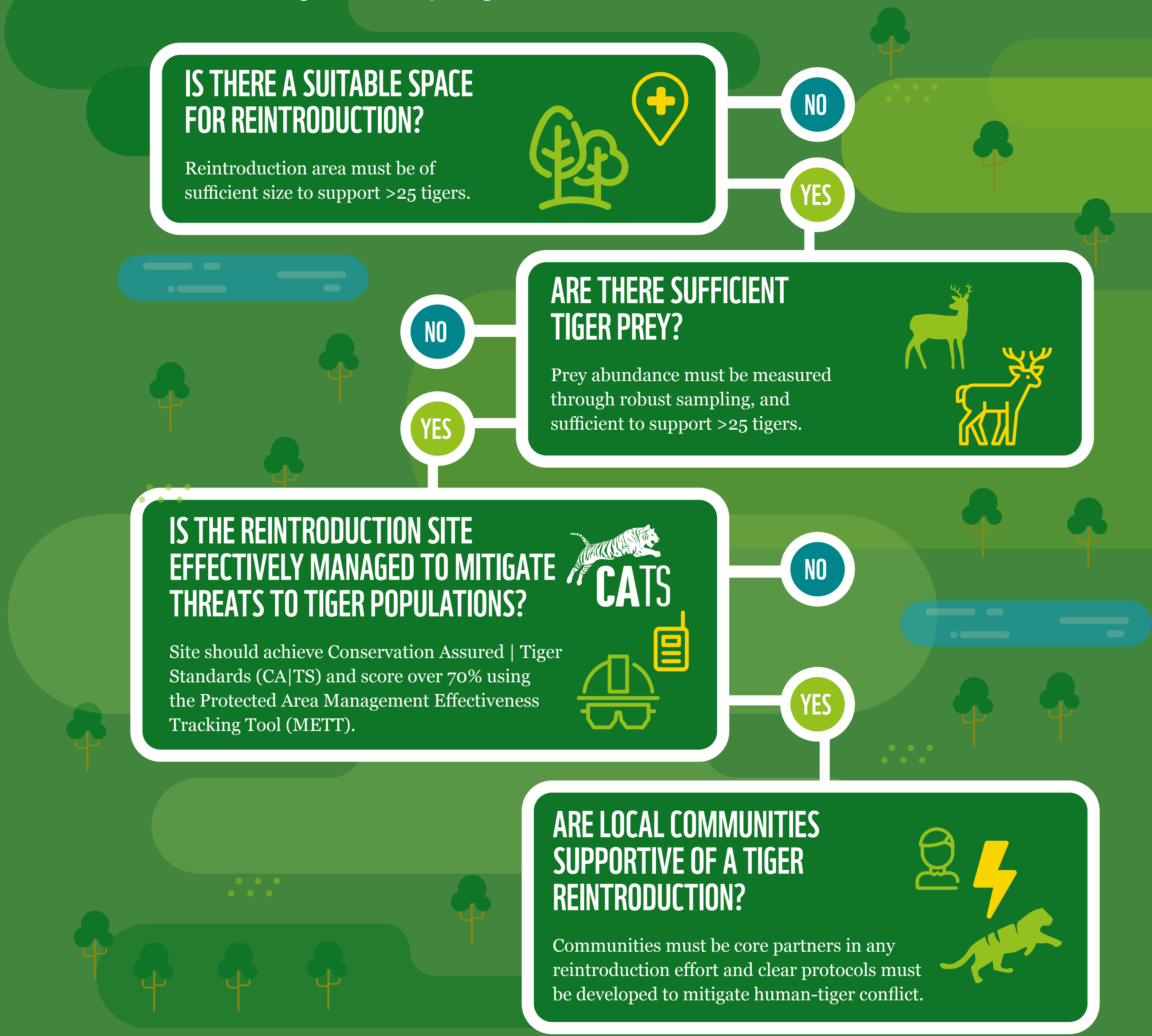
3 WWF. 2017. Beyond the Stripes: save tigers, save so much more. WWF International, Gland, Switzerland. 74 pp.

Range recovery refers to the expansion of tiger populations into currently unoccupied areas within the historic range, either through natural dispersal or active reintroductions.

Natural dispersal is an evolutionary process by which individuals move away from the location they were born and resettle in a new area. Female tigers will disperse from their mother's territory when they reach independence, and will often settle in adjacent areas, while male tigers are known to disperse much longer distances to establish new territories or to find mates. Whilst many factors can influence the dispersal distance of tigers, movements of >100km have regularly been recorded.[4] This conservative 100km threshold is used as a reference point for potential natural dispersal feasibility in our analysis.

Reintroduction refers to the translocation of tigers to an area within their historic range. This can take place either by removing and relocating individuals from existing populations, or in some situations, by raising or rehabilitating injured or orphaned tigers and then releasing them into a new location. The goal of any reintroduction is to establish a viable population which will contribute to the conservation of the species. Reintroductions are an expensive, complicated and time consuming process, the planning of which takes many years and requires the support and backing of governments, civil society and communities. Many enabling conditions must be in place for a successful tiger reintroduction, a summary of which is outlined below.

Framework for assessing the feasibility of tiger reintroductions[5]



4 Sarkar, M.S., Niyogi, R., Masih, R.L., Hazra, P., Maiorano, L. and John, R., 2021. Long-distance dispersal and home range establishment by a female sub-adult tiger (Panthera tigris) in the Panna landscape, central India. European Journal of Wildlife Research, 67(3), pp.1-7.

5 Adapted from Gray, T. N. E., Crouthers, R., Ramesh, K., Vattakaven, J., Borah, J., Pasha, M. K. S., ... & Baltzer, M. (2017). A framework for assessing readiness for tiger Panthera tigris reintroduction: a case study from eastern Cambodia. Biodiversity and Conservation, 26(10), 2383-2399.

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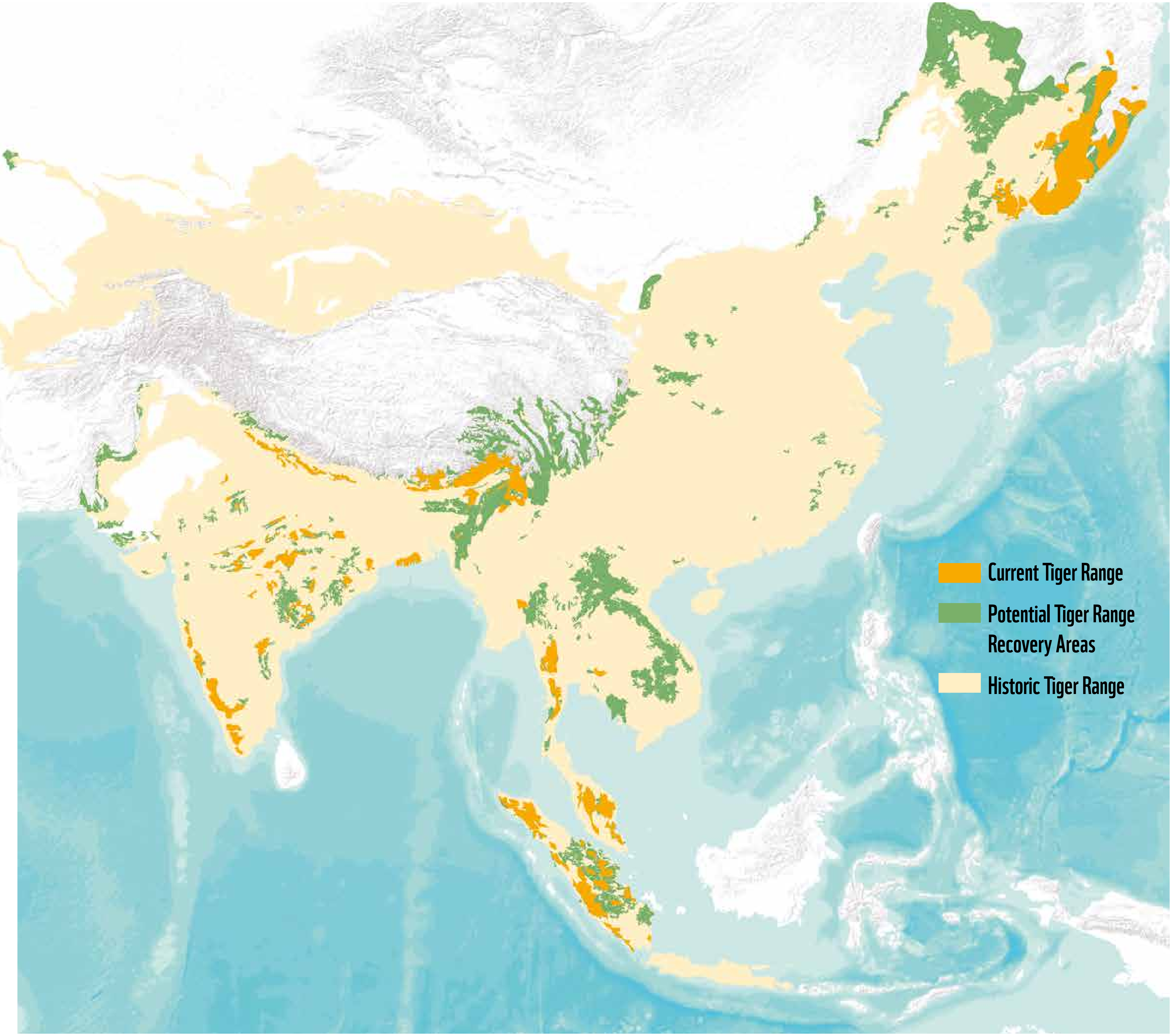
GEOGRAPHIC AREAS: THE TIGER RANGE

Current tiger range: the approximate current distribution of breeding tigers.[6] This range covers ~650,000km² across 10 countries: Bangladesh, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Russia, and Thailand.

Historic tiger range: the historic extent of likely tiger breeding populations. The historic tiger range is estimated to have covered ~11,800,000km² across 30 countries: the ten listed above as well as Afghanistan, Armenia, Azerbaijan, Cambodia, Georgia, Iran, Iraq, Kazakhstan, Kyrgyzstan, Lao PDR, North Korea, Pakistan, South Korea, Singapore, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan and Vietnam.

Range recovery areas: landscapes (>500km²) within the historic tiger range, where tigers are currently believed to be absent, and which have similar levels of human impacts as areas within the current tiger range. These areas may be able to sustain tiger populations in the future and should be considered by governments, civil society, and local communities as opportunities for future tiger range recovery.

6 Based on the 2015 IUCN Red List assessment of tiger (Goodrich et al., 2015) and modified for recent published changes in mainland Southeast Asia (Johnson et al., 2016; Suttidate et al., 2021) and Bhutan (Thinley et al., 2021).



OPPORTUNITIES FOR TIGER RANGE RECOVERY

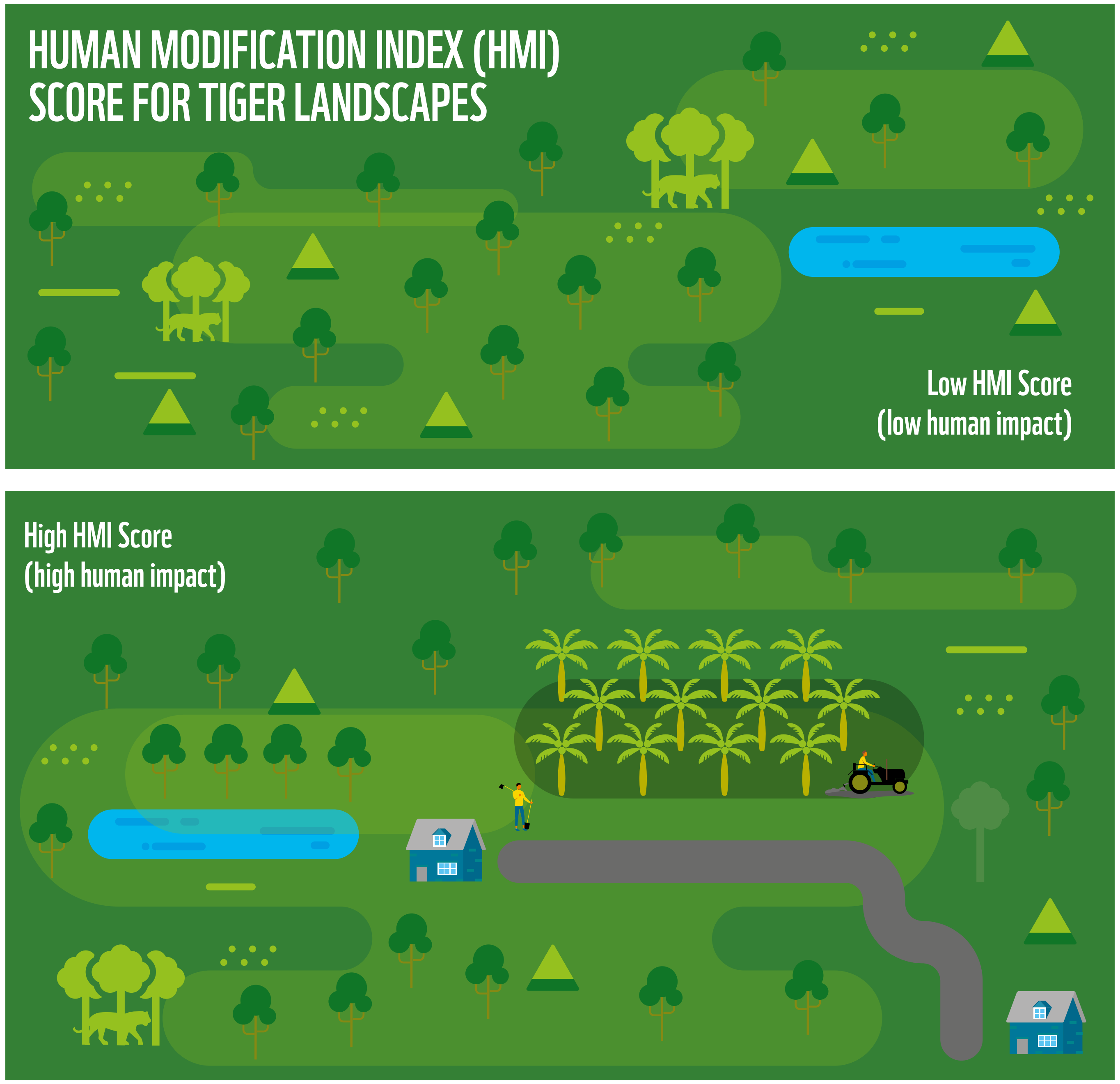
Tiger range recovery areas identified in this analysis cover 1.7 million km² across 15 countries, including all ten current tiger range countries and five additional countries where tigers were historically present. Together, these areas represent a >250% increase in the current tiger range and cover numerous ecosystems, including the steppe grasslands of central Asia and the dry forests of Indochina, from which tigers were lost in the 20th and early 21st century respectively. Approximately half of the range recovery areas are within 100km of current tiger populations — highlighting the potential for natural dispersal to drive significant range recovery. Returning tigers to some of these landscapes would generate significant benefits to people, wildlife, and the planet, but these efforts will only be successful with the full backing and participation of local communities. Holistic approaches which support people's ability to coexist with tigers are essential. Many of the range recovery areas, such as the Cardamom rainforest in Southwest Cambodia, serve as critical carbon sinks and protecting these and other important landscapes for tiger recovery would contribute to global climate change mitigation goals. An ambitious global goal for tiger range recovery — such as doubling the tiger range by 2040 — is achievable, and would make a powerful target around which to organise the next 12-years of International tiger conservation collaboration.

HUMAN IMPACT IN CURRENT TIGER HABITAT

Tigers are found in a diverse range of habitats from temperate forests, to grasslands, to mangrove swamps. Given enough space, sufficient prey and adequate protection, tiger numbers can grow quickly, even in areas where humans are present. However, not all human pressures present the same risks. For example, tigers are well known to use plantations and agricultural fields as movement corridors between core habitat, however other human modifications, such as linear infrastructure — roads, railways, gas pipelines, power lines, and canals — can seriously threaten tiger survival. In areas with significant human populations, tigers may compete directly with people for space and resources, and this human-tiger conflict (HTC), both real and perceived, can greatly impact the success of tiger recovery.

Current (and future) tiger distribution is strongly influenced by human pressures, but the impact of these pressures varies between regions due to political, cultural, and ecological factors. By measuring the degree of human pressure present in current tiger landscapes, we can estimate the threshold of human impact tigers could tolerate in potential future range areas as well.

To better establish the relationship between human impact and current tiger presence, we used the Human Modification Index (HMI)[7] — a cumulative measure of the human "footprint" on the environment. For countries with remaining tiger populations, we calculated the mean HMI score of the current tiger habitat. HMI is composed of remote sensed data (1km² resolution) on human settlements, agriculture, transportation, mining and energy production, and electrical infrastructure across the globe. Scores range from zero to one, with higher scores indicating greater human impact.



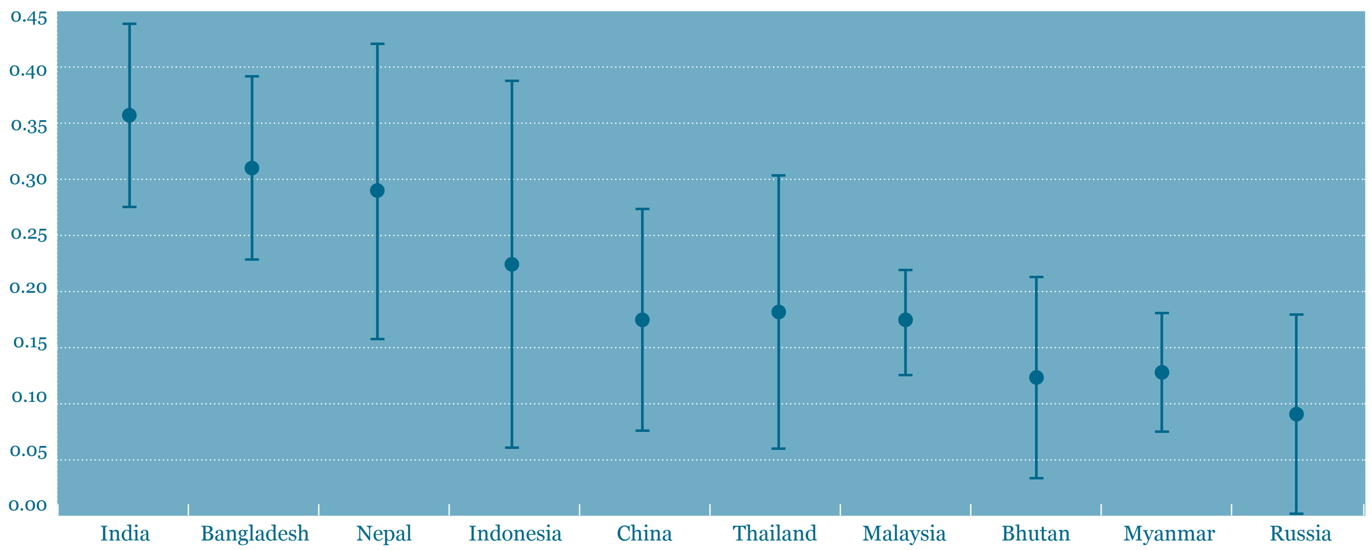
A woman planting a rice paddy in Assam, India.

The mean HMI score of the current tiger range varied considerably across the ten countries with breeding tiger populations. Tigers are found in areas with higher levels of human activity in South Asia than in Southeast and East Asia, with India, Bangladesh, and Nepal having the highest mean HMI within currently occupied tiger landscapes.

In addition to the national level scores, a mean score was also calculated for each large region within the tiger range: South Asia (Bangladesh, Bhutan, India, Nepal), Southeast Asia (Indonesia, Malaysia, Myanmar, Thailand), and East Asia (China, Russia). The human footprint within occupied tiger habitat was highest in South Asia followed by Southeast Asia, and lowest in East Asia.

Countries also varied in the per cent of current tiger range that is classified as forested. This was generally higher in East and Southeast Asia and lower in South Asia — particularly in India and Nepal. In these countries, large areas of current tiger habitat comprise mosaics of grassland and low intensity agriculture. A considerable proportion of the current tiger range is also outside formal protected areas (PAs). In four countries, the area of current tiger range within protected areas is less than 25%.

Mean HMI scores (+ standard deviation) of current tiger range



7 Kennedy, C.M., Oakleaf, J.R., Theobald, D.M., Baruch-Mordo, S. and Kiesecker, J., 2019. Managing the middle: A shift in conservation priorities based on the global human modification gradient. Global Change Biology, 25(3), pp.811-826.

Table 1. Mean HMI score, % protected area coverage and % forest cover across the current tiger range

COUNTRY	MEAN (± SD) HMI OF CURRENT TIGER RANGE	% OF CURRENT TIGER RANGE CLASSIFIED AS FOREST	% OF CURRENT TIGER RANGE WITHIN PROTECTED AREAS*
India	0.36 ± 0.16	54.1	24.07%
Bangladesh	0.31 ± 0.08	82.7	88.01%
Nepal	0.29 ± 0.14	39.0	38.09%
Indonesia	0.22 ± 0.07	68.1	33.40%
China**	0.20 ± 0.13	88.8	0.20%
Thailand	0.19 ± 0.12	88.9	88.44%
Malaysia	0.17 ± 0.12	77.2	28.01%
Bhutan	0.16 ± 0.08	93.6	54.10%
Myanmar	0.13 ± 0.05	99.2	53.29%
Russia	0.06 ± 0.06	97.2	23.68%

* Protected area coverage comes from the United Nations Environment Programme's (UNEP) World Database on Protected Areas (WDPA) (protectedplanet.net), and is not comprehensive. Errors in the WDPA are particularly egregious in China and India.

** Protected area data for China does not include the new Tiger and Leopard National Park in Jilin and Heilongjiang, which was established in 2016.

© KWCI / WWF - Myanmar

A camera trap captures a tiger in the Dawna Tenasserim landscape of Myanmar.

© WWF - Myanmar / Hkun Lat

ESTIMATING RANGE RECOVERY AREAS

HMI thresholds for existing tiger habitat were used to identify possible range recovery areas across the historic tiger range. For the ten countries with existing tiger populations, country specific HMI thresholds were used. Unoccupied historic range areas of 500km² or larger, with an HMI score below the mean for the country's current tiger range, were identified as recovery areas.

For the 20 historic tiger range countries, without current tiger populations, unoccupied areas of more than 3,000km² with an HMI score below the average for the region (South, Southeast or East Asia) were identified as recovery areas. For countries in Central Asia, the score for East Asia was used. This 3,000km² threshold was used in former tiger range countries, to conservatively account for the large landscapes which may be required to establish viable populations following tiger reintroduction.

The overlap between tiger range recovery areas and existing protected areas was identified based on the World Database of Protected Areas (WDPA), a global database on terrestrial and marine protected areas. Land cover data[8] were also analysed to determine the percentage of range recovery areas that are classified as forested, human-modified, or other land cover type (e.g. sparse vegetation, water bodies, bare areas, etc.) Lastly, all potential range recovery areas within 100km of current tiger habitat were extracted to identify those areas in which natural tiger dispersal might be possible.

8 Arino, O., Ramos Perez, J. J., Kalogirou, V., Bontemps, S., Defourny, P., & Van Bogaert, E. (2012). Global land cover map for 2009 (GlobCover 2009). http://due.esrin.esa.int/page_globcover.php

IDENTIFYING RANGE RECOVERY AREAS

Using the HMI thresholds, 1,701,991.52km² of habitat across the tiger's historic range are potentially suitable to support future tiger populations. These range recovery areas occur within 15 countries including all current tiger range countries and five with extirpated tiger populations — Cambodia, Lao PDR, Viet Nam, Pakistan and Kazakhstan. The countries with the largest extent of recovery areas are China (431,614.03km²), India (369,933.11km²), and Russia (209,699.69km²). These countries comprise just under 60% of all recovery areas. No recovery areas were identified in 15 historic tiger range countries including North and South Korea and the majority of countries in central and western Asia.

In total, ~50% of recovery areas are within 100km of current tiger populations. Seven countries (Bhutan, Malaysia, Indonesia, Bangladesh, India, Nepal, and Myanmar) had >75% of their recovery areas within 100km of current populations.

Overall 357,157.54km² of range recovery areas (21%) are within protected areas. This varied from 76% in Lao PDR and 74% in Cambodia to less than 5% in Pakistan (4%) Russia (2%), and Kazakhstan (0%).[9]

Almost 77% of the current tiger range is classified as forest (498,507.26km²), with the highest percent of forest cover in Myanmar and Russia (99% and 97% respectively). The lowest percent of forest cover is in Nepal and India, where 40% and 55% of the current tiger range is within human modified habitats. Similarly 74% (1,257,548.15km²) of range recovery areas are in forested areas, with 18% in human modified habitat. Range recovery areas in Russia overlapped almost exclusively with forested areas (98%) as did Lao PDR (98%), while range recovery areas in India, Pakistan, and Kazakhstan overlapped primarily with human modified habitat or other non-forested areas (8%, 3%, and 0% forested respectively).

Table 2. Potential range recovery areas by country

Country	Size of potential range recovery area (km²)	% of range recovery areas that overlap with PAs*	% of range recovery areas within 100km of existing tiger range	% of range recovery areas that are forested
China	431,614.03	16.42%	12.16	68.26%
India	369,933.11	31.31%	86.47	8.06%
Russia	209,699.69	2.03%	64.57	98.03%
Indonesia	188,693.20	12.90%	94.51	55.60%
Lao PDR	155,255.15	76.01%	0.00	97.64%
Myanmar	89,433.76	45.80%	78.38	96.98%
Cambodia	71,000.05	74.18%	0.00	89.58%
Thailand	59,556.73	41.41%	56.61	94.55%
Pakistan	41,225.04	4.41%	0.00	2.96%
Malaysia	35,025.67	23.02%	100.00	82.41%
Viet Nam	18,550.58	8.04%	0.00	94.65%
Bangladesh	10,457.42	37.24%	92.14	95.68%
Bhutan	9,415.30	23.95%	100.00	96.30%
Nepal	7,954.69	11.31%	79.94	67.31%
Kazakhstan	4,177.08	0.00%	0.00	0.00%
Total	**1,701,991.52**	**20.98%**	**49.96%**	**73.89%**

* Protected area coverage comes from the United Nations Environment Programme's (UNEP) World Database on Protected Areas (WDPA) (protectedplanet.net), and is not comprehensive.

9 Protected area coverage comes from the United Nations Environment Programme's (UNEP) World Database on Protected Areas (WDPA) (protectedplanet.net), and is not comprehensive. In Kazakhstan, the range recovery area overlaps protected areas established to support tiger reintroduction.

50% RANGE RECOVERY AREAS ARE WITHIN 100KM OF CURRENT TIGER POPULATIONS. THIS MEANS, NATURAL DISPERSAL INTO MANY OF THESE AREAS IS POSSIBLE.

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In Indonesia, community members and WWF staff meet to discuss traditional community conservation areas.

DISCUSSION

We demonstrate there is potential for significant tiger range recovery across the species' historic range. Range recovery areas occur in all of the countries which currently support tigers and in at least five countries which lost their tigers in the past 20 to 100 years. Our results demonstrate that tiger range expansion is feasible and we urge governments to commit to an ambitious goal of increasing the range of tigers as a key element of the new Global Tiger Recovery Program 2022-34.

In every current tiger range country but China, the majority of range recovery areas are within 100km of current tiger populations; well within the documented dispersal distance of tigers.[10] This means, natural dispersal into many of these areas is possible provided the matrix is hospitable to tiger movements. There is recent evidence that such dispersal events are currently taking place, for example, in the Himalayan foothills of Bhutan and eastern Nepal. In 2020, cameras in Nepal's Ilam district captured a tiger at 3165m — the highest documented altitude for tigers in the country and 250km east of Nepal's known tiger range.[11] In neighbouring Bhutan, tigers have been photographed as high as 4100m.[12] Such areas may be the future frontiers of tiger dispersal and colonisation. To facilitate this process, conservation and land-use planning should focus on range recovery areas in close proximity to existing tiger populations and work with local communities to prepare for possible future tigers. The protection of tiger source populations must also remain a priority.

In all but two countries (Cambodia and Lao PDR), more than half of range recovery areas we identified are outside of formal protected areas. In China, India, and Russia, the countries with the largest potential area for range recovery, the percentage of area outside PAs is even higher (84%, 69%, and 98% respectively).[13] While effective protection and enforcement is crucial to tiger recovery, there is increasing recognition of the critical role that other effective area-based conservation measures (OECMs), such as indigenously managed land, play for conservation. Community-led studies are needed to understand the impact of possible tiger recovery, particularly those outside of protected areas, and to develop supportive conservation strategies that incorporate the needs and perspectives of people living in these areas. In landscapes where tiger reintroductions are planned, a rights-based approach, including the voluntary participation and support

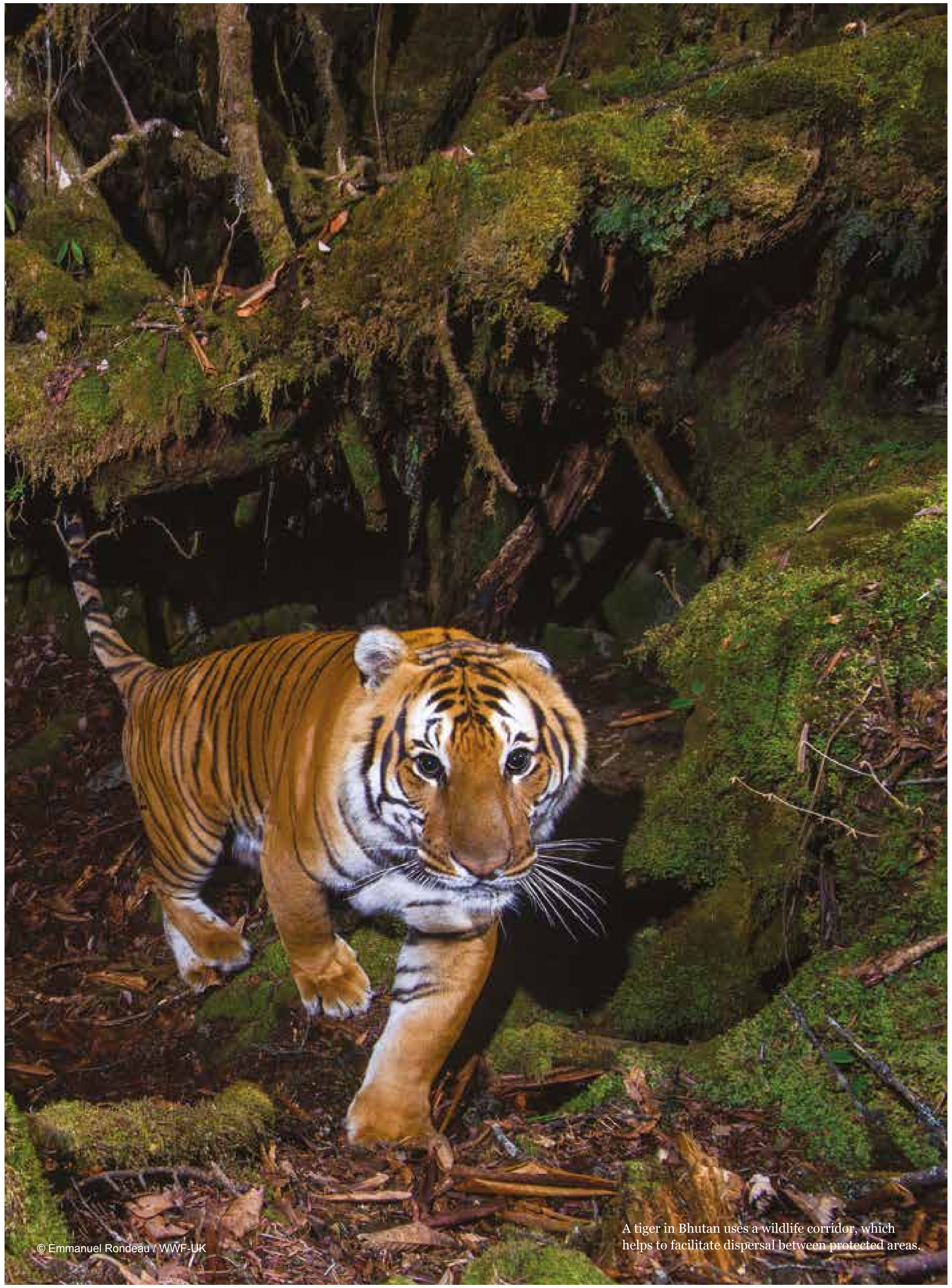
10 Sarkar, M.S., Niyogi, R., Masih, R.L., Hazra, P., Maiorano, L. and John, R., 2021. Long-distance dispersal and home range establishment by a female sub-adult tiger (Panthera tigris) in the Panna landscape, central India. European Journal of Wildlife Research, 67(3), pp.1-7.

11 Bista D, Lama ST, Shrestha J, Rumba YB, Weerman J, Thapa MK, Acharya H, Sherpa AP, Hudson NJ, Baxter GS, Murray PJ (2021) First record of Bengal Tiger, Panthera tigris tigris Linnaeus, 1758 (Felidae), in eastern Nepal. Check List 17 (5): 1249–1253. https://doi.org/10.155 60/17.5.1249

12 Thinley, P., Dendup, T., Rajaratnam, R., Vernes, K., Tempa, K., Chophel, T. and Norbu, L., 2020. Tiger reappearance in Bhutan's Bumdeling Wildlife Sanctuary: a case for maintaining effective corridors and metapopulations. Animal Conservation, 23(6), pp.629-631.

13 Protected area coverage comes from the United Nations Environment Programme's (UNEP) World Database on Protected Areas (WDPA) (protectedplanet.net), and is not comprehensive. Protected area data for China does not include the new Tiger and Leopard National Park in Jilin and Heilongjiang, which was established in 2016.

NEARLY 80% OF RANGE RECOVERY AREAS ARE OUTSIDE FORMAL PROTECTED AREAS.


© Emmanuel Rondeau / WWF-UK

A tiger in Bhutan uses a wildlife corridor, which helps to facilitate dispersal between protected areas.

LANDSCAPES FOR TIGER RANGE RECOVERY

Tiger range recovery is essential to the long-term conservation of the species. In some landscapes, efforts to reintroduce tigers have already been successful. In others, range recovery through reintroductions or natural dispersal is possible, given the right enabling conditions. This map highlights some areas for range recovery efforts across the tiger's historic range.

ILI-BALKHASH, KAZAKHSTAN

Tigers were driven to extinction in central Asia in the mid 20th century. In one of the most exciting conservation programs globally, the government of Kazakhstan, in partnership with WWF, is working to return tigers to the delta of lake Balkhash. A combination of habitat restoration, prey recovery, and community outreach is likely to result in tiger reintroduction by 2025.

AMURSKAYA OBLAST, RUSSIA

Rehabilitated wild tigers have been released into this remote area of Russia and established a small breeding population. Satellite tracking shows these tigers also dispersing into the adjacent Lesser Khingan mountains of China.

HIMALAYAN FOOTHILLS, INDIA

Range recovery areas exist in the Himalayan foothills of India, and recent surveys have shown that a small number of tigers likely exist in this landscape. With improved connectivity to sources in the Terai Arc Landscape and recovery of prey populations, this landscape could support a larger tiger population in the future.

PANNA, INDIA

In 2009, tigers had gone extinct in Panna Tiger Reserve, in Madhya Pradesh India, as a result of poaching. Tigers were translocated into Panna from other reserves in the state and today the population in the protected area is >50 tigers. This represents one of the most successful examples of large carnivore reintroductions globally.

THAILAND

A number of well managed protected area complexes occur in Thailand. Following robust feasibility studies to assess prey populations, conducted in partnership with local communities, these areas could provide opportunities for future tiger reintroductions.

South China

South China tigers are extinct in the wild, but well managed captive populations remain. With prey augmentation and strong protection, the South China tiger could be reintroduced to a number of potential sites in the future.

CARDAMOMS, CAMBODIA

Tigers were lost from the rainforests of the Cardamom Mountains of Cambodia around 2005 due to poaching. However, plans for reintroduction are now underway as a result of strong law enforcement efforts to recover tiger prey and protect these carbon rich forests which are critical for regional climate stability.

of all relevant stakeholders, especially Indigenous Peoples and local communities, is essential. In many areas the social or political support for tiger range recovery may not yet exist. Such areas, including some which we have identified as range recovery areas, would be inappropriate for active recovery until such constraints are addressed. Expanding protected areas to cover some of the range recovery areas, and effectively accounting for and protecting OECMs in other recovery areas, would support and align with the global vision of 30x30. In this context, tiger range countries are particularly important, as they contain many areas of high biodiversity which would almost certainly deliver broad ecological benefits beyond the protection of a single species. Many of the range recovery areas are critical for climate stability, and protecting these landscapes — which can be catalysed through active tiger recovery efforts — is an essential part of the global response to the climate crisis and nature-based solutions.

Across the historic range, low densities of prey species, partly as a result of the Asian Snaring Crisis, has driven the decline in tiger numbers.[14,15] In many range recovery areas, there is also a need to restore populations of tiger prey species. Such efforts are currently underway in range recovery areas in countries including Kazakhstan, Thailand, and China. Restoration will be most impactful in those areas which serve to connect high quality habitat fragments and facilitate tiger dispersal, or help to buffer core areas from further encroachment.

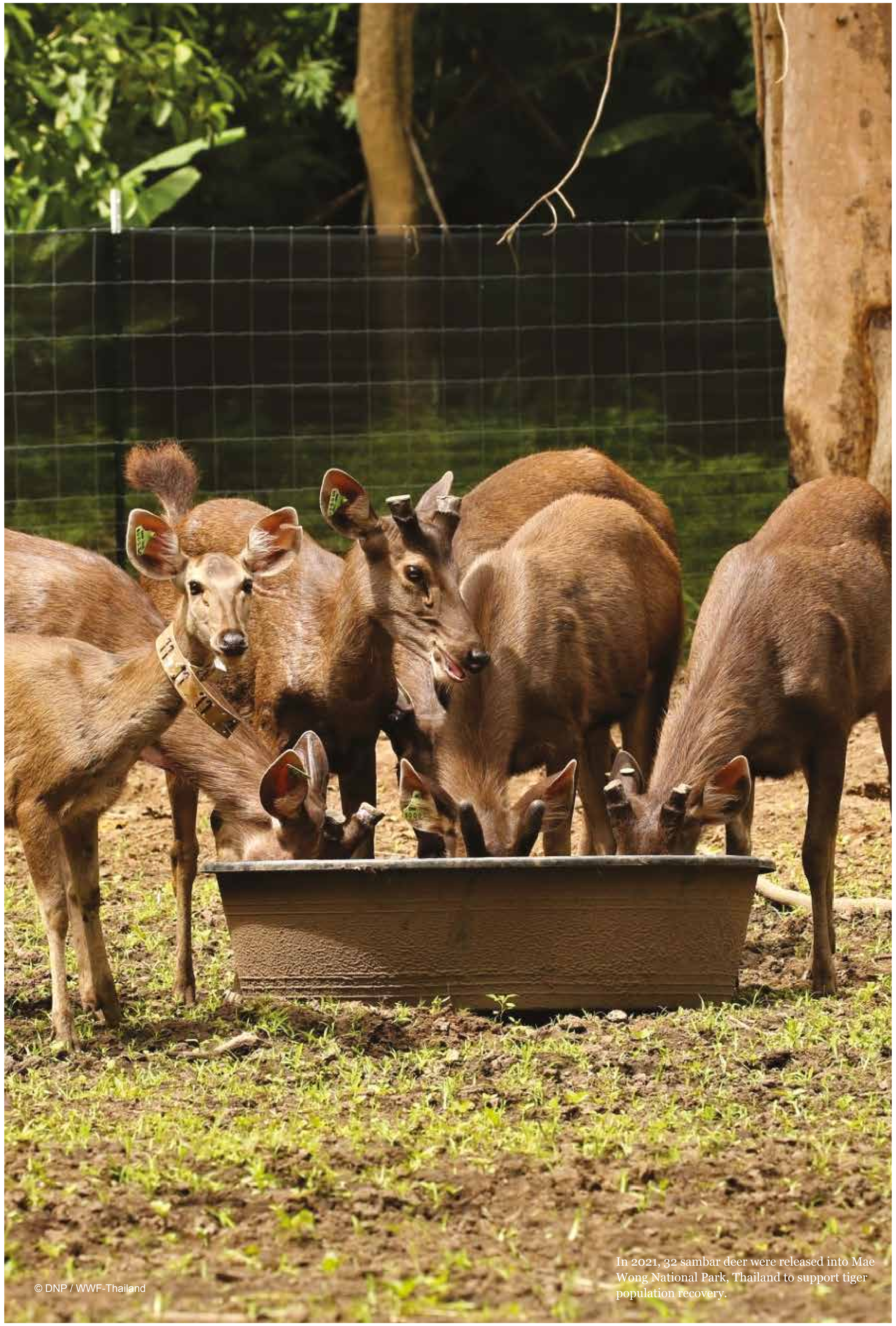
For range recovery areas that are isolated from the current tiger range, reintroductions can be considered. Reintroductions using both wild captured and rehabilitated tigers have been successful in a number of tiger range countries including India and Russia. Russia has also reintroduced wild born but abandoned tiger cubs, which were raised in a specialised tiger facility prior to their release. Three landscapes which we identified — the Ili-Balkhash landscape in Kazakhstan, the Cardamom Rainforest Landscape in Cambodia, and the Eastern Plains Landscapes in Cambodia — are the focus of current tiger reintroduction plans. Those in Kazakhstan, where initial tiger releases are planned for 2025, are the most advanced. A number of the landscapes identified in Thailand (e.g. the Phou Khieu and Khlong Saeng-Khao Sok Forest Complexes) have also been highlighted in the country's tiger recovery planning as appropriate for future reintroductions. We recommend a detailed site feasibility analysis be conducted in full partnership with local communities, ahead of any proposed reintroduction. Effective protected area management, community and political support, and sufficient prey are essential to any tiger reintroduction effort.

The new Global Tiger Recovery Program (2022-2034) should include ambitious goals that inspire bold conservation action across tiger range countries, and build on the successes achieved to date. WWF, together with a coalition of other non-governmental organisations (NGOs), believe that a key feature of this strategy must include targets to expand occupied tiger habitat and to increase suitable habitat for tigers within each tiger range country. In areas of their historic range where tigers no longer occur, but where restoration is feasible, the global conservation community should assess whether reintroduction may be possible and, when appropriate, should develop and implement plans for reintroduction to help turn the tide.

Achieving these goals is likely to require conservation interventions and institutional support at every level. Therefore, identifying opportunities and constraints in terms of the political and social enabling conditions necessary for tiger recovery, will also be an important consideration. Where other carnivore range recovery efforts have been successful (e.g brown bear and grey wolf recovery in Europe), it has only been with strong political will (and resources) for conservation, and with support from local communities.

We know that political support for tiger conservation varies across Asia. In Bhutan, India, Nepal, and Russia, national tiger conservation bodies have been formally established to support and foster the tiger conservation agenda. It is important to note that the results of this analysis would differ based on the HMI thresholds selected, and if a higher HMI threshold was used in countries with higher political support for conservation, the area available for range recovery may increase. Similarly, if a lower HMI threshold was used in places such as Lao PDR and Viet Nam, where the species has recently been lost, the area available for range recovery would shrink dramatically. Therefore, increasing both the political and social carrying capacity for tigers will expand the available area for recovery and will be vital to the success of any tiger recovery goals. Political support, as evidenced by tangible indicators such as conservation funding, hiring and training of rangers and other enforcement staff, criminal prosecutions for wildlife offenders, and investments in local communities, is essential to effective tiger conservation in increasingly human dominated landscapes. Incorporating explicit measures of political support for tiger conservation would further strengthen our understanding of range recovery opportunities.

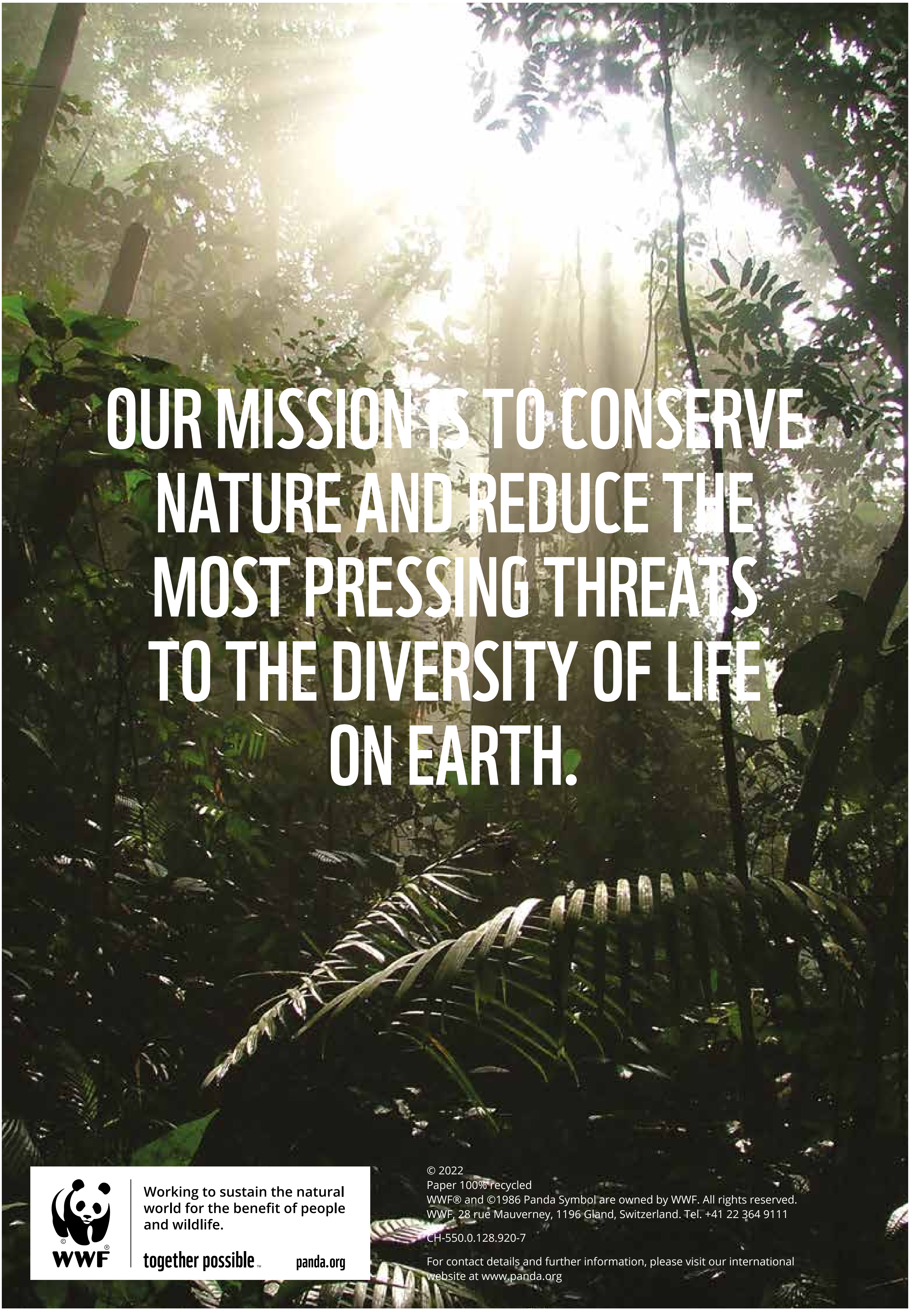
While this report is not a prescriptive blueprint for tiger recovery, reintroductions, or translocations, we hope the areas identified showcase some of the opportunities for future range recovery provided the landscapes are protected and existing threats are mitigated. Focusing conservation efforts on some of these places could prepare for the return of the tiger while also securing critical conservation landscapes and benefiting both people and wildlife.



In 2021, 32 sambar deer were released into Mae Wong National Park, Thailand to support tiger population recovery.

14 Wolf, C. and Ripple, W.J., 2016. Prey depletion as a threat to the world's large carnivores. Royal Society Open Science, 3(8), p.160252.

15 Gray, T.N., Hughes, A.C., Laurance, W.F., Long, B., Lynam, A.J., O'Kelly, H., Ripple, W.J., Seng, T., Scotson, L. and Wilkinson, N.M., 2018. The wildlife snaring crisis: an insidious and pervasive threat to biodiversity in Southeast Asia. Biodiversity and conservation, 27(4), pp.1031-1037.



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