



The Global Tiger Recovery Program

SUB-ZERO WORKING DRAFT
subject to team, peer, and TRC review

July 30, 2010



GLOBAL TIGER RECOVERY PROGRAM

VOLUME 1

FOREWORD

TK

EXECUTIVE SUMMARY

TK

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122 **ACRONYMS USED IN THE TEXT**

ADB	Asian Development Bank
ASEAN-WEN	Association of Southeast Asian Nations-Wildlife Enforcement Network
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Flora and Fauna
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GIS	Geographical Information System
GMS	Greater Mekong Sub-region
GSP	Global Support Program
GTF	Global Tiger Forum
GTI	Global Tiger Initiative
GTRP	Global Tiger Recovery Program
ICCWC	International Consortium for Combating Wildlife Crime
IDA	International Development Association
IFAW	International Fund for Animal Welfare
INTERPOL	ICPO – International Criminal Police Association
ITC	International Tiger Coalition
IUCN	International Union for Conservation of Nature
KGTW	Kathmandu Global Tiger Workshop
MDG	Millennium Development Goals
MoU	Memorandum of Understanding
NGO	Non-governmental Organization
NTRP	National Tiger Recovery Priorities
PA	Protected Area
PES	Payment for Ecosystem Services
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
SA-WEN	South Asia-Wildlife Enforcement Network
SEA	Strategic Environmental Assessment
SGI	Smart Green Infrastructure
STF	Save the Tiger Fund
TCL	Tiger Conservation Landscape
TCM	Traditional Chinese Medicine
TRC	Tiger Range Country
UN	United Nations
UNCAC	United Nations Convention against Corruption
UNTOC	United Nations Convention against Transnational Organized Crime
UNODC	United Nations Office on Drugs and Crime
US	United States
USAID	United States Agency for International Development
WBI	World Bank Institute
WCO	World Customs Organization
WCS	Wildlife Conservation Society
WEF	Wildlife Enforcement Network
WWF-US	World Wildlife Fund US
WWF	Worldwide Fund for Nature

123

124

125 Chapter 1 INTRODUCTION

126 Part A Background to the GTRP

127 The Global Tiger Recovery Program (GTRP) is the result of an
128 unprecedented collaboration among the consortium of 13 Tiger
129 Range Countries (TRCs) (Box 1), national and international non-
130 profit conservation organizations, international institutions, and
131 others working together within the framework of the Global Tiger
132 Initiative (GTI).

133 The GTI was founded in 2008 after wild tiger population
134 trajectories predicted that wild tigers would go extinct by 2040, if
135 not sooner. The discovery that tigers had been extirpated or were
136 on the brink in Tiger Reserves in India, protected areas in Nepal,
137 and across the landscape in Cambodia was empirical testimony of
138 this alarming trend. More than 30 years of conservation initiatives and investments of millions of dollars
139 may have slowed the rate of the tiger’s decline: there are some tiger conservation success stories. But
140 overall, despite the best of intentions, these disparate efforts are not working to save tigers and the
141 ecosystems on which they depend because the critical threats have not been adequately addressed or have
142 grown. Habitat fragmentation, degradation, and loss continue largely unabated. The exploitation of tigers—
143 killing them to feed a large illegal trade in their parts and products—is increasing, fueled by growing
144 consumer demand globally and societal impotence to stop it. The exploitation of tigers’ prey—deer, wild
145 pigs, and wild cattle—continues to rob tigers of the food they need to survive.

146 The Tiger Range Countries, with some exceptions, suffer from inadequate institutional and financial
147 capacity for sustained interventions to mitigate these threats and the interventions supported and
148 conducted by the international community have been largely uncoordinated and subject to the vagaries of
149 changes in donor funding and priorities. The GTI is built on the belief that political will and commitment
150 at the highest level and coordinated action by all stakeholders are essential to successful tiger and
151 biodiversity conservation. To succeed, we must engage a host of constituencies, from the general public
152 to national political leaders, from local communities to international development agencies and
153 corporations.

154 The GTRP emerged out a series of international fora in which the TRCs achieved consensus on the tiger
155 recovery goal described below and how to achieve it, including the type of support they require from the
156 international community. These fora (Box 2), which included the first-ever Asian ministerial-level
157 meeting on tiger conservation, also created the political will that led to the unprecedented heads of
158 governments “Tiger Summit” in St. Petersburg, Russia, in September 2010, where the GTRP was
159 endorsed in the St. Petersburg Declaration.

Box 1: Tiger Range Countries

People’s Republic of Bangladesh
Kingdom of Bhutan
Kingdom of Cambodia
People’s Republic of China
Republic of India
Republic of Indonesia
Lao People’s Democratic Republic
Malaysia
The Union of Myanmar
Federal Democratic Republic of Nepal
Russian Federation
Thailand
Socialist Republic of Vietnam

Box 2: International Fora on Tiger Conservation and Their Outcomes, 2009-2010
April, 2009: A Forgotten Crisis International Workshop → *Pattaya Manifesto on Combating Wildlife Crime*
November, 2009: Kathmandu Global Workshop on Tiger Conservation → *Kathmandu Recommendations*
January, 2010: 1st Asian Ministerial Conference on Tiger Conservation → *Hua Hin Declaration*
July, 2010: Bali Pre-Tiger Summit Partners Dialogue → *Global Tiger Recovery Program Endorsement and Draft St. Petersburg Declaration*
September, 2010: **Tiger Summit in Russia official name** → *St. Petersburg Declaration*

160

161 The particular challenges and opportunities for tiger conservation vary from nation to nation among the 13
162 sovereign Tiger Range Countries that bear primary responsibility for the tigers that live within their
163 borders. Thus, the foundation of the GTRP consists of 13 separate National Tiger Recovery Priorities
164 (NTRPs), developed in response to the commitments TRCs made in the Hua Hin Declaration, that outline
165 the incremental actions each TRC will take to contribute to the global goal. The national priority actions
166 detailed in the GTRP are based on good science and analyses of existing and proven best practices and
167 models employed in one or more TRC, with appropriate habitat- or country-specific adaptations.

168 Recognizing, however, that solving the tiger crisis is also a global responsibility and requires global
169 action, the GTRP also includes a set of Global Support Programs (GSPs)—actions the TRCs requested in
170 the Hua Hin Declaration be undertaken by the international community to help ensure the success of the
171 TRCs’ recovery programs. The four GSPs address combating wildlife crime, demand reduction,
172 institutional development and capacity building, and monitoring of tigers and their prey and habitat across
173 the range to assess progress toward tiger recovery.

174 Finally, the Hua Hin Declaration calls for the international community to provide or mobilize financial
175 and/or technical support to tiger conservation and invited the development of a multi-donor trust fund or
176 other flexible arrangements to be to support a global tiger recovery program. Thus, the GTRP includes a
177 discussion of program costs and funding mechanisms.

178 **Part B Goal of the GTRP and the Feasibility of Achieving Tx2**

179 The goal of the Global Tiger Recovery Program (GTRP) is ensure the implementation of actions that will
180 reverse the rapid decline of wild tigers toward extinction and then double the number of wild tigers by
181 2022. In shorthand, the goal is “Tx2.” Reaching this goal means going from the current estimate of about
182 3,200 tigers across the range to about 7,000.

183 The GTRP is also based on the premise that the tiger crisis does not exist in isolation, but represents the
184 broader biodiversity crisis in Asia and around the world. As apex predators, tigers are barometers of the
185 health of their forests ecosystems—ecosystems that support an immense wealth of biodiversity. The same
186 broad forces—natural habitat deterioration and anthropogenic over-exploitation—that endanger tigers
187 also endanger other wildlife and their ecosystems. But people also depend on these natural systems, and
188 endangerment of the ecosystems will have cascading impacts on the socio-economic systems and
189 structures of people and nations. Thus, wildlife conservation can no longer be treated as a fringe concern
190 we can’t afford; rather, it must be understood for what it really is—an integral cog in social and economic
191 development aspirations and plans, and central enough that, if ignored, will result in a bleaker future as
192 the ecological services that sustain livelihoods and economies begin to deteriorate and disintegrate.

193 Tx2 is not merely an aspirational goal. Our scientific understanding of tigers demonstrates that doubling
 194 is theoretically feasible, if poaching is contained and habitat is protected and managed for tigers, as
 195 discussed further in Chapter 4. More important, the goal each TRC believes it can achieve, *if* its priority
 196 actions are undertaken in conjunction with global support, makes it possible. As shown in Table 1, the
 197 numbers add up.

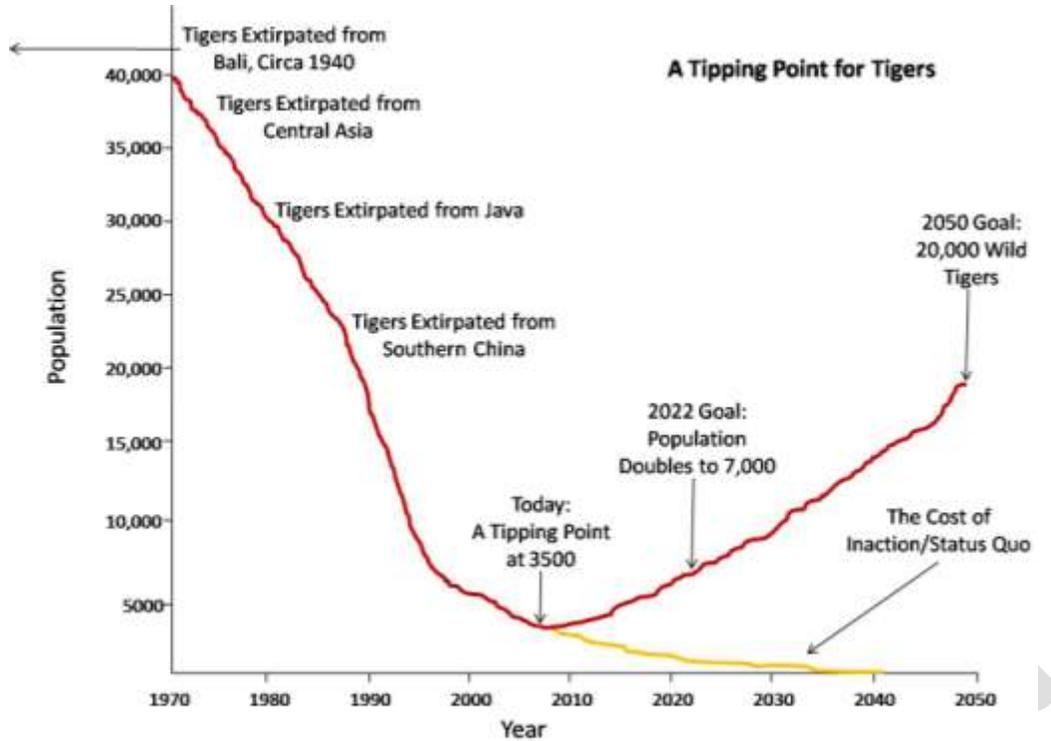
198 Table 1 Tiger Recovery Goals of TRCs from NTRP Assessments: Getting to Tx2.

TRC	Baseline mean estimated number of tigers, adults (range)	Recovery goal by 2022 in adult tigers	Estimated % increase potential; adult tigers
Bangladesh	400 (300-500)	Demographically stable at or near carrying capacity	<20%; 500
Bhutan	75 (67-81)	Demographically stable population	<20%; 90
Cambodia	No known source breeding population;	75; will require translocation program	75
China	45 (40-50)	Significant population growth; Increase to 50 in Changbaishan recovery program	>100%; 90
India	1400 (1165-1657)	50% increase	50%; 2100
Indonesia	325 (250-400)	Increase tiger populations at 6 priority landscapes by 100 percent and occupancy levels by 80%	100%; 650
Lao PDR	25 at only 1 source site	100% increase	100%; 50
Malaysia	500	100% increase	100%; 1000
Myanmar	85	100% increase	100%; 170
Nepal	121	100% increase	100%; 250
Russia	360 (330-390)	50% increase	50%; 500
Thailand	275	50% increase	50%; 410
Vietnam	No known source breeding population	50 tigers; will require translocation program	50
TOTAL	3611		6935

199
 200 All that is missing is the required resources to get it done. The GTRP offers for the first time a good
 201 estimate, developed by TRCs from the “bottom up,” of the costs of conserving wild tigers and their
 202 landscapes. If society, in the broadest sense, comes to understand the true values of tigers and their
 203 landscapes, including their economic value, and supports tiger conservation at level commensurate with
 204 those values, the goal of the GRTP will be achieved.

205 Wild tigers are at a tipping point (Figure 1). By taking the actions outlined in this GTRP, we can double
 206 the number of wild tigers by 2022, and even look to a future where their numbers double or more again.
 207 Or, we face the certain prospects of world without wild tigers.

208



209

210 Figure 1: Tigers are at a Tipping Point: Action today will determine whether tigers recover or go extinct.
211

212 **Part C How This Document is Organized**

213 Chapter 2 outlines the values of tigers and their landscapes, noting that the root cause of all of the threats
214 to the survival of tigers and their landscapes is that they are undervalued. Chapter 3 outlines why and how
215 tigers and tiger habitats have reached their current severely imperiled state in the wild. Chapter 4
216 describes how the threats to tigers and their landscapes can be addressed, based on good science and best
217 practices. Chapter 5 synthesizes the priority actions the Tiger Range Countries will take to conserve
218 tigers, based on their National Tiger Recovery Programs (NTRPs), and summarizes the Global Support
219 Programs offered by the international community.. Chapter 6 summarizes the costs of the GTRP and
220 mechanisms for funding it. Chapter 7 discusses GTRP management and implementation. Detailed
221 snapshots of the NTRPs are provided in Appendix 1, while the complete NTRPs and GSPs are found in
222 Volume 2

223

224 Chapter 2 THE VALUE OF TIGERS AND TIGER LANDSCAPES

225 The future of tiger conservation is a matter of societal choice and the choices people make—as
 226 individuals, communities, institutions, and wider society—are determined by the value they ascribe to the
 227 existence of tigers, tiger landscapes, and biodiversity. For many people, the intrinsic or existence value of
 228 wildlife and wildlands is sufficient to justify their conservation. Set against other priorities, especially for
 229 economic development and poverty alleviation, arguments based on intrinsic value rarely prevails in
 230 policy and decision making. However, people do derive benefits from nature, many of which are local,
 231 national, or global public goods. Called *ecosystem services*, these benefits are of significant economic
 232 importance and there are growing efforts to measure and monetize them.

233 The Economics of Ecosystems and Biodiversity (TEEB) study is one major initiative to demonstrate the
 234 global economic benefits of biodiversity as well as the costs of biodiversity loss and environmental
 235 degradation, which have direct economic repercussions that are systematically underestimated.¹ Further,
 236 while values of nature have not been fully appreciated in finance, infrastructure, business, and other
 237 sectors, that is beginning to change. Among global CEOs surveyed in 2009, 27 percent were concerned
 238 about the effects of biodiversity loss on their business growth prospects.²

239 Although economic assessments of the ecosystem services provided by Tiger Conservation Landscapes
 240 are in their infancy (but see Box 3), available data indicate that tiger ecosystems are protectors of Asian
 241 biodiversity and human well being in the region. Tigers and their ecosystems are part of the national
 242 heritage of 13 countries that should be preserved for future generations. Tiger ecosystems provide a host
 243 of ecosystem services that range from poverty alleviation at the local level to carbon sequestration at the
 244 global level.

245 Box 3: Economic Valuation of Leuser National Park

246
 247 An economic valuation of the Leuser National Park
 248 on Sumatra is one of the most comprehensive of its
 249 kind in a Tiger Conservation Landscape.³ The 2002
 250 study determined the total economic value (TEV) of
 251 the Leuser Ecosystem, taking into account the
 252 benefits of water supply, fisheries, flood and
 253 drought prevention, agriculture and plantations,
 254 hydropower, tourism, biodiversity, carbon
 255 sequestration, fire prevention, non-timber forest
 256 products, and timber. Over a 30-year period, the
 257 accumulated TEV for the ecosystem was US \$7.0
 258 billion under a deforestation scenario, \$9.1 billion
 259 under a selective use scenario, and \$9.5 billion
 260 under a conservation scenario, with major
 261 contributors to the later two being water supply,

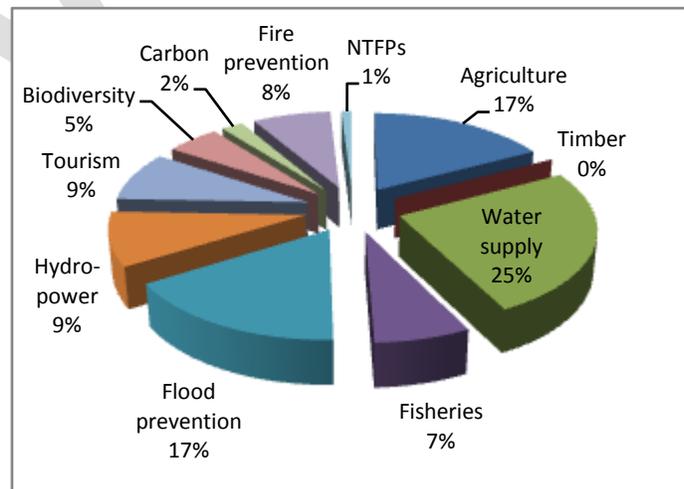


Figure 2 How different ecosystem services contribute to the TEV of Leuser Ecosystem under a conservation scenario.

¹ <http://www.teebweb.org>

² TEEB – The Economics of Ecosystems and Biodiversity Report for Business – Executive Summary 2010.

³ Van Beukering, P.J.H, H.S.J. Cesar, and M.A. Janssen. 2002. Economic valuation of Leuser National Park on Sumatra, Indonesia. *Ecological Economics* 44:43-62.

262 flood prevention, tourism, and agriculture. What is more, conservation benefits all stakeholders except for the
263 elite logging and plantation industry. Thus deforestation contributes to social and economic inequity while
264 conservation promotes equity by distributing more the value to the unprivileged majority.
265

266 Tigers live in forests and forests provide more ecosystem services than any other habitat type. Moreover,
267 tiger landscapes are among the last, if not the only remaining large forest ecosystems in the TRCs. Only
268 24 percent of areas outside tiger habitat is forested in the historic tiger range but, on average, 81 percent
269 of the area of a TCL is forested. There is no more wilderness to be discovered, in Asia or anywhere. If
270 tigers and their ecosystems are eliminated, the values they embody cannot be replaced.

271 **Ecosystem Services of Tiger Landscapes**

272 *Cultural Services*

273 Tigers are highly significant symbols in Asian cultures and globally. Tigers figure prominently in the
274 spiritual beliefs of many different Asian peoples and tigers are the subject of a wealth of Asian lore and
275 legend. These fabulous great predators have long inspired art and literature in Asia and in the West and
276 are metaphors for power, mystery, grace in many languages. Wild tigers embody wildness. A tiger's roar
277 in the night or track in the sand evokes awe—and respect for the treasures of the natural world. The loss
278 of this icon of Asia and glory of the world will mean the loss of these cultural and spiritual values and
279 will diminish the spirit of current and future generations. Tiger landscapes also encompass many sites that
280 are sacred in traditional Asian cultures.

281 Ecotourism is the fastest growing and most profitable segment of the tourist industry. A 2006 report
282 concludes that tourism, "appears to be one of the few economic sectors able to guide a number of
283 developing countries to higher levels of prosperity and for some to leave behind their least-developed
284 country status".⁴ One recent study estimated that ecotourism alone is worth \$1,350 per hectare of dense
285 forest in India.⁵ Charismatic megafauna, like tigers and other carnivores, are highly attractive to tourists.
286 In the United States, tourists who visited Yellowstone National Park specifically to see wolves generated
287 about \$35.5 million a year in the three-state area around the park.⁶ There is also increasing evidence that
288 visits to forests and other green areas contribute to mental and physical health.

289 *Ecological Services*

290 Because tigers are apex predators at the top of the food chain in many Asian ecosystems, the loss of tigers
291 from their natural habitat will result in irreversible changes in the intricate web of life that forms and
292 maintains those ecosystems. The consequences of this cannot be predicted with confidence, but research
293 in a variety of ecosystems shows that the loss of a top predator has effects that cascade through the
294 ecosystem. The primary prey of tigers are deer, wild pigs, and wild cattle. Without the tiger holding their
295 numbers in check, an increase in these herbivore can also have serious economic consequences.

⁴ http://psdblog.worldbank.org/psdblog/2006/07/tourists_have_n.html

⁵ The Value of Biodiversity in India's Forests

<http://www.esocialsciences.com/data/articles/Document12682007150.4325373.pdf>

⁶ Duffield, J, C. Neher and D. Patterson.. 2006. Wolves and People in Yellowstone: Impacts on the Regional Economy

296 In Bhutan, for example, a poisoning campaign to eradicate dholes, which depredated livestock, in the
297 early 1980s resulted in an explosion of wild boar and a large increase in crop depredation.⁷ Without
298 wolves in the eastern United States, overabundant white-tailed deer inflict significant economic losses to
299 agriculture, nurseries, and landscaping, estimated in 13 states at \$248 million each year. In 2008,
300 collisions with car and other vehicles resulted in 150 human fatalities, 29,000 injuries, and an estimated
301 \$1.1 billion in vehicle damage.⁸

302 *Protection of Biodiversity*

303 Tigers serve as umbrella species: setting aside large areas for their protection will automatically protect
304 many other species. South Asia is home to about 15 percent of the world's biodiversity, and Southeast
305 Asia accounts for about 20 percent. South and Southeast Asia are also home to a high percentage of the
306 animals species that are known to be threatened, and many inhabit ranges that overlap with tiger
307 conservation landscapes, including Asian elephants, orangutans, and Sumatran, Javan, and greater one-
308 horned rhinoceroses.

309 Asian habitats occupied by tigers have extraordinarily high biodiversity. All TCLs except those in
310 northeast China and the Russian Far East fall into one of the 34 "Biodiversity Hotspots" identified by
311 Conservation International. For example, the Sundarbans TCL, which spans the border of India and
312 Bangladesh, is the largest tidal mangrove forest, accounting for about six percent of all mangroves
313 globally; 80 percent of the known species of mangrove trees are found there. The Sundarbans is a rich
314 commercial fishery and many of the fish and shrimp that live in the Bay of Bengal depend on the
315 Sunderbans at some point in their life.⁹

316 More than 10 percent of Birdlife International's 231 Important Bird Areas in Asia and more than 10
317 percent of their area intersect with TCLs.¹⁰ Also under some part of the tiger's umbrella are six Ramsar
318 Wetlands of International Importance in six TCLs; eight natural World Heritage sites in 11 TCLs; and
319 seven UNESCO Man the Biosphere Reserves in six TCLs.¹¹

320 The biodiversity in tiger landscapes also contribute to the plant-based pharmaceutical industry. More than
321 8,000 plants in South Asia alone are known to have medicinal uses. The monetary value of global trade in
322 medicinal and aromatic plants is estimated at more than \$60 billion per year and this trade is expected to
323 grow to \$5 trillion by the year 2050.¹²

324 *Carbon*

325 The value of carbon storage and sequestration is the ecosystem service receiving most attention at present
326 because of the growing carbon market. On average, TCLs have 3.5 times the amount of carbon than areas
327 outside TCLs: Mean carbon in TCLs is 78 tons per hectare; mean carbon outside TCLs is 2.5 tons per
328 hectare (Map 1). TRCs stand to earn significant income from carbon markets if their forests are protected.

⁷ http://www.bhutan2008.bt/ndlb/typescripts/220/JBS_10_07.pdf

⁸ <http://www.actionbioscience.org/biodiversity/rooney.html>

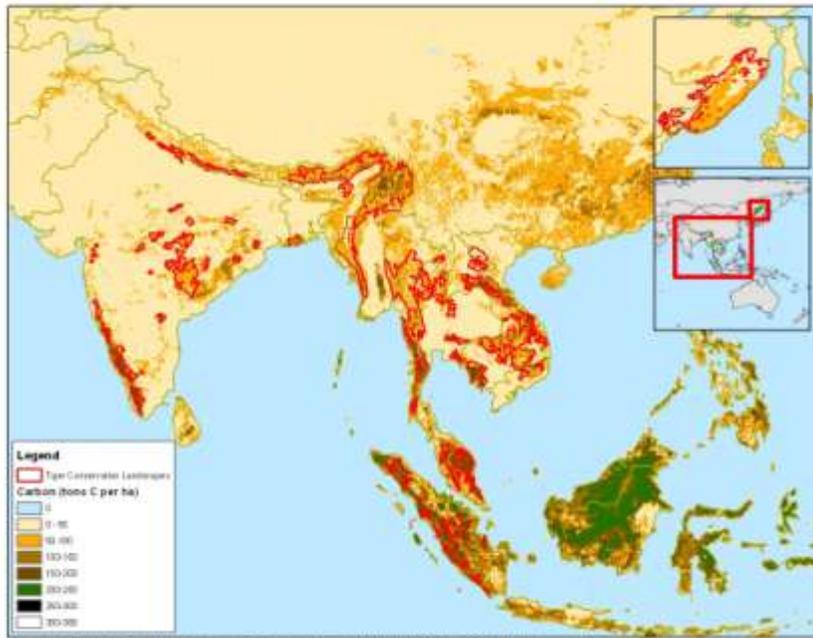
⁹ Hotspots Revisited. Conservation International

¹⁰ <http://www.birdlife.org/action/science/sites/index.html>

¹¹ Sanderson et al. 2007.

¹² http://ntfp.inbar.int/wiki/index.php/Medicinal_plants

329 Map 1: Carbon in TCLs (Source: WWF)



330
 331 **BOX REDD+ and Tigers.** One major cause for declines in tiger populations is loss and degradation of their habitat.
 332 Almost all tiger countries are on a fast track to economic development. These pressures place a huge demand on
 333 land for infrastructure and other economic ventures. Natural forests that governments and communities fail to
 334 value except through exploitation leads to degradation and deforestation. Destruction and degradation of these
 335 forests releases their sequestered carbon into the atmosphere, thereby adding to the crisis of global climate
 336 change.

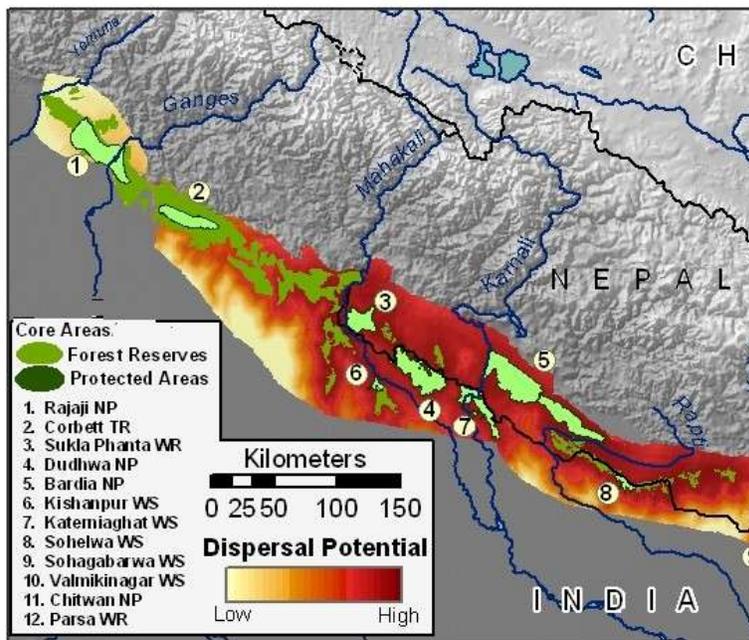
337 A program designed to offset carbon releases through the REDD+ mechanism provides a major triple-win
 338 opportunity by stabilizing carbon, protecting tiger habitat, and improving the livelihoods of impoverished
 339 communities living in and adjacent to Asia's tiger-inhabited forests. Providing communities with alternative income
 340 enables them to move away from destructive, non-sustainable uses of these carbon-rich forests and achieve
 341 improved livelihoods with greater stability. One such pilot program, known as "Carbonated Tigers" is already
 342 underway in Nepal's Terai-Arc Landscape, to link recovery of tigers and tiger prey, with restored riverine forests,
 343 and annual payments to adjacent communities as guardians of the regenerating forest. The challenge is to scale
 344 such project level activities to the provincial or national scale and expand this initiative rangewide. Simply put,
 345 forests that have retained their tiger populations, or where such populations are rebounding, will likely prove to be
 346 worth more than forests where tigers and most wildlife have disappeared.

347 Tiger range country ministers and other government officials have clearly recognized and articulated the links
 348 between forest conservation, forest carbon stocks, and tiger conservation. Land cover, as a proxy for forest
 349 carbon, shows that areas inside Tiger Conservation Landscapes contain on average forests with densities of carbon
 350 3.5 times as higher as do forests outside TCLs. The link between tigers and REDD+ is obvious. Tigers serve as an
 351 ideal ambassador for saving forests through REDD+ because their space-demanding ecology and behaviour make
 352 them an effective umbrella species for many smaller taxa. Only by setting aside large tracts of forested land, well-
 353 connected by forest corridors to allow young tigers to disperse, can a future for tigers be secured. Moreover, the
 354 data from the WWF Tier I analysis on distribution of forest carbon suggests that where forests have lost their

355 tigers, carbon values are lower, perhaps because these forests are valued much less and are likely to be more
356 readily exploited.

357 The REDD+Tigers initiative is seen as a mechanism to add value to existing reserves and protected areas that store
358 large amounts of carbon and can support breeding tiger populations. But funding forest protection in core reserves
359 through REDD+ and other sources is insufficient to achieve the goal of Tx2.

360 Virtually all tiger reserves are too small to maintain a viable population so the best way to conserve tigers is
361 through a network of reserves linked by forest corridors and to conserve tigers in larger landscapes known as Tiger
362 Conservation Landscapes, much of which are not designated reserve status but could add greatly to supporting
363 additional tigers (Fig. 1-3).



364
365 **Figure 1. The future of tiger conservation is to manage this**
366 **endangered species as what biologists call a metapopulation—a**
367 **population linked by dispersal. In the lowlands of Nepal and**
368 **northern India, tigers found in 12 reserves can be managed as a**
369 **single genetic population if adequate funding exists to pay for**
370 **conservation and restoration of core reserves and forested corridors**
371 **that link them. Between the forest reserves and protected areas,**
372 **the darker red dispersal areas are often community-managed**
373 **forests and forest restoration areas, where incentives to recover**
374 **habitat could connect this entire landscape 1,000 km long.**

375 Many of these wildlife corridors lie outside protected areas and are
376 degraded or threatened with development . So the best mechanism
377 to restore forest corridors and make them safe for tigers is in part
378 through support from REDD+ (Figure 2). The best example of the
379 multiple win effect of linking REDD and tigers comes from Sumatra.

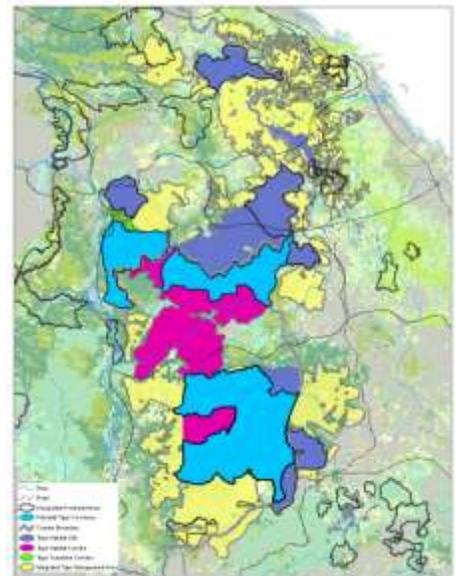
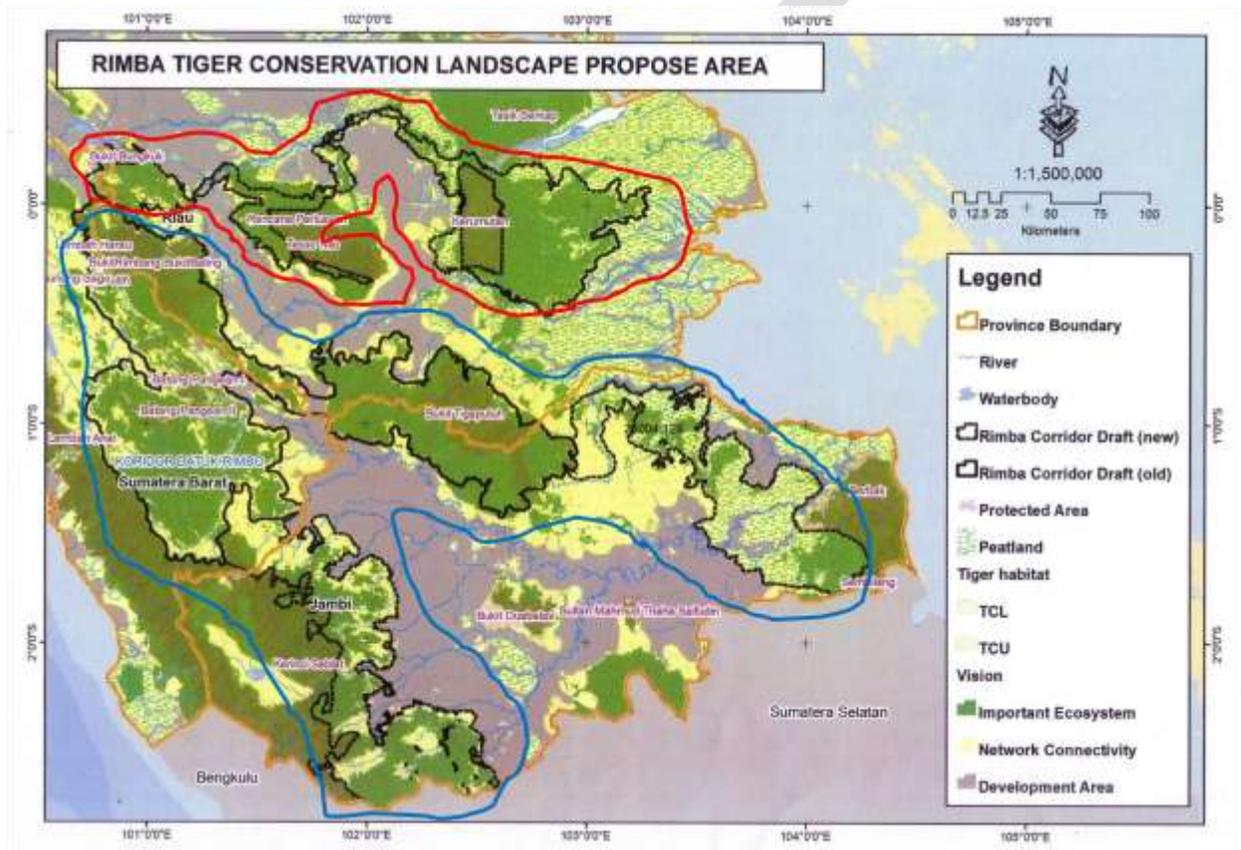


Figure 2. One possible scenario to protect one of Asia’s largest wilderness areas in the Eastern Plains of Cambodia is to finance forest protection of protected areas like Mondilkiri and Phnom Prich (in blue) under REDD+ and the forested corridors that link them to the north through REDD funding support.

380 The RIMBA TCL contains the highest levels of combined above and below ground carbon as much of sits on peat.
381 Forests on mineral soils are among the most diverse tropical forests on earth and also of global conservation value.
382 Areas undervalued as natural forest and tiger habitat are swiftly converted to oil palm or pulp and paper
383 plantations, resulting in extirpation of tigers and dramatic pulses in greenhouse gas emissions from forests and
384 soils. REDD and REDD+ offer the most powerful mechanisms to date to offset the destruction of tiger habitat.

385 REDD and REDD+ alone will not ensure that tigers will still persist even when funding mechanisms to conserve
386 forest stands are in place. Vast empty forests, lacking tigers, their large prey, and even smaller vertebrates are a
387 common phenomenon across the range. Linking tigers+REDD in creative new ways, to make tigers the face of
388 REDD/REDD+ in Asia, could help incentivize the recovery of tigers in carbon-rich forests.



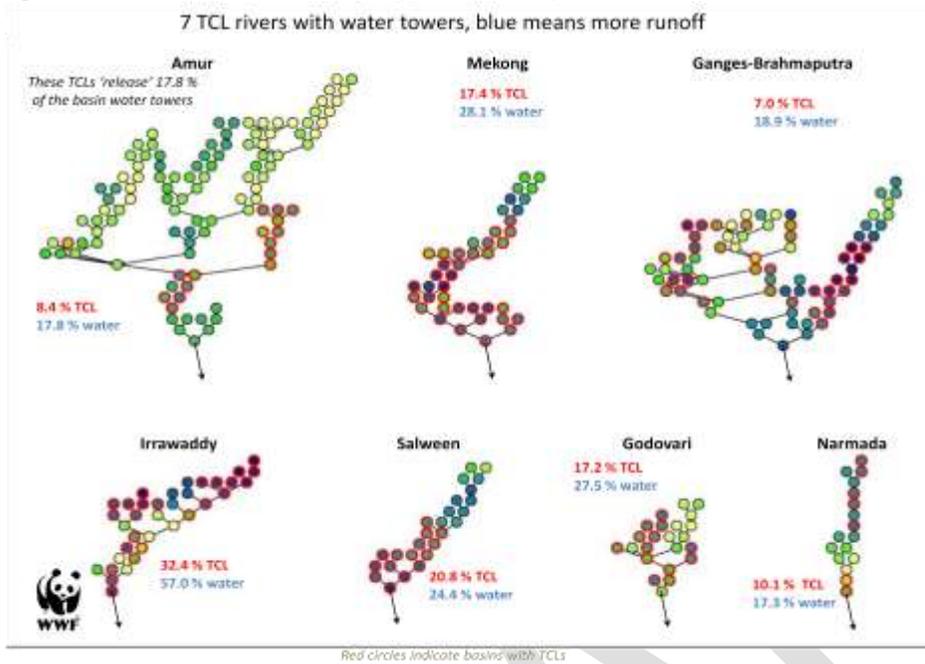
389
390 **Figure 3. Delineation: Area in blue line agreed with 3 Provincial Planning Agencies to be provincial strategic**
391 **area, while those in the red line is still under proposal and consideration to expand into Kampar-Kerumutan**
392 **landscape (Prov of Riau, West Sumatra, South Sumatra).**

393
394 ***Watershed Protection***

395 Tiger ecosystems are part of nine globally important watersheds with a total catchment area of 5.8 million
396 km². These watersheds supply water to as many as 832 million people and form the basis of rural
397 livelihoods. TCLs contribute to the run-off of a disproportionate amount of water per unit area in seven

398 major river basins (Figure 3). For example, in the Amur, the TCL covers 8.4 percent of the area, but
 399 contributes to the run-off of 17.8 percent of the water.

400 Figure 3 Water Run-off of TCL Rivers (Source: WWF)



401

402 **Box 4 Value of Watershed Protection**

403 One of the best known examples of the value of watershed protection is provided by New York City, whose 9
 404 million people rely on the Catskill/Delaware watershed for an average of 1.3 billion gallons of clean, safe water per
 405 day. As water quality began to decline in the early 1990s, New York compared the cost of building and operating a
 406 filtration plant to that of protecting the watershed, about 75 percent of which was privately owned. Through a
 407 process of land acquisition and agreements with land owners, New York was able to protect the watershed at far
 408 less total cost than a filtration plant. Maintaining this watershed's water purification services was assessed at US\$
 409 1-1.5 billion while the estimated cost of a filtration plant was US\$ 6-8 billion plus US\$ 300-500 million/year
 410 operating costs. Taxpayers' water bills increased by 9 percent instead of doubling.¹³

411

412 Apart from provisioning drinking water, watershed protection is important to the maintenance of
 413 hydropower by sustaining the continuous flow of water. In four TRCs, hydropower provides 74 to 100
 414 percent of electricity, and 77 percent of Asia's current hydropower capacity is in tiger range countries.

415

416 **Natural Hazard Regulation**

417 Intact natural ecosystems ameliorate the effects of natural hazards such as floods, droughts, fires, and
 418 storms. The Sundarbans ecosystem, for instance, protects human lives and habitation from cyclones, and
 419 cyclonic activity is expected to increase in intensity and frequency with global warming. There is clear
 420 evidence that the impacts of the 2009 cyclone Aila were mitigated by the Sundarbans' mangrove islands.
 421 In Vietnam, planting and protecting nearly 12,000 hectares of mangroves to reduce the impacts of storms

¹³ <http://www.teebweb.org/LinkClick.aspx?fileticket=I4Y2nqqliCg%3d&tabid=1278&language=en-US>

422 and flooding cost US\$ 1.1 million but saved \$ 7.3 million in annual expenditures on dyke maintenance.¹⁴
423 During the 1997-98 El Nino season, the regional economic costs of large-scale forest fires in Indonesia,
424 which were exacerbated by deforestation, were estimated to be \$2.3 billion.

425 *Food Security and Agricultural Services*

426 Tiger landscapes support agriculture by supplying fresh surface and ground water, protecting soil from
427 erosion, and regulating local weather. They enhance food security by providing a source of wild genetic
428 material for crop relatives including mango, rambutan, longan, and rice. Intact ecosystems support the
429 pollination services of bees and other insects for both crops and NTFPs. In a study in the Nilgiri
430 Biosphere Reserve in India 80 percent of more than 200 plant species benefited from animal pollination
431 as did 62 percent of crops 40 percent of NTFPs.

432 *Poverty Alleviation*

433 Poor people are highly dependent on ecosystem services including provisioning of water, food, medicine,
434 fuel, and fiber. It is estimated that 80 percent of the income of the rural poor is derived from the local
435 biodiversity in Southeast Asia¹⁵. About 80 percent of people in Asia, especially the rural poor, rely on
436 wild medicinal plants for health care. Medicinal plants also provides livelihood options for rural people in
437 Asia. In India, the collection and processing of medicinal plants is estimated to contribute to at least 35
438 million workdays of employment a year.¹⁶

439 Protected areas can also contribute to poverty reduction (Box 5). Protection of Cambodia's Ream
440 National Park is estimated to generate benefits from sustainable resource use, recreation, and research
441 worth 20 percent more than the benefits from current destructive use, with the benefits favoring local
442 people, who would earn three times more with effective protection of the park than without.¹⁷

443 The value of NTFPs in households around Lao's Nam Et and Phou Loey Biodiversity Conservation Areas
444 is \$250 per year for households outside the conservation areas, \$500 to households on the border, and
445 more than \$675 for those inside.¹⁸

446 See also Chapter 3 on community engagement.

447 Box 5: Protected Areas Found to Reduce Poverty in Thailand and Costa Rica¹⁹
448 Ecosystem protection sequesters land from agricultural develop and limits or prohibits the extraction of natural
449 resources, and is thus seen as limiting opportunities for economic development in rural areas. On the other hand,
450 the economic benefits of ecosystem protection to local people include provisioning of ecological services, new
451 livelihood opportunities, and access to infrastructure, such as new roads built to reach protected areas in remote

¹⁴ <http://www.teebweb.org/LinkClick.aspx?fileticket=I4Y2nqqIiCg%3d&tabid=1278&language=en-US>

¹⁵ http://www.aseanbiodiversity.org/index.php?option=com_content&view=article&id=341&Itemid=175

¹⁶ http://ntfp.inbar.int/wiki/index.php/Medicinal_plants

¹⁷ TEEB. 2009 The Economics Of Ecosystems And Biodiversity For National And International Policy Makers. Summary: Responding To The Value Of Nature.

<http://www.teebweb.org/LinkClick.aspx?fileticket=I4Y2nqqIiCg%3d&tabid=1278&language=en-US>

¹⁸ ICEM. 2003. Regional Report on Protected Areas and Development: Review of Protected Areas and Development in the Lower Mekong River Region.

¹⁹ Andam, K.S., P.J. Ferraro, K.R.E. Sims, A. Healy, and M.B. Holland. 2010. Protected areas reduced poverty in Costa Rica and Thailand. PNAS 107:9996-10001.

452 locations. However, no scientific research had demonstrated a clear causal link between protection and an
453 increase or decrease in poverty in neighboring local communities. A recent study carefully controlled for the
454 effects of geographic and baseline variables (for instance, poverty rates when the parks were established and the
455 quality of surrounding agricultural land) and compared various indices of poverty in comparable communities near
456 and far from protected areas in Costa Rica and Thailand. The results indicated that in both countries, protected
457 areas significantly reduced poverty in local communities.

458 *Perspective*

459 Data on the estimated total value of ecosystem services provided by TCLs across the wild tiger's range
460 are not yet available²⁰, although undertaking the research is planned for in the GTRP. However, a look at
461 global estimates puts the benefits and costs of conserving TCLs in perspective. In 1997, it was estimated
462 that the global value of ecosystem services was \$16 to 54 trillion annually, with an estimated average of
463 \$33 trillion; the study authors suggested that the real value was much larger, however.²¹ At that time, \$33
464 trillion was 1.8 times the global GNP. The estimated \$30 billion per year required to establish and
465 maintain a global protected area system is roughly less than *one-tenth of one percent* of \$33 trillion, and
466 currently only an estimated \$6.5 billion is spent per year on protected areas. Should the analysis of the
467 Leuser TCL be extended to other TCLs and put in the context of current conservation expenditures in
468 TCLs (See), a very similar conclusion can be drawn: the world is grossly under investing in conserving
469 valuable ecosystems, just because all these services do not enter the market.

470

²⁰ For the sake of illustration, recognizing all the problems of extrapolation, if all of the other 75 TCLs each have a TEV equivalent to only 25% of that estimated for the Leuser Ecosystem, their total TEV would be about \$178 billion.

²¹ Costanza et al. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.

471 **Chapter 3 THE TIGER CRISIS**

472 **Part A The Decline of Tigers**

473 In 2002, the Parties to the Convention on Biodiversity (192 countries and the European Union) agreed “to
474 achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and
475 national level as a contribution to poverty alleviation and to the benefit of all life on Earth.” The 2010
476 *Global Biodiversity Outlook 3* states starkly that this target has not been met. *Outlook 3* reports that
477 species are moving closer to extinction, that natural habitats continue to decline in extent and integrity,
478 that fragmentation and degradation of ecosystems have led to loss of biodiversity and ecological services,
479 and that drivers of biodiversity loss, including habitat erosion and overexploitation, are either constant or
480 increasing in intensity.²²

481

482 Tigers and their habitats are exemplars of the crisis of biodiversity.

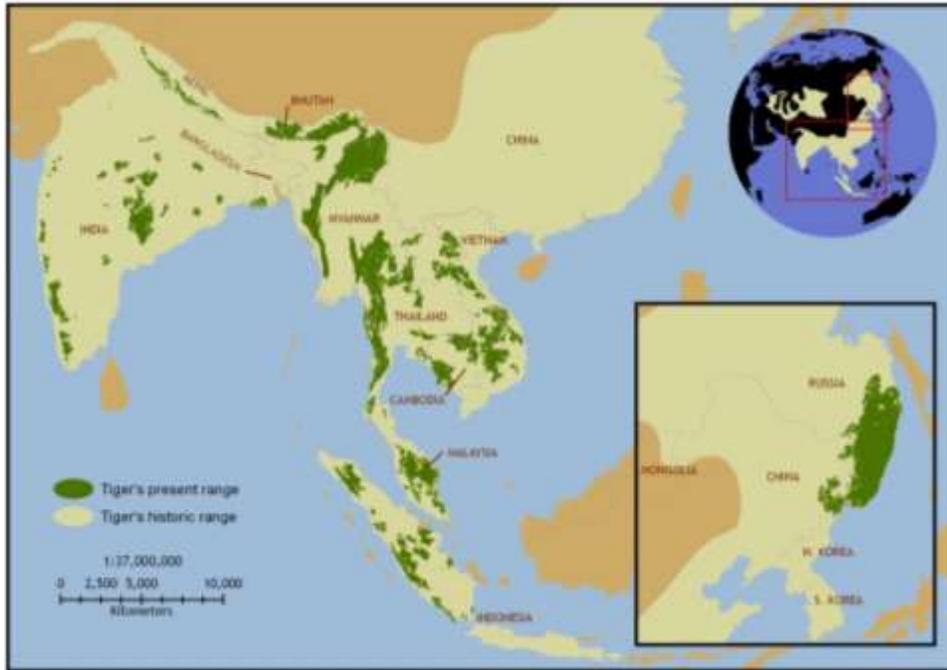
483 Tigers now live only in 13 countries in Asia, all of which are experiencing profound economic and
484 ecological changes. Tiger range countries face severe challenges from the effects of rapid urbanization,
485 environmental degradation, and climate change. Rampant deforestation, often illegal, coupled with an
486 insidious illegal trade in wildlife of all kinds threatens to leave Asia bereft of its natural heritage and its
487 natural wealth. As a result, wild tigers and all they represent face imminent extinction.

488 In the last few centuries, wild tiger populations have declined by more than 98 percent and their range has
489 collapsed. In about 1900, at least 100,000 wild tigers ranged in an arc stretching across Asia (Map 2).
490 Populations at the edges of the tiger’s range were the first to be extirpated: the Bali tiger in the 1940s,
491 Caspian tiger in the 1960s, Javan tiger in the 1970s, and the South China tiger probably during the 1990s.

492 Map 2: Historical and Current Range of Tigers²³

²² Secretariat of the Convention on Biological Diversity. 2010. Global Biodiversity Outlook 3. <http://gbo3.cbd.int/>

²³ E. Sanderson et al. 2006. Setting Priorities for the Conservation and Recovery of Wild Tigers: 2005-2015: Technical Assessment New York and Washington DC: WCS, WWF, Smithsonian.



493

494 The tiger was declared a threatened species facing extinction in 1969, even though at that time as many as
495 10,000 still survived and the first efforts to save them began, most notably India's comprehensive Project
496 Tiger. In 1975, international trade in tigers and their parts and products was banned with the placement of
497 tigers on Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna
498 (CITES). Since then, every tiger range country has banned hunting of tigers and created national parks or
499 other protected areas in tiger habitat but the tiger remains Endangered on the IUCN Red List of
500 Threatened Species.

501 Yet despite some successes in stemming the tiger's decline, and in a few places actually reversing, total
502 wild tigers numbers have since plummeted to the current abysmal estimate of between 2,800 and 4,800
503 individuals, not including cubs,²⁴ but there is a general consensus among practitioners that the total wild
504 population, including cubs, is only about 3,200 and declining very rapidly.

505 These 3,200 remaining tigers occupy fragmented forest and grassland habitats that cover a mere 7 percent
506 of their former extent in Asia. Tiger habitat has declined by 40 percent in the last 10 years alone, lost
507 largely to economic development activities.²⁵ Also in the last decade, an estimated thousands of tigers
508 have been killed to supply an illegal trade in their parts and products. All evidence suggests that more
509 tigers and more habitat are lost every day. Indeed, the trend of the last 100 years has been one of
510 accelerating decline.

511 If tigers occurred as a single population—or better, as three large populations—that totaled 3,200, we
512 would be less concerned. Larger populations are more resilient than small ones, which are highly
513 vulnerable to the ecological and anthropogenic stressors of habitat loss and degradation, and poaching.

²⁴ 2010 Red List, as updated

²⁵ E. Dinerstein et al. 2007. The fate of wild tigers. *BioScience* 57:508-514.

514 But, in fact, the wild tiger's landscapes are increasingly fractionated and degraded, and many populations
515 are quite small.

516 The most comprehensive analysis ever attempted of the present range occupancy of a large, cryptic,
517 terrestrial mammal living at low density found that 1,185,000 km² of occupied and potential tiger habitat
518 remained in 2006. This is fractured into 76 units—Tiger Conservation Landscapes (TCLs).²⁶ Roughly half
519 of all TCLs are large enough to support 100 or more tigers, with the seven largest TCLs offering the
520 potential to support 500 or more tigers (the number of TCLs and area by tiger subspecies are given in
521 Table 2; **TCL maps will be included in an Appendix**).

522 Table 2: Tiger Conservation Landscapes Supporting Tiger Subspecies

Tiger Subspecies	Number of TCLs	Total km ²
Amur (Siberian) tiger <i>P. tigris altaica</i>	2	269,983
Indian (Bengal) tiger, <i>P. t. tigris</i>	40	227,569
Indochinese tiger, <i>P. t. corbetti</i>	19	540,758
Malayan tiger, <i>P. t. jacksoni</i>	3	56,934
Sumatran tiger, <i>P. t. sumatrae</i>	12	84,467

523
524 Since 2006, however, further observations and consultation with tiger range country experts have led to
525 the horrific realization that there may be no remaining ecologically functioning tiger populations²⁷ in
526 Cambodia, Lao PDR, Myanmar, and Vietnam. Indeed, more than 33 percent of the TCLs may have lost
527 their tigers completely, or their numbers are depressed to the point that the populations are no longer
528 ecologically functional. However, the considerable land cover that remains in these landscapes could
529 support tiger population recoveries if there is strong protection of tigers, prey, and habitat.

530

²⁶ TCLs were defined as areas where there is sufficient habitat for a least five tigers and tigers have been confirmed to occur in the last ten years. A TCL is a contained tiger metapopulation; there is no potential for dispersal of tigers between TCLs without habitat recovery.

²⁷ Defined as a population so reduced that it no longer plays a significant role in ecosystem function or the population is no longer viable without direct management interventions.

531 **Part B The Threats**

532 Exploitation of tigers and their prey and habitat erosion (loss, fragmentation, and degradation) have been
 533 and remain are overarching threats to the wild tiger’s survival.

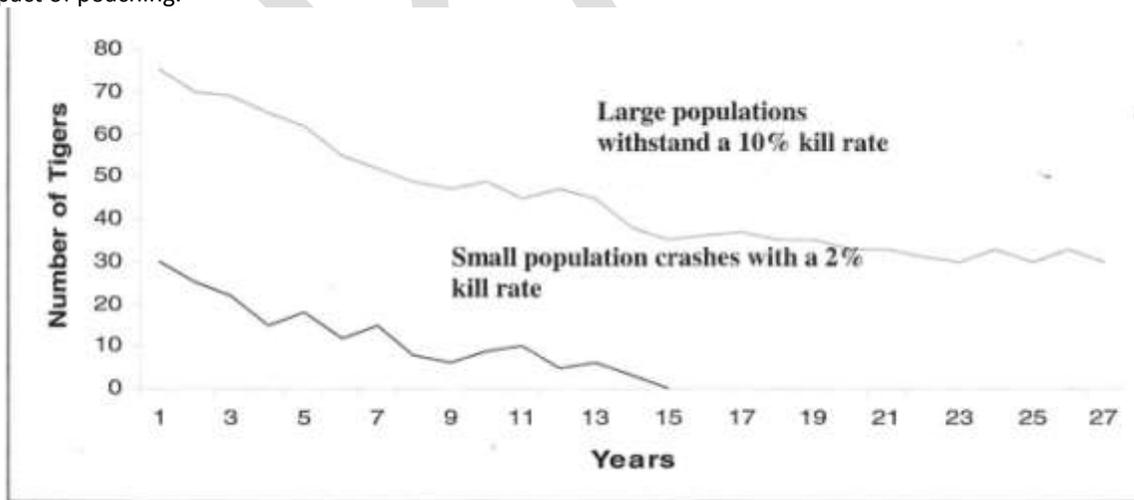
534 **Exploitation of Tigers and their Prey**

535 *Poaching*

536 Until the 1960s, and in some places later, tigers were hunted for sport or killed as pests in sometimes
 537 astonishing numbers. For instance, in the first half of the last century in India, the Maharaja of Surguja is
 538 said to have killed more than 1,100 tigers and the Maharaja of Udiapur 1,000. King George V killed 39
 539 tigers in 11 days in Nepal in 1911 and the Prince of Wales shot seven in four days in 1922. In the early
 540 years of the 20th century, Tsarist military game hunters decimated Caspian tigers in parts of Russia to
 541 make the area safe for settlement; some of these hunters were reported to have “had in their possession
 542 several tens (!) of tiger skins.”²⁸ Between 1959, when tigers were declared a pest in China, and 1977 when
 543 hunting tigers was banned, an estimated 3,000 tiger were killed, based on the number of tiger skins
 544 handled during that period.²⁹

545 Hunting is now prohibited throughout the tiger’s range but poaching, and the illegal trade and trafficking
 546 of tiger parts and products that drive it, has emerged in the last decades as the most urgent and immediate
 547 threat to the survival of wild tigers. Small populations of tigers—and most are small, numbering fewer
 548 than 30 individuals—go extinct when just two percent of the population is killed annually³⁰ (Figure 4).

549 Figure 4: Impact of Poaching on Large and Small Tiger Populations³¹
 550 This figure demonstrates the interaction between habitat fragmentation that results in small populations and the
 551 impact of poaching.



552

553

²⁸ Heptner, V.G. and A.A. Sludskii. Mammals of the Soviet Union Volume II Part 2. P 117. (First published in Russia in 1972; English translation by the Smithsonian Institution 1992.

²⁹ Kristin Nowell Far From a Cure: The Tiger Trade Revisited

³⁰ Chapron et al

³¹ Damania et al 2008, p. 8

554 In India's Sariska and Panna Tiger Reserves, poaching extirpated their small tiger populations in just a
 555 few years.³² Even though large expanses of excellent tiger habitat remain in the Greater Mekong Sub-
 556 region, tiger numbers have fallen by about 70 percent there in the last 10 years, largely due to poaching.³³
 557 Omitting Thailand from the list of Mekong countries would make the tiger's decline in this region much
 558 steeper. Poaching of the tiger's prey—large deer, wild pigs, and wild cattle—reduces the carrying
 559 capacity of tiger habitat and, when prey are significantly depleted in an area, tigers starve.³⁴ Intense
 560 poaching also accounts for recent declines in tigers and prey in the Russian Far East, where relaxed
 561 protection recently led to a down-turn in tiger numbers after many years of fairly steady growth.³⁵
 562 Human-caused mortality accounts for 75 to 85 percent of all Amur tiger deaths. Current estimates indicate
 563 that 20-30 tigers are poached in the Russian Far East each year, although actual numbers may be higher.³⁶

564 Detected incidences of poaching are believed to seriously underestimate the problem. Indian authorities,
 565 for instance, multiply known offenses by a factor of 10 to estimate the magnitude of poaching. Records
 566 compiled by the Wildlife Protection Society of India show that 535 tigers were known to have been killed
 567 in India between 1998 and 2009. That the real number may be 10 times this gives an indication of the
 568 scale of the problem. Some experts believe India would have double its current number of tigers (about
 569 1,400) without this source of mortality. In other countries, experts multiply known offenses by a factor of
 570 70 to estimate the scale of poaching.

571 Both poverty and prosperity drive poaching.³⁷ Most TCLs are pockets of deep poverty in which Asian
 572 villagers eke out meager livings that are largely dependent on using locally available natural resources.
 573 The poor don't usually poach tigers for food and medicine for their own consumption; they kill tigers in
 574 revenge for livestock depredations and human casualties. However, they are tempted into poaching by
 575 their poverty and the opportunity to earn cash income offered by tiger traders. Most poaching of the
 576 tiger's prey—deer, wild pigs, and wild cattle—is for local subsistence although wild food is growing in
 577 cachet in some Asian urban markets. A reduced prey base contributes significantly to declining tiger
 578 numbers.

579 Wealth in Asia is now the far more important driver of tiger poaching. Market demand for wildlife, with
 580 tigers being among the most valuable species, is growing along with growing economic prosperity that
 581 puts wildlife and their derivatives within the financial reach of many more people than in the past. In most
 582 Asian countries, annual growth in GDP in recent years has approached or exceeded 10 percent and
 583 personal incomes and purchasing power are rising rapidly (even while many people remain in dire
 584 poverty³⁸). This is believed to be driving much of increased demand for tiger parts and products used as
 585 medicine, décor, food, and adornment in Asia, including in China, Vietnam, Taiwan, South Korea, and
 586 Japan, as well as in the entirety of Russia. The demand for tiger meat is reported to be driven by wealthy

³² Tigers have since been translocated to Sariska and Panna and cubs were born to a translocated female in Panna in spring of 2010.

³³ WWF Tigers on the Brink: Facing Up to the Challenges in the Greater Mekong 2010

³⁴ Karanth, K.U., J.D. Nichols, N.S. Kumar, W.A. Link, and J. Hines. 2004. Tigers and their prey: predicting carnivore densities from prey abundance. PNAS 101:4854-4858.

³⁵ Dale's report

³⁶ <http://www.wcsrussia.org/Species/AmurTigers/ConservationThreats/tabid/1468/language/en-US/Default.aspx>

³⁷ TRAFFIC 2009

³⁸ The ADB estimates that as many as 900 million people in developing Asia continue to live on less than \$1.25 per day. ADB. 2009. *Aid for Trade in the Asia and the Pacific: An Update*. The Philippines: ADB.

587 businessmen in Beijing, Hanoi, and other major cities, who serve it as a sign of their wealth and status.
588 Using tiger pelts as decor is believed to be on the rise among wealthy Russians. In addition, there is
589 significant demand outside of Asia, in North America, Europe, and Australia.

590 Using tiger parts in medicine has a very long history in Traditional Chinese Medicine (TCM) but the
591 World Federation of Chinese Medicine Societies (WCMS) declared that tiger parts are not necessary for
592 human health care and that alternatives are plentiful, affordable, and effective. Tiger bone was removed
593 from the TCM pharmacopeia in 1993 and the Chinese government banned domestic trade in tiger parts
594 that same year. Since then, sale and use of products containing tiger parts is believed to have declined.³⁹
595 Nonetheless, use of medicines and tonic containing or purporting to contain tiger bone continues. In a
596 survey conducted in seven Chinese cities in 2007, 43 percent of respondents had consumed some product
597 alleged to contain tiger parts (primarily tiger bone plasters and tiger bone wine), most of them since the
598 ban was put in place. Yet 88 percent of respondents knew that it was illegal to buy or sell tiger products,
599 93 percent agreed that a ban in trade of tiger parts was necessary to conserve wild tigers, and 96 percent,
600 believed it was important to protect wild tigers. Translating this positive attitude about tiger conservation
601 into behavior change is the challenge.

602 In the 1990s, a demand for tiger skins as adornment emerged among new wealthy Tibetans. Historically,
603 wearing tiger (or leopard) skin cloaks was largely confined to the military. After photographs of Tibetan
604 wearing the skins attracted world attention in 2005, however, there was a dramatic decline in use and
605 trade volume. This is attributed to public awareness campaigns launched in early 2006 by environmental
606 and religious organizations, as well as China's State Forest Administration, asking Tibetans to give up
607 endangered wildlife clothing. Nonetheless, the skin trade continues at some level in Tibet.⁴⁰

608 In Sumatra, tiger claws, whiskers, canine teeth, and small pieces of skin are used for magical purposes. A
609 seven-month survey of 326 Sumatran retail outlets, including jewelry and souvenir shops, in 28 cities
610 revealed that 10 percent had tiger parts for sale in 2006, a decrease from 2002 when 19 percent did, but
611 still a large number given that these sales are illegal. As a very conservative estimate, the tiger parts found
612 in these retail outlets represented 23 tigers.⁴¹ According to a 2010 news report, 44 percent of the 134
613 jewelry and antique shops investigators visited in Singapore were selling tigers parts, including claws and
614 teeth.⁴²

615 *Wildlife Crime*⁴³

616 Poaching and illegal trade and trafficking of tiger parts and products are significant and growing
617 categories of crimes involving natural resources. These crimes violate national laws to protect natural
618 resources, including wild animals and plants, and, in many cases, international agreements such as
619 CITES. Wildlife crime is a symptom of the generally weak management of all natural resources that
620 exists in most countries; it also drains human and financial resources that could otherwise be devoted to
621 improving natural resource management.

³⁹ Nowell K, Ling X. 2007. *Taming the Tiger Trade*. Hong Kong: TRAFFIC East Asia.

⁴⁰ See previous footnote.

⁴¹ Ng, J. and Nemora. (2007). *Tiger trade revisited in Sumatra, Indonesia*. TRAFFIC Southeast Asia, Petaling Jaya, Malaysia

⁴² <http://www.reuters.com/article/idUSTRE6212IE20100319>

⁴³ Much of this section is from Sellar, J. et al 2010.

622 Wildlife crime is not different from many other forms of illegal activities. In its substance, it is highly
623 lucrative, low-risk theft operating at a transnational scale. Wildlife crime has the hallmarks of organized
624 crime and shares characteristics with other kinds of transnational crime. There is ample evidence to tie
625 criminal networks that trade in wildlife to those that traffic in narcotics, weapons, and/or humans. Like
626 these other crimes, wildlife crime very often involves corruption, money laundering, fraud, counterfeiting,
627 and violence, and may be linked to terrorist activities.

628 Wildlife crime can also take on forms similar to those of the black market in works of art and historical
629 and cultural objects. Collectors value rarity, and the rarer the species, the higher the price collectors are
630 willing to pay to obtain individuals of the species or its parts and products. In fact, evidence suggests that
631 plans to list a species on CITES Appendix I, which prohibits international trade except under very limited
632 circumstance and thus is an indicator of rarity, drives up demand and value.⁴⁴ In the 1960s, when it
633 became apparent that tiger hunting would be banned due to dwindling populations, hunter demand for
634 tiger trophies increased.⁴⁵

635 Economic growth in Asia has also fueled massive efforts to expand transportation networks that gives
636 poachers and traders access to formerly inaccessible habitats and makes transporting wildlife and
637 products to distant markets cheaper and easier. Laborers brought in to work on infrastructure construction
638 projects also hunt nearby wildlife for food and sale. While in some cases this is temporary, settlements
639 often persist long after construction is complete.

640 Illegal logging, which represents a significant share of natural resources crime, also contributes directly to
641 the degradation, fragmentation, and loss of habitat for tigers in parts of their range including Sumatra, the
642 Mekong Region, and the Russian Far East. Like tiger and other wildlife trafficking, timber trafficking is a
643 global problem, as shown in the map below. Recently, there has been increased large-scale illegal logging
644 of Korean pine. Illegal logging is estimated to account for 50 percent of all timber harvested in the
645 Russian Far East.⁴⁶

646 Map X: Timber Trafficking Routes from Southeast Asia to the world⁴⁷

⁴⁴ Franck Courchamp, Elena Angulo, Philippe Rivalan, Richard J. Hall, Laetitia Signoret, Leigh Bull, Yves Meinard. 2006. Rarity Value and Species Extinction: The Anthropogenic Allee Effect. *PLoS Biology* 4(12): e415.

⁴⁵ Sunquist. M.E. and F. Sunquist. 2002. *Cats of the World*. University of Chicago Press.

⁴⁶ http://wwf.panda.org/what_we_do/angered_species/korean_cedar_pine/

⁴⁷ Map source: UNODC. 2010. *The Globalization of Crime: Transnational Organized Crime Threat Assessment*.



647

648 Attempting to place a value on wildlife crime and determining the profits it generates for criminals is
 649 extremely difficult. Experts suspect, however, that size of the wildlife trade is roughly comparable with
 650 the trade in drugs and weapons, and is estimated in the billions of dollars per year worldwide. Attempting
 651 to measure the scale of poaching is also fraught with difficulty. Data related to wildlife crime are often
 652 missing or not collected. What is clear in the case of tigers is that the magnitude of poaching is high.
 653 Moreover, with the scarcity of tigers, poachers have begun to turn to lions, leopards, snow leopards, and
 654 clouded leopards to meet demand for products that can be fraudulently sold as tiger derivatives.

655 Wildlife crime robs from national treasuries and corporate revenues and also steals global public goods.
 656 Illegal logging, for instance, evades taxation that helps support national goals for economic growth and
 657 also contributes to the greenhouse gas emissions that are fueling global climate change. Illegal logging
 658 and trafficking are estimated to cost the legal forest products industry more than \$10 billion a year and
 659 governments an additional \$5 billion annually in evaded taxes and royalties.⁴⁸

660 But the most significant victims of natural resources crime are often the rural poor, who rely
 661 disproportionately on harvesting natural resources to support subsistence needs for food, medicine, fuel,
 662 fodder, and building material. The rural poor are also most directly dependent on other ecological services
 663 of natural areas, such as provision of clear and clean water, erosion control and mitigation of flood
 664 damage, and maintenance of soil fertility. Natural areas and charismatic species such as tigers also
 665 provide economic opportunities, such as through eco-tourism to help alleviate rural poverty. Thus,
 666 wildlife crime may hamper national and global goals related to poverty reduction and sustainable
 667 development.

⁴⁸ World Bank. 2008. *Forest sourcebook*. Washington, DC.

668 Despite all of this, natural resources crime is not viewed as a mainstream crime. It is often perceived as a
 669 victimless crime and not very important because human life and property is not usually directly or
 670 immediately threatened. As a result, national and international responses to curb it are weak at all levels,
 671 although several international organizations, CITES Secretariat, INTERPOL, United Nations Office on
 672 Drugs and Crime (UNODC), and World Customs Organization (WCO) all carry some mandate to be
 673 active in combating wildlife crime.

674 This perception is also reflected in the size of penalties levied on people convicted of wildlife crimes,
 675 which tend to be relatively mild and bear no correlation to the potential profits to be gained from the
 676 crime. Although some TRCs can prescribe relatively severe penalties for tiger poaching—the maximum
 677 prescribed prison sentences in TRCs range from 2 to 20 years (median = 7 years)—the actual sentences
 678 are very often lighter and may be reduced to payment of fines (Table 3). For example, in 12 cases of tiger
 679 poaching or possession that came to court in Indonesia between 2004 and 2006, the harshest penalty was
 680 14 months in jail and a \$110 fine.⁴⁹ In the United States, a notorious international wildlife trafficker was
 681 arrested after a five-year undercover investigation by the U.S. Fish and Wildlife Service with the
 682 cooperation of the US Customs Service, the US Department of Justice, the Mexican Attorney General's
 683 office, INTERPOL, and the Royal Canadian Mounted Police. Under a plea bargain agreement, he was
 684 sentenced to 71 months in prison, with credit for 34 months served, and fined \$60,000. If the maximum
 685 penalties had been imposed for the crimes he admitted to, his sentence could have been 250 years in
 686 prison and a fine of \$12.5 million. Even while serving his prison sentence, this trafficker's enterprise was
 687 active and, since his release, has grown.⁵⁰

688 Table 3: Penalties for Poaching Tigers in TRCs⁵¹
 689 The current minimum and maximum penalties for people convicted of illegal hunting or trafficking of tigers or
 690 endangered animals in TRCs. Fines are presented in US\$ equivalents.

Country	Minimum	Sentence
Bangladesh	6 months in prison and/or \$12 fine	14 years in prison*
Bhutan	\$1100 fine	5 years in prison and/or \$4,500 fine
Cambodia	5 years in prison	20 years in prison
China	\$120 fine	10 years in prison and/or \$1,200 fine**
India	3 years in prison and fine of \$220	7 years in prison and \$550 fine
Indonesia	No minimum, usually 6 months in prison	3 years in prison
Lao	3 months in prison and \$24,000 fine	5 years in prison and \$24,000 fine
Malaysia	No minimum	5 years in prison and/or a fine of \$4,200
Myanmar	7 years in prison or \$2000 fine	7 years in prison and \$2000 fine
Nepal	5 years in prison and/or \$700 fine	15 years in prison and/or \$1400 fine
Russia	4-6 months in prison or \$400 fine	2 years in prison or \$11,500 fine
Thailand	No minimum	4 years in prison and/or \$1,000 fine
Vietnam	No minimum	7 years in prison

* The Wildlife Preservation Act 1974 prescribes a maximum of one year in prison and/or a \$24 fine, but in 2003 a tiger poacher was sentenced to 14 years in prison under Section 15 (1) of the Special Power Act, 1974.
 ** In December 2009, a man convicted of killing an Indochinese tigers was sentenced to 10 years in prison, an additional two years for illegal possession of a firearm, and also fined \$70,000.

⁴⁹ Ng and Nemora 2007

⁵⁰ Christy Bryan National Geographic January 2010

⁵¹ From R. Damania, J. Seidensticker, T. Whitten, G. Sethi, K. Mackinnon, A. Kiss, and A. Kushlin. 2008. *A Future for Wild Tigers*. Washington, D.C.: World Bank.

691
 692 In practice, poachers and traffickers have low probabilities of arrest and those that are arrested are seldom
 693 brought to justice. In many countries, legal loopholes allow poachers to escape punishment. For instance,
 694 poaching a tiger may be a criminal offense but possession of tigers or their parts or being caught with a
 695 tiger snare is not. Corruption is also known to play a role in the ease with which poachers and traffickers
 696 escape arrest or conviction, and, in some nations, wildlife crime networks are likely to be run by elite,
 697 powerful members of society, including politicians and the military, who are ‘above the law’.

698 Wildlife law enforcement capacity is also low throughout national criminal justice systems in the TRCs,
 699 as it is around the world. Those responsible for wildlife law enforcement, especially at the level of the
 700 park guard and others on the front lines of protection, are too few in number, under-funded, and under-
 701 equipped to counter the increasingly sophisticated high-tech methods that organized wildlife crime
 702 networks employ. Staff in these agencies are poorly trained and poorly compensated compared to those in
 703 other law-enforcement agencies such as police and customs. Effective wildlife crime law enforcement
 704 involves cooperation and coordination among many agencies, including police, customs, border control,
 705 the military, and the judiciary, but this cooperation and coordination is often absent or poorly organized.

706 **Habitat Erosion**

707 *Deforestation*

708 For much of the last century, habitat degradation, fragmentation, and loss has been driven by clearing
 709 forests and grassland for agriculture to support the growing human population in Asia. Population density
 710 in Asia has risen from 44 people per km² in 1950 to 131 per km² in 2010 and is predicted to reach 164 per
 711 km² by 2050.⁵² The human influence index is high (Map 3).

712
 713 Map 3: Human Influence Index in Asia **TO BE INSERTED**

714
 715 The mostly poor people who live near protected areas (and, in some cases, within protected areas) also
 716 contribute to habitat degradation through encroachment, unsustainable collection of forest products, and
 717 livestock grazing. Commercial logging, legal and illegal, also plays a significant role in habitat erosion.
 718 For example, in just 10 years between 1990 and 2000, Sumatra lost more than 25 percent of its forest
 719 cover, nearly 50,000 kilometers of logging roads were constructed, and 60 percent of protected areas had
 720 been encroached by loggers.⁵³ Korean pine forests in the Russian Far East have been reduced by over two
 721 thirds in the last half century and if the current rate of deforestation continues, the entire Korean pine
 722 forest could be lost within 15 years.

723 *Infrastructure Development*

724 More recently, infrastructure development to support Asia’s burgeoning economic growth, especially
 725 roads/transportation networks, hydroelectric power generation, and mining, has become a leading driver

⁵² Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2008 Revision*, <http://esa.un.org/unpp>, Friday, June 18, 2010; 1:26:36 PM.

⁵³ Gaveau D.L.A, Epting J., Lyne O., Linkie M., Kumara I., Kanninen M., Leader-Williams N. 2009 Evaluating whether protected areas reduce tropical deforestation in Sumatra. *Journal of Biogeography* 36 2165-2175.

726 of habitat fragmentation and threatens to become a still larger threat in the years ahead. According to the
727 Asian Development Bank, the Asia and Pacific region needs to invest about \$750 billion per year in
728 infrastructure year over the next 10 years.⁵⁴

729 As a result of these development efforts, protected areas, the bastions of tiger conservation efforts in Asia,
730 become isolated. An assessment conducted in 2010⁵⁵ found that no part of nine TCLs is protected.
731 Overall, only about 21 percent of the area of all 76 TCLs—a total of 1,192,879 km²—is protected. The
732 same assessment revealed that oil and gas concessions and potential concessions (an indicator of
733 infrastructure development pressure) cover 15 percent of the total area of the TCLs (Map 4). Proposed
734 transportation networks also threaten the integrity of many TCLs and protected areas. Massive
735 infrastructure development is under way, for instance in the Mekong Region (Map 5).

736 Map 4: Oil and Gas Concessions in 3 TRCs **TO BE INSERTED**

737
738 Map 5: Infrastructure in the Mekong Region **TO BE INSERTED**

739
740

741 **Other Challenges**

742 Several other factors make the challenges of tiger conservation yet more daunting.

743 ***Lack of Conservation Capacity***

744 In most TRCs, both human and institutional capacity for conservation action is limited. Only seven
745 percent of the protected areas in TCLs have highly effective management, and 20 percent reported
746 absolute lack of management.⁵⁶ Indian officials report that management effectiveness of 16 of 39 tiger
747 reserves is poor; in 10 it is satisfactory, and in 13 good⁵⁷.

748 There is also a need to build capacity for “boots on the ground.” Building capacity (both institutional and
749 individual) for strong patrolling and surveillance system is the most urgent and immediate action needed
750 at the local scale (reserve level) to stop the bleeding. Nine of the 13 TRCs have recommended a strong
751 patrolling and surveillance system to stem poaching of tigers and their prey. Needed are:

- 752 1. Regular patrolling system covering the entire tiger habitat on a regular basis;
753 2. Strong and credible intelligence network to feed the management for prompt actions;
754 3. Long term and short term research – increased human presence; and
755 4. Eco-tourism – increased human presence, where possible and appropriate.

756 Strong patrolling and intelligence network systems with appropriate support and oversight mechanisms
757 support adaptive management actions based on field reports. The main purpose of a patrolling system is
758 to have increased law enforcement and deter criminal activities. This system can be used opportunistically
759 to gather some basic ecological information that can be used for trend analysis of populations of tigers
760 and other wildlife species.

⁵⁴ ADB and ADBI (2009). *Infrastructure for a Seamless Asia*. Tokyo: ADBI.

⁵⁵ Forest et al 2010 An Assessment of Management and Threats in Tiger Conservation Landscape

⁵⁶ See reference 37

⁵⁷ National Tiger Conservation Authority Stripes Jan-Feb 2010

761 **MORE ON THIS SECTION, INCLUDING SOME BEST PRACTICES, TO BE ADDED.**

762 ***Lack of Community Engagement***

763 The people who live near tigers are very often poor and heavily dependent on forest resources, and tend to
764 be alienated by conservation policies that ignore their needs in favor of those of wildlife. Many people
765 also possess livestock, which are a source of nutrition and cash income, and, in some communities,
766 indicators of wealth and social status. These livestock are usually free-grazed in forests and grasslands,
767 where they are vulnerable to tiger depredations, and the loss of an individual represents a significant
768 economic loss to the owners. In revenge, tigers are poisoned, snared, or otherwise killed. Peoples'
769 attitudes toward tigers and other wildlife also become negative, and if depredations continue, tolerance
770 thresholds begin to erode with a concomitant increase in the clamor for retribution and action from
771 politicians to remove tigers and convert the habitats to prevent future threats. If tigers are seen as a source
772 of depredation and economic deprivation, people will be ready converts to poaching to supply organized
773 wildlife traders.

774 ***Issues of Tiger Conservation Transcend National Boundaries***

775 Of the 76 TCLs, 15 span two or more countries, and eight of these are priority TCLs that could support up
776 to or more than 500 tigers with effective management and protection. Successful interventions on one side
777 of the border may be obviated by inaction on the other side, so cooperative management of these
778 landscapes is essential. Illegal trade and trafficking of tigers and their parts is transnational. Organized
779 wildlife crime involves not only TRCs but countries in Europe and North America as well. Yet
780 transboundary and regional cooperation in wildlife law enforcement is absent or poorly organized. At the
781 official international law-enforcement level, there are fewer than about 10 people devoted to wildlife
782 crime, and some, and their operations, are funded externally rather than through agency core budgets.

783
784 ***Tiger and Landscape Protection is Under-resourced***

785 That tigers and tiger landscapes are undervalued accounts in part for the fact that the financial resources
786 invested in wildlife conservation and habitat protection, while varying between countries, are typically
787 low in TRCs. As a point of comparison, the US federal budget for the management of protected areas
788 exceeds \$2 billion a year, or about \$20 per hectare. Expenditure on protection in Lao is as low as \$0.07
789 per hectare, about \$1 per hectare in Indonesia, about \$2 to \$3 per hectare in India, and as much as \$25 per
790 hectare in Nepal.⁵⁸ Looking at tiger source sites⁵⁹ alone, expenditures on protection average about \$5 per
791 hectare; omitting India from this analysis reduces this figure to \$3.6 per hectare. Analysis suggests that \$9
792 per hectare on average is required for *protection alone* of these source sites.⁶⁰ Other essential activities,
793 such as community engagement and broader landscape management, require considerably greater
794 resources.

795 In all TRCs, donors supplement some portion of national budgets for conservation and non-governmental
796 organizations support a variety of conservation activities. However, such funding is not sustainable:

⁵⁸ Damania et al. 2008. **The high figure for Nepal is largely the result of paying the military to protect PAs.**

⁵⁹ Define source site

⁶⁰ Walston et al

797 national conservation budgets shrink when donor funds dry up and promising projects of NGOs are
798 abandoned when grant money runs out or priorities change.

799

DRAFT

800 Chapter 4 WAYS FORWARD

801 Part A Managing and Protecting Tigers and Tiger Landscapes

802 The central conservation target is to double the size of the overall tiger population by 2022. TRCs have
803 set their individual targets to increase tiger numbers by from 50 to 100 percent by 2022 (Table 1, p x). Is
804 doubling tiger numbers a biologically achievable goal? The answer is yes, if the following conditions are
805 met:

- 806 • Protected area management effectiveness increases to provide much more efficient protection of
807 tigers and their prey in protected core areas so these areas are at their full potential to support
808 tigers (Box 6);
- 809 • The extent of protected core tiger habitats increases, where feasible; and
- 810 • Core tiger habitats are linked with corridors that enable tigers to move between the core habitats.
811 The latter strategy allows tigers to exist as a collection of ecologically and genetically linked sub-
812 populations—known as a ‘metapopulation’—that confers more robustness and resilience to
813 withstand threats and stressors generated by people.

814 Achieving Tx2

815 Four recent assessments conclude that most core tiger breeding areas, or source sites, can support many
816 more tigers than they do at present if these are fully protected and poaching of tiger and their prey is
817 minimized and then eliminated.

818 Box 6: Tiger Vulnerability to Poaching and Population Recovery Potential

819 Reducing poaching on tiger populations is universally regarded as essential for tiger conservation. Poaching can
820 decimate tiger populations, even where prey densities are high. Chapron et al.⁶¹ modeled mortality rates
821 associated with poaching on tiger population demography. They concluded that:

- 822 1. Tigers require large populations to persist, are susceptible to modest increases in mortality, and are less
823 likely than other big cats, such as pumas and leopards, to recover quickly after declines.
- 824 2. Because, in contrast to other large felids, tigers breed later and their inter-birth interval is longer, making
825 them less resilient to poaching.
- 826 3. While high prey numbers are essential to sustain tiger population, prey recovery efforts will not be
827 sufficient if mortality rates reach or exceed 15 percent. A population with 15% mortality among the
828 breeding females requires 83 breeding females to remain viable. However, if survivorship of the breeding
829 females approaches 100 percent, tiger populations can grow at an annual rate of about 20 percent.
- 830 4. Reduction of human-caused mortality, especially of breeding females, is the most essential short-term
831 conservation effort.
- 832 5. Because mortality rates are usually unknown and generally stochastic in nature, any management policy
833 that reduces tiger survival rates should be firmly avoided.
- 834 6. Excessive turn-over of territorial males is another negative consequence of tiger poaching.

835
836 One further trait of tigers needs to be highlighted. Breeding male tigers have a propensity for infanticide. When
837 territorial male tigers are killed, the males that replace them as breeders most often kill the offspring of any

⁶¹ Chapron et al

838 females that have young. This additional source of mortality can be expected to further dampen any tiger recovery
839 efforts.

840 *Case 1. Russian Far East (REF)*⁶². While only less than 13percent of available tiger habitat in the RFE is
841 in strictly protected areas (PAs), eight of those PAs are core breeding areas for tigers (source sites) that
842 now support 71 tigers. Scientists working on the ground estimate that the potential size of the tiger
843 population in these PAs is 142. The evidence for this comes from long-term monitoring of tiger and prey
844 numbers that shows both tiger and prey are significantly depressed by poaching even in protected areas.
845 Tigers have reached a point where reproduction is no longer compensating for losses. Full protection will
846 require full staffing and considerably more resources for the protected areas themselves, with additional
847 support for protection outside these PAs because radio tracking has shown that a large percentage of
848 protected tigers range outside the PA boundaries on a regular basis.

849 *Case 2. Protecting Source Sites across the Tiger Range*—⁶³. Case 1 is from one TCL. This analysis has
850 been included and expanded upon in a larger study to identify source tiger populations across the tiger
851 range. Source sites are those in which the number of cubs produced exceeds mortality; these core
852 protected areas that have been proposed for priority on-the-ground conservation attention. The features of
853 a source site includes 1) higher densities of tigers than in the overall landscape in which it is imbedded; 2)
854 evidence of current tiger reproduction; 3) the potential to maintain a cluster of more than 25 breeding
855 females; 4) embedded within a tiger-permeable landscape with the potential to maintain more than 50
856 breeding females; 5) government commitment to prevent further human in-migration or infrastructure
857 development; 6) existing protection capacity or political commitment to establish such capacity in the
858 very near future; 7) and a legal framework in place or being developed for the prevention of poaching or
859 hunting of tigers and their prey. The focus of the source site proposal is on implementing an enhanced
860 protection system for these source sites. There are now an estimated 2,200 tigers residing in 42 source
861 sites with a total area of 90,000 km² (Map 6). This analysis concluded that the number of tigers in many
862 of these sources sites is depressed below potential “carrying capacity” as in Case 1. This study concluded
863 that there is the potential to double the number of tigers in the source site to 4,400 if there is effective
864 protection.

865 Map 6: Source Populations
866 **INSERT SOURCE POP MAP**⁶⁴

867
868 *Case 3. Protecting Source Sites across Tiger Range*—⁶⁵. A third analysis found that 103,867 km² in 62
869 core protected areas (or source sites) in 16 TLCs, if fully protected at their full potential, would support
870 3,200 tigers. This assessment included more core breeding areas than Case 2. For example, the Bhutan
871 protected area and corridor system than links with the very important transboundary Manas protected
872 areas in Bhutan and India was not included in the Case 3 analysis. The Case 3 analysis identified
873 protected area size and status, size of occupied areas, fragmentation and land-use in the landscape matrix

⁶² WCS Russia Program. 2010. A proposal for increasing tiger densities in core breeding habitat of the Russian Far East. Vladivostok: WCS.

⁶³ J Walston et al. 2010. Avoiding the unthinkable: what will it cost to prevent tigers becoming extinct in the wild? New York: WCS

⁶⁴ Walston et al

⁶⁵ E. Dinerstein. 2009. <http://www.globaltigerinitiative.org/2009/12/15/the-kathmandu-files/>

874 impacting tiger dispersal, availability of prey, number of breeding tigers present, and the characteristics
 875 and intensity of the threats. By adding adjacent protected areas to the analysis –protected areas between
 876 which tigers could move -- the total core protected areas increased to 115, including 135,500 km² that can
 877 be secured, restored, and managed to support about 4,700 tigers (Map 7, Table 5). This analysis did not
 878 appraise local political commitment by governments to prevent further human in-migration or
 879 infrastructure development and existing protecting capacity or political commitment to establish such
 880 capacity in the very near future.

881 Map 7: Priority TCLs for Recovery **TO BE INSERTED**

882

883 Table 4: Priority Tiger Conservation Landscapes suggested by WWF for Tiger Population Recovery.

Landscape (TCLs are located by number in Map 7.)		Tiger Population Status
1	Russian Far East (Sikote-Alin-Lazovsky)	Core
2	Terai Arc, Nepal (Suklaphanta-Bardia-Chitwan)	Core
3	Terai Arc, India (Rajaji-Corbett- Nandhour)	Core
4	North Bank, Bhutan/India (Bhutan protected areas-Ripu-Chirang-Manas, Pakeh-Nameri)	Core
5	Kaziranga, India (Kaziranga-Karbi Anglong)	Core
6	Western Ghats, India (Nagarahole-Bandipur-Mudumalai-Sathyamangalam-BRT Hills, Anamalai-Periyar-Kalakad Mundunthurai)	Core
7	Satpuda Maikal, India (Pench-Khana-Achanakmar, Pench-Nagzira-Navegaon-Tadoba)	Core
8	Tennaserims, Thailand (Kuiburi-Kaeng Krachan-Thung Yai-Huai Ka Khang)	Core
9	Malaysia (Belum-Temengor-Taman Negara-Endau Rompin)	Core
10	Aceh- Northern Sumatra, Indonesia (Ulu Masen-Gunung Leuser)	Core
11	Central Sumatra, Indonesia (Bukit Tigapuluh-Rimbang Baling-Batang Hari-Kerinci-Bukit Barisan Seletan)	Core
12	Sunderbans – Bangladesh/India	Core
13	Amur Heilong, Russia/China - Changbaishan (Barsovy-Borisovskoe Plateau-Hunchun-Dungning)	Recovery
14	Lower Mekong, Cambodia/Lao (Mondulkiri-Phnom Prich-Siema-Lomphat- Xe-Pian-Dong Ampham)	Recovery
15	Northern Lao (Nam Et-Phou Louey)	Recovery

16	Hukaung Valley, Myanmar	Recovery
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884

885 *Case 4. Indian Subcontinent.* There are more tigers in the Indian Subcontinent than in any other region.
 886 Ranganathan et al.⁶⁶ suggested that with effective management of protected and adjacent areas, more than
 887 6,000 tigers could be supported in India alone, compared to the present number of about 1,400. If the
 888 adjacent lands are hostile toward the protected areas, then the tiger numbers that can be supported is
 889 reduced by about half as long as the protected areas are well managed.

890 A unified recommendation from these analyses is that the eventual fate of tiger populations depends on
 891 the human social and political structure in which they are embedded and the extent and character of the
 892 environments in which they live. The long-term viability of a tiger population depends on ecological and
 893 genetic connectivity with other tiger populations in the landscape. In addition to full, effective protection,
 894 habitat and population connectivity can be improved through appropriate management and restoration to
 895 facilitate dispersal and gene flow between tiger populations⁶⁷.

896 A scenario projection of the impacts of continued habitat loss, degradation, and fragmentation in TCLs
 897 indicated that the number of Class 1 TCLs⁶⁸ will decrease from 16 to only six in the next decade, with a
 898 43 percent reduction in habitat area, confining wild tigers to only three percent of their historic range⁶⁹.
 899 However, if connectivity between core areas is improved in these TCLs, there is potential to link core
 900 areas within TCLs and also to link adjacent TCLs to create larger landscapes. Across the tiger range,
 901 these restored TCLs represent more than 1.5 million km² of tiger habitat, increasing the range to 10
 902 percent of the historic range (Table 5). While this projection represents a broad-brush analysis, it is
 903 indicative of the potential for improving and restoring habitat connectivity across the tiger's range with
 904 judicious and strategic habitat restoration, zoning, and land management.

905 Table 5: Expert estimates (from WWF) of tiger numbers and estimates of recovery potential for populations and
 906 habitat in priority Tiger Conservation Landscapes.

2022 Landscape Goal	Current estimate of tiger numbers	Tiger estimates from landscape strategies or from WWF landscape coordinators by	Tiger numbers needed to reach 2022 meta goal	Percent habitat increase

⁶⁶ J Ranganathan et al. Where can tigers can persist in the future? *Biological conservation* 141: 67-77.

⁶⁷ E Dinerstein, C Loucks, A Heydlauff, et al. 2006. Setting priorities for the conservation and recovery of wild tigers:2000–2015. A User's Guide. Washington, DC, New York: WWF, WCS, Smithsonian Institution, and NFWF-STF; Sanderson EW, Forrest J, Loucks C, et al. 2006. Setting Priorities for the conservation and recovery of wild tigers: 2005 – 2015. The Technical Assessment. New York, Washington DC: WCS, WWF, Smithsonian Institution, and NFWF-STF.

⁶⁸ Highest priority for tiger conservation

⁶⁹ E. Wikramanayake, et al. 2010. Roads to Recovery or Catastrophic Loss: How Will the Next Decade End for Wild Tigers. In R. Tilson and P. Nyhus, eds. *Tigers of the World (2nd edition): The Science, Politics, and Conservation of Panthera tigris*. Elsevier/Academic Press. Pages 484-495

		2022		
Russia-China: by 2022, a population of over 650 Amur tigers (~ at least 250 breeding females) in the Amur-Heilong-Changbaishan landscape.	429-502	650	650	30%
Malaysia: by 2022, 1,000 wild tigers in the Central Forest Spine landscape in Peninsular Malaysia.	500	1000	1000	
Vietnam, Lao, Cambodia: by 2022 at least 60% occupancy of tigers in 11 sites (PAs) in the Lower Mekong Forests landscape.	No Data	Estimate not provided	500	
Sumatra: by 2022, the number of tigers has increased by 50% across the 6 core sites in KKTE, whilst maintaining baseline (2008) forest cover and increasing quality and prey throughout the KKTE landscape.	40	200	1000	41%
Sumatra: by 2022, populations of tigers remain stable at 2008 levels across the range in the southern Riau landscape.	187	383	383	51%
Sumatra: by 2022, populations of tigers remain stable at 2008 levels (136 individuals) across the range in BBS with a 10% increase in habitat from baseline (2008).	136	136	136	65%
Nepal, India: by 2020, a population of 500 adult tigers in the TAL.	less than 400	500	500	25%
Bhutan, India: by 2022, the tiger populations in Manas-Namdapha complex increased by 50% compared to 2009 baseline (152), while populations are maintained in Bhutan	152 (Manas-Namdapha); 115-150 (B2C2)	225	300	26%
India: by 2022, the tiger population in the Kaziranga-Karbi Anglong landscape increased by 50% compared to 2009 baseline, and existing tiger habitat secured.	~100	150	350	23%

India: by 2022, the Central Indian Tiger Landscape is fully connected via Tiger Reserves (core areas) and newly functional corridors, resulting in a 20% increase in habitat, and a 75% (also 600 tigers) increase in the tiger population.	400	600	600	20%
Bangladesh, India: by 2022, tigers in the Sundarbans (India and Bangladesh) are increased by 20% (baseline 2009) OR maintained at 2009 levels (depending on the official figures that are announced)	274 (or 70-74 according to the Indian Statistical Institute)	Estimate not provided	450	25%
India: by 2020 there is 50% increase in the tiger population of the Western Ghats (2008 baseline of 400) along with 25% increase in well managed tiger habitat (4,000 km ²)	400	600	600	25%
Total tiger population		4,061	6,469	
Average increase in habitat area in landscape				33%

907

908 Recognizing the above, the Hua Hin Declaration required commitments to policy changes and other
909 activities to make critical habitats and core areas that support tiger source populations inviolate from
910 economic development; identify and zone buffer zones and corridors for tiger conservation and ensure
911 their integrity through assessment of proposed infrastructure and other land-altering economic
912 developments and appropriate mitigations (such as Smart Green Infrastructure); mainstream tiger
913 concerns through sectoral integration; and foster transboundary land management.

914 Achieving the vision to double tiger numbers in the next 12 years requires concomitant management
915 interventions at the source sites and in the surrounding landscapes; the battle to save tigers is at a stage
916 where it has to be fought at multiple fronts. Tiger conservationists have accepted the proposition that for
917 tigers to survive in the long-term, tigers and their prey must be protected and managed at a landscape
918 scale that includes protection of source sites, buffer zones, dispersal corridors, and the restoration of
919 degraded lands, coupled with initiatives through which the conservation of tigers directly and indirectly
920 meets the needs of local people.

921 **Recovering Tiger Populations**

922 In the absence of high poaching rates and human disturbance, prey numbers and availability determine
923 tiger abundance (Box 7). In habitats where tiger populations are depressed, population numbers and
924 densities can be restored by managing and retaining high prey densities.

925 Box 7: What Determines Tiger Numbers in a Defined Area

926
927 Tigers are habitat generalists as evidenced by their once-wide distributions in multiple vegetation types across
928 Central, East, and South Asia. Tigers specialize in preying on large mammals, and are the largest meat-eaters in
929 Asian wildlands. They kill prey ranging from 20 to 100 kg as encountered, but also selectively seek and kill large-
930 bodied ungulate prey—large deer, wild pigs, and wild cattle. In the absence of poaching, it is prey density and
931 distribution that explain tiger density. Broadly, however, tiger prey densities vary across different habitat types
932 because the production and availability of food for ungulates varies in different habitats. Thus, tiger recovery is
933 protection from poaching, but also about prey recovery. Tiger prey populations are depressed both within and
934 outside protected areas through most of the tiger’s remaining range. Targets for increasing prey population
935 density that are aligned with potential carrying capacity need to be established as management objectives for each
936 Tiger Conservation Landscape.

937 The number of tigers residing in any given area is largely defined by the numbers of territories that can be
938 established by breeding females in a defined area. A reproducing tiger’s home range is defended, and thus, is its
939 territory. Breeding males defend their territories from other breeding males and overlap those of several breeding
940 females. Male territory size is dependent on the assertiveness of the resident and adjacent territorial males.
941 Reproducing female tigers exhibit strong intra-sexual territorial behavior and exclude other reproducing females
942 from their territories. A breeding female’s territory size tracks available food resources. It must be large enough to
943 support enough prey to feed her and her offspring as they grow and until they leave their natal areas (disperse) at
944 19 to 28 months of ages, and to partially feed the resident breeding males. And it must be large enough to supply
945 prey for non-reproducing, transient and temporary immigrants that can compose 38% of the population.

946 Tigers on average are estimated to remove 10% of available prey within their territories each year; average kill rate
947 is estimated to be about 50 ungulates per year. Thus, 500 individuals can be considered the prey base needed to
948 provide a tiger with the basic energy it needs for survival. Prey in female territories have been found to exceed by
949 1.7 times the females’ basic energetic need, accounting for the basic amount required to support growing cubs,
950 the territorial male, and transient tigers that are killing prey from the same base.

951 Monitoring data have established that, in response to varying prey densities, tiger densities vary by a
952 factor of 40, from less than 0.5 per 100 km² (tigers one year of age or older) in the temperate forest of the
953 Russian Far East and tropical rain forests to more than 20 per 100 km² in the prey-rich floodplain
954 savannahs and riverine forests of Nepal and India.

955 The conservation implications of these ecological differences are immense. The largest strictly protected
956 area in the Russian Far East is 4,000 km², yet supports fewer than 30 tigers, half of which regularly use
957 areas outside the boundaries of the reserve. A similar sized reserve in prey-rich Indian floodplain or
958 monsoon forest would support 800 tigers, in an ideal situation.⁷⁰ These ecological statistics indicate that
959 tiger recovery in the Russian Far East will have to consider very large spatial landscapes and strict
960 protection and recovery of prey recovery to conserve tigers. The numbers also indicate that viable tiger
961 populations could have been conserved in such core tiger protected areas in prey-rich habitat in India;
962 unfortunately, there are few very large core areas remaining in the Indian sub-continent, necessitating a
963 landscape approach to connect smaller core areas nested within a larger landscape. The natural ecological
964 parameters and the impacts from centuries of human-dominated land-uses have combined and conspired
965 to pursue a landscape approach to conserving tigers in the present-day context.

⁷⁰ Dale Miquelle et al. 2010. Amur tigers: a case study of tigers living on the edge. Pp 325-339 in DW Macdonald and AJ Loveridge. *Biology and conservation of wild felids*. Oxford: Oxford University Press.

966 ***Optimizing the Resilience of Tiger Populations***

967 Our tiger conservation challenge is to protect remaining tiger breeding populations and reconnect the
968 natural flows in now-fragmented landscapes that are needed to support the demographic and genetic
969 processes that sustain tiger populations and to maximize the resilience of these populations (Box 8).
970 (Resilience is the ability of a particular animal population or ecological system to absorb stress or changes
971 – such as poaching pressure -- and still retain its basic function and structure and persist.)⁷¹

972 Box 8: What Determines Tiger Population Persistence?

973
974 A *population* is a group of interbreeding tigers living in a given area. A central conservation target then has to be
975 increasing population size both by increasing protected area size and linking protected areas through dispersal
976 corridors. Distinct populations linked through dispersal are called a *meta-population*. *Source tiger populations* are
977 those in which the number of young produced exceeds mortality. *Sink populations* are those in which mortality
978 exceeds reproductive output; they are not self-sustaining and rely on immigration from source populations for
979 persistence. However these population sink areas can also serve as dispersal corridors for tigers, usually young
980 adults, as they move between source populations. The sink population is also important to allow sub-adults and
981 other non-territory holding adults in source populations to disperse, and minimize intra-sexual conflict that can
982 disrupt the social structure. Infanticide can be a significant disruptive factor when adults are unable to disperse out
983 of small, isolated source sites and have to fight for limited territorial spaces. Tiger Conservation Landscapes are
984 areas of source populations and sink areas that serve as connections to form a distinct tiger meta-population.

985 When the network of protected areas (PAs) was developed in tiger habitat over the last half century, most of the
986 PAs were nestled in landscape matrices that included suitable tiger dispersal routes to other sites. Today, these
987 same protected areas are islands in a sea of land-uses and infrastructure that stop or greatly restrict tiger dispersal.
988 This has large negative implications for tiger long-term persistence, not only in tiger landscapes but even in
989 protected areas themselves. The conflict with people on PA borders is a major cause of mortality so that border
990 areas represent population sinks. Conservation programs then must seek to maximize protected areas size and
991 mitigate tiger persecution on reserve borders and in buffer zones.

992 Dispersal plays a critical role in tiger population dynamics because recruitment into a local population is strongly
993 supported by immigration from adjacent populations while many of the population's own offspring emigrate to
994 other areas. Dispersing tigers have been known to travel more than 100 km through suitable, but sub-optimal
995 habitat. However, tigers are stopped cold by unsuitable habitat, especially open landscapes. Ameliorating barriers
996 to dispersal, such as highways, canals, and urbanization, and minimizing human-caused mortality, such as poaching
997 and road kills, are key to promoting successful tiger dispersal and are central to tiger conservation planning.

998 **Protecting Tiger Core Areas and Tiger Source Sites**

999 Protected core areas are a mainstay of tiger conservation, and biodiversity conservation generally.⁷²
1000 Indian tiger occupancy of forest patches was negatively correlated with human disturbance and positively

⁷¹ B. Walker and D Salt. 2006. Resilience thinking: sustaining ecosystems and people in a changing world. Washington DC: Island Press.

⁷² RF Noss et al. 1999. Core areas: where nature reigns. Pp 99-128 in ME Soule and J Terborgh, eds. Continental conservation: scientific foundations of regional reserve networks. Washington DC: Island Press.

1001 correlated with prey availability, forest patch and core size.⁷³ The strategy to stabilize and recover tiger
1002 numbers requires that core tiger breeding populations are secure. But these core tiger areas—with notable
1003 exceptions in Malaysia, Myanmar, Russia, and Sumatra—are no longer embedded in a larger landscape
1004 tiger-friendly habitat; instead they are usually isolated or tenuously connected to other habitat.

1005 Core areas refer to areas where human uses are greatly restricted and natural processes reign. Core areas
1006 are where the conservation of biodiversity and ecological integrity or similar values takes precedent over
1007 other values and uses and are distinguished by limited human access. Some IUCN protected area classes⁷⁴
1008 (1a, 1b, II, IV, VI), such as national parks and strictly protected reserves, qualify in whole or in part as
1009 core areas, while others, or even portions of national parks, do not because of their degree of development
1010 and intensity of use. Designated forest lands that put conservation of biodiversity as the highest priority,
1011 provincial parks and nature reserves, and areas managed by conservation groups or clusters of these can
1012 serve as core areas. Natural conditions and limited access to humans are the important attributes of core
1013 areas, but an area need not be pristine to qualify for protection as a core area. Core areas can be areas that
1014 have been degraded by human activities and restored. Road density is often the most accurate predictor of
1015 habitat effectiveness. The challenge of managing core protected areas is in restricting uses inside the areas
1016 and stabilizing threats outside that area that spill in.⁷⁵ But even within protected areas, conflict with
1017 human is a significant cause of tiger mortality.⁷⁶ And significant mortality occurs when tigers range
1018 beyond the borders of core protected areas that requires mitigating carnivore persecutions on the edges of
1019 protected core areas and in buffer zones.⁷⁷

1020 Female tigers and female carnivores generally are vulnerable demographically (Box 7) and will raise their
1021 young in areas where critical resources are concentrated and easiest to obtain. Because they must satisfy
1022 their elevated energy requirement with minimal time away for their young they are restricted to optimal
1023 habitat. The essential function of core protected areas is to serve the needs of species especially
1024 reproducing female tigers, which are hypersensitive to human activities. This is critical habitat for tigers
1025 which is now recognized in India wildlife law but has not been so designated by other TRCs. A female
1026 territory size represents the quality of the habitat, determined by available prey, and will determine how
1027 many reproducing females can be accommodated within a protected core area.

1028 Dispersal plays a critical role in tiger population dynamics because recruitment into a local population is
1029 strongly supported by immigration from adjacent populations while many of the population's own
1030 offspring emigrate to other areas. Dispersing tigers have been known to travel more than 100 km through
1031 suitable, but sub-optimal habitat. However, tigers are stopped cold by unsuitable habitat, especially open
1032 landscapes. Ameliorating barriers to dispersal, such as highways, canals, and urbanization, and
1033 minimizing human-caused mortality, such as poaching and road kills, are key to promoting successful
1034 tiger dispersal and are central to tiger conservation planning.

⁷³ Y Jhala et al. 2008. Status of tigers, co-predators and prey in India. Dehradun India: National Tiger Conservation Authority and Wildlife Institute of India.

⁷⁴ http://www.unep-wcmc.org/protected_areas/categories/index.html

⁷⁵ K. Brandon. 2002. Putting the right parks in the right places. Pp 443-467 in J. Terborgh et al., eds. Making parks work: strategies for preserving tropical nature. Washington DC: Island Press.

⁷⁶ B Gurung et al. 2008. Factors associated with human-killing tigers in Chitwan National Park, Nepal. Biological conservation 141:3069-3078.

⁷⁷ R Woodroffe and JR Ginsberg. 1998. Edge effects and the extinction of populations inside protected areas. Science 288: 2126-2128.

1035 While the goal in tiger conservation is to create core protected areas that are buffered and linked to other
1036 core protected areas, in fact many people live within their borders and they rely on resources from the
1037 area for their livelihood. There may or may not be internal zoning regulating use. Most Indian Tiger
1038 Reserves, protected-area systems in Bhutan, Indonesia, Malaysia, and the Bikin Wildlife Reserve in the
1039 Russia Far East have people living within their boundaries. The need to reduce the human footprint in the
1040 protected core areas is fully recognized by the TRCs. Some TRCs propose a process of voluntary
1041 resettlement where the social context will allow it to occur, or, alternatively, more refined zoning to shield
1042 breeding female tigers from human intrusions.

1043 The foundation of sustainability of natural resources and forests is healthy ecosystems, and tigers are a
1044 barometer of ecosystem health. This landscape approach to conserving tigers recognizes their ecological,
1045 behavioral, and genetic distinctiveness across their range. It also recognizes the value of tigers as top
1046 predators in ecosystems and their role as umbrella species for conservation of other species and for the
1047 ecosystem services their landscapes provide⁷⁸.

1048 *Smart Green Infrastructure*⁷⁹

1049 Infrastructure is essential to economic growth and to meeting goals for poverty alleviation and other
1050 social goods in TRCs but often has adverse effects on wildlife and ecosystems (Box 9). However, it is
1051 also possible to build infrastructure that takes into account the maintenance of biodiversity and the values
1052 of intact ecosystems such as tiger conservation landscapes. In fact, well-designed infrastructure projects
1053 have the potential to freeze and even reverse the degradation of natural habitats and the loss of
1054 biodiversity.⁸⁰ Application of the tenets of “smart green infrastructure” (SGI) in tiger landscapes will give
1055 tigers the space and seclusion they need and give people—especially the mostly poor rural communities
1056 that live near tiger habitats—the sustainable economic and social benefits they need.

1057 Box 9: The Problem With Roads

1058 Transportation infrastructure generates serious direct and cumulative adverse impacts if poorly planned. Road
1059 density can affect wildlife movement, cause population fragmentation, and give people greater access to wildlife
1060 areas; these impacts increase as road density increases⁸¹. Roads often have downstream hydrological impacts.
1061 Perhaps most important, roads open up intact habitat and create opportunities for poachers to reach remote
1062 areas that once provided refuge for tigers and their prey. Roads also create the means for exporting tiger parts as
1063 most of the illegal tiger trade occurs by roads and trains. While tiger populations may suffer few road-related
1064 casualties in an absolute sense, because of their small population sizes the loss of even a few individuals might lead

⁷⁸ E. Dinerstein et al. 1997. A Framework for Identifying High Priority Areas and Actions for the Conservation of Tigers in the Wild. Washington DC and New York: World Wildlife Fund-US and Wildlife Conservation Society.

⁷⁹ This section is excerpted and adapted from Quintero J., Roca R., Morgan A.J., Mathur A. 2010. *Smart Green Infrastructure in Tiger Range Countries: A Multi-Level Approach*. The World Bank.

⁸⁰ Quintero, JD (2007) *Mainstreaming Conservation in Infrastructure Projects: Case Studies from Latin America*. Washington, D.C.: The World Bank.

⁸¹ Forman, R.T.T., D.S. Friedman, D. Fitzhenry, J.D. Martin, A.S. Chen and L.E. Alexander. 1997. Ecological effects of roads: toward three summary indices and an overview for North America. *In* *Habitat Fragmentation & Infrastructure*. Pp. 40–54. Edited by K. Canters. Ministry of Transport, Public Works and Water Management, Delft, The Netherlands

Mech. L.D.1989. Wolf population survival in an area of high road density. *American Midland Naturalist* 121:387-29
Forman, R.T.T. 1995. *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge Univ. Press, Cambridge.

1065 to their local extinction. Roads often produce induced impacts and these cumulative impacts can ultimately
1066 jeopardize tiger populations.
1067

1068 Beginning with the choices behind a project's location, including entirely avoiding projects in areas
1069 important to the tiger's survival, smart green infrastructure uses landscape planning, careful design, tiger-
1070 friendly construction practices, community engagement, strong assessments, monitoring, and adaptive
1071 management to ensure that infrastructure does not interrupt natural ecological processes. While avoidance
1072 of all adverse impacts on tigers and biodiversity in general should be a primary focus of any infrastructure
1073 planning, an array of policies and practices can help ensure that there is a future for wild tigers.

1074 Tiger-friendly infrastructure options can be framed in the context of the mitigation hierarchy:

1075 **Avoidance:** measures taken to avoid creating impacts from the outset, such as careful spatial or temporal
1076 placement of elements of infrastructure, in order to completely avoid impacts on certain components of
1077 biodiversity. For tigers, this includes making core breeding habitats with source populations inviolate
1078 areas where no infrastructure development activities are permitted and avoiding, to the extent possible,
1079 development in the buffer zones and corridors that are integral to maintaining tiger conservation
1080 landscapes.

1081 **Minimization:** measures taken to reduce the duration, intensity, and/or extent of impacts that cannot be
1082 completely avoided, as far as is practically feasible.

1083 **Rehabilitation/restoration:** measures taken to rehabilitate degraded ecosystems or restore cleared
1084 ecosystems following exposure to impacts that cannot be completely avoided and/or minimized.

1085 **Offset:** measures taken to compensate for any residual significant, adverse impacts that cannot be
1086 avoided, minimized, and/or rehabilitated or restored, in order to achieve no net loss or a net gain of
1087 biodiversity. Offsets can take the form of positive management interventions such as restoration of
1088 degraded habitat, arrested degradation or averted risk, and protecting areas where there is imminent or
1089 projected loss of biodiversity.

1090 Tiger-friendly infrastructure must be driven and supported by decision makers at the national policy level,
1091 the sectoral planning level, and finally, at the project level. At the national level, government officials can
1092 use a range of regulatory policies, fiscal policies, and incentive programs to promote tiger-friendly
1093 infrastructure development. Regulatory options for controlling impacts on tigers and their habitats include
1094 land-use and tiger-corridor planning, infrastructure permitting, and transfer mechanisms such as payment
1095 for ecosystem services schemes. Strategic Environmental Assessments (SEAs) have been shown to be a
1096 major factor in well planned infrastructure projects when it comes to biodiversity. Traditional EIAs do not
1097 always cover the induced and cumulative impacts of infrastructure projects (to which tigers are
1098 particularly sensitive) and thus SEAs can play a key role in informing the range of factors to consider in
1099 advance of construction. Mandating SEAs that evaluate tiger impacts specifically within TCLs would
1100 form a strong basis for SGI development. Environmental compensation policies and incentive programs
1101 can help drive investments in alternative livelihoods, as well as drive SGI and preserve key habitat areas.
1102 Still, avoiding TCLs—designating core tiger population habitats as inviolate areas where no economic

1103 infrastructure development is permitted—is the best and cheapest option available to governments to save
1104 wild tigers and to this extent TRC governments have committed to.

1105 Regardless of the national policy options adopted, sectoral planning must begin to explicitly consider
1106 tigers and related biodiversity considerations. Developers and financial institutions have a significant role
1107 to play in tiger conservation as it relates to infrastructure development. Industry has numerous options,
1108 including having explicit tiger conservation goals, effective stakeholder engagement, environmental
1109 management systems, and biodiversity offsets. Emphasizing concentrated lower-impact forms of
1110 development, whether via run-of-river or railroad infrastructure, may assist tiger conservation. Overall,
1111 voluntary approaches at an industry level that demonstrate leadership can play a critical role in tiger
1112 conservation.

1113 Lastly, on a project level, engineers have various options available to them to ensure that habitat loss,
1114 fragmentation, and induced impacts, such as poaching, are minimized. In terms of road infrastructure
1115 design, the primary focus should be on open-span bridges and bridge extensions, which are likely to be
1116 both cost-effective and preferred by both large cats and their prey. Minimizing paving and design that
1117 considers hydrological impacts is also important. Mining and hydroelectric infrastructure also has tiger-
1118 friendly options available throughout the project lifecycle; in particular, attention should be paid to
1119 limiting ancillary roads and settlements and establishing strict policies for workers with respect to hunting
1120 and poaching.

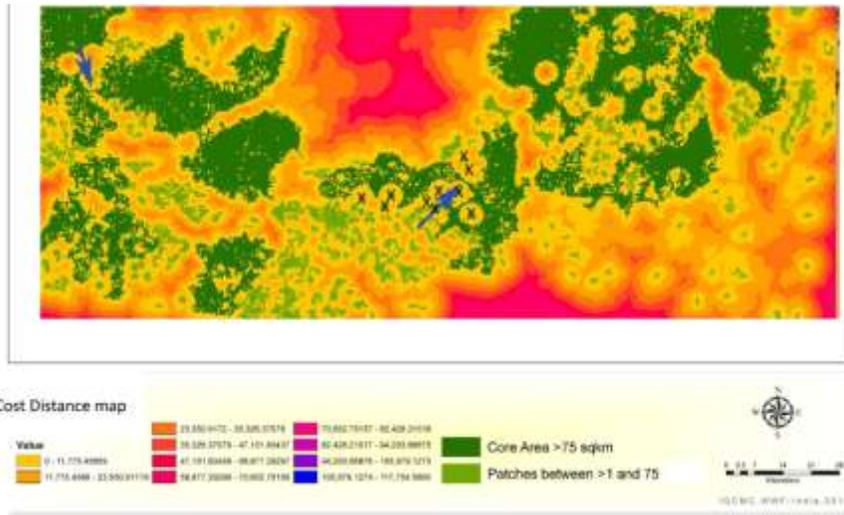
1121 In summary, while avoidance of all adverse impacts on tigers and biodiversity in general should be a
1122 primary focus of all infrastructure planning, an array of policies and practices are available to help ensure
1123 that infrastructure development is tiger friendly.

1124
1125 **Box 10: The Tiger Filter**

1126 A tool for land-use planning and impact evaluation of large economic development projects in tiger conservation
1127 landscapes. A case study from the Nilgiris

1128
1129 The 'Tiger Filter' is a GIS-based model that helps to assess the impacts of infrastructure on TCLs and to build
1130 mitigations to prevent loss and fragmentation of critical tiger habitat. The model uses field-based information
1131 about tiger populations, distributions, and habitat use to identify core areas and potential dispersal corridors that
1132 can be incorporated as a 'tiger habitat' layer during sectoral land-use and project planning. The pilot analysis was
1133 developed for the Nilgiris, in the Western Ghats mountain range of southwestern India using maps and imagery to
1134 prepare a composite tiger habitat/land-cover/land-use (Map 8).

1135 **Map 8: The Nilgiris**



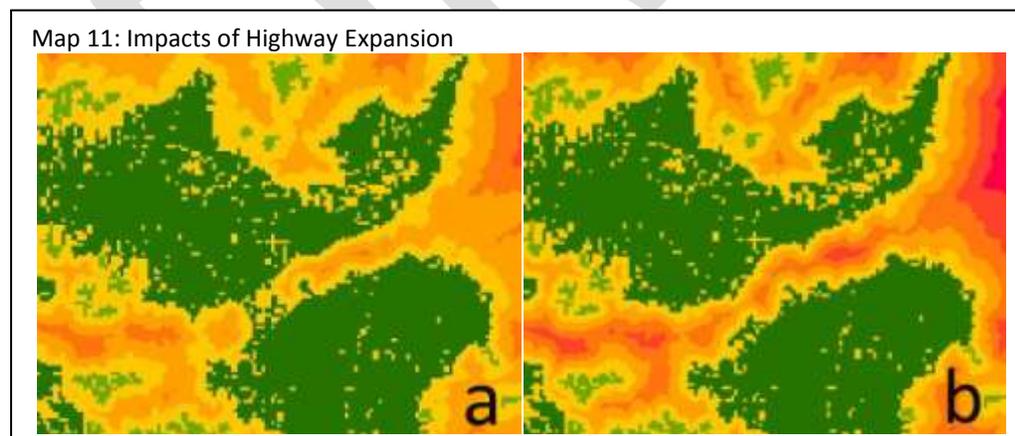
1145

1146 The model indicates the ecological cost to tigers in moving between core areas, based on habitat suitability and
 1147 distance travelled, and thus the potential paths used by tigers during dispersal.

1148 The 'better' corridors are shown in yellow (Map 10), with corridor functionality decreasing towards the orange and
 1149 redder end of the color ramp. The map also shows bottlenecks, where connectivity is narrow and tenuous
 1150 (indicated by blue arrows), and human-impact areas where restoration can be strategically directed (e.g., indicated
 1151 by villages marked with 'X').

1152 The smaller, non-core habitat fragments act as 'stepping stone' habitat in the context of landscape-scale
 1153 connectivity, and are thus essential for corridor functionality.

1154 We used a planned highway expansion project to model the impacts of infrastructure on connectivity (Map 11).
 1155 The corridor cost values will increase from the pre-expansion model (Map 11a) to the post-expansion model (Map
 1156 11b), making it more unsuitable for tiger dispersal. This model is an example of how infrastructure development
 1157 plans can be assessed for impacts on tiger habitat and landscape connectivity.



1158

1159 This analysis can be used to: 1) define the current state and configuration of the core areas and corridors in the
 1160 tiger landscape; 2) identify priority restoration areas to ensure adequate core habitat and corridors are available to
 1161 conserve a viable tiger population and meet conservation targets; 3) ensure that institutions engaged in land-use
 1162 planning and land divestment include important tiger habitats in planning processes; and, 4) assess and monitor

1163 any planned and pipeline infrastructure and development projects to determine the impacts on core areas and
1164 tiger corridors.

1165 Box 11: BEST PRACTICE: Developing Tiger-Friendly Infrastructure⁸²

1166
1167 Several tiger range countries are already implementing the SGI principles, some on an ad hoc, project-by-project
1168 basis, and others in a more comprehensive manner. The North South Economic Transport Corridor (NSEC) in the
1169 Greater Mekong Sub-region (GMS) is an example where biodiversity conservation was an integral aspect of the
1170 planning process at the national and regional level. The NSEC will link important economic hubs throughout the
1171 GMS countries and a Strategic Environmental Assessment was carried out to evaluate indirect/induced impacts on
1172 the corridor's natural assets and ecosystem services as well as on poor and vulnerable populations.

1173
1174 A Spatial Multi-Criteria Assessment (SCMA) tool was used to integrate a wide range of factors such as construction
1175 costs and value of assets to be connected; it also considered spatial layers related to environmental and social
1176 factors such as biodiversity, water resources, livelihood and health, and security— all factors that add indirect costs
1177 if the targeted investment is not harmonized with them. A map identifying areas of high suitability for a desired
1178 investment was developed. At the same time, the SMCA was used to identify areas of low suitability which usually
1179 are vulnerable areas/sensitive areas where the respective investments would have considerably increased costs.
1180 The suitability map produced by the SMCA can be used to plan development on a regional scale and can be
1181 beneficial in planning future development projects to ensure they are tiger friendly.

1182
1183 More specifically, **Bhutan** has established a Biological Corridor Complex (B2C2) where 51 percent of the country is
1184 under protected areas linked by biological corridors covering 9 percent of the country. This was established the
1185 1990s based on forest linkages using Landsat images; a revision is planned using the latest tools and techniques to
1186 ensure all tiger/key biodiversity habitat is included. Infrastructure development is restricted in the corridors and
1187 the government is focused on green development.

1188
1189 In **Malaysia** the Central Forest Spine (CFS) master plan was developed to create corridors linking fragmented
1190 habitats through smart green infrastructure. Thirty-two linkages have been identified as primary and secondary
1191 links and pilot linkage projects are being implemented at the northeastern part of Taman Negara National Park
1192 with three wildlife viaducts.

1193
1194 The SGI principles are also being applied in other tiger range countries. For example the Nam Theun 2
1195 hydroelectric project in Lao People's Democratic Republic is an example of compensation. Protecting the unique
1196 ecosystem is one of the cornerstones of the project and the project will allocate US\$1 million annually for 31 years
1197 for the protection of the area and patrols are being put in place to enforce protection. Avoidance, mitigation and
1198 minimization is observed in the the Guiguang Railway Project in China where the project avoids seven nature
1199 reserves by at least 300 m and crosses the Shoucheng Nature Reserve (provincial level) through a tunnel. The
1200 alignment was shifted to avoid two parks and will pass through only three scenic corridors (out of seven in the
1201 project corridor) with minimum impact.

1202

⁸² Quintero J., Roca R., Morgan A.J., Mathur A., Shi X. 2010. Smart Green Infrastructure in Tiger Range Countries: A Multiple-level Approach. Washington, D.C.: World Bank

1203 **Part B Combating Wildlife Crime and Illegal Trade**

1204 This threat posed by poaching and illegal trade and trafficking of tigers must be urgently addressed to
1205 stem the tiger's rapid decline, concomitant with other priority actions such as protection of core breeding
1206 populations and restoring, securing and managing tiger landscapes for a multi-fronted strategy to recover
1207 tigers in Asia's wildlands. In their NTRPs, all TRCs recognized combating one or more aspects of
1208 wildlife crime as a priority.

1209 To more effectively combat wildlife crime affecting wild tigers, the following are needed:

- 1210 • Significantly increased wildlife law enforcement capacity—both physical capacity and human
1211 capacity at all levels of criminal justice system from park guards to the judiciary.
1212
- 1213 • Greater cooperation among the TRCs' national agencies charged with various aspects of
1214 combating wildlife crime, such as forest officers, customs, police, and the military.
1215
- 1216 • Stronger regional and global cooperation in wildlife law enforcement to address the transnational
1217 nature of wildlife crime. Regional enforcement networks are developing (Box 12) but need
1218 continued support from the international community and donors.
1219
- 1220 • International wildlife law enforcement agencies need to provide increased technical assistance
1221 and support. International law enforcement agencies involved in combating wildlife crime include
1222 the CITES Secretariat, INTERPOL, UN Office on Drugs and Crime, and the World Customs
1223 Organization.
1224
- 1225 • High-impact bi-lateral and regional wildlife crime interdiction operations that begin to dismantle
1226 or disrupt tiger trafficking networks (Box 13), and also demonstrate that the countries involved
1227 in these operations have the political will to strongly enforce wildlife laws.
1228

1229 **Box 12: BEST PRACTICE: Wildlife Enforcement Networks as Models for Regional Cooperation in Wildlife Law**
1230 **Enforcement and Capacity Building**

1231
1232 The Association of Southeast Asian Nations Wildlife Enforcement Network (ASEAN WEN), established in 2005,
1233 serves as a good model demonstrating the importance of regional cooperation for wildlife law enforcement.
1234 ASEAN-WEN, an intergovernmental organization, is the world's largest wildlife law enforcement network involving
1235 police, customs, and environment agencies of all 10 ASEAN countries – Brunei, Cambodia, Indonesia, Laos,
1236 Malaysia, Myanmar, the Philippines, Singapore, Vietnam, and Thailand.⁸³

1237
1238 Through annual meetings, workshops, and trainings, ASEAN-WEN facilitates increased capacity and better
1239 coordination and collaboration of law enforcement agencies among Southeast Asian countries, regionally and
1240 globally. Links with CITES offices, INTERPOL, U.S. Fish and Wildlife Service, U.S. Department of Justice, and other
1241 wildlife law enforcement groups has broadened the Network's reach. ASEAN WEN has been instrumental in
1242 controlling the illegal trade in wildlife and a number of significant seizures involving tiger parts, ivory, reptiles, and
1243 numerous other species have been made.
1244

⁸³ All information on ASEAN WEN has been obtained from its website <http://www.asean-wen.org>

1245 On similar lines, a South Asia Wildlife Enforcement Network (SAWEN) is being developed to combat the illegal
1246 wildlife trade in South Asia. The eight member countries of the South Asia Co-operative Environment Programme
1247 (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) have pledged to work together
1248 to tackle illegal wildlife trade in the region and a plan of action was approved in 2010.

1249
1250 Also, in June 2010, China and Nepal signed a comprehensive Memorandum of Understanding (MoU) on nature
1251 conservation, agreeing to work jointly to combat illegal wildlife trade and trafficking and promote conservation
1252 awareness and to cooperate on forestry issues and management of nature reserves and protected areas. An MoU
1253 between Nepal and India to cooperate in wildlife law enforcement and other conservation issues was signed in
1254 later July 2010. Another model for bilateral cooperation is the Protocol between the Government of the People's
1255 Republic of China and the Government of the Russian Federation on Tiger Protection.

1256
1257 **Box 13: Quick-impact Operations**

1258
1259 Led by the INTERPOL, **Operation Baba** was a coordinated one-day crackdown on elephant ivory smuggling in
1260 Africa, conducted in November 2008. It led to the arrest of almost 60 people and the seizure of one ton of illegal
1261 elephant ivory. The sweep targeted more than 50 locations, including local ivory markets, airports, border
1262 crossings, and smuggling points.

1263 The arrests and seizures were part of a five-country law enforcement operation that involved more than 300 law
1264 enforcement officers from police, customs, national wildlife and national intelligence agencies in Congo
1265 (Brazzaville), Ghana, Kenya, Uganda, and Zambia. The six-country **Operation Costa** was conducted in November
1266 2009 across Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda, and led to the arrest of more than 100
1267 people and the recovery of 1.5 tons of ivory and hundreds of other illegal wildlife items.

1268 In May 2010, **Operation Mogatle**, a two-day operation in southern Africa resulted in the location and closure of an
1269 illegal ivory factory, the seizure of nearly 400 kilos of ivory and rhino horn with a market value of more than one
1270 million dollars, as well as the arrest of 41 people. The operation involved nearly 200 officers from police, national
1271 wildlife, customs, and national intelligence agencies across six countries – Botswana, Namibia, South Africa,
1272 Swaziland, Zambia and Zimbabwe – who carried out inspections and raids on markets and shops. Checks were also
1273 made on suspect vehicles at border crossing points where for the first time in a wildlife crime operation, sniffer
1274 dogs provided by South African and Swaziland police were used at check points at the Mozambique/Swaziland
1275 border.

1276 **Operation Tram** was a month-long (February 2010) international operation targeting the illegal trade in traditional
1277 medicines containing protected wildlife products. National wildlife enforcement authorities, police, customs, and
1278 specialized units from 18 countries across five continents joined forces to conduct the operation that included
1279 investigations into individuals and companies as well as inspections of premises such as seaports and wholesalers.
1280 These investigations revealed a large amount of medicines either containing or marketing the use of illegal
1281 ingredients such as tiger, bear, and rhinoceros. It has resulted in a series of arrests worldwide and the seizure of
1282 thousands of illegal medicines worth more than 12 million dollars. Countries involved in Operation Tram were
1283 Australia, Canada, the Czech Republic, Ecuador, France, Georgia, India, Italy, New Zealand, Nigeria, Norway,
1284 Portugal, Serbia, Slovakia, South Africa, Turkey, the United Kingdom, and Zimbabwe.

1285 **Project AIRCOP**, funded by European Commission, coordinated by the UNODC and implemented by the WCO and
1286 INTERPOL, aims at building drug-enforcement capacities at international airports in West Africa, South America,

1287 and the Caribbean, as well as in Morocco, to target trafficking in narcotics, counterfeit products, hazardous waste,
1288 wildlife, avoidance of duties, etc.

1289 **Operation COCAIR (2008)**

1290 Seizures of cocaine, heroin and cannabis to the value of USD 600,000

1291 Firearms and ammunition seized

1292 88 kg of cultural items prohibited from export

1293

1294 **Operation COCAIR 2 (2010)** in 25 international airports from 22 countries under the multi-annual Project
1295 AIRCOP:

1296 3,000 kg of chemical precursors

1297 1,800 kilograms of herbal cannabis, and 15 kilograms of cocaine

1298 One handgun seized

1299 20 kg of cultural items prohibited from export

1300 Chemical precursors seized

1301 One false passport

1302

1303 **UNODC/WCO Container Control Programme (CCP)** helps States create sustainable law enforcement structures in
1304 selected seaports to minimize the exploitation of maritime containers for illicit drug trafficking and other
1305 transnational organized criminal activities. CCP has been implemented in 8 countries since 2004, and is to be
1306 expanded to a further 21 countries.

1307 Seizures by June 2010:

1308 36,828 kg of narcotic drugs

1309 769,250 kg of chemical precursors

1310 1,554,000 kg of protected wildlife

1311

1312 In addition, within the WCO environmental programmed, two important functions are capacity building and
1313 operational support. In the last year, WCO organized four Green Customs workshops for Customs officers from
1314 more than 50 countries; at the same time, the **Green Customs Initiative**, in which four of the ICCWC partners are
1315 members, have hosted several Green Customs workshops worldwide. The WCO has also successfully organized
1316 several global joint operations targeting wildlife, hazardous waste, and ozone-depleting substances since 2009.

1317

1318 Several international agreements address wildlife crime issues. The Convention on International Trade in
1319 Endangered Species of Wild Fauna and Flora (CITES)⁸⁴ is the principal international agreement to control
1320 and regulate the international trade in protected species. One hundred and seventy-five nations are Parties
1321 to CITES, including all Tiger Range Countries. Serious wildlife crime, such as illicit trafficking in natural
1322 resources, falls within the scope of the United Nations Convention against Transnational Organized
1323 Crime (UNTOC)⁸⁵. This Convention applies to all serious crime with a transnational and organized crime
1324 aspect. Eleven of the 13 TRCs are parties to the UNTOC.⁸⁶ The United Nations Convention against

⁸⁴ <http://www.cites.org/>

⁸⁵ <http://www.unodc.org/unodc/en/treaties/CTOC/index.html>

⁸⁶ http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XVIII-12&chapter=18&lang=en

1325 Corruption (UNCAC)⁸⁷ provides an important legal basis for international cooperation in combating
1326 forms of trafficking closely connected with corrupt practices. All TRCs are signatories to the UNCAC.⁸⁸

Box 14: INTERPOL's Ecomessage System

International co-operation between national law enforcement agencies is vital if the criminals involved are to be successfully apprehended and deterred. At its 15th meeting in Doha in 2010, the Conference of the Parties to CITES decided to direct all Parties, particularly the tiger range countries, to submit information on incidents of poaching and illegal trade in tigers within their territory using the Ecomessage format. With the Ecomessage system, data are rapidly and methodically entered into the INTERPOL database where they can be cross-referenced with other entries. This system has a number of important benefits:

1. The cross referencing of material can produce rapid and valuable feedback. For example, if a country reports via Ecomessage the arrest of a suspect, the INTERPOL database may produce information that the same suspect is wanted on similar charges in a different country, or indeed may have prior convictions to his or her name. Information on outstanding arrest warrants or prior convictions is of great interest and importance to prosecuting authorities. Furthermore, through INTERPOL's I-24/7 global police communications system and MIND/FIND system, law enforcement officials on the ground will soon have immediate access to this information.
2. The Ecomessage form enables the reporting country to ask questions or make requests and, in doing so, encourages international co-operation between law enforcement agencies. For example, a customs agency in one country may have seized contraband smuggled from a second country. The Ecomessage system allows the first country to enquire about the exporter or carrier in the second country. In the case of smuggled wildlife, the Ecomessage system also allows countries to address such issues as the repatriation and preservation of the seized wildlife.
3. Information collected by Ecomessages and entered into the database allows INTERPOL criminal analysts to study the data and begin to discern such information as the structure, extent, and dynamics of international criminals and organizations involved.

1327

1328

⁸⁷ <http://www.unodc.org/unodc/en/treaties/CAC/index.html>

⁸⁸ <http://www.unodc.org/unodc/en/treaties/CAC/signatories.html>

1329 **Part C Reducing Demand for Tigers and Their Derivatives⁸⁹**

1330 Demand for tiger parts and products drives most of the poaching of tigers⁹⁰ and all of illegal trade and
1331 trafficking in tigers. Conversely, insufficient demand for the survival of wild tigers living in natural
1332 landscapes essentially allows this criminal activity to flourish. Tipping the balance of this demand
1333 equation requires a new understanding of the value of tigers and their landscapes (discussed in Chapter 2),
1334 significantly improved wildlife law enforcement (discussed in Chapter 3), which is largely a matter of
1335 increased resources and expertise coupled with political will, and persuading people who consume⁹¹ tigers
1336 to change their behavior through awareness campaigns,

1337 The TRCs have called upon the international community to develop and execute a global demand
1338 reduction campaign; the following outlines the nature of the demand and the basis for the development of
1339 a campaign.

1340 A variety of studies have examined the nature of the demand for tiger parts and products to better
1341 understand the motivation for consuming tigers. The main segments of tiger product consumption are:

1342 *Skins for display.* There is a long history of using tiger skins, and more recently, whole taxidermy
1343 specimens, for display as hunting trophies. However, this sector of trade now has a global dimension and
1344 those who use tiger skins or specimens for display today are seldom the actual hunters of the skin. Rather,
1345 they wish to be associated with hunting or merely admire the skin or specimen as a object of beauty or
1346 emblem of status. This demand may be growing.

1347 *Skins for garments.* Tiger skins historically were not in strong demand as garments; in the 1990s a market
1348 for tiger-skin cloaks emerged in Tibet, rooted in traditional use of animal skins as garments but newly
1349 fashionable as a symbol of wealth. This demand was a primary driver of illegal trade up to about 2006,
1350 when public awareness campaigns appear to have reduced the overt sale and use of these goods.

1351 *Curios.* Demand for tiger parts, including teeth, claws, whiskers, collar bones, and scraps of skins, as
1352 magic amulets and charms or as collectors' items and souvenirs, exists primarily in Southeast Asia,
1353 particularly in Sumatra, Indonesia, where it appears to have been the main recent driver of tiger poaching.
1354 This market may be declining due to legal pressure, but its strong cultural roots may make it difficult to
1355 eradicate. Fake tiger curios are quite common in this sector.

1356 *Formalized medicinal use of bones.* Tiger bones have been part of formal medical preparations in China,
1357 Japan, Korea, and Vietnam for centuries. This market sector was the dominant driver of the tiger trade
1358 from the mid-1970s to the early 1990s, when China and South Korea stopped production and domestic

⁸⁹ This brief review is drawn entirely from Broad and Damania. 2009. Competing demands: understanding and addressing the socio-economic forces that work for and against tiger conservation. A Background Paper for the Kathmandu Global Tiger Workshop.

⁹⁰ Revenge killing of tigers following depredations on livestock and human casualties accounts is believed to account for a relatively smaller portion of poaching incidents, although the opportunity to earn money selling a tiger's parts to local buyers may increase the motivation for revenge killing. Along with enhanced local law enforcement, engaging communities with livelihood support, involving local people in the management of protected areas, and reducing and compensating for human-tiger conflict is believed to be the best way to curb revenge killing and local poaching.

⁹¹ The word 'consume' here and throughout this document is defined as the use of *dead* tigers and their parts and products as food, medicine, décor, adornment, and talismans.

1359 and international trade in tiger bone to aid in the conservation of wild tigers. Tiger bone was also removed
1360 from the official pharmacopeia of Traditional Chinese Medicine. In Vietnam, however, tiger bone is still
1361 recommended by medical practitioners. There is evidence that legal sanctions and awareness campaigns
1362 have reduced the use of tiger bone by Chinese consumers.

1363 *Tonic and folk remedies.* While formalized prescription of tiger parts and products as medicine has proven
1364 to be amenable to regulation, use of tonics and other folk remedies based on tiger parts remains
1365 widespread and is difficult to regulate due to its diffuse nature and the fact that demand is driver by
1366 individual consumers rather than prescription by medical practitioners. As with curios, there is a high-
1367 level of fakes in this segment.

1368 *Wild meat.* The market for tiger meat as restaurant food is considered to be relatively small, and driven
1369 largely by a desire to display status by offering meat from a rare species to guests (although in at least
1370 some cases, the meat is not actually tiger). These consumers may be difficult to dissuade by awareness
1371 raising about the tiger's endangered status, given that their motivation is based on their knowledge of the
1372 tiger's rarity.

1373 Several key issues must be addressed in developing demand reduction programs. There is clearly a strong
1374 desire for tiger parts and products among some people, based on long-standing cultural traditions as well
1375 as contemporary status demonstration, that has persisted despite significant legal restrictions against trade
1376 in tiger parts over the last decades. The growing ability to pay for tiger parts and products in Asia's
1377 growing economies has had a large effect on increasing demand. Some traders and consumers buy tiger
1378 products and store them as investments, on the assumption they will become rarer and more valuable is
1379 the future. Finally, demand and consumption of tiger parts and products exists not only in parts of Asia
1380 but around the world, including in North America, Europe, and Australia.

1381 Two main factors are believed to moderate demand. First is the illegality of the tiger trade and, in many
1382 countries, significant legal sanctions against trade in tiger parts (although not necessarily against
1383 possession or use of tiger parts). However, generally weak enforcement undermines the impact of legal
1384 sanctions on reducing demand; this aspect of demand reduction is addressed in the Combating Wildlife
1385 Crime Global Support Program.

1386 Second is awareness campaigns that create a stigma associated with consuming tigers. The main
1387 messages that have been employed in awareness campaigns by governments and NGOs are:

- 1388 • Conservation: over-use will result in the tiger's extinction
- 1389 • Heritage: use conflicts with cultural values
- 1390 • Alternatives: are available and of at least equal value
- 1391 • Illegality: crime is morally wrong and risks punishment
- 1392 • Role models: influential people urge others to join them in avoiding consumption

1393 Past and current awareness campaigns, however, have not succeeded in reducing demand for tiger parts to
1394 the point that it does not threaten the tiger's survival or recovery. There must be a scaled-up, sustained,
1395 coordinated global effort to achieve this.

1396 Recommendations for a global campaign to transmit and reinforce the message that use of tiger parts is
1397 socially unacceptable include:

1398 **Talk to the unconverted:** The volume and focus of public and targeted communications aimed
1399 to deter tiger product consumption needs to be vastly improved. Building from lessons learned
1400 and opportunities created during past campaigning on wildlife trade issues in Asia, there is a great
1401 need to invest significant new resources in dedicated messaging aimed at specific groups of tiger
1402 product consumers, their suppliers ,and those who regulate their activities. Market analysis should
1403 form the basis for identifying, segmenting and targeting key audiences and innovative approaches
1404 should be used to frame and deliver messaging. There is an enormous amount to gain in this
1405 regard by looking at actions, results and lessons gained from social cause communications in Asia
1406 in other spheres of concern, such as HIV-AIDS, child labour, conflict diamonds and narcotics.
1407 New media need to be employed more creatively and new ideas, such as disruptive marketing
1408 may have a place to play. It is easy to be cynical about the likelihood of success from demand
1409 reduction campaigning, but for tigers in particular it has simply not been tried at a scale where
1410 impact could expect to be measured.

1411 **Monitor progress:** Methods to monitor changes in the main tiger market sectors need to be
1412 developed and employed over time to provide a basis for assessing the impact of and refining the
1413 legal, enforcement and communications actions described above. . . .Investing in monitoring and
1414 assessment will increase the efficiency of investment in the main demand reduction approaches,
1415 allowing emphasis to be shifted in response to emerging market trends and other developments.

1416

1417 **Part D Engaging Communities and Managing Human-Tiger Conflict**

1418 *Turning A Problem Into A Solution*

1419 Many TRCs in their NTRPs cite engaging local communities and addressing human-wildlife conflict as
 1420 priority actions. Participatory, community-based, and incentive-driven practices that give local people a
 1421 stake in tiger conservation can make a live wild tiger worth more than a dead one. The right incentives
 1422 can turn tiger poachers into tiger protectors and forest abusers into forest guardians. These incentives
 1423 include developing alternative livelihoods and alternative sources of fuel, fodder and the like to
 1424 compensate for loss of access to protected forest resources, such as community forestry projects in buffer
 1425 zones and revenue-sharing between local communities, and conservation-related income-generators such
 1426 as park entry fees.

1427 There are many examples of conservation interventions where local people's livelihoods have been
 1428 successfully transformed, pressures on livelihoods and biodiversity have been reduced, and local support
 1429 for conservation of endangered species has been established through programs of community
 1430 engagement. There are also many instances of communities taking the lead in ecosystem restoration to
 1431 revive and maintain their resource base and livelihoods, given conducive policy environments.

1432 Moreover, with the adoption of landscape approaches, conservation effort must be dispersed across a
 1433 wider spatial area and new strategies are needed to conserve and protect endangered species and their
 1434 habitat. In almost all TRCs, the conservation capacity of wildlife departments, including at cadre levels, is
 1435 already woefully inadequate. A workable strategy is build local stewardship for conservation, especially
 1436 in buffer zones, corridors, and non-core areas within large protected areas (Box 15).

1437 Box 15: BEST PRACTICE: The Aceh Tiger Monitoring Program⁹²

1438
 1439 The Aceh Tiger Monitoring (ATM) program is designed to monitor tiger numbers and habitat in Indonesia's Aceh
 1440 province. The program involves on-the-ground surveys covering 1,300 km² in Ulu Masen and 4,251 km² in the
 1441 Leuser Ecosystem to determine tiger population numbers. The program also employs satellite imagery and
 1442 conservation planning tools to identify core tiger areas and put management systems in place. Key to the success
 1443 of the program has been the creation of strong local support and the empowerment of communities living in close
 1444 proximity to tigers. Furthermore, threats to tigers have been reduced through a community and forest ranger
 1445 training effort. This aspect of the ATM program provides alternative employment for ex-loggers, ex-tiger poachers,
 1446 and ex-combatants, and has already trained some 346 forest rangers and 46 community rangers. The training
 1447 program has been instrumental in putting an end to illegal activities. The ATM program is an excellent example of
 1448 what can be achieved for tiger conservation when monitoring is combined with local support.
 1449

1450 *Potential Benefits from Ecotourism*

1451 As an income-generating activity, ecotourism stands out as one of the possible options that can be
 1452 developed in tiger landscapes. Tigers are extremely attractive to tourists. They are elusive by nature and
 1453 hard to see—and their very elusiveness is probably what makes them a sought after tourist attraction—but
 1454 there is a diversity of other wildlife and landscapes in tigerlands that can compensate and satisfy nature-

⁹² World Bank. 2009. Managing tigers in Ache. World Bank in partnership with FFI, Leuser International Foundation, Ache Forest and Environment foundation, Multi Donor Fund for Ache-Nias Bersama Membangun.

1455 tourists who visit these areas. Unfortunately, the potential of eco- and nature-tourism to provide viable
1456 economic alternatives for local people remains unrealized in most TRCs. One reason for this is that most
1457 ecotourism operations are not owned or managed or even co-managed by local communities; thus, profits
1458 and employment accruing to them are minimal. But the potential of ecotourism as a revenue-generating
1459 activity can be greatly enhanced by ensuring ownership and management by the local community, their
1460 participation in planning and decision-making, and through coordinated investments with private parties
1461 in local infrastructure and services (Box 16).

1462 Box 16: BEST PRACTICE: Community-based Ecotourism

1463
1464 The eco-development project in Nepal's Chitwan National Park is a good case study illustrating how community
1465 involvement leads to improved livelihood for local communities and also protects the wildlife in the area.⁹³ This
1466 case study is built upon experiences recorded in 1999, it can serve as a model for developing ecotourism activities
1467 where local communities have a stake in protecting the wildlife and benefit from the protected area.

1468
1469 Bordering Chitwan on three sides were 36 Village Development Committees supporting over 260,000 people.
1470 Demand for firewood, fodder, and grazing areas put pressure on the habitats of Chitwan and its surrounding area.
1471 In 1993, national policy reform allowed for the creation of legal buffer zones around protected areas. Management
1472 of these zones would be handed over to local Users Group Committees, provided they developed effective
1473 management plans based on rational use of resources. In 1995, the Parliament ratified a series of bylaws requiring
1474 50 percent of the revenues generated by the protected areas to be channeled into local development programs in
1475 buffer zones surrounding national parks.

1476
1477 Buffers zones were regenerated and fenced, and soon protected wildlife inhabiting Chitwan began to re-colonize
1478 the buffer zones. At the same time, ecotourism activities were planned and developed in the regenerating buffer
1479 zones. By 1997, 16.5 km² of critical riverine forest habitat in the Chitwan buffer zone had been recovered, densities
1480 of rhinos began increasing, and tiger presence was observed in these areas as well. During the first year of
1481 operation (November 1995 to October 1996), 10,632 tourists visited the Bagmara Community forest, generating
1482 \$276,432. Before this, the local community derived no income from this area. The local communities felt a sense of
1483 empowerment and view themselves as local guardians of the endangered species.

1484
1485 Similarly, Periyar Wildlife Sanctuary in India is well known for its community-based ecotourism. Local people are
1486 responsible for the surveillance of the vulnerable parts of the reserve. Though tourism, they are involved in the
1487 conservation of the forests and revenues are generated for the community.⁹⁴ The traditional knowledge of the
1488 surrounding community was tapped and poachers and women of the villages have become tour guides and
1489 custodians of the park, playing a vital role in maintaining the wildlife sanctuary while earning their livelihood
1490 through these programs.

1491
1492 Tax collections from tourist and local resorts to subsidize local development and incomes can also be a
1493 useful means of benefiting local people. In many cases, user fees can be multiplied several-fold without
1494 causing a decline in tourist visitation. The role of the national governments in creating policies that

⁹³ Dinerstein, E., *et al.*, (1999). Tigers as neighbors: efforts to promote local guardianship of endangered species in lowland Nepal. In *Seidensticker, J. et al., (Eds), Riding The Tiger: Tiger conservation in human-dominated landscapes* (pp. 316-333). Cambridge University Press.

⁹⁴ <http://www.periyartigerreserve.org/>

1495 encourage co-investments between companies and village councils and for sharing park revenues with
1496 local communities is critical.

1497 ***Community Forest Management, Access to Resources, and Land Tenure***

1498 In the Nepal Terai and in India, community forestry is playing an important role in promoting community
1499 stewardship in managing wildlife corridors (Box 17). Community access to forest resources and forest
1500 management compatible with wildlife conservation objectives also generates support for local schools,
1501 health-care facilities, and other public goods, and can contribute to poverty reduction and enhanced
1502 quality of life.

1503 Alternatives that can at least partially substitute for forest resources have been attempted in many sites.
1504 For instance, biogas installations have become common in the agricultural households of Nepal's Terai
1505 Arc Landscape, and the 1,350 plants installed in the five-year period from 2001 to 2006, together with
1506 fuel-efficient cooking stoves, have saved an estimated 21,000 metric tons of fuel wood annually. This fuel
1507 wood would have been collected from the corridors and bottlenecks, and is deemed equivalent to 162 ha
1508 of clear-felled forests. As an additional benefit, in 2005 the biogas program qualified as a 'gold standard'
1509 Clean Development Mechanism project because of the carbon savings. This led to an Emission Reduction
1510 Purchase Agreement for 10,356 metric tons of carbon credit from biogas signed with WWF Germany for
1511 Euro 100,000. Moreover, when combined with promotion of stall-fed livestock management to facilitate
1512 dung collection for use in biogas digesters, the grazing pressure on forests by free-ranging livestock is
1513 reduced, livestock depredation is reduced, and the chance encounters of people and tigers that result in
1514 conflict are also diminished.

1515 In other sites where road accessibility is not a problem, liquefied petroleum gas (LPG) can be adopted
1516 with some subsidies from the government. In Bandipur Tiger Reserve in India, cooperatives are being
1517 created to supply cooking gas to peripheral households.

1518 Alternative income-generating activities can sometimes be linked to forest resources that can be
1519 sustainably harvested, while providing communities with significant incomes. For instance, in Nepal's
1520 Terai Arc Landscape, a community-based enterprise that harvests marmelos fruits (*Aegle marmelos*) from
1521 a tiger corridor connecting two core areas has earned a net profit of about US \$6,000, which is a
1522 considerable sum for rural communities.

1523 Box 17: BEST PRACTICE: Forest-based Livelihood Regeneration in India⁹⁵

1524
1525 The role of community institutions in common property resource management has come to be seen as that of
1526 crucial importance to the sustainability of both the resource and welfare of the resource-dependent community.
1527 Such community-initiated efforts can be of considerable significance around tiger areas by forming buffers and
1528 corridors and diverting the pressure of biomass collection from core habitats.

1529
1530 Saigata, a village in Maharashtra state in western India, is a community of cultivators, dominated by traditionally
1531 marginalized classes. Lush forest within the village boundary once provided them with sufficient fuel wood, fodder,
1532 and timber for household use as well as surplus for commercial sale. Over the years, unsustainable exploitation of
1533 NTFPs, headloading, encroachments on forestland, timber extraction, charcoal manufacture, and a growing

⁹⁵ Adapted from Damania et al

1534 number of settlements in the neighborhood nearly wiped out the forest. The growing denudation of the forest
1535 disturbed Suryabhan Khobragade, a resident of Saigata, and he began discussions with the like-minded people in
1536 the village. Community action began with setting up a Farmers Discussion Group. Through continuous dialogue,
1537 the firewood sellers were persuaded that they were actually losing out by under-charging each head load, while
1538 the charcoal-makers were making neat profits. The conservationist group in the village convinced the charcoal-
1539 makers that their business would last only as long as the forest lasted. All the households of Saigata were
1540 simultaneously educated about the ill-effects of indiscriminately exploiting forest products. The villagers had, by
1541 now, started to experience lowering water level in their wells and fodder shortages. Already facing such hardships,
1542 the community was easily persuaded to rethink their modes of forest utilization.

1543
1544 A Forest Protection Committee was set up in 1979 to deliberate on forest conservation, with every household
1545 participating in decision-making. The whole community also began to share the responsibility of protecting the
1546 forest from outsiders, with households taking turns to patrol. People gradually moved toward improving the
1547 quality of the forest through management. Different parts of the forest were reserved for different uses such as
1548 fodder collection, extraction of NTFP, wood-cutting, etc. Each management zone was closed to harvesting for a
1549 certain period of time in order to allow natural regeneration. In 1992, the Forest Department invited the Saigata
1550 community to join the Joint Forest Management Program (JFM) under which village management would be
1551 institutionalized. The villagers decided to register their forest under JFM in 1993. JFM, a set of rules promulgated
1552 by the Indian government in 1990, provides for co-management of government forests under an agreement that
1553 allows access to local people for fulfilling their livelihood needs with the responsibility of protection, regeneration,
1554 and monitoring belonging to the village committee. Almost 30 years after the community started protecting forest,
1555 it today boasts of sighting a tigress with cubs.

1556
1557

1558 *Human-Wildlife Conflict Mitigation*

1559 Human-wildlife conflict mitigation programs are needed to address the issue of revenge killings following
1560 wildlife deprecations, which also create local animosity toward conservation and protected areas. This
1561 includes education about ways to prevent wildlife deprecations, and rapid-action management responses.

1562 An information-based, participatory approach to managing conflicts that incorporates public awareness
1563 activities can both help reduce local hostility as well as enable solutions to chronic conflicts. In Kenya,
1564 for instance, attitudes to wildlife, even in situations of conflict, are far more positive in areas that have
1565 ongoing animal control and educational programs, than in areas with inadequate intervention. Experience
1566 in the Russian Far East shows that the presence of federally mandated rapid response teams that interact
1567 with locals can bring about a feeling of security, even in situations where the problem predator has not
1568 been controlled. Establishment of mechanism of dialogue between different sections of the local
1569 community and national/provincial government is the first step towards involving local people and
1570 improving livelihoods and incentives.

1571 Prompt, equitable compensation for losses to wildlife is very important, and compensation can be
1572 dependent on villagers' use of preventive measures. Sustainable ways to fund compensation may include
1573 insurance programs, but thus far, governments still bear the burden of compensation for protecting
1574 wildlife. In the Russian Far East, for instance, neither international aid nor non-governmental insurance
1575 was found to be a sustainable means for compensatory payments for livestock lost to Amur tigers.
1576 Efficient payments by government based on rapid response and evaluation appears to be the only
1577 workable solution to reduce local conflicts, followed up by appropriate mitigation measures.

1578 Mitigation measures can involve capture and captivity of problem animals, moving the animal to another
1579 location, or lethal control in extreme situations. Other ameliorative steps, such as creation of physical
1580 barriers and improved livestock herding practices, can be taken in communities with chronic conflicts,
1581 shored up by widespread public education about how to behave and be more vigilant in forests, and
1582 livelihood activities linked to tiger conservation. Radio-collaring tigers can potentially help to detect
1583 tigers in the vicinity, especially if the villages have access to receivers, and thus act as an early warning
1584 system.

1585 *Voluntary Relocation for Better Livelihoods*

1586 In some circumstances, relocation and rehabilitation of forest-dependent villagers, especially those living
1587 within protected areas, may be a viable policy option. Relocation, however, must be citizen-initiated, with
1588 villagers participating in planning and receiving fair and sufficient compensation, and relocation must
1589 result in improvement to the villagers' quality of life. Based on these principles, voluntary relocation of
1590 villagers from India's Bhadra Tiger Reserve and Nepal's Chitwan National Park represent good models
1591 that have been beneficial to the villagers and improved wildlife habitat at the same time. Financial
1592 packages have recently been increased by ten-fold in India with the realization that sufficient
1593 compensation can help people re-establish themselves. A just relocation with positive effects on incomes
1594 and social infrastructure can lead to a snowballing demand for resettlement among the remaining villages
1595 in a given area. Very often, people are ready to move out of remote parks where education, health care,
1596 and employment opportunities are limited.

1597 **Box BEST PRACTICE Relocation of Forest-Dependent Villages in Tiger Protected Areas**

1598
1599 The old Padampur Village was within the Chitwan District, close to Chitwan National Park in Nepal.⁹⁶ Residents
1600 faced loss of livestock, damage to crops, loss of human life, and restrictions on the use of the Park's resources.
1601 Hunting, fishing, grazing, collection of timber, fuel wood, and other forest products for food and medicine were
1602 prohibited within the Park. Sixteen deaths by tigers were reported in and around the Park between October 1980
1603 and early 1989.

1604
1605 As a result, villagers from old Padampur started discussions with the Biodiversity Conservation Center (BCC) about
1606 the possibility of relocation. A master resettlement plan was developed and villagers were moved to new
1607 Padampur. The relocation had mixed results. Villagers gave positive evaluations for equity in land distribution and
1608 security, social ties did not disintegrate, and people were involved from the beginning of the planning process.
1609 Land was distributed favorably to smaller landholders, who received an equal amount of land, and landless
1610 households were provided land and title to support their livelihoods. Problems included the lengthy planning and
1611 implementation process. Food production in new Padampur was reduced compared to the old location primarily
1612 due to water shortages.

1613
1614 This resettlement program helped support biodiversity conservation in the old as well as new location by restoring
1615 a natural ecosystem, reducing human-induced pressure, and increasing the understanding of conservation
1616 practices in the new Padampur. A positive outcome of this relocation was that that residents of other enclaves

⁹⁶ All information on the Padampur resettlement is taken from the Ph.D. thesis "Assessment of Resident Wellbeing and Perceived Biodiversity Impacts in the Padampur Resettlement, Royal Chitwan National Park, Nepal" by Narayan P. Dhakal submitted in 2006.

1617 within lowland biodiversity landscapes were also eager to initiate a dialogue about their resettlement to a safer
1618 place.

1619
1620 Other TRCs have also undertaken voluntary resettlement programs, such as in Kanha National Park in India. In
1621 India, each family is monetarily compensated and land is given at the relocation site, potable as well as irrigation
1622 water facility, roads and housing, pasture and fuel-wood plantation, transportation of household goods to the site
1623 of relocation amongst other benefits are provided. As tigers and humans live in close proximity and human tiger
1624 conflict is prevalent in most of the countries, such voluntary resettlement schemes provide a solution for
1625 improving the lives of the local community as well as protecting the tiger.

1626

1627 ***Enabling Conditions for Successful Community Engagement***

1628 Certain enabling conditions can considerably improve the chances of success of livelihood and other
1629 community-based projects in tiger landscapes. These include:

- 1630 • Clear land tenure and property/access rights: Almost every analysis of community-based
1631 interventions suggests that the lack of clear land tenure and access rights in and around wildlife
1632 habitats has been a major cause of failure. Lack of clarity on tenure and access rights, for
1633 instance, does not allow clear differentiation of rights and responsibilities for the local people
1634 living in and around a PA who are unsure about what they are allowed and what they are not.
1635 Experience shows that the type of land tenure is not important and successful projects have been
1636 undertaken on communal, private or government-owned forest land. The important requirement is
1637 that there should be clarity on boundaries and tenure as well as clear access rules for particular
1638 forest products.
- 1639 • Capacity building: Implementation of complex and large-scale community-based projects
1640 requires high capacity in national governments to enforce forest laws and develop interventions
1641 with local communities. There is also a need for capacity-building among forest managers for
1642 developing partnerships with rural communities, as well as capacity-building among local
1643 community institutions for running independent conservation, livelihood, and awareness
1644 programs.
- 1645 • Enhanced local awareness about the importance of forests to quality of life and to livelihoods:
1646 The creation or renewal of a sense of the importance of and pride in forests and biodiversity
1647 among local people is one of the prime factors that encourage them to participate in conservation.
1648 It has been shown that awareness of the ecological services that conservation landscapes provide
1649 increases willingness to protect them.
- 1650 • Well functioning local institutions and good governance: Strong local institutions are important.
1651 Most of the gains in forest restoration outside protected areas have been made in regions that had
1652 experienced long-term investment in local institutions such as in the community forestry program
1653 in Nepal. Well functioning institutions are linked to good governance, accountability, and
1654 transparency, all of which leads to better results on the ground.

1655

1656 **Part E Transboundary Landscapes**

1657 Transboundary TCLs are found in all tiger range countries except for Indonesia. Fifteen TCLs cross at
 1658 least one set of country boundaries and three TCLs are found in at least three countries.⁹⁷ Transboundary
 1659 activities and cooperation in wildlife law enforcement is a basic element of wild tiger recovery and those
 1660 actions are described in their own section. Many TRCs cite as priorities international coordination and
 1661 cooperation to maintain ecological and administrative links between countries sharing TCLs. This is a
 1662 fundamental component of wild tiger recovery and important to achieving Tx2 because more than three
 1663 times as much potential tiger habitat is encompassed in transboundary TCLs (920,000) km² than there is
 1664 in any single country TCLs (270,000 km²).

1665 Six major transboundary TCLs currently supporting source sites have the potential to support 500 tigers
 1666 or more and two transboundary TLCs currently without ecologically viable populations have the potential
 1667 to support several hundred tigers with restoration of tigers and prey (Table 6; *indicates the two
 1668 restoration TCLs).

1669 Table 6 Transboundary TCLs

Transboundary TCLs	Countries	Habitat area (km ²)
Northern Forest Complex-Nandapha-Manas	Myanmar, India, Bhutan	213,000
Russian Far East-Northeast China	Russia, China	216,600
Tenasserims	Thailand, Myanmar	128,200
Terai Arc	Nepal, India	49,500
Taman Negara-Halababa	Malaysia, Thailand	26,700
Sundarbans	India, Bangladesh	10,000
*Southern-Central Annamites and Eastern Plains	Cambodia, Lao, Vietnam	37,500
*Nam Et Phou Loey	Lao, Vietnam	12,000

1670

1671 ***Considerations for Cooperative Management of Transboundary Protected Areas***

1672 The importance of cooperative management of transboundary protected areas (TBPAs) has long been
 1673 recognized, but it has proven difficult to achieve in practice. Among these are political conflicts, lack of
 1674 collaboration with adjacent parties and countries, differences in relevant national legislation, lack of
 1675 physical trans-border marker, different levels of PA managers, agencies, and variable levels of authority.⁹⁸

⁹⁷ Sanderson, E., J. Forrest, C. Loucks, J. Ginsberg, E. Dinerstein, J. Seidensticker, P. Leimgruber, M. Songer, A. Heydlauff, T. O'Brien, G. Bryja, S. Klenzendorf and E. Wikramanayake. 2006. Setting Priorities for the Conservation and Recovery of Wild Tigers: 2005-2015. The Technical Assessment. WCS, WWF, Smithsonian, and NFWF-STF, New York – Washington, D.C.

⁹⁸ ASEAN Centre for Biodiversity, 2009. Regional Workshop on the Conservation of Terrestrial and Marine Transboundary Protected Areas, 22-25 July 2008, Jakarta Indonesia.

1676 A study published in 2005⁹⁹ identified six levels of cooperation: none, communication, consultation,
1677 collaboration, coordination of planning, and full cooperation. A global survey of managers working in
1678 TBPA's according to this system found that at the extremes, 18 percent responded that there was no
1679 cooperation at all, while seven percent were fully cooperating; 39 percent were at the level of
1680 "communication." Analysis revealed that higher levels of cooperation occurred (a) if the idea of
1681 transboundary cooperation and ecosystem-based management was important to the protected area
1682 managers and personnel, (b) if there were adequate communication technologies in place, (c) if there were
1683 individuals willing to take leadership roles, and (d) if land managers were able to make personal contact
1684 across the border. The last factor correlated most strongly with the level of cooperation achieved.

1685 Various examples of best practices for transboundary protected area management are available, The
1686 EUROPARC Federation, for instance, has a certification system for "exemplary transboundary
1687 cooperation between protected areas" according to a set of criteria in the form of seven questions:

- 1688 1. Do the parks have a common vision for sustainable development in the region?
- 1689 2. Is an agreement in place, which is signed by the parks or at political decision-making
1690 levels and which guarantees the continuity of the cooperation?
- 1691 3. Does a joint work program exist, which defines the main areas of cooperation in the
1692 individual fields of work?
- 1693 4. Are mechanisms for direct cooperation between protected area staff, the regular exchange
1694 of experience, and the implementation of joint meetings and decisions established?
- 1695 5. Does observation of changes in parks' natural values through joint monitoring and the
1696 holding of regular exchanges of data take place?
- 1697 6. Are steps taken to ensure that communication between the protected areas is not held back
1698 by language barriers?
- 1699 7. Are joint transboundary projects in existence and has their financing been secured?
1700

1701 The World Commission on Protected Areas (WCPA) has also put forth a set of "good practice guidelines"
1702 under nine primary headings:

- 1703 • identifying and promoting common values;
- 1704 • involving and benefiting local people;
- 1705 • obtaining and maintaining support of decision makers;
- 1706 • promoting coordinated and cooperative activities;
- 1707 • achieving coordinated planning and protected area development;
- 1708 • developing cooperative agreements;
- 1709 • working toward funding sustainability;
- 1710 • monitoring and assessing progress; and
- 1711 • dealing with tension or armed conflict.
1712

⁹⁹ Charles Chester (Lead Author); James Dontje and William C.G. Burns (Topic Editor). 2008. "Transboundary protected areas." In: Encyclopedia of Earth. Eds. Cutler J. Cleveland (Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment). [First published in the Encyclopedia of Earth November 17, 2006; Last revised September 24, 2008; Retrieved July 24, 2010]
<http://www.eoearth.org/article/Transboundary_protected_areas>

1713 The WCPA has also proposed a “Draft Code for transboundary protected areas in times of peace and
1714 armed conflict.”¹⁰⁰

1715
1716 More recently, in 2010, the ASEAN Center for Biodiversity published *ASEAN Transboundary Protected*
1717 *Area Guidelines*.

1718

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¹⁰⁰ Available at http://www.tbpa.net/docs/pdfs/IUCN_TBPA_guidelines3.pdf.

1719 **Part F Institutional Development and Capacity Building¹⁰¹**

1720 There is universal agreement among TRCs that institutional development and capacity building are
1721 essential to successful tiger conservation. Overall, the capacity needed includes:

- 1722
- A cadre of professional leaders, managers, and staff at all levels working on the ground in tiger
1723 protected areas, corridors, and local communities, with appropriate skills and adequate tools, as
1724 discussed below.
 - Institutional arrangements, policies, and practices that support, monitor, and provide high-value
1725 incentives for that cadre of professionals to succeed in stabilizing and restoring the tiger
1726 populations entrusted to them.
 - Networks of collaborators, colleagues, and partners within and among tiger range states, as well
1727 as regionally and internationally, through which knowledge is shared. These networks must be
1728 developed among protected area professionals, the scientific community, civil society, and
1729 governments.
1730
1731

1732 As discussed in Chapter 2, many protected areas in the TRCs have no, poor, or failing management; this
1733 is mirrored in a recent global study of management effectiveness in protected areas which found that,
1734 overall, 65% of the assessed protected areas had “management with significant deficiencies.”¹⁰² The
1735 critical findings of this global study that can inform the development of protected area managerial
1736 capacity is that good management outcomes were most strongly correlated with strong research and
1737 monitoring and resource protection coupled with good communications, involvement of local
1738 communities, and programs of community benefit. Overall, management effectiveness was most strongly
1739 linked to adequate infrastructure, equipment, and information; good management planning; high levels of
1740 communication; visitor management and community participation; professional resource management,
1741 research, and monitoring; and good governance and administration. Management outcomes also have to
1742 be carefully monitored.

1743 Based on these findings and others, there are at least two initial “points of entry” for building capacity for
1744 tiger conservation: 1) the individuals who lead and manage protected areas (at the level of director
1745 general, or equivalent, and their lieutenants, the reserve heads) and 2) the policy makers (ministers,
1746 secretaries, and other high-level actors). Managers who are equipped, well trained, and effective leaders
1747 also stand at the interface between organizational and societal capacity on the one hand and lower-level
1748 staff and the local community on the other. They are pivotal to building capacity above and below them.
1749 But they must also be supported by the policy makers who value the national treasures they are charged
1750 with protecting and sustaining, and understand the challenges they face in doing so.

¹⁰¹ This summary is drawn from Seidensticker, J. et al. 2009. *Managerial Capacity Building to Support the Conservation of Wild Tigers*. Kathmandu Global Tiger Workshop.

¹⁰² Leverington, F, M Hockings, and KL Costa. 2008. *Management Effectiveness Evaluation in Protected Areas Report for the Project “Global Study into management effectiveness Evaluation of Protected Areas” – A Global Study*. The University of Queensland, Gatton, IUCN WCPA, TNC, WWF, Australia.

1751 The GEF¹⁰³ has identified key characteristics under several broad categories that facilitate capacity
1752 development, are broadly applicable¹⁰⁴, and can become strategic targets with actionable goals and
1753 objectives to improve managerial capacity at all levels (Box X). Among these are:

1754 Box X Some Facilitators of Capacity Development

1755 Public Sector Institutional Setting

- 1756 • Clear rules that facilitate action and encourage problem-solving and innovation by organization and
1757 officials;
- 1758 • Public service systems for recruitment and promotions that reward merit and performance, not
1759 patronage and seniority;
- 1760 • Sufficient budgetary resources to support the sector activity;
- 1761 • Salaries that are attractive to highly motivated people;
- 1762 • Reform programs that emphasize adequate salaries linked to level and performance, improvement in
1763 organizational management, problem-solving orientation of the public sector, development of key skill for
1764 general and critical competencies (see below), incentives for superior performances of organizations and
1765 individuals, and elimination of ineffective workers and unnecessary tasks.

1766 Task Networks

- 1767 • Effective capacity across multiple organizations that must collaborate to accomplish essential tasks;
- 1768 • Policy frameworks that define goals for coordinated action;
- 1769 • Specific mechanisms for frequent interaction across organizational boundaries;
- 1770 • Horizontal interactions within levels of government involved in performing a common task;
- 1771 • Common training institutes or programs that bring together staff assigned to different organizations but
1772 involved in the same task;
- 1773 • Clear organizational responsibilities.

1774 Organizations

- 1775 • Strong mission mystique held widely within the organization;
- 1776 • Recruit motivated and competent staff;
- 1777 • Raising salary levels and competitiveness with private-sector salaries;
- 1778 • Strong sense of professional identity within the organization;
- 1779 • High prestige of the organization and links to high-prestige domestic and international peer groups or
1780 organizations;
- 1781 • Equity, participation, and flexibility in work assignments;
- 1782 • Participation in organization decision making;
- 1783 • Managers focused on performance, incentives, participation, and problem solving;
- 1784 • Ability to demote and fire unproductive or unprofessional staff;
- 1785 • Adequate physical environment and equipment;
- 1786 • A rewards and recognition system for high performance.

1787 Human Resources

- 1788 • Links between training institutions and task-orientated organizations;
- 1789 • Training in management;
- 1790 • Training opportunities linked to commitment to the organization;

¹⁰³ La Fontaine, A. 2000. *Capacity Development Initiative*. GEF-UNDP Strategic Partnership

¹⁰⁴ Salim, J. 2009. *The Challenge of Establishing World-Class Universities*. Washington D.C: World Bank.

- 1791
- Recruitment managed by the organization (rather than by the civil service);
- 1792
- Open and competitive recruitment procedures;
- 1793
- Meaningful jobs assigned to those with appropriate skills and levels of training;
- 1794
- Job satisfaction;
- 1795
- Professional identification among staff, reinforced by professional associations;
- 1796
- Contracts of limited durations with clear links to performance criteria.

1797

1798 The ASEAN Regional Center for Biodiversity Conservation reviewed the job expectations for protected
1799 area employees from managers to maintenance workers.¹⁰⁵This review identified 250 different skills in
1800 17 categories that are needed at different levels and at different times by protected area staff. With these
1801 identified skills and competence standards, training can be designed to exactly match the job. The
1802 competence standards tool is available online at
1803 [http://www.aseanbiodiversity.org/index.php?option=com_docman&task=doc_details&gid=10&Itemid=1](http://www.aseanbiodiversity.org/index.php?option=com_docman&task=doc_details&gid=10&Itemid=130)
1804 30.

1805 Also of interest are the U.S. National Park Service (NPS) Universal Competencies, available at
1806 <http://www.nps.gov/training/uc/whauc.htm>. The NPS further identifies competencies for each specific job
1807 classification, found at <http://www.nps.gov/training/uc/home.htm>.

1808 In most TRCs, funding for protected areas is limited, but funding alone does not account for disparities in
1809 management effectiveness. Development agencies and conservation organizations, have learned through
1810 years of experience that *the capacity to use funding effectively is as or more important than the amount of*
1811 *funding*. Simply put, money will not save tigers, people will. Similarly, it is increasingly evident that good
1812 science is essential for effective biological conservation but not sufficient. In summing up the experience
1813 of identifying and establishing competence standards for protected area staff, John MacKinnon noted:
1814 "...it became clear that more skills are needed in communication areas than in biological knowledge."¹⁰⁶

1815 Tigers are now a *conservation-reliant species*, one that depends on human conservation interventions for
1816 survival. The management skills needed to support these interventions continually change as the context
1817 for tiger conservation changes. Developing and maintaining the individual, organizational, and social
1818 capacity to effectively conduct needed managerial interventions is essential.

1819

¹⁰⁵ Appelton, M.R., G.I. Texon, and M.T. Uriarte. 2003. *Competency Standards for Protected Area Management in South East Asia*. ASEAN Centre for Biodiversity Conservation, Los Banos, Philippines.

¹⁰⁶ MacKinnon, J, p v in MR Appelton, GI Texon, and MT Uriarte. 2003. *Competency Standards for Protected Area Management in South East Asia*. ASEAN Centre for Biodiversity Conservation, Los Banos, Philippines.

1820 **Part G Scientific Monitoring**

1821 **Importance of Monitoring**

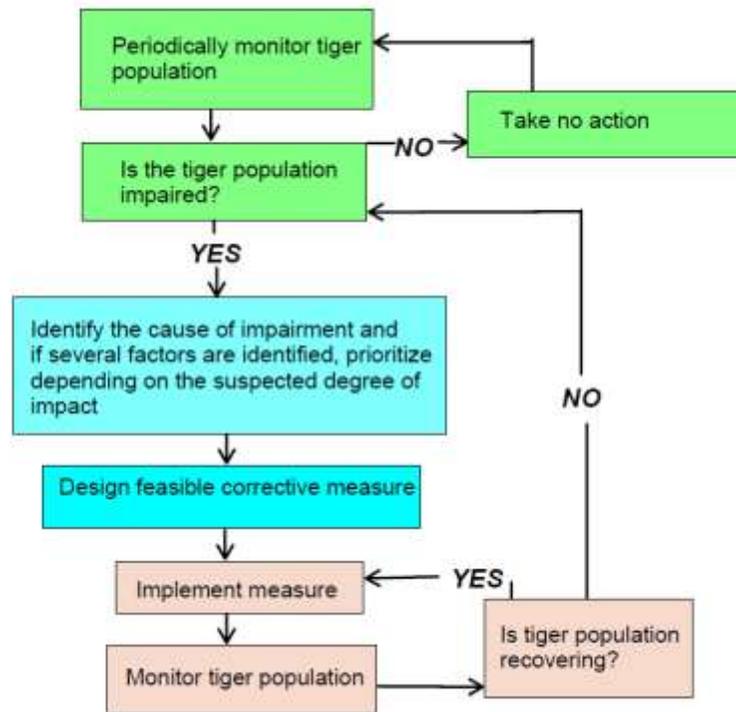
1822 Measurement matters: If you can't measure it, you can't track it, and you can't manage it.
1823 Recommendations from the Kathmandu Global Tiger Workshop, strategies from the *First Asian*
1824 *Ministerial Conference on Tiger Conservation*, and the national consultations for the GTRP direct the
1825 development and implementation of science-based estimators to monitor tigers and their prey to inform
1826 and support management actions for increasing tiger numbers to twice their present number in the next 12
1827 years.

1828 Current estimations of tigers and their trends have been inconsistent; various data have been collected
1829 with no clear objectives, are gathered using protocols and methods that are not scientifically defensible, or
1830 are not gathered at all. Therefore, consistent, transparent, scientifically defensible, and yet simple and
1831 practical monitoring systems to determine how tiger conservation programs are performing are requisite
1832 in the platform for a wild tiger stabilization and recovery.

1833 Monitoring informs all along the vertical axis of the practice and governance system: it informs
1834 conservation practice and practitioners, and it informs the governance and support mechanism for
1835 conservation, including the expectations of the global community that values wild tigers. In its simplest
1836 form, the traditional conservation project process has been linear, beginning with a protected-area
1837 management plan based on best information available, targets to be reached or achieved, compilation of
1838 best practices to reach the targets, a time line, and human and financial resources needed. But tiger
1839 conservation has not been a linear.¹⁰⁷ It is more realistic to see tiger conservation as a cycle of activities to
1840 be refined over time based on better tools, feedback from monitoring, and more experience. These can
1841 lead to better practice across all the core management competencies needed to recover tiger populations in
1842 a specific protected area and landscape. This iterative or adaptive approach (Figure 4) will have to be
1843 embedded in the management philosophy, practice, and policy for protected-area and landscape-level
1844 management.

1845

¹⁰⁷ K. Kawanishi, and J. Seidensticker 2010. Collaborations and partnerships are essential to sustain wild tiger populations. Pp175-184 in R. Tilson and P Nyhus. *Tigers of the World*. San Diego: Elsevier. D. Miquelle et al. 2010. Science-based conservation of Amur tigers in the Russian Far East and Northeast China. Pp 403-427 in R.Tilson, op cite.



1846

1847 Figure 5: Simplified Adaptive Tiger Management.
1848

1849 **Monitoring Tools**

1850 Monitoring is an essential component of the larger practice of science-orientated conservation
1851 management. Monitoring must focus precisely on the information needed to make management decisions
1852 that link internal processes and employee and system performance to the long-term conservation success
1853 of reaching Tx2.

1854 Monitoring tools are available and continually being refined. For our purposes, these can be grouped
1855 under: monitoring for site level management efficacy (**Error! Reference source not found.**), law
1856 enforcement monitoring (**Error! Reference source not found.**), tiger occupancy and corridor use at the
1857 landscape scale (**Error! Reference source not found.**), and measuring the trends in tiger and prey
1858 abundance at the site level (**Error! Reference source not found.**). A significant added benefit to on-the-
1859 ground monitoring program is the additional “eyes and ears” it lends to law enforcement efforts.

1860 Resources Needs for Implementing Reliable Tiger Monitoring at Landscape and Core (Source) Sites
1861 Scales

1862 There is no need to reinvent tiger monitoring programs. Best practice is available in peer-reviewed
1863 literature, software, and instruction manuals. Table 7 provides details about the recommended monitoring
1864 methods, objectives, spatial scales, frequencies, intensities, and other technical details in quick summary
1865 form. Details and justifications for these are in literature cited in Karanth et al. (2009).

1866 Tiger monitoring must carefully consider and integrate available man-power, skill levels, equipment,
 1867 laboratory facilities and other resources. Table 10 provides some examples of typical resource needs for
 1868 conduct of surveys based on surveys in Malenad-Mysore Tiger Landscape (MRTL) of India under the
 1869 WCS/Panthera supported Tigers Forever Project. These needs require to be adjusted for local variations in
 1870 costs and social context. Of course, not all methods need to be implemented at all sites or landscapes.

1871

1872 Table 7: Tiger and prey monitoring methodologies: objectives, scale, and intensity method

Method code	Metrics of focus	Spatial Scale of Surveys	Intensity and coverage	Frequency and duration	Remarks
Large Cell Occupancy (LCO)	Tiger distribution, relative density & tiger numbers	TCLs are areas typically over 10,000 km ² ; 50-100 large cells	Cell size of 200 to 2000 km ² ; Effort walked typically 40 km per 200 km ² habitat	Once in 3-5 years; survey duration of about 3-6 months	Cell size and survey design by experts critical
Photographic capture-recapture (closed model) (PCRC)	Tiger numbers and density as a 'snap shot'; Age-class and sex	Source areas of 500 km ² or more, with potential for 25 breeding females	100 trap-days per 100 km ²	Once a year; Survey duration of 30-45 days	Requires dozens of cheap camera traps. Survey design critical
Genetic capture-recapture (closed model) (GCRC)	Tiger numbers and density as a snap shot; age-sex; relatedness	Source areas of 500 km ² or more, with potential for 25 breeding females	Intensive sweeps on foot to collect scats in a manner amenable to CR analysis	Once a year Survey duration of 30-45 days	Stringent scat collection protocols, only 1-2 labs can do this analysis
Photographic or genetic capture recapture (Open model) (PCRO GCRO)	Changes in tiger numbers and density; survival rates, losses, recruitment; temporary emigration	Source areas of 500 km ² or more, with potential for 25 breeding females	Same as in the case of PCRC and GCRC	Once a year for 30-45 days, continued across multiple years	Same as in the case of PCRC and GCRC
Line transect Sampling (LTS)	Prey densities and current carrying capacity for tigers	Source areas of 500 km ² or more, with potential for 25 breeding females, done where terrain	Minimum 20 spatial replicates of 2-4 km length; Temporal replication to ensure 40	Once a year if feasible, if not once in 2-5 years; Survey duration 15-30 days	Distances must be measured with range finders; Design-based placement of

		and access permit	detections for each species		transects critical.
Small Cell Occupancy survey (SCO)	Relative densities of prey species; Intensity of habitat use of different parts of a source area	Source areas of 500 km ² or more, with potential for 25 breeding females; where LTS is not feasible	50-100 cells; Cell size of 3-15 km ² ; Effort typically 4-15 km walked per cell	Once in 2-5 years; Survey duration of 30-60 days	Cell size linked to expected ungulate home range size. Survey design by experts c

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Box 18: Building Core Competencies and Monitoring Site-Level Management Effectiveness

Effective protected-area management is fundamental to tiger conservation and tiger recovery, and the core competencies and actions of the leaders, managers, and staff of protected areas at the front lines of tiger conservation should be monitored.

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The Management Effectiveness Tracking Tool (METT) is one rapid assessment questionnaire being used by the World Bank, WWF, and GEF as a mandatory tool for areas in which they are involved. The 30-question GTRP Progress Report is completed as part of a discussion between the project or task manager, the protected area manager, and representative of local stakeholders, and allows monitoring of the above key management parameters and competencies of staff. Employed annually, it allows the tracking of trends in management effectiveness over time. Other tools such as the IUCN WCPAP Management Effectiveness Assessment Framework, can be applied. Most measure will relate to science-based estimates of tiger density (see box below).

Box 19: Law Enforcement Monitoring at the Site Level

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If the criminals don't feel the heat, protected-area management will not succeed. Recent studies indicated that increases in anti-poaching patrols that increase the risk of detection lead to dramatic declines in levels of poaching. Effective law enforcement requires a transparent and accountable monitoring system with which to evaluate progress and performance and provide guidance focus and in the allocation of human and financial assets.

1893
1894
1895

How do we track "applying the heat"? Law-enforcement monitoring includes ranger-based enforcement monitoring managed through a data and spatial management program such as MIST (Management Information System, <http://www.uwa.or.ug/IS.htm>), which is being utilized in Thailand, Nepal, and Lao PDR.

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A recent release is the MStripe system developed by Wildlife Institute of India. It is being adopted as the standard law enforcement monitoring system by the National Tiger Conservation Authority for Indian tiger reserves. <http://www.wii.gov.in/>.

1899

These systems require intelligence support to anticipate threats which originate outside the reserve boundaries.

1900
1901

GIS-based observation systems can also help track trends to help protectors follow problematic hotspots. They allow both tactical and strategic planning and adjustment in tactics for more effective outcomes. Over time, as

1902 their patrolling and observations are mapped, they can see for themselves the fruits of their work. Protection
1903 patrols can compare their compiled observations with those of other patrols, and provide a map of the distribution
1904 of the larger animals in the protected areas over time. Thus, staff can track the impact of their own interventions.
1905 These tools are a terrific motivation devise as well as an essential management tool.

1906 Box 20: Assessing Occupancy of Tigers and Their Principal Prey in Tiger Conservation Landscapes
1907

1908 Because tigers are secretive, prefer thick cover, and live at large landscape scales, counting them with confidence
1909 is challenging. Regular and statistically-reliable estimates of tiger density and distribution are critical if managers
1910 are to detect any rapid changes in populations that may be occurring. Measuring the potential of areas in terms of
1911 tiger carrying capacity through an assessment of ungulate densities is of central importance in stabilizing and
1912 recovering tiger populations. Tiger populations have typically been assessed at two spatial scales: individual tiger
1913 populations at specific source sites to establish tiger densities with confidence, usually in a protected area, and
1914 measurement of tiger habitat occupancy (distribution mapping) over landscapes, regions, and the entire
1915 geographic range.

1916 The science of counting tigers and monitoring the trends in their numbers has evolved rapidly in the last 15 years.
1917 There is no longer any debate on the tradeoffs between science-based sampling and expert-based enumeration.
1918 There is a sound statistical framework available and it continues to evolve. Details and practical application are
1919 available from Wildlife Institute of India (<http://www.wii.gov.in>) and Wildlife Conservation Society-India
1920 (<http://www.youtube.com/monitoringtigers>).

1921 The pioneering work on documenting and measuring changes in tiger occurrence was conducted in India and the
1922 Russian Far East. Models for estimating tiger area of occupancy have come forward from India, Bangladesh,
1923 Indonesia (Sumatra), and Russia, thus covering a wide range of the vegetation types that tiger occupy. These can
1924 be aligned for use in other tiger range countries with similar vegetation types.

1925 More recently, the metapopulation structure of tiger populations was documented in Nepal and Thailand. In the
1926 last decade, statistically reliable habitat occupancy estimations were generated from Bhutan, Bangladesh,
1927 Malaysia, and Myanmar. Indonesia is about to publish Sumatran tiger occupancy data for the entire island; to date
1928 it is available for only some areas of the island.

1929 What has to be discussed in the scientific community to support tiger occupancy estimation is the size of the
1930 sampling grid cells that are appropriate for each landscape, because much can be learned from the
1931 characterization of cells that no longer support tigers as well as from those that do.

1932 Box 21: BEST PRACTICE: Site-based Tiger Abundance Monitoring Tools
1933

1934 The sampling-based approach to monitoring has revolutionized wildlife management. The ability to identify
1935 individual tigers based on their markings has enabled the application of population assessment based on the
1936 capture-recapture statistical platform. This has been augmented recently with software that that can be used to
1937 scan photographs and to identify individuals with certainty. Techniques to establish prey densities using distance
1938 sampling and/or measuring the accumulations of prey species feces in plots are well established and have or are
1939 being used in a number of TRCs including India, Nepal, Bhutan, Bangladesh, Thailand, Malaysia, Indonesia, Lao, and
1940 Russia. India has a particularly robust program.

1941 Individual tigers can be “captured” using DNA analysis of their hair and feces. Hair can be caught in hair traps but
1942 hair traps have not yet been perfected for tigers as they have been for bears. The sequence is as follows: locating

1943 tiger scats with specially trained dogs and field assistants, preserving the scat free of contamination, extracting and
1944 analyzing the DNA that can be extracted from the edge of a tiger's scat, and then analyzing these in a capture-
1945 recapture framework. Different climates are more conducive to scat preservation; ever-wet forests offer a poor
1946 context for scats preservation while winter in the Russian Far East is the best. Not all individuals in the population
1947 will be sampled using scat detection. Consequently, simply using scats to count minimum number of individuals is
1948 of limited utility. Alternatively, the methodology to use is the capture-recapture platform has been developed. The
1949 barrier to using this technology is that it requires specialized genetic labs that some TRCs do not have. DNA
1950 analysis usually must be conducted in-country because most TRCs have restrictions on the export of genetic
1951 material.

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1953 **Chapter 5 The Program**

1954 **Part A Implementing National Tiger Recovery Priorities**

1955 All TRC have the equivalent of a Tiger Action Plan, some of recent origin, others continuations of
1956 decade-long projects, and some in need of renewal. Based on the knowledge sharing and harvesting effort
1957 made in Kathmandu and cemented in the in Hua Hin Declaration, the TRCs undertook to reflect on new
1958 concepts and approaches as well as the new goal of doubling wild tiger numbers by 2022, and to refresh
1959 their national thinking. This process of reflection is embodied in the 13 National Tiger Recovery Priorities
1960 (NTRPs) presented in Volume 2 and summarized in Appendix 1. For some TRCs starting from a low
1961 base, the NTRP could well represent close to their total future effort; for others with a long track record
1962 of tiger conservation, the NTRP represents the additional effort needed to accelerate or fast track the
1963 chosen priorities.

1964 The NTRPs collectively rely upon three pillars to create a new dynamic not just to reverse the current
1965 decline but to restore tiger landscape and populations. The three pillars are discussed below:

1966 ***Policy Support Priorities***

1967
1968 Almost all NTRPs call for strengthening the provisions of existing laws governing wildlife protection and
1969 conservation to provide for better protection of reserves and stronger penalties for wildlife crimes,
1970 including against possession of equipment to snare wild animals. Major policy changes are called for to
1971 ensure that core breeding areas/source sites and key corridors are totally inviolate of human activity,
1972 relocating these as needed. Policies to support better inter-sectoral coordination, and establishment of
1973 conservation-friendly management practices in key sectors such as mining, hydro power, roads, and
1974 plantation feature as important in many TRCs, Indonesia being a prime example. Shifting the paradigm
1975 away from production forestry to habitat conservation is needed in many countries, especially Indonesia
1976 and Bangladesh. Many TRCs, notably Bangladesh, Bhutan, China, Laos, and Indonesia, highlighted need
1977 for policies to ensure increased community engagement by sharing the financing benefits from
1978 conservation, following the example of Nepal, which has a legislative basis for local community
1979 participation in conservation in buffer zones and corridors. China and Vietnam plan to pursue a policy to
1980 ensure that any captive tiger populations are very strictly managed, and do not present threats to wild tiger
1981 populations.

1982 1983 ***Institutional Development Priorities***

1984
1985 Further Institutional Development for effective control of poaching and protection is needed in all TRCs.
1986 Most conservation departments operate with minimal cadres, who lack equipment and skills for logistical
1987 operations and anti-poaching operations. Creating separate wildlife conservations and enforcement units
1988 or departments is favored by most TRCs. In addition, proper incentives, pay-scales, equipment, and
1989 infrastructure such as guard posts are needed as well as elimination of disincentives, such as lack of
1990 insurance for the risks involved in these functions. For instance, in Thailand, the park rangers have to
1991 purchase their own uniforms and meet expenses while on patrol personally and many TRCs depend upon
1992 NGO financial support to support field staff undertaking basic patrolling functions. Thus, revamping the

1993 conservation machinery from the central level to the field level to focus, motivate, and equip those
1994 charged with front line duties is a strong and common thread across the TRCs.
1995

1996 ***Expenditure Priorities***

1997 NTRPs demonstrate a high level of selectivity in TRC choices of the most critical actions over the next
1998 five years to change the basic dynamic of tiger and landscape conservation. Primary attention is given to
1999 habitat management and controlling prey and tiger poaching. These common priorities are supported by
2000 actions in the area of capacity building, reducing human-tiger conflict by engaging communities,
2001 controlling illegal trade, reducing demand, and introducing scientific monitoring systems. Interestingly,
2002 NTRPs devote increasing attention to joint management of important landscapes which straddle political
2003 boundaries across TRCs.

2004 a. **Habitat management.** Habitat conservation and management was another common theme in
2005 most TRCs. While demarcation and protection of core sites, and designating them as inviolate
2006 areas to protect tiger source populations was a priority, almost all TRCs also recognized the
2007 importance of managing, and restoring where necessary, the corridors that connect these core
2008 areas and maintain landscape integrity. Malaysia, Thailand, and Nepal specifically mentioned the
2009 need for ensuring that infrastructure in corridors adheres to smart, green designs to maintain
2010 connectivity and corridor integrity. Nepal recognized the need for policy backing. Some of the
2011 landscapes have transboundary linkages, and international coordination and cooperation to
2012 maintain ecological and administrative links were considered priorities by Nepal, Thailand,
2013 Myanmar, China, and Russia. Both China and Indonesia indicated the need to identify and secure
2014 sites for tiger release and relocation programs.

2015 b. **Controlling poaching** of tigers and prey populations was seen as a major threat by TRCs.
2016 Most TRCs lacked capacity for effective and efficient patrolling; thus capacity building for anti-
2017 poaching was seen as a priority. Training, better patrolling models, and intelligence networks to
2018 prevent poaching on core areas and buffer zones were some of the strategies proposed in the
2019 recovery plans. Thailand and Malaysia also indicated the need to patrol or investigate the sale of
2020 wild meat in shops and restaurants around the core areas.

2021 d. **Controlling Illegal trade and reducing demand.** Transboundary collaboration and
2022 coordination to control the international trade in tigers and tiger parts and derivatives was an
2023 overwhelming priority. With the exception of Laos, all other TRCs explicitly stated the need for
2024 transboundary cooperation

2025 e. **Engaging local communities and managing human conflict.** Six countries, Bangladesh,
2026 Bhutan, India, Nepal, and Thailand, recognized the need for engaging local communities as
2027 conservation stewards, especially in buffer zones and corridors. Access to forest resources and
2028 land management, and alternative income-generating activities are seen as incentives and
2029 compensation for opportunity costs associated with conservation-related constraints.
2030 Compensation and other mitigations to address human-tiger conflict were considered a significant
2031 activity by the TRCs that prioritized community engagement. China, Myanmar, Russia, Thailand,

2032 and Vietnam indicated the need for awareness programs to communicate the need for tiger
2033 conservation to various stakeholders, especially to the local communities living next to tigers.

2034
2035 **f. Scientific monitoring of tigers and prey populations.** Science-based, structured monitoring
2036 programs were deemed priorities among all TRCs. The adoption of MIST or a similar system as a
2037 monitoring system, coupled with smart patrolling, has been a common denominator, and will help
2038 in range-wide tracking of tigers and prey. While some TRCs have already adopted MIST, others
2039 want to, and regional training programs should be designed to meet this need.

2040 **g. Trans-boundary management of shared landscapes.** The TRCs that shared common cross-
2041 border tiger conservation landscapes also indicated the need for policies to facilitate better
2042 transboundary cooperation.

2043 **h. Sustainable finance:** Bhutan, Indonesia, Laos, Nepal, and Thailand indicated the need for a
2044 developing sustainable financing mechanism to support tiger conservation. They emphasize the
2045 need to creating systems to monetize and capture the value of ecological services from TCLs such
2046 as carbon finance, offsets from smart, green infrastructure, payments for environmental services,
2047 and community-based ecotourism.

2048
2049 **Summary**

2050 Currently the frontline cadres in all TRCs are constrained in executing their mandates; thus appropriate
2051 incentives such as training, properly equipping them for patrolling, and career advancement opportunities
2052 based on performance will motivate the frontline staff. The regional training centers proposed by
2053 Thailand, for instance can help to develop cadres in other TRCs.

2054
2055 Better coordination among the line agencies is also an imperative because of the increasing role of a
2056 wider range of stakeholders in landscape conservation, as opposed to site-based conservation, and the
2057 need for proactive land-use planning and identification of important habitats for conservation in
2058 landscapes where there is inter-sectoral competition for land and land-uses.

2059
2060 Despite decades of tiger research and attempts at population estimates, most TRCs still lack reasonably
2061 accurate tiger population estimates. Thus, it is important that scientifically defensible baselines are
2062 established to initiate standardized monitoring of tiger and prey populations and habitat extent and
2063 integrity. These initiatives will also help to determine progress towards the goal of doubling the range-
2064 wide tiger population.

2065
2066 Only three TRCs, Malaysia, Nepal, and Thailand, explicitly stated that development in tiger landscapes
2067 should follow smart, green infrastructure designs to mitigate impacts on corridors. Other TRCs should
2068 also be encouraged to follow a similar development policy in the relevant landscapes with appropriate
2069 policy and laws as legal support.

2070
2071 Overall, the NTRPs were quite consistent in their tiger conservation objectives and have also recognized
2072 several common threats with regional reach, which are also reflected in the need for better transboundary
2073 cooperation and coordination. The GTI has successfully brought together all TRCs at several international

2074 fora; which has been unprecedented in the history of tiger conservation. Thus, the GTI can serve as an
2075 ideal platform on which to build the regional cooperation and coordination necessary to counter the
2076 threats and fulfill the requirements in the national plans and successfully recover wild tiger populations.

2077 **Part B Summary of Global Support Programs**

2078 In the Hua Hin Declaration, the TRCs called for the international community to support the
2079 implementation of their national tiger conservation priorities (NTRPs) by helping to address issues that
2080 require a coordinated range-wide or global effort. In response, international organizations and experts, in
2081 consultations with national counterparts, developed four Global Support Programs. The details of the
2082 GSPs are provided in Volume 2 and are summarized below.

2083 **Combating Wildlife Crime (\$4 million)**

2084 Wildlife crime, in particular the transnational illegal trade and trafficking that drives most tiger poaching,
2085 is a global issue that demands a global response. As a pilot for a proposed collaboration called
2086 International Consortium for Combating Wildlife Crime (ICWC), four international agencies charged
2087 with wildlife law enforcement—CITES Secretariat, INTERPOL, United Nations Office on Drugs and
2088 Crime (UNODC), and the World Customs Organization (WCO)—plus the World Bank, have developed a
2089 collaborative program to be implemented in TRCs. The proposed two-year program will be conducted on
2090 the request of TRCs, consists of:

2091 *Law Enforcement Assessment Workshops and Strategy Articulation* to review current national wildlife
2092 crime responses and facilitate stronger collaboration and cooperation among the various national agencies
2093 charged with wildlife law enforcement

2094 *Trans-boundary Interdiction Support* to sovereign TRCs' empowered national agencies to conduct up to
2095 20 focused interdiction operations at 10 hotspots for tiger trade and trafficking in 10 TRC locations. The
2096 aim of these interdictions is to break up trafficking networks and make wildlife criminals "feel the heat"
2097 of enforcement. These high-visibility interdictions are modeled on successful multi-national interdictions
2098 coordinated by INTERPOL, UNODC, and WCO.

2099 *Legislative Assessments* for making wildlife crime a priority through the entire chain of the criminal
2100 justice system will be offered to strengthen legislative support for wildlife law enforcement and to make
2101 the issue a high priority beyond the agencies whose mandates are related to wildlife/forest/environmental
2102 affairs.

2103 *Capacity Building* will be offered by ICWC partners to strengthen national agencies' ability to respond
2104 to wildlife crime by introducing 'best practice' methodologies and policing skills based on the assessed
2105 needs of TRCs from the relevant assessments

2106 **Demand Reduction(\$500,000)**

2107 Like the poaching, trade, and trafficking that feeds it, demand for tiger parts and products is global and
2108 reducing demand requires a large-scale, coordinated, and targeted campaign to change the behavior of
2109 current consumers of tiger derivatives. This GSP proposes an initial three-part program of research in
2110 three tiger-consuming markets—United States, Vietnam, and Hong Kong—to amass the knowledge and

2111 insights about consumers' attitudes and motivations that are necessary to create an effective global
2112 campaign. Proposed approaches will form the basis of a workshop with major GTI stakeholders.
2113 Conceptual communication ideas will then be developed for pre-communication research in test markets.
2114 Subsequently, on approval of the concept by GTI partners, the best concept will be taken forward into a
2115 creative communication program using mass media and other vehicles, with annual evaluations for
2116 effectiveness to redirect the effort as needed.

2117 **Institutional Development and Capacity Building (\$2.3 million)**

2118 All TRCs identified institutional development and capacity building for wildlife conservation as an
2119 important priority in their NTRPs and have proposed to allocate significant resources for this. This GSP
2120 aims to complement and support those national capacity building efforts by focusing on three areas with
2121 the ultimate goal to build a strong cadre of knowledgeable and skilled field staff who are supported by an
2122 institutional and community framework that enables for the recovery of wild tiger populations.

2123 The two-year pilot program complements current national efforts by supporting three focal areas:

- 2124 I. Professionalize core wildlife, habitat and protected area management positions and
2125 ensure capacity is available to address tiger and wildlife conservation on the ground.
- 2126 II. Engage high-level policy and decision-makers in enhancing institutional capacity
2127 that enables effective, efficient and sustainable support of professionalized tiger
2128 conservation staff.
- 2129 III. Provide for ongoing opportunities for learning, knowledge sharing, collaboration and
2130 support among stakeholders to maintain the highest level of capacity.

2131
2132 Addressing the needs for enhancing enforcement, monitoring, community engagement, etc., each of these
2133 areas seeks to work with TRCs and international partners to identify and utilize the existing good capacity
2134 building initiatives, enhance programs which need strengthening and fill identified gaps. In providing for
2135 effective, efficient and sustainable capacity building efforts, this GSP also highlights the need for building
2136 managerial and institutional capacity to provide for the enabling support.

2137 Six GSP projects have been proposed:

2138
2139 (1) *Support Centers of Excellence* – to unify existing efforts by governments, NGOs, CBOs, academic
2140 institutions, and industries with the objective of collectively addressing critical capacity building needs
2141 and professionalizing tiger conservation (working collaboratively to provide diverse opportunities which
2142 meet high standards and achieve core competencies resulting in 'experts' on-the-ground).

2143 (2) *Provide Training of Trainers Program* – to increase the capabilities and proficiencies of existing
2144 trainers with the objective that they will in-turn provide the most effective learning opportunities for on-
2145 the-ground staff and community member audiences who are on the frontlines of tiger conservation
2146 (provide training in current technology, proven and standard protocols, etc.).

2147 (3) *Formalize an Executive Leadership Forum* – to provide high-level decision makers within TRCs
2148 and across sectors the opportunity to share knowledge and gain managerial and leadership skills with the
2149 objective that they will use those skills to implement policies and actions which support on the ground
2150 conservation in their country and across countries (trans-boundary).

2151 (4) *Establish Leadership Training for Wildlife and Protected Area Managers* – to provide managers the
2152 basic science, managerial and leadership skills with the objective of them using these to provide
2153 incentives and a supportive environment for their field staff and local community members.

2154 (5) *Offer Institutional Capacity Assessments and Consultations* – to offer government institutions with
2155 the opportunity to receive an independent and confidential assessment and consultation of their
2156 institutional capacity with the objective they will use this information to strengthen their institutional
2157 capacity to address the tiger conservation challenges.

2158 (6) *Support a Community of Practice* – to offer a portal for all stakeholders to bridge knowledge and
2159 communication gaps with the objective of providing an outlet for individuals and institutions to maintain
2160 a high level of capacity on tiger conservation issues and form a strong network of support.

2161 In addition, to support the extensive and intensive capacity building for front-line protected area
2162 rangers, guards, and officers (“boots on the ground”), including training and implementation of
2163 MIST or a similar system, WCS, WWF, STF, and the Smithsonian intend to form a consortium
2164 to coordinate and deliver this essential capacity building, on the request of TRCs. Other relevant
2165 international and range-country partners will be invited to join this consortium to ensure that this
2166 capacity building is delivered as quickly, efficiently, and effectively as possible. A block
2167 allocation of funds will be added to the Capacity Building GSP when the costs of delivery is
2168 determined.

2169

2170 **Scientific Monitoring (\$800,000)**

2171 All TRCs recognize the need for scientific monitoring of tigers and their prey and habitat to track
2172 progress toward Tx2 and to serve as early warning signals of any increase in threats in the landscape. This
2173 GSP, based on the collective knowledge of the Smithsonian Institution, WWF, and WCS, proposes to
2174 conduct workshops as requested by TRCs, divided into TCLs or clusters of TCLs with similar
2175 characteristics, to develop the appropriate monitoring framework for the TCLs. The workshops will also
2176 offer an opportunity to assess exactly what further capacity building and technology will be required.
2177 Once these are identified, tailored workshops and courses will be developed. A block of funds is set aside
2178 for follow up to the assessments and the outcomes of the proposed workshops. and budgeted for to meet
2179 those needs.

2180

2181 **Part C Undertaking Key Studies**

2182 **Valuation of TCL Ecosystems (\$450,000)**

2183 Several TRCs expressed strong interest in economic valuation of ecological services provided by tiger
2184 ecosystems. These are Bangladesh, Bhutan, India, Nepal, Thailand, and Vietnam. The objective of these
2185 studies is to quantify the economic value of multiple ecological services (flow of fresh water, protection
2186 from natural hazards, sustaining production of hydropower, supporting agriculture and fisheries,
2187 sequestration of carbon, biodiversity-based ecotourism) to facilitate willingness of Governments and
2188 communities to invest in protection of valuable ecosystems from further degradation.

2189 **Sustainable Finance Workouts (\$1 million)**

2190 As outlined in the national priorities, development of sustainable financing strategies is on the list of
2191 majority of the TRCs. The objective of the study is to develop national-level strategies for sustainable
2192 financing of tiger conservation activities and propose an action plan for mobilizing sustainable financing.
2193 The key national-level activities will be: designation of a multi-stakeholder group to guide development
2194 and implementation of the TRC's tiger financing strategy; organization of workshop(s) to raise awareness
2195 of sustainable financing for tiger conservation and consult with stakeholders regarding priorities;
2196 initiation of feasibility study; endorsement of sustainable financing strategy; and development of a
2197 communications strategy to mobilize funding.

2198 The study will also support pilot programs to test the most promising sustainable financing approaches.
2199 Three potential mechanisms to test are Reduced Emissions from Deforestation and Degradation (REDD),
2200 payments for ecosystem services (PES), and biodiversity offsets.

2201 REDD. The study will be focused on sharing lessons learned from early implementation of REDD
2202 mechanism under UN-REDD and the World Bank's Forest Carbon Partnership Facility (FCPF),
2203 developing a strategy for scaling up REDD in the TRCs, and exploring opportunity to capitalize on higher
2204 carbon process for credits that ensure social and environmental benefits through a tiger-friendly standard
2205 and label.

2206 PES. Valuation of TCL ecosystems will generate the estimated value of ecological services. To capture
2207 these values, there is a need for policy work, legal reform, and market development in order to generate
2208 new financing. The pilot programs will focus on the lessons learned from existing programs and
2209 developing a strategy for scaling up the following PES within the TRCs

- 2210 • flow of fresh water,
- 2211 • protection from natural hazards,
- 2212 • sustaining production of hydropower,
- 2213 • supporting agriculture and fisheries, and
- 2214 • biodiversity-based ecotourism.

2215 Biodiversity Offsets. This mechanism is considered a last resort, after all reasonable measures have been
2216 taken first to avoid and minimize the impact of a development project and then to restore biodiversity on-
2217 site. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on
2218 the ground with respect to species composition, habitat structure, ecosystem function, and people's use
2219 and cultural values associated with biodiversity. There are various mechanisms for financing offsets
2220 including protected area funding, tax and subsidy shifts, and PES. The study will focus on: reviewing the

2221 current framework for managing development impacts; developing and implementing an offset policy;
2222 mapping project development in tiger landscapes; facilitating engagement with private and public sector
2223 developers; and, design and implementation of pilot biodiversity offsets.

2224 **Transboundary Collaboration (\$150,000)**

2225 There are eight transboundary TCLs: Northern Forest Complex-Nandapha-Manas (Myanmar, India, and
2226 Bhutan), Russian Far East-Northeast China (Russia and China) Tenasserims (Thailand and Myanmar),
2227 Terai Arc (Nepal and India), Taman Negara-Halababa (Malaysia and Thailand), Sundarbans (India and
2228 Bangladesh), Southern-Central Annamites and Eastern Plains (Cambodia, Lao, Vietnam), and Nam Et
2229 Phou Loey (Lao and Vietnam). Only seven TRCs have given priority to cooperative transboundary
2230 landscape management: Myanmar, Bhutan, India, Nepal, Russia, China, and Vietnam. These priorities
2231 are not always reciprocal and neither country cites cooperative management of two priority TCLs as a
2232 priority. However, maintaining ecological and administrative links between countries sharing TCLs is
2233 important to achieving Tx2 (see Chapter 4, Part E).

2234 To facilitate dialogues among TRCs that share TCLs, three regional workshops are proposed, in South
2235 Asia, in Southeast Asia, and the Russian Far East-Northwest. The goal of the workshops would be to
2236 discuss existing best practices for transboundary protected area (TBPA) management, such as those
2237 developed by the World Commission on Protected Areas (WCPA), EUROPARC, and the ASEAN Center
2238 for Biodiversity; modify them, if necessary to adapt to regional conditions; and create a plan for
2239 continued communication and collaboration that will lead to effective joint planning and management of
2240 these important TCLs. Development of the Joint Management plan for these landscapes will be done
2241 under the NRTPs.

2242 **Translocation of Tigers (\$50,000)**

2243 Restoration of tigers to some landscapes from which they have extirpated, or nearly so, appears to be
2244 essential to achieving Tx2 by 2022. Developing a coordinated, science-based plan for translocation,
2245 reintroduction, and rehabilitation of tigers is important. Cambodia, China, Indonesia, Russia, and
2246 Thailand describe actions with components related to translocating, reintroducing, and/or rehabilitating
2247 problem tigers for return to the wild. Thailand explores the possibility of restoring tigers to areas from
2248 which they have been extirpated. Cambodia aims to secure a source site to enable tigers to be restored.
2249 China plans to explore returning artificially bred South China, Amur, and Indochinese tigers. Indonesia
2250 plans to identify at least one site in each of its priority landscapes where tigers can be released; a program
2251 at Tambling in Sumatra has already begun to translocate, rehabilitate, and release problem tigers. Russia,
2252 too, translocates and releases problem and rehabilitated tiger. India has been translocating tigers in an
2253 effort to restore them to Sariska and Panna Tiger Reserves. Further, there is the possibility of restoring
2254 tigers to the Caspian area, based on the genetic near-identity of living Amur tigers and the extirpated
2255 Caspian tiger, and captive Amur tigers were recently sent to Iran for restoration.

2256 A 3-4 day technical meeting in a TRC to discuss and develop an agreed upon, coordinated, science-based
2257 plan for translocation, reintroduction, and rehabilitation of tigers based on best practices and experience to
2258 date with tigers and other large carnivores is proposed. At this workshop, expertise developed in
2259 Indonesia, India, Iran, and Russia, and expertise present in the international community, such as
2260 experience in the United States restoring wolves to Yellowstone National Park and pumas in south
2261 Florida, can be shared. The various consortia of accredited zoos in that have scientific breeding programs
2262 for tigers would also have much to offer.

2263 **Chapter 6 Program Costs and Funding Mechanisms**2264 **Part A Program Costs**

2265 Building on the good practices developed at the Kathmandu Workshop and formalized in the Hua Hin
 2266 Declaration, the TRCs undertook reflections about their priorities in light of agreed global goals. These
 2267 reflections were based on all available tiger action plans and their equivalent documents and led to the
 2268 identification of key priorities in the NTRPs (Chapter 5, Part 1, and Appendix1). Working with a team of
 2269 advisers from GTI partners, they undertook a bottom-up exercise to determine the incremental costs
 2270 associated with implementing these priorities. The costs developed through this process are seen as order
 2271 of magnitude costs based on TRC-wide experience and represent the foreseeable costs over the next five
 2272 or so years, which represent the early and critical phase of the global effort to recover tiger populations
 2273 and habitats. These costs will need to be updated, as priorities are realigned and further experience is
 2274 gained in implementing the agreed priorities to achieve the 12 year goal.

2275 The proposed four Global Support Programs are, on the other hand, designed as short, 2-3 year
 2276 interventions, which would be continued as needed and justified based on the lessons learnt and
 2277 evaluation results from the first phase efforts. The proposed program of studies, sustainable finance work-
 2278 outs, and pilots is aimed to be completed in the first two years to enable the implementation of the key
 2279 outcomes in the latter part of the program after its midterm evaluation.

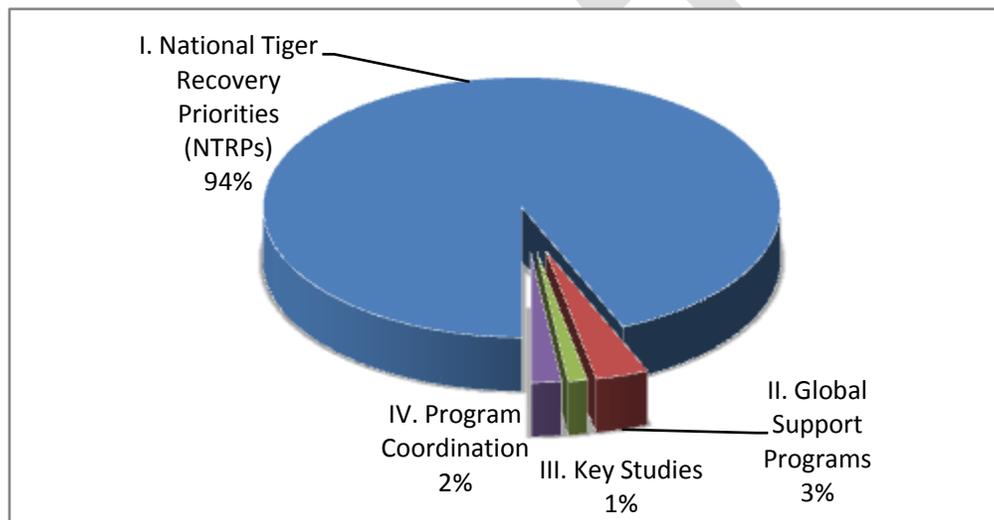
2280 Program coordination costs are built from the proposed staffing of a small Secretariat for the first two
 2281 years of the program until longer-term arrangements are developed and agreed by all stakeholders.
 2282 Program coordination costs include those associated with bringing together the Program Council annually
 2283 as well the costs of a midterm evaluation of the Program for a review by TRC Heads of Government in
 2284 2013. Costs are also included for an initial technical assistance component to be offered to the New Delhi-
 2285 based Global Tiger Forum to build its capacity and outreach in order to progressively play an increased
 2286 role in the coordination of the GTRP as well as for the evaluations of the four GSPs. See Chapter 7 for
 2287 details on Program Management and Implementation.

2288 Table 8 Costs by Component of the GTRP

Component	Estimated Cost	Period
I. National Tiger Recovery Priorities (NTRPs)*	213.0	5 years
Habitat management	66.6	
Controlling Prey and Tiger Poaching	63.9	
Institutional Strengthening & capacity building	18.1	
Tiger Human Conflict & Community Engagement	22.0	
Controlling Illegal Trade & Reducing Demand	17.8	
Scientific Monitoring, Surveys, research	14.6	
Trans-boundary Management	9.5	
II. Global Support Programs	7.5	2 years
Combating Wildlife Crime	4.0	
Demand Reduction	0.5	
Institutional Development and Capacity Building	2.3	
Scientific Monitoring	0.8	

III. Key Studies	2.8	2 years
Valuation of TCL Ecosystems	0.6	
Sustainable Finance Program	1.0	
Trans-boundary Collaboration	0.2	
Translocation of Tigers	0.1	
IV. Program Coordination	4.3	2 years
Secretariat	4.0	
Global Tiger Forum (GTF)	0.3	
TOTAL	226.1	

* India's estimates of incremental costs for the NTRP themes are pending.



2289

2290

2291 **Part B Initial Funding Matchmaking Scenario**

2292 Thus far, SAR is pursuing a regional IDA project by India, Nepal, Bhutan, and Bangladesh to address
 2293 transboundary wildlife law enforcement, and is planning for a valuation assessment of the ecological
 2294 services of tiger landscapes in India. Pre-identification work is underway on a GEF-5 supported program
 2295 to restore Amur tiger landscapes in Northeast China, which link to Amur tiger populations in the Russian
 2296 Far East. The project would cover all three major tiger habitats, namely Wan Da Shan, Hunchung-
 2297 Wangqing, and Changbaishan. Jointly prepared by EASSD and GTI, a GEF-4 MSP for \$1 million to
 2298 strengthen biodiversity conservation in Vietnam has just been approved for pipeline entry; the project will
 2299 work across sectors to support policy dialogue, change in wildlife-use practices, and reduction of illegal
 2300 wildlife trade. GEF-5 projects with tiger conservation components are being discussed in Lao PDR and
 2301 considered in Thailand.

2302 Table 9. Initial Matchmaking of Funding

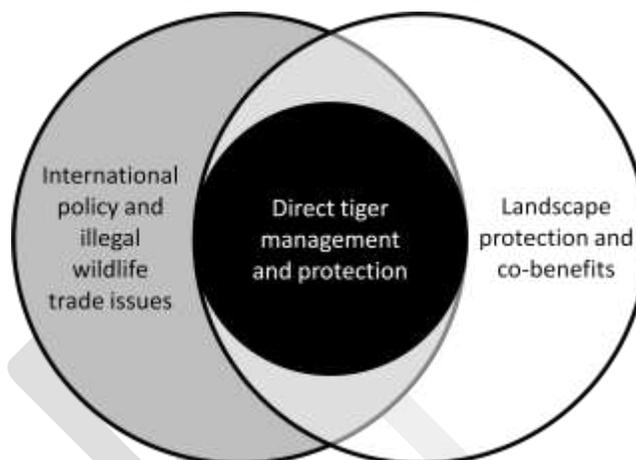
	WB	IDA	GEF	International NGOs, others to join
Bangladesh		Regional project, up to \$100m in 4 countries: trans-boundary law enforcement		
Bhutan		Regional project, up to \$100m in 4 countries: trans-boundary law enforcement	GEF-5: under consideration	
Cambodia				
China	NE China forest project		GEF-5, \$7-10m: restoration of tiger landscapes	
India		Regional project, up to \$100m in 4 countries: trans-boundary law enforcement, valuation of tiger landscapes		
Indonesia				
Lao PDR			GEF-5: under discussion	
Malaysia				
Myanmar				
Nepal		Regional project, up to \$100m in 4 countries trans-boundary law enforcement		
Russia			GEF-5: under discussion	
Thailand			GEF-5: under consideration	
Vietnam			GEF-4, \$1m: addressing wildlife demand and trade	

2303

2304

2305 **Part C Funding Mechanisms: Ways for Donors to Get Involved**

2306 Different parts of the GTRP require different sources of financing. The NTRPs mostly require short-term
2307 funds for direct tiger management and protection. These funds can be provided in parallel from various
2308 sources and donors and/or through pooled funding. International policy and illegal wildlife trade issues
2309 such as demand management, combating illegal trade, and other parts of the GSP require pooled funding
2310 on a regional or global level or strong
2311 coordination among development partners, for
2312 example through co-financing. Protecting
2313 landscapes in the long run requires large
2314 amounts that are not necessarily specific to
2315 tiger conservation but will also help protecting
2316 forests and water resources and support
2317 communities fighting poverty. These funds
2318 could be raised by creating co-benefits to
2319 existing funding for forests, water,
2320 infrastructure, etc.



2321 The design of the funding mechanism builds
2322 on consultations with Tiger Range Countries, development partners and other stakeholders; research on
2323 best practices for partnership models; and, a review of funding channels including pooled funding, co-
2324 financing, parallel funding and clearinghouse approaches.¹⁰⁸ Important design features of a funding
2325 mechanism are:

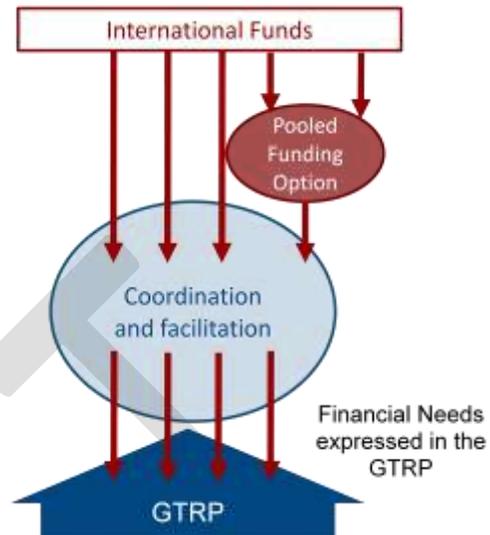
- 2326 • Flexible financing arrangements with multiple coordinated funding channels for different donors;
- 2327 • Possibility of pooled financing for short term core tiger projects and programs;
- 2328 • Direct and country driven access to funding;
- 2329 • Integration of broader development issues and global public goods such as protecting forests;
- 2330 building ecosystems, protecting water, and improving livelihoods;
- 2331 • Respond to financial needs expressed by TRCs;
- 2332 • Align funding with existing national systems, including management of public finances,
- 2333 accounting, auditing, procurement and monitoring and coordinate financing and harmonize funds
- 2334 to ensure an efficient financial architecture;
- 2335 • Based on an appropriate governance structure; and
- 2336 • Provide accountability in financial management, while being cost effective.

2337 The financing mechanisms will be flexible to accommodate all development partners. On the one hand,
2338 financing should be flexible and accommodate the needs of various funding channels. On the other hand,
2339 it should coordinate funding partners, provide transparency, align with country systems, and support best
2340 practice investments and mutual learning.

2341 The key elements of the funding mechanisms for the GTRP are:

¹⁰⁸ See background paper on financial architecture—full reference needed.

2342 *The funding mechanism – coordination and facilitation of parallel funding:* Available donor funding will
 2343 be coordinated based on the demand expressed in the GTRP (NTRPs, GSP, and strategies for sustainable
 2344 financing). Available donor funding includes various
 2345 sources: bilateral and multilateral organizations, NGOs
 2346 and private sources, as well as from trust funds. Parallel
 2347 financing would be coordinated through an agreed
 2348 partnership arrangement based on a common program, the
 2349 GTRP. This funding mechanism would be governed by a
 2350 multi-stakeholder partnership arrangement that coordinates
 2351 funding, supports the national planning process, ensures a
 2352 consistent results framework, and monitors
 2353 implementation. At the Tiger Summit, TRCs will task an
 2354 organization with the coordination and facilitation of
 2355 funding.



2356 Parallel funding requires ongoing coordination of funding
 2357 partners. Best practice examples for coordination are
 2358 compacts in the health sector by the International Health
 2359 Partnership (IHP+) and Sector Wide Approaches (SWAs). All funding partners will agree to the broad
 2360 principles as outlined by the GTRP. Principles include

- 2361 ○ support of national planning processes;
- 2362 ○ agreement on unified modalities for partner support;
- 2363 ○ agreement on one harmonized results monitoring framework to track implementation; and,
- 2364 ○ monitoring progress against commitments/pledges of all stakeholders to ensure greater
- 2365 mutual accountability.

2366
 2367 *Pooled funding:* The GTRP asks development partners to create pooled funding. One option for pooled
 2368 funding would be a trust fund relying on contributions mostly by bilateral donors. This fund could be
 2369 managed by one a multilateral development bank. A second option would be a private trust fund that
 2370 would pool funds preliminary from NGOs. This fund could be managed by one of the existing tiger funds.

2371 *Leveraging of funding for related sectors:* Saving tigers can leverage funding from related sectors such as
 2372 forests, climate change and carbon, water, communities, infrastructure. These funds would create co-
 2373 benefits for tigers. The GTRP will incentivize development partners to create these co-benefits by
 2374 reporting on co-benefits created. Also, a “tiger friendly” label that certifies projects across sectors, such as
 2375 REDD+^T, infrastructure^T, forest protection^T, and community development^T may leverage substantial
 2376 additional funds and would create awareness. As all other sources, funding from related sectors would be
 2377 coordinated and facilitated through the GTRPs funding mechanism.

2378 *Sustainable financing:* In the long term, financing should increasingly rely on sustainable funding sources
 2379 such as PES, payments from REDD+ and biodiversity offsets.

2380
 2381 *Reporting:* An annual financial report will recognize all financial contributions to tiger conservation
 2382 including domestic funds, bilateral and multilateral contributions, private funds from NGOs, foundations,
 2383 corporations, and individuals, pooled funding, as well as funds for related sectors that create tiger co-
 2384 benefits.

2385 In the short term, the GTRP will require funding, mostly concessional, from the following sources:

- 2386 • Domestic sources;
- 2387 • Multilateral resources (GEF, World Bank, ADB);
- 2388 • New development partners from Tiger Range Countries;
- 2389 • Traditional bilateral donors; and
- 2390 • Philanthropy (NGOs, foundations, corporations, individuals).

2391 Studies described in Chapter 5, Part 3, cover the development of sustainable financing mechanisms for
2392 tiger conservation in the TRCS.

2393 **Part D Access to GTRP Support**

2394 Access to GTRP support is in principle to be based on a combination of need and performance. TRCs starting from a
2395 very rudimentary position and aiming to recover tiger habitats and populations have enormous needs, first to get
2396 policies right and create the institutional framework and then to undertake sensible high priority expenditures. TRCs
2397 with established mature programs of conservation on the other hand are in a position not only to help others but also
2398 to build future efforts on the foundation of performance achieved. Given the flexible funding framework which aims
2399 to allow all potential funder to support key elements of the Program, the principles suggested below may have to be
2400 applied in different ways. Nevertheless it is proposed that:

- 2401 a. Access to Program Resources ¹⁰⁹ that help create the right policy environment and to strengthen
2402 institutional frameworks be available promptly based on agreed criteria for prioritization;
- 2403 b. Access to Program resources to implement major expenditures in habitat management and tiger and prey
2404 poaching be linked to undertaking the relevant policy and institutional development actions as in the
2405 NTRPs;
- 2406 c. Access to Program Resources funds for capacity building, combating wildlife crime and scientific
2407 monitoring be linked to undertaking relevant assessments and progress in implementing relevant actions,
2408 except in situations where performance is such that that assessments are judged not to be needed;
- 2409 d. Access to Program Resources to implement relevant GSPs and trans boundary actions would be linked to
2410 achieving required understandings with and among relevant TRCs; and
- 2411 e. Access to Program Resources for offsets/payment for ecological services and the like would be linked to
2412 the creation of adequate monitoring and governance systems.

2413

¹⁰⁹ Program Resources are those that are determined to be proposed to be applied to specific concepts/projects/studies of the GTRP, irrespective of source and manner of funds flow. The determination is to be made by the Secretariat, based on criteria approved by the Program Council.

2414 **Chapter 7 Management, Implementation, and Reporting**

2415 **Part A Program Direction and Management**

2416 To ensure achievement of the GTRP's agreed goals, its implementation will need to be duly coordinated
2417 and managed at three levels: (i) program level; (ii) national level; and (iii) project or activity level.
2418 National and project/activity level arrangements will vary depending on specific TRC government
2419 decisions and individual project requirements. This chapter focuses on the minimum necessary
2420 requirements for program-level implementation arrangements.

2421 Directing and managing the GTRP at a program-wide level will require an institutional arrangement that
2422 is goal- and action-oriented, flexible, includes all stakeholders (TRCs, development partners, etc.),
2423 ensures accountability and transparency, is efficient and effective and therefore will rely as much as
2424 possible on existing organizations and structures. The institutional arrangement will have to ensure the
2425 following tasks:

- 2426 • Coordinating and enhancing ongoing engagement and interaction of TRCs and of other
2427 stakeholders around the agreed goals;
- 2428 • Ensuring refinement and further development of the GTRP and its components;
- 2429 • Facilitating resource mobilization and engagement of development partners;
- 2430 • Coordinating parallel funding sources with financial needs expressed in the GTRP;
- 2431 • Monitoring, evaluating, and reporting on progress of the GTRP towards the agreed goals;
- 2432 • Reporting on resource mobilization.

2433 A Program Coordination Secretariat will carry our day-to-day interaction and information exchange with
2434 policy and operational decision-makers in the TRC Governments, Funding and Implementation Partners,
2435 and other stakeholders; consolidation of NTRP and GSP reports into an annual GTRP progress report and
2436 an annual financial report; supervision of implementation of the approved GSPs and key studies; and
2437 administration of the 'pooled funding' component of the GTRP funding. Program coordination costs are
2438 estimated at \$2 million per year.

2439 In the interest of ensuring seamless continuity of the GTRP development to date, the Global Tiger
2440 Initiative (GTI) Secretariat located at the World Bank headquarters (with staff in Washington DC
2441 headquarters and field offices in several TRCs) will carry out the interim functions of the Program
2442 Coordination Secretariat during the initial period of GTRP implementation. The Secretariat will support
2443 two vital processes: (i) an annual consultation with all TRCs and with funding and implementation
2444 partners of progress achieved and future directions and (ii) periodic systematic consultations with the
2445 funding community to meets its needs for review of funding situation and program delivery. Two reports
2446 for this purpose will be prepared as described in Part D below.

2447 The Program management system will further evolve and mature on the basis of a process mandated by
2448 the TRCs in the draft St. Petersburg Declaration on Tiger Conservation that requests "financial
2449 institutions and other partners, including the Global Tiger Initiative, to assist in identifying and
2450 establishing a mechanism to coordinate and monitor the use of the multi-donor trust fund allocated for
2451 tiger conservation and the implementation of the GTRP."

2452 **Part B Program Implementation and Partnership Roles**

2453 The GTRP will be implemented by a multitude of Partner organizations. These will include various
2454 government agencies of the thirteen Tiger Range Countries (possibly including subnational and/or local
2455 entities where relevant), interested intergovernmental organizations (such as Global Tiger Forum,
2456 INTERPOL, UNDP, UNEP, UNODC, etc.), convention secretariats (such as CBD, CITES, CMS, etc.),
2457 national and international NGOs (such as STF, IFAW, ITC, IUCN, WCS, WWF, etc.), multilateral and
2458 bilateral funding agencies (such as ADB, GEF, JICA, KfW, USAID, World Bank, etc.), foundations and
2459 private companies, research, education, and media organizations (such as Smithsonian Institution, US
2460 Fish and Wildlife Service, National Geographic Society, Zoological Society of London, etc.). Their
2461 respective engagements would be taking place at a combination of program-wide, national, and project
2462 levels.

2463 All organizations that share the strategic goals of the GTRP and want to be formally associated with the
2464 process of achieving these goals at a program level would be considered Program Partners. Depending on
2465 the specific nature of their contributions to the GTRP, they can be either Implementation Partners or
2466 Funding Partners or both. A simple text of a GTRP Partnership Memorandum of Understanding—
2467 defining the adherence to the Program goals and minimum communication and reporting requirements
2468 (with optional clauses for Implementation Partners and Funding Partners)—will be included as an Annex
2469 to the GTRP Program Document to be endorsed by the Tiger Summit and will be open to signing by any
2470 Partner from the date of the Tiger Summit and any time thereafter. The TRC Governments and other
2471 Partners that will endorse and sign the GTRP Document during the Tiger Summit will be automatically
2472 covered by the Partnership MOU. Any organization that decides to join the Partnership MOU after the
2473 Tiger Summit will be expected to convey their signature by a cover letter to the Program Coordination
2474 Secretariat, which will serve as the depositary of the MOU.

2475 In the Hua Hin Declaration of the 1st Asia Ministerial Conference on Tiger Conservation and in the draft
2476 St. Petersburg Declaration on Tiger Conservation, the TRCs have acknowledged the work to date of the
2477 Global Tiger Forum (GTF) as an intergovernmental and international body dedicated to conservation of
2478 wild tigers and encouraged its revitalization and more active role in the future. In this regard, the GTRP
2479 will provide targeted technical assistance to the GTF (estimated at \$300,000 over a two-year period) in
2480 strengthening its capacity to properly fulfill its intergovernmental functions, including its potential future
2481 responsibilities for facilitating and supporting range-wide independent monitoring of tiger populations
2482 and habitats across the range.

2483 **Part C Program Implementation Schedule and Phasing**

2484 The overall program implementation will span 12 years from 2010 to 2022, the next Year of the Tiger. It
2485 is expected to be divided into the following four implementation phases based on the main outcomes to be
2486 achieved:

2487 Phase One (2010-2014) — “Stop the Bleeding and Start the Paradigm Shift”: all key national and global
2488 components of the GTRP fully resourced and launched; global awareness achieved; tiger and prey
2489 poaching and habitat loss effectively stopped in core breeding areas, consistent science-based monitoring
2490 in place; sustainability policies and practices piloted and disseminated.

2491 Phase Two (2015-2019) — “Scale Up Paradigm Change”: sustainability policies and practices in place
2492 (enacted) and implemented (with adequate institutional capacity and sustainable financing) in the majority
2493 of TRCs; consumer attitudes changed.

2494 Phase Three (2020-2022) — “Tx2”: tiger conservation landscapes managed sustainably on at least 1
2495 million km²; wild tiger populations doubled and thriving, benefitting surrounding communities.

2496 The present version of the GTRP Document is effectively covering the needs of Phase One (2010-2014).
2497 It is expected that the first generation of GTRP projects would have been substantially implemented
2498 during that period and a major stock-taking and dissemination of results would be carried out at a
2499 Program level in 2015, to allow appropriate review of the overall Program targets and endorsement of the
2500 relevant pipeline of new activities and their coordinated resourcing for Phases Two and Three. This will
2501 also significantly coincide with the funding programming cycles at the TRC national levels and for some
2502 of the key prospective Funding Partners, thereby facilitating necessary resource mobilization and
2503 planning efforts.

2504 Within the present GTRP programming, the first two-year period, ending in 2012, will be critical for
2505 getting the entire scope of the Program up to speed and fully funded. It will also be the period of intensive
2506 learning and transforming political commitments into innovative and catalytic actions on the ground that
2507 will also support securing the full scope of the needed resources for Phase One of the Program. As a
2508 follow-up to the high-level GTRP commitments endorsed by the Tiger Summit in late 2010, a series of
2509 intensive learning, awareness, and fund-raising events involving the TRCs and Funding Partners will be
2510 planned in 2011-2012, including a high-level Implementation Review Conference in early 2012, to
2511 support this objective.

2512 **Part D Reporting Arrangements**

2513 In line with the proposed GTRP implementation framework, reporting will also be carried out at the
2514 program-wide, national, and project/activity levels. The main Program-level reporting effort in the
2515 medium and long term (starting from Phase Two of the Program) will be linked to science-based
2516 monitoring system—the so called ‘Tiger Progress Report (or Dashboard) —that should consistently
2517 record range-wide indicators and trends of wild tiger populations and habitats across all TRCs. This
2518 reporting system will be the main tool to gauge the success of GTRP interventions vis-à-vis its strategic
2519 goals. The foundations of this system are described in Chapter 4, Part 7, and below, and its
2520 operationalization and implementation will be enabled by high-level commitments of the Tiger Summit
2521 and subsequent support through a dedicated Global Support Program (see Chapter 5).

2522 An Annual Progress Report will be prepared by the Program Coordination Secretariat on the basis of the
2523 Program Partners’ standardized output-based reporting linked to specific projects and activities (as
2524 defined in the Program Partnership MOU, **Annex X to be added**). The Annual Progress Report will be a
2525 public document circulated to all participants of the Tiger Summit and the organizations they represent.

2526 A Program-wide common reporting system will be established for the TRCs and Funding Partners. An
2527 Annual Financial Report will recognize all financial contributions to tiger conservation including
2528 domestic funds, bilateral and multilateral contributions, private funds from NGOs, foundations,

2529 corporations and individuals, pooled funding, as well as funds for related sectors that create tiger co-
2530 benefits.

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2534 **Part E Developing a GTRP Progress Report**

2535 The credibility and sustainable financing of the GTRP and the projects that will be implemented at
 2536 national and global scales depend on a transparent, rigorous reporting mechanism to track progress that
 2537 enables a process of adjusting tactics and strategy, as necessary, to achieve Tx2. This index—the ‘Tiger
 2538 GTRP Progress Report’—can be used to report back to governments, donors, and the world public each
 2539 year to demonstrate progress toward achieving the goal.

2540 A GTRP Progress Report would bring together all site-level management effectiveness evaluations,
 2541 results of law-enforcement monitoring, trends in the occupancy of tigers and their principal prey in tiger
 2542 conservation landscapes, and trends in tiger numbers or density and their prey in key sources sites, among
 2543 other potential measures, such as the level of public support, locally and beyond (See Chapter 4, Part 7).
 2544 The GTRP Progress Report will also be a tool to move our shared vision into a fundable strategy that can
 2545 be implemented and its success measured. A suggested model for the GTRP Progress Report is in the
 2546 table below.

2547

2548 **Table X: GTRP Progress Report¹¹⁰**

2549 **Global Goal. Stop the decline of tigers and double the number of wild tigers by 2022**

Status	Measure	Discussion
++ Increasing -- Decreasing nc No Change	Trends in tiger numbers	
++ Increasing -- Decreasing nc No Change	Trends in tiger occupancy	
++ Increasing -- Decreasing nc No Change	Trends in tiger habitat	
++ Increasing -- Decreasing nc No Change	Trends in tiger-related wildlife crime	
+++ Increasing -- Decreasing nc No Change	Trends in demand for tiger parts and products	
++ Increasing -- Decreasing nc No Change	Trends in financing for tiger conservation	
+++ Increasing -- Decreasing nc No Change	Trends in excellence in protected area and landscape management	

2550

2551 **Goal 1. Preserve, protect, and enhance tiger conservation landscapes**

Progress	Measure	Discussion
++ Significant ** Some	1.1 Make core tiger breeding habitats inviolate areas where no	

¹¹⁰ The Goals outlined here are suggestive and will be modified based on the Global Goals from the Summit.

<p>None</p>	<p>economic and infrastructure development or other adverse activities are permitted</p>	
<p>Significant Some None</p>	<p>1.2 Maintain or create green buffer zones around core habitats and corridors between the core habitats and buffer zones in which all permitted development activities are tiger- and biodiversity- friendly, such as through applying the principles of Smart Green Infrastructure.</p>	
<p>Significant Some None</p>	<p>1.3 Intensify cooperative management of trans-boundary tiger landscapes.</p>	

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2553

Goal 2. Combat wildlife crime

Progress	Measure	Discussion
<p>Significant Some None</p>	<p>2.1 Make wildlife law enforcement a high national priority, with strict enforcement of laws against wildlife crime, and enhanced laws and policies, if necessary, to deter poaching, trading, and trafficking in tiger parts and products.</p>	
<p>Significant Some None</p>	<p>2.2 Intensify regional cooperation in wildlife law enforcement to shut down transnational tiger trafficking networks</p>	
<p>Significant Some None</p>	<p>2.3 The international community interdiction of wildlife crime.</p>	

2554
2555

Goal 3. Reduce and then eliminate demand for tiger parts and products

Progress	Measure	Discussion
<p>Significant Some None</p>	<p>3.1 Promote and conduct national activities designed to make consumption of tiger parts unacceptable.</p>	
<p>Significant Some None</p>	<p>3.2 Conduct activities globally to make consumption of tiger parts unacceptable</p>	

2556
2557

Goal 4. Make local communities who live near tiger landscapes part the solution

Progress	Measure	Discussion
<p>Significant Some None</p>	<p>4.1 Encourage communities near tiger landscapes with sustainable livelihood support</p>	
<p>Significant Some</p>	<p>4.2 Apply policies and appropriate technologies to minimize human-</p>	

--None	tiger conflict and adverse impacts to tiger habitat	
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2558
2559

Goal 5. Enhance excellence in the management of tigers and their landscapes

Progress	Measure	Discussion
++Significant **Some --None	5.1 Implement scientifically developed adaptive management tools in tiger conservation landscapes	
++Significant **Some --None	5.2 Implement scientific systems of estimating and monitoring the status of tigers and their prey	
++Significant **Some --None	5.3 Professionalize and improve management practices by applying best practices, technology, and science.	

2560
2561

Goal 6. Develop sustainable financing for tiger conservation

Progress	Measure	Discussion
++Significant **Some --None	6.1 Mobilize funding, including new financing mechanisms based on forest carbon financing, payment for ecosystem services (PES), and offsets from infrastructure development.	

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2563
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2565 **Appendix 1 Snapshots of the NTRPs**

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Bangladesh

2567

2568 **Tiger Conservation Goal:** *By 2022, achieve a demographically stable tiger population close to 'carrying*
2569 *capacity' under sound conservation management in the Bangladesh Sundarbans ecosystem.*

2570

2571

1. Strengthen Policy Framework

2572

- Develop Policy framework to strengthen collaboration with the police, coast guard and local administrations.

2573

2574

- Include wildlife crime in current cross border law enforcement mechanisms

2575

- Revise and enact new Wildlife Conservation Act with associated Rules to enhance penalties, create special wildlife conservation units.

2576

2577

- Mainstream conservation into the development agenda through an economic valuation of the Sundarbans landscape

2578

2579

2. Pursue Institutional Development

2580

- Change the focus of FD from production forestry to conservation

2581

- Create a Dedicated institution for wildlife conservation and management with appropriate training and logistical support to retain expertise and skills.

2582

2583

- Expand conservation governance across Government Organizations (GOs), Non Government Organizations (NGOs), civil society, and communities.

2584

2585

3. Undertake Priority Actions:

2586

Engaging local communities

2587

- Develop and support alternative livelihoods linked to wildlife conservation and maintaining healthy habitats

2588

2589

Protecting the habitat

2590

- Recruit, train, and post adequate field staff with adequate logistical support and appropriate incentives and risk insurance.

2591

2592

Trans-boundary collaboration with India on illegal trade

2593

- Trans-boundary collaboration to curb cross-border poaching, smuggling and trade.

2594

4. Proposed Expenditures: to match NTRP costing.

2595

5. Financing Options

2596

- Government budget to pay for ecological services, including Increased revenue from well-managed tourism

2597

2598

- Global Environment Facility (GEF) 5 funding to fund priority components

2599

- IDA: A regional IDA project for controlling illegal trade and trafficking

2600

- Technical Assistance (TA): The current World Bank Sundarbans Technical Assistance project could fund some activities identified in the NTRP.

2601

2602

- IDA: A potential trans-boundary project among India and Bangladesh for habitat protection and preservation of the biological integrity of the Sundarbans as a holistic ecosystem.

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Bhutan

Tiger Conservation Goal: *By 2022, demographically stable tiger meta-population in Bhutan thrives and co-exists harmoniously with people through habitat conservation and compatible development activities and livelihoods.*

1. Strengthen Policy Framework

- Finalize the Protected Areas and Wildlife Act.
- Create a bilateral policy and MoU between India and Bhutan for collaborative management of transboundary protected areas and to designate Transboundary Peace Parks
- Involve local communities and local institutions in conservation
- Integrate clear policies on PES into overall government conservation policies and acts.
- Improve linkages among the different units of the DoFPS.

2. Pursue Institutional Development

- Build staff capacity
- Strengthen coordination between different units of the Department of Forests and Park Services (DoFPS)

3. Undertake Priority Actions:

Integrating tiger conservation and rural livelihoods

- Engage local people to participate in habitat conservation and protection.
- Compensate for opportunity costs of conservation.

Conserving habitat and species

- Revise the corridor system to include important tiger habitat outside the current park-corridor system.
- Zone parks to identify core tiger habitats, and clearly designate corridors.
- Establish a reliable baseline of the status and distribution of tigers.
- Pursue trans-boundary collaboration with India and China, and create regional links to curb the illegal trade of tiger parts and derivatives.

Sustainable financing

- Create a sustainable financing mechanism from innovative fund sources.

4. Proposed Expenditures: to match NTRP costing.

5. Financing Options

- Government budget to pay for core operational costs
- NGOs (WWF, BTF, STF) to support research, monitoring.
- Bilateral/Multilateral (SDS, HELVETAS, SNV, DANIDA, UNDP) to support community engagement, park zoning.
- GEF to support community participation, capacity building, and human-tiger conflict.
- PES to support sustainable funding.

Cambodia

2643

2644 **Tiger Conservation Goal:** *To restore and conserve at least one defined, delimited and inviolate*
2645 *Source Site large enough to hold at least 25 breeding females.*

2646 **1. Strengthen Policy Framework**

- 2647 • Develop a sub-decree to legally designate an inviolate source site.
- 2648 • Inter-ministerial cooperation and coordination for sustainable land-use and management across
- 2649 the Eastern Plains Landscape.
- 2650 • Sign a trans-boundary agreement with Vietnam to combating cross-border wildlife crime.
- 2651 • Review and revise existing wildlife laws that govern penalties for poaching and trade in species
- 2652 of high commercial value.

2653 **2. Pursue Institutional Development**

- 2654 • Improve technical skills of enforcement agencies and community to monitor and manage
- 2655 protected areas and community managed areas.
- 2656 • Train FA, and GDANCP personnel on scientific skills for biological monitoring.
- 2657 • Increase operational resources for effective patrolling and monitoring.
- 2658 • Create greater awareness of the conservation values of tigers in local communities.

2659 **3. Undertake Priority Actions:**

2660 **Designate inviolate source site for tiger recovery**

- 2661 • Secure at least one inviolate potential source site, free from any type of infrastructure, habitat
- 2662 conversion, concessions and human interference with a clear mandate for management of the
- 2663 source site for tiger recovery.
- 2664 • Increase frequency and efficiency of regular patrols to monitor illegal activity within the source
- 2665 site and protected areas in the broader landscape, with strict monitoring of law enforcement
- 2666 operations using MIST and full integration of monitoring into PA management cycle.
- 2667 • Integrate legal designations of tiger source sites, protected area zoning, landscape corridors and
- 2668 community managed areas within provincial, district and commune development and land-use
- 2669 plans, through consultation of key stakeholders, capacity building, advocacy, and coordination
- 2670 of technical support to relevant government departments.

2671 **Monitoring tigers and tiger prey**

- 2672 • Implement consistent tiger and prey monitoring protocols in potential source sites

2673 **Trans-boundary collaboration with Vietnam to combat illegal trade**

- 2674 • Conduct annual coordination meetings for patrol planning and exchange of results from joint
- 2675 law enforcement patrol activities along the border

2676 **4. Proposed Expenditures: to match NTRP costing.**

2677 **5. Financing Options**

- 2678 • International Development Agencies: ADB and JICA implement regional development projects
- 2679 and could facilitate trans-boundary activities of the NTRP.
- 2680 • GEF: Complimentary to potential GEF-5 biodiversity priority areas and activities.
- 2681 • International NGOs: Currently supporting FA and GDANCP within the landscape.
- 2682 • PES/REDD: Sustainable financing opportunities are being investigated in the landscape and have
- 2683 the potential to contribute to protected area management and conservation in the long-term.
- 2684 • Tourism: Increased revenues from well managed and appropriate tourism development.
- 2685 • National budget: Institutional support from central government.

2686

China

2687

2688 **Tiger Conservation Goal:** *To achieve large scale extension and quality optimization of the wild tigers’*
2689 *habitat by 2022, to promote significant population growth of the wild tigers, to guide and assist the local*
2690 *residents to adequately develop economy and improve livelihood.*

2691

2692 **1. Strengthen Policy Framework**

2693

- Policy to ban hunting in key areas to improve prey populations.

2694

- Policy and legal backing for conservation plan for wild tigers.

2695 **2. Pursue Institutional Development**

2696

- Use current technology for field patrolling and monitoring.

2697

- Improve management and patrolling facilities and equipment, recruit additional staff and
2698 provide better training.

2699 **3. Undertake Priority Actions:**

2700 **Coordination of tiger conservation with social and economic development of local communities**

2701

- Compensate for damages to people, livestock, and crops from tigers and their prey from
2702 earmarked funds.

2703

- Establish clear standards and procedure of compensation with strong monitoring and
2704 verification.

2705

- Pilot and demonstrate economic development models favorable to wild tiger conservation.

2706 **Conservation, extension, and optimization of the wild tigers’ habitat**

2707

- Identify zones for wild tiger conservation and restoration, and evaluate potential tiger release
2708 sites.

2709

- Zone tiger habitats to prevent damage from infrastructure and development.

2710 **Strengthen law enforcement against smuggling and illegal operation of tiger products**

2711

- Collect information on smuggling and illegal operations of tiger products.

2712

- Improve enforcement system and strengthen capacity to enhance enforcement effectiveness
2713 and curb illegal activities.

2714 **Improve international cooperation mechanism for wild tiger conservation**

2715

- Promote effective cooperation mechanism for technical exchanges, information sharing and
2716 coordinated actions

2717 **Improve the monitoring system for wild tiger populations and their habitat**

2718

- Identify the areas of responsibility of monitoring agencies, establish coordination systems, and
2719 implement monitoring in action zones.

2720 **Develop propaganda and education on tiger conservation**

2721

- Explain to the public the damages to wild tiger populations from illegal trade and consumption.

2722

- Establish reporting phone lines, set up reward and punishment system, encourage public to
2723 report on illegal activities.

2724 **4. Proposed Expenditures: to match NTRP costing.**

2725 **5. Financing Options**

2726

- The Central government in combination with the ecological development of “12th five year
2727 plan” will provide necessary funds.

2728

- Local governments will provide necessary counterpart funds according to proportions.

2729

- Other domestic and foreign funds will be sought.

2730

2731

2732

India

2733 **Tiger Conservation Goal:** *By 2022, adequate critical tiger habitat be secured and made*
2734 *inviolate to provide total protection to the core breeding tiger populations and put in place a*
2735 *criteria for assessment of success that includes, extent and quality of habitat, increase in prey-*
2736 *base, number of tigers and reduction in human-wildlife conflict.*

2737

2738 **1. Strengthen Policy Framework**

- 2739
 - none

2740 **2. Pursue Institutional Development**

- 2741
 - Professionalize and improve management practices and systems.

2742 **3. Undertake Priority Actions:**

2743 **Engage local communities**

- 2744
 - Encourage communities around landscapes through sustainable livelihood support.
 - Minimize tiger-human conflict.

2746 **Anti-poaching and protection**

- 2747
 - Step up intelligence-based enforcement.
 - Protect tiger/prey base from poaching through smart patrolling

2749 **Securing Habitats**

- 2750
 - Make critical tiger habitats/corridors inviolate from biotic disturbance.

2751 **Transboundary coordination**

- 2752
 - Eliminate trade in tiger parts and derivatives and increase demand for tigers in the wild.

2753 **Monitoring**

- 2754
 - Implement scientific adaptive management for tiger conservation with robust monitoring mechanisms.

2756 **4. Proposed Expenditures: to match NTRP costing.**

2757 **5. Financing Options**

- 2758
 - No information provided

2759

Indonesia

2760

2761 **Tiger Conservation Goal:** *Tiger population at tiger's priority landscapes increased by 100%*
2762 *while occupancy level at identified tiger's priority landscapes increased by 80%.*

2763

2764

1. Strengthen Policy Framework

2765

- Upgrade laws for arresting poachers and illegal wildlife traders and increase penalties.

2766

- Set up a tiger conservation fund under the existing legal frame work (Environmental Law No. 32 of 2009).

2767

2768

- Minister to decree that SPORC engage actively in wildlife crime.

2769

- Develop Laws to protect tiger habitat outside of protected areas in priority landscapes.

2770

2. Pursue Institutional Development

2771

- Minister to establish a national tiger advisory board.

2772

- Strengthen cross sectoral program planning, i.e. RPJM/D, spatial plan, SEA, EIA (permit control).

2773

- Establish high level inter-agency (MoF, Police, Customs, MoJustice) command team to deal with wildlife traders and work with Interpol/UNODC and WCO.

2774

2775

- Create a well trained Elite Investigation group (100 staff) within the Ministry of Forestry for wildlife crime investigations.

2776

2777

- Develop capacity of the judicial system to interpret and apply the law.

2778

3. Undertake Priority Actions:

2779

Protection outside protected areas

2780

- Enact the local regulations to protect tiger habitats in priority landscapes.

2781

- Secure and maintain the integrity of source sites and landscapes.

2782

Law enforcement and conflict mitigation

2783

- Replicate Tiger Conservation Units in priority tiger landscapes.

2784

- Reduce tiger poaching and trade, and tiger, human and livestock fatalities from conflict.

2785

Transboundary

2786

- Reduce international demands on tiger, its parts and derivatives.

2787

Sumatra-wide monitoring

2788

- Develop a blue print for an adaptive management scheme and implement in priority landscapes.

2789

- Establish a robust time series dataset to show trends in tiger and prey populations.

2790

- Train relevant key stakeholders in tiger conservation.

2791

- Enhancing patrolling capacity by implementing MIST and spatially explicit monitoring framework in priority landscapes.

2792

2793

4. Proposed Expenditures: to match NTRP costing.

2794

5. Financing Options

2795

- Funds from forestry budget for law enforcement, patrols and rapid reaction units.

2796

- Incentive schemes from watershed benefits, certification scheme, carbon trading, taxes, etc.

2797

- Funds from donors through pledges and/or project proposals.

2798

- Performance bonds to protect tigers and restore habitats (Environmental Law No. 32 of 2009).

2799

- The \$17.5 million Aceh Forest and Environment Project to protect critical environmental resources and services from Leuser and Ulu Masen forest ecosystems during the post-tsunami reconstruction process.

2800

2801

- World Bank grant support to help Indonesia to implement REDD program (through the Forest Carbon Partnership Facility)

2802

2803

2804

2805

Lao PDR

2806 **Tiger Conservation Goal:** *To recover and maintain viable breeding populations of tigers in all*
2807 *Class 1 and 2 Tiger Landscapes, and to ensure connectivity between all tiger landscapes in Lao*
2808 *PDR, by 2020.*

2809 **1. Strengthen Policy Framework**

- 2810 • Government to endorse the Tiger National Action Plan.
- 2811 • Revise the national protected areas regulation into a Prime Ministers Decree to grant higher
- 2812 status to the protected area system.
- 2813 • Use policy and legislation provisions to facilitate sustainable funding (e.g. though payments for
- 2814 watershed protection, given the high number of hydropower proposed developments in Laos)

2815 **2. Pursue Institutional Development**

- 2816 • Train technical staff in each TCL, recruit necessary cadre, and equip properly.
- 2817 • Strengthen the capacity of DoFI, customs staff, border staff, economic police and CITES MA and
- 2818 SA (training, equipment)
- 2819 • Establish: Lao WEN; a Prime Minister's Commission on Endangered Species; and a Tiger
- 2820 Taskforce under MoF.

2821 **3. Undertake Priority Actions:**

2822 **Engage local communities**

- 2823 • Support alternative livelihood for local communities

2824 **Habitat conservation**

- 2825 • Establish inviolate core zone at Nam Et Phou Louey NPA.
- 2826 • Establish connectivity between TCLs

2827 **Law enforcement and tiger monitoring**

- 2828 • Implement camera trapping and occupancy surveys and MIST.
- 2829 • Conduct scientific surveys of tigers in the entire TCL

2830 **4. Proposed Expenditures: to match NTRP costing.**

2831 **5. Financing Options**

- 2832 • GEF 5
- 2833 • Possibly funds from private industry for Corporate Social Environment Responsibility or Payment
- 2834 for Ecosystem Services
- 2835 • Donors

2836

2837

Malaysia

2838 **Tiger Conservation Goal:** *By 2022, a wild tiger population of up to 1000 adults thriving within*
2839 *the Central Forest Spine as envisaged in the National Tiger Conservation Action Plan (NTCAP) of*
2840 *Malaysia.*

2841 **1. Strengthen Policy Framework**

- 2842 • Finalize the enactment of the new Wildlife Conservation Act.

2843 **2. Pursue Institutional Development**

- 2844 • Build capacity for Prosecution and Forensic Activities.
- 2845 • Professionalize and strengthen the Wildlife Crime Unit and Malaysian Wildlife Enforcement
2846 Network (MY-WEN).
- 2847 • Establish a coordination mechanism within the Ministry to monitor the implementation of the
2848 NTCAP and CFS

2849 **3. Undertake Priority Actions:**

2850 **Protection for tigers and their prey**

- 2851 • Strengthen law enforcement in and around the core tiger habitats.
- 2852 • Increase the number of informants in core tiger areas
- 2853 • Develop focused and intelligence driven anti-poaching patrol strategies in key forest sites
2854 (poaching hotspots) to secure tiger habitat

2855 **Habitat conservation and management**

- 2856 • Maintain linkages between the three priority areas through ecologically sound land use
2857 compatible with tiger conservation.
- 2858 • Secure the core areas in the Central Forest Spine and enlarge where possible
- 2859 • Implement community-based, better management practices (BMPs), effective awareness
2860 programmes, and compensation mechanisms to mitigate human-tiger conflict.
- 2861 • Design and develop smart infrastructure to maintain linkages and corridors.

2862 **Curb the illegal trade in tiger parts, derivatives, and other wildlife crimes**

- 2863 • Work with customs, border officials, and INTERPOL to crack down on illegal international trade.
- 2864 • Enhance informant networks at local level.

2865 **Transboundary**

- 2866 • Strengthen and improve cooperation through bilateral and ASEAN to curb the illegal trade of
2867 tigers and parts across borders and in the Straits of Malacca.

2868 **Monitoring**

- 2869 • Institutionalize effective science-based systems to monitor tiger, prey, and habitat conservation.
- 2870 • Improve knowledge and awareness of tiger ecology through research.

2871 **4. Proposed Expenditures: to match NTRP costing.**

2872 **5. Financing Options**

- 2873 • Government (Federal and State)
- 2874 • NGOs
- 2875 • Commercial sector
- 2876 • PES

2877

2878

Myanmar

2879

2880 **Tiger Conservation Goal:** *To conserve two source sites for Tigers*

2881 **1. Strengthen Policy Framework**

- 2882
- Amend penalties of the current law and legislations with regard to tiger related offences.
- 2883
- Review existing development policies to strengthen support for Tiger Conservation and
- 2884
- integrate in the development agenda.

2885 **2. Pursue Institutional Development**

- 2886
- Improve capacity and strengthen infrastructure to monitor the population status and
- 2887
- distribution of tigers.
- 2888
- Prepare management plans for tiger landscapes and PAs with tigers.
- 2889
- Create meaningful cooperation with government line agencies for effective and efficient law
- 2890
- enforcement and education outreach for tiger conservation.

2891 **3. Undertake Priority Actions:**

2892 **Anti-poaching and protection**

- 2893
- Improve law enforcement in source Landscapes
- 2894
- Increase effective patrolling and integrate with appropriate database (e. g MIST).

2895 **Habitat management**

- 2896
- Nominate important tiger core areas and corridors for legal protection.

2897 **Transboundary coordination**

- 2898
- Enter into trans-boundary agreements with India, Thailand and China to reduce illegal trade and
- 2899
- wildlife crime.

2900 **Monitoring**

- 2901
- Establish a baseline for tiger and tiger prey species.
- 2902
- Standardize biological monitoring protocols (possibly with MIST).

2903 **4. Proposed Expenditures: to match NTRP costing.**

2904 **5. Financing Options**

- 2905
- GEF: Potential GEF-5 biodiversity priority areas and activities.
- 2906
- International NGOs: Currently supporting the Hukaung landscape.
- 2907
- PES/REDD: A PES system currently operates in the Thaninthayi Nature Reserve but other PES
- 2908
- type projects are not being developed. No REDD projects are being developed yet in Myanmar.
- 2909
- National budget: Institutional support from central government.
- 2910

2911

Nepal

2912

2913 **Tiger Conservation Goal:** *By 2022, a demographically stable meta-population with at least*
2914 *250 tigers conserved in the TAL with transboundary ecological links.*

2915 **1. Strengthen Policy Framework**

- 2916 • Amend the NPWC Act 1973 and Forest Act 1993 to enable landscape conservation.
- 2917 • Gazette the TAL as a priority conservation landscape.
- 2918 • Place TAL conservation as a high-profile feature in the political agenda.

2919 **2. Pursue Institutional Development**

- 2920 • Establish a National Tiger Conservation Committee (NTCC), WCCB, and SAWEN
- 2921 • Develop adequate human resources and capacity in the field and centre for research, smart
- 2922 patrolling, intelligence, judiciary procedures (e.g., scene of crime).
- 2923 • Build and restore infrastructure for effective management and protection.

2924 **3. Undertake Priority Actions:**

2925 **Building local community stewardship for conservation**

- 2926 • Implement proactive human-tiger conflict mitigation program
- 2927 • Implement alternative livelihood programs compatible with tiger habitat conservation.

2928 **Population and habitat conservation**

- 2929 • Manage the TAL as a conservation landscape with core areas, buffer zones, corridors to
- 2930 conserve tigers as a metapopulation with transboundary ecological linkages.
- 2931 • Protect tiger habitat from human encroachment through strict law enforcement.
- 2932 • Assess development projects planned in the TAL to determine impact on tigers, prey, and
- 2933 habitat, and approve only on the basis of recommendations from rigorous impact assessments.

2934 **Monitoring and protection**

- 2935 • Implement and upgrade MIST (Management Information System Technology)
- 2936 • Conduct periodic population monitoring using camera-trapping and occupancy surveys.
- 2937 • Conduct research programs on tiger ecology and metapopulation structure.
- 2938 • Strengthen anti-poaching in protected areas with small, highly-mobile patrol teams.
- 2939 • Strengthen and scale-up community-based protection units and intelligence networks.

2940 **Sustainable financing**

- 2941 • Explore potential for carbon-related funds and financial offsets from smart infrastructure for
- 2942 tiger and tiger habitat conservation and management.
- 2943 • Initiate national and international cooperation for payments for water and other hydrological
- 2944 services from the river system to support tiger conservation in the TAL.

2945 **4. Proposed Expenditures: to match NTRP costing.**

2946 **5. Financing Options**

- 2947 • Government of Nepal: Recurrent cost and infrastructure.
- 2948 • IDA (World Bank): Regional programs, capacity building and networking and institution building.
- 2949 • World Bank (PAF): restoration of critical tiger conservation corridors through voluntary
- 2950 resettlement of communities in flood-prone areas.
- 2951 • GEF: Capacity building, human tiger conflict, livelihood and infrastructure.
- 2952 • WWF: Species, habitat, trans-boundary, corridors and connectivity
- 2953 • CITES: Law enforcement capacity building
- 2954 • Bilateral: All activities
- 2955 • Multilateral support: All activities

Russia

2956

2957 **Tiger Conservation Goal:** *To identify mechanisms for safeguarding the existence of a viable*
2958 *population of the Amur tiger consisting of at least 500 animals with a maximum genetic diversity*
2959 *across the Russian Federation.*

2960

2961 **1. Strengthen Policy Framework**

- 2962 • Prescribe legal requirements to prosecute those sell and purchase tiger skins on the internet.
- 2963 • Amend the forest legislation to protect Korean pine and oak trees.
- 2964 • Amend laws to provide economic incentives to increase prey populations.
- 2965 • Amend laws to include stiff punishments for illegal procurement and transport of tiger parts.

2966 **2. Pursue Institutional Development**

- 2967 • Raise the level of professional knowledge of nature resource managers and specialists.
- 2968 • Mobilise additional financial support for protected areas to improve protected areas management.
- 2969 • Raise the level of knowledge about tigers among officers of customs and law enforcement services.

2972 **3. Undertake Priority Actions:**

2973 **Human-tiger conflict prevention and settlement**

- 2974 • Prepare recommendations on safety rules for local people in Amur tiger habitats.
- 2975 • Put radio-tracking collars on Amur tigers.
- 2976 • Establish an Amur Tiger Recovery Centre.

2977 **Strengthened protected area network**

- 2978 • Establish ecological corridors to connect protected areas in key Amur tiger habitats.
- 2979 • Expand the area of the existing nature reserves and national parks in the Amur tiger range.
- 2980 • Establish protection zones with restricted natural resource use on land adjacent to PAs.
- 2981 • Provide incentives to PA staff by increasing salaries and supplying needed equipment.

2982 **International cooperation**

- 2983 • Establish trans-boundary reserves for seamless movement of Amur tigers
- 2984 • Coordinate actions to suppress smuggling and re-selling of Amur tiger poaching products.
- 2985 • Coordinate research programs, and develop international Amur tiger research cooperation.

2986 **Amur tiger population studies and monitoring**

- 2987 • Improve methodological frameworks for Amur tiger monitoring and counts following the guidelines approved by the MNR in its Order # 63 of March 15, 2005.

2989 **Public awareness and education**

- 2990 • Implement targeted PR campaigns for various social groups living in the Amur tiger habitats to develop a positive image of the tiger as a symbol of the region's wildlife.
- 2991 • Preserve and promote spiritual culture and traditions of indigenous people that respect the Amur tiger.
- 2992 • Promote sustainable natural resource management to conserve tiger habitats and prey populations.
- 2993 • Develop negative public opinion about poaching.

2997 **4. Proposed Expenditures: to match NTRP costing.**

2998 **5. Financing Options**

- 2999 • Details unavailable

3000

3001

Thailand

3002 **Tiger Conservation Goal:** *Recover tiger populations in Tenasserim – Western Forest Complex*
3003 *(Tenasserim-WEFCOM) and Dong Phrayayen Khao Yai (DP-KY) Forest Complex by 50%.*

3004

3005

1. Strengthen Policy Framework

3006

- Reform policy on promotion, salaries, and benefits for PA staff and park rangers.

3007

- Reform policy on career path for superintendents of PAs for better work quality.

3008

- List tigers as a reserved species under the WARPA (Wild Animal Reservation and Protection Act).

3009

- Amend the WARPA to increase the penalties on wildlife crimes.

3010

2. Pursue Institutional Development

3011

- Implement MIST-based Smart Patrol System capacity in the Tenasserim-WEFCOM landscape.

3012

- Establish research and monitoring capacity in the Tenasserim WEFCOM and DY-KY Forest Complex.

3013

3014

- Establish Wildlife crime units and CITES transboundary check points.

3015

- Set up a subcommittee on tiger recovery and conservation under the National Wildlife Reservation and Protection Committee to monitor the progress of Tiger Action Plan.

3016

3017

- Run the Regional Tiger Conservation and Research Center at Huai Kha Khaeng Wildlife Sanctuary.

3018

3019

3. Undertake Priority Actions:

3020

Conservation action and enforcement

3021

- Secure the Tenasserim-WEFCOM and DP-KY landscapes with MIST-based Smart Patrol Systems.

3022

- Establish wildlife crime units outside the priority landscapes to reduce demands of wild meat.

3023

Monitoring, research, and information management

3024

- Use up-to-date techniques to annually or regularly monitor trends of tigers and prey in the two landscapes and extend surveys to other potential tiger habitat.

3025

3026

- Conduct tiger ecology research in the two landscapes.

3027

Education, awareness, and public participation

3028

- Run tiger focused education and awareness campaigns around the two priority landscapes.

3029

- Encourage public participation through protected area committee.

3030

Strategic financing for tiger conservation

3031

- Give tiger conservation national priority and pride and create a long-term financial support source in the government budget

3032

3033

- Seek international opportunities for large scale and long-term international funding.

3034

4. Proposed Expenditures: to match NTRP costing.

3035

5. Financing Options

3036

- Thai government (75% of All activities above)

3037

- WCS (Smart patrol system, wildlife crime units, tiger focused education campaigns, tiger monitoring system, regional center)

3038

3039

- WWF (Smart patrol system, tiger focused campaigns, tiger monitoring systems, regional center)

3040

- Freeland (Enforcement training on patrolling, Investigation training)

3041

- US Fish & Wildlife Service (Smart patrol system, enforcement, tiger monitoring system)

3042

- Save the tiger fund (Smart patrol system, tiger monitoring system)

3043

- Liz Claborn – Art Ortenberg Foundation (Smart patrol system, Wildlife crime units)

3044

- Panthera (Tiger monitoring)

3045

- National Geographic Society (Tiger research and monitoring)

Vietnam

3046

3047 **Tiger Conservation Goal:** *Wild tigers and their prey are recovering through significant*
3048 *reduction of the threats they face.*

3049

3050

1. Strengthen Policy Framework

- 3051 • Issue Directive on investment standards and sustainable financing for Tiger Protected Areas.
- 3052 • Sign Transboundary MoUs for better coordination to tackle trade and smuggling.
- 3053 • Develop policies on smart green infrastructure in Tiger Conservation Landscapes and to prevent
- 3054 non-SUF infrastructure being constructed within Tiger Protected Areas
- 3055 • Develop policies for captive tiger registration system with breeding management plans for the
- 3056 Indochinese tiger.
- 3057 • Issue Directive to dismantle organized tiger crimes as a matter of national urgency.

3058

2. Pursue Institutional Development

- 3059 • Improve and strengthen management, enforcement and monitoring in Tiger Protected Areas
- 3060 • Develop and implement strong monitoring program in captive breeding facilities, wildlife trade
- 3061 control, investigations and prosecutions.

3062

3. Undertake Priority Actions:

3063

Prevention, detection, and suppression of organized tiger and wildlife crime

- 3064 • Make sure that captive tiger facilities present no threat to wild tiger populations and support
- 3065 conservation of wild tigers
- 3066 • Launch inter-agency investigations into illegal tiger trade networks.
- 3067 • Prevent retailers selling tiger and prey products in restaurants, medicine and souvenir shops.
- 3068 • Participate in ASEAN-WEN Asian Big Cat task force and UNODC's Border Liaison Offices.

3069

Conservation and protection of priority tiger conservation sites

- 3070 • Recognize and strengthen management of 5 Tiger Protected Areas.
- 3071 • Make Tiger Protected Areas inviolate by voluntary re-settlement of people living inside them
- 3072 and in critical corridors between them.
- 3073 • Provide adequate resources to all protected areas in Tiger Conservation Landscapes to
- 3074 implement regional standards for tiger conservation.

3075

Monitoring for law enforcement effectiveness in the protected area system

- 3076 • Adopt and implement MIST (or a similar system).

3077

Reduce demand for tiger products by Vietnamese consumers

- 3078 • Identify economic, social, cultural factors that cause increasing declines in wildlife and tigers and
- 3079 develop communications campaigns to counter them.

3080

4. Proposed Expenditures: to match NTRP costing.

3081

5. Financing Options

- 3082 • Government financing: increased operational support for the five PAs, enforcement, and demand
- 3083 reduction campaign.
- 3084 • Support from the international community: ENV, WCS, WWF, TRAFFIC, GEF 5): technical and
- 3085 financial support to establish appropriate systems and policies.
- 3086 • Sustainable financing: PES, Smart Green Infrastructure transfer payments.

3087