

# Chapter 1. Introducing the Problem

*“An environment in which animals and plants become extinct is not safe for human beings either.” — Indira Gandhi, former prime minister of India<sup>1</sup>*

## I. Introduction

1. Tigers are an umbrella species and symbolize the plight of wildlife across Asia. They are the religious and cultural icons of Asia, serve as the national animal in some countries and are a prominent figure on the flags of others. Their charismatic appeal is used to sell everything from gasoline to sporting goods to confectionary. Yet, paradoxically, wild tigers are on the brink of extinction.

2. Within a century their numbers have plummeted from over 100,000 to below 4,000 animals.<sup>2</sup> The existing wild populations inhabit fragmented and isolated patches of land that constitute a tiny fraction of their historic range (Figure 1.1). If current trends persist, tigers are likely to vanish from the wild. Poised as they are at the top of ecosystems, the loss of tigers indicates that ecosystems are under stress. There is danger that if tigers are eliminated from forests the life-sustaining ecosystem services they provide will erode. As a top predator, tigers play some unexpected but nevertheless crucial roles in sustaining ecosystems and building their resilience.<sup>3</sup>



Photo Courtesy: Michael J. Vickers

## II. Why Are Wild Tigers in a Precarious State?

3. **A vulnerable top predator.** Tigers are large carnivores and have evolved as highly specialized predators of large animals (such as deer, pigs, and wild cattle). The tiger is never found far from water and displays remarkable resilience to temperature, with a range that spans from freezing alpine meadows to sweltering tropical mangrove swamps. Because of its size and specialized biological niche the tiger is highly vulnerable.<sup>4</sup>

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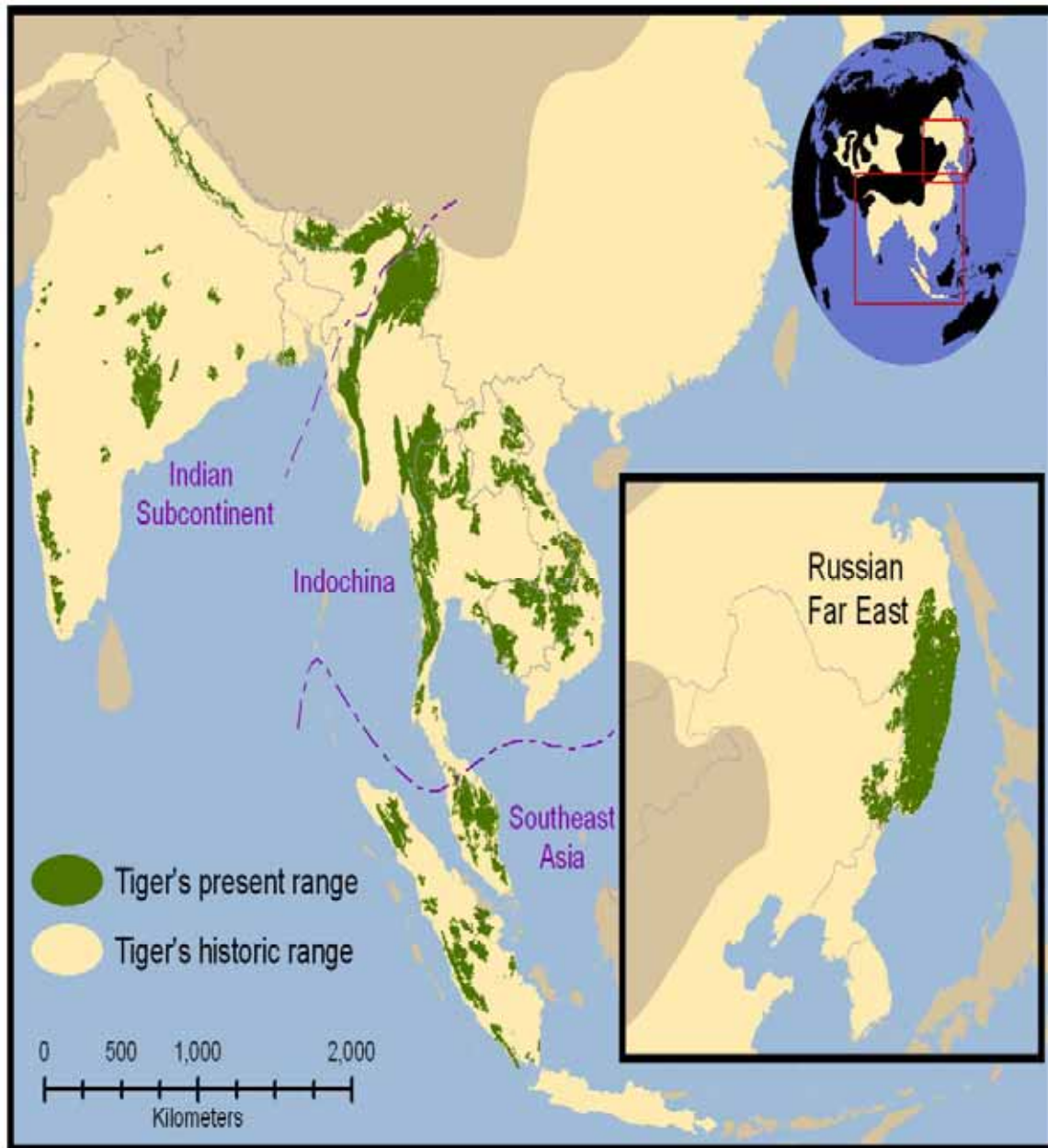
<sup>1</sup> Inaugural Address, Inaugural Function, April 12, 1972, National Committee on Environmental Planning Commission, Vigyan Bhavan, New Delhi, India.

<sup>2</sup> J. Seidensticker, B. Gratiwice, and M. Shrestha, in press.

<sup>3</sup> G. Chapron, H. Andren and O. Liberg, 2008.

<sup>4</sup> J. Seidensticker, S. Christie, and P. Jackson, eds., 1999.

Figure 1.1. Historic and Present Distribution of Tigers



Source: Dinerstein et al 2007

4. **To survive, tigers require abundant prey and ample space.** The carrying capacity of tigers in a given area is determined by the availability of prey animals. In the prey-rich tall-grass savannahs of Kaziranga in India tiger densities have been as high as twelve per 100 square kilometers, whereas in the prey-poor forests of the Russian Far East tiger densities are as low as about one tiger per 200 square kilometers.

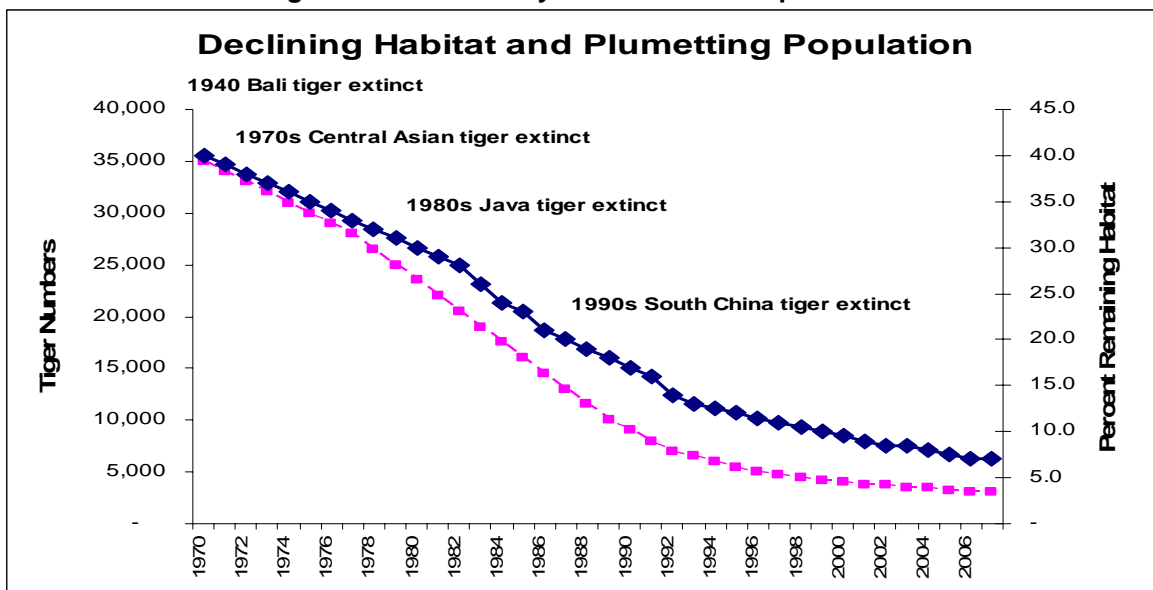
5. **Why do tigers require so much prey and space?** To survive, a tiger must feed on a deer-sized mammal approximately once a week, consuming about 50 animals per year. Tigers crop about 10 percent of the available prey base, which broadly corresponds to the rate at which

the prey population grows.<sup>5</sup> The implication is that a prey population of about 500 deer-sized animals is needed to support a single tiger. Consequently, in prey-rich tropical forests, tiger densities are higher than in the prey-poor landscapes of the Russian Far East.

**6. Tigers occupy only 7 percent of their original range.** Tigers once ranged in an arch stretching from the southern reaches of the Caspian Sea to the Indonesian islands of Sumatra, Java, and Bali. Their habitat encompassed the Russian Far East, Eastern and Southern China, Southeast Asia and the Indian subcontinent (including the Indus River Valley in Pakistan) (Figure 1.1). Tiger subspecies from the extreme ends of the distribution — the Caspian area, Java, and Bali — are now extinct. In the last decade habitat collapse has accelerated, and the tiger-occupied area has shrunk by 40 percent. The precipitous decline in tiger populations mirrors the reduction in their habitat (Figure 1.2).<sup>6</sup>

**7. Habitat erosion is driven by both poverty and prosperity.** The expanding economies and populations of South and East Asia have led to the conversion of habitats for agriculture, plantations, mines, and other uses. Simultaneously, subsistence needs and a high degree of resource dependence in some poor and densely populated landscapes have compounded these problems, leading to further degradation of habitats.

Figure 1.2. A Summary of Habitat and Population Trends



Pink = tiger numbers      Purple = habitat remaining

Tigers are solitary animals that inhabit semi-exclusive ranges. The amount of forest required to sustain a tiger depends on the availability of prey.

Source: Wikramanayake et al., in press.

**8. Poaching is the most urgent and immediate threat to tigers.** The consequences of poaching are particularly damaging in degraded habitats with a depleted prey base, where tigers are few in number and face a high risk of starvation. Most tiger populations fall into this category: they are small (numbering less than 30 individuals), completely isolated, and face a bleak future. These intrinsically fragile population clusters are especially vulnerable to the consequences of poaching (Figure 1.3).

<sup>5</sup> The reason for this is closely linked to the need for biological sustainability of both tigers and their prey. For the prey population to sustain itself, the off-take of prey (predation rate) cannot exceed the prey's reproduction rate. The prey population typically grows at about 10 percent, and in equilibrium, this "excess" is consumed by predators.

<sup>6</sup> E. Sanderson, et al., 2006.

Figure 1.3. The Differential Impacts of Poaching

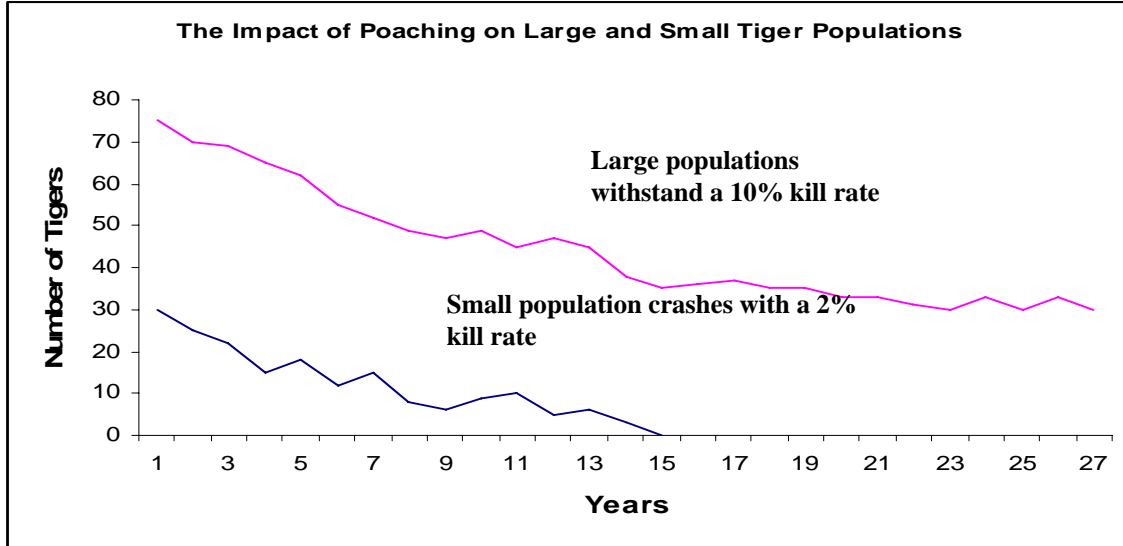


Figure 3 summarizes simulations from the Damania-Karanth-Stith model<sup>7</sup> of tiger demography. Small populations are fragile, unstable, and vulnerable to extinction. Modest amounts of poaching induce extinction here. This is the norm — most tiger populations are small. A larger population can sustain losses of 10 percent a year or more.

### III. The Tiger Trade

9. **Why are tigers poached?** While trade in tiger parts and derivatives has been banned around the world for more than a decade and law-abiding practitioners of traditional Chinese medicine (TCM) now use alternatives, the illegal trade continues. Poachers mainly operate to satisfy a stubborn demand for tiger bones to make health tonics and for tiger skins to use as décor or clothing. Recent reports identify a growing illegal market for tiger meat as an exotic cuisine. Most tiger products appear to be destined for markets in East Asia, where the average per-capita GDP is rising, leading to an expanding market for illegal tiger parts. The legal international trade in tiger products has been banned since 1975 through the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Nonetheless, the illegal trade in wild tigers persists and remains highly profitable, well structured, with close links to other organized crime.

10. The World Federation of Chinese Medicine Societies (WFCMS) has declared that tiger parts are *not necessary* for human health care and that alternatives are plentiful, affordable, and effective. The WFCMS recognizes, however, that more public outreach will be necessary to change attitudes and convince consumers who self-prescribe illicit products such as tiger-bone wine.

11. **How are tigers poached?** Poaching is usually undertaken by skilled forest inhabitants who generally work on behalf of a trader. The techniques used to kill tigers are simple and lethal: typically, a reusable steel trap, cable snare, or poisoned bait. The costs of poaching a wild tiger are thus small and unlikely to exceed \$100 to \$200, even when the opportunity costs of time and the expected penalties for poaching are factored into the calculations.<sup>8</sup>

12. The carcass is sold to traders who capture the bulk of the profits by smuggling tiger parts to retail markets in the urban centers of East Asia.<sup>9</sup> All parts of a tiger — the penis, paws, teeth,

<sup>7</sup> R. Damania, et al., 2003.

<sup>8</sup> See Damania, et al., 2003.

<sup>9</sup> The market structure and marketing chain is complex. First, a large number of poachers operate under near open-access conditions. They sell to a small number of traders who by virtue of their market power set the prices paid to poachers and demanded from sellers. This portion of the market exhibits the features of an oligopoly. The products are finally sold by a large number of retailers in various locations. Depending on the precise parameters of the market, this can have troubling consequences for controlling the trade through such economic instruments as legalization. Stated simply, traders can

bones, and fur — can be traded, with a total retail value in the region of \$10,000 up to \$70,000 per adult male. Products derived from some tiger parts, especially tiger-bone wine, are diluted to increase the value exponentially through the trade chain.

**13. Though legislation is in place to protect tigers, wildlife agencies frequently lack resources for effective enforcement of laws.** The penalties for poaching are often harsh, but the likelihood of apprehension remains low and that of a conviction even lower. Even in India, with its well-developed institutional structure for conservation, a mere ten tiger poachers have been convicted in the past five years, and not a single trader has been penalized.

**14. Tiger poaching has become contagious.** Having depleted tiger populations, commercial poachers have turned to the other Asian big cats: Asian lions, leopards, snow leopards, and clouded leopards. The Gir lions are the only survivors of what was once an extensive population of Asian lions that ranged from Greece to India (Box 1.1). Within a two-week period poachers killed 10 percent of the population of this rare subspecies of lion. Having poached tiger populations in Cambodia, Myanmar, and Thailand, commercial poachers have intensified and focused their efforts in Malaysia, and now tigers and other wildlife there are under heavy pressure.

## IV. Conclusions

**15. With the twin pressures of poaching and habitat loss, tigers have become an enforcement-dependent species.** To secure their future in the wild they must both be protected from poaching and given adequate land with sufficient prey. This requires financial and material resources and a strong policy commitment to conservation. Ironically, there are more tigers, of a non-wild variety, in captivity than in the wild. Reintroducing captive-bred tigers is neither feasible nor cost effective. Rather, the only practical option is to protect and allow existing wild populations to survive and expand.<sup>10</sup> Consequently, potential habitat must be secured to permit the existence and expansion of viable populations.

**16. The inconvenient truth is that under current management systems wild tigers are slipping away.** Well-intentioned international, national, and regional support for tiger conservation efforts over the last decade has clearly been inadequate to halt the decline in tiger populations. The most urgent problem is to find effective strategies to control the poaching of tigers and their prey. In the medium term, the fragmentation and degradation of habitats needs to be addressed by developing a conservation model that enlists the forces of development and turns a species often viewed as an economic liability into an asset living in the wild.

### Box 1.1. The Gir Lions and the Poaching Contagion

Having depleted wild tiger populations, poachers have recently turned to the last remaining Asiatic lion: the Gir lion living in the Gir Forest of the Indian state of Gujarat. This subspecies is biologically and behaviorally unique and distinct from the more common African lion. Just one small population (of 300 to 350 individuals) of the Asiatic lion remains.

Lion bones and claws are essentially indistinguishable from those of tigers, and appear to be traded in lieu of tiger products. The Asiatic lions are conditioned to share their habitat with humans and make easy prey for poachers. Within a short two-week period (between April 28 and May 13, 2007), sixteen lions were killed by poachers, despite the arrest of one of the poaching gangs. Poaching at this scale will rapidly extirpate the population, with negative consequences for globally significant biodiversity and the rural economy of Gir, which depends heavily on its lions as a tourist draw- card.

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adjust their margins to accommodate changes in competition or demand at the retail end of the market and thus frustrate attempts to diminish incentives to poach (Bulte and Damania, 2005).

<sup>10</sup> S. Christy, Zoological Society of London, personal communication.