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**Creation of Malaysia's Royal Belum State Park:
A Case Study of Conservation in a Developing Country***

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Creation of Malaysia's Royal Belum State Park: A Case Study of Conservation in a Developing Country

Abstract

The incentives for resource extraction and development make the conservation of biodiversity challenging within tropical forestlands. The 2007 establishment of the Royal Belum State Park in the Malaysian state of Perak offers lessons for creating protected areas in tropical countries where subnational governments are major forestland owners. This paper elucidates the social and political forces that influenced Royal Belum's creation. Those forces included Malaysian conservation groups' efforts to establish the ecological uniqueness of the site and rally public support to protect it; the Perak state government, which is the landowner under Malaysia's constitution, seeking a protection option that would minimize the economic costs to it (and perhaps generate net economic benefits); and the federal government providing a legal framework and support for park protection and ecotourism development. Successful long-run protection of Royal Belum will require action beyond simply designating the area as protected.

BIOS

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Creation of Malaysia's Royal Belum State Park: A Case Study of Conservation in a Developing Country

Habitat loss and hunting are the major threats to biodiversity in tropical forests (Dobson & Lynes, 2008; UNEP/FAO/UNFF, 2009; Hoffmann, 2010). The majority of forestland in tropical countries—home to most of the world's terrestrial biodiversity (Dirzo & Raven, 2003)—is not protected from agricultural conversion or exploitation for timber, minerals, and other natural resources. Currently, barely a fifth of it has been set aside as national parks, wilderness areas, nature reserves, and other protected areas (FAO, 2010, p. 60). Without some sort of protected status, the private returns from agriculture, logging, and other forms of development provide strong incentives for landowners to ignore the ecological impacts of deforestation and forest degradation, even though the benefits of protection to society at large could be greater (e.g., nature-based recreation, water purification, pollination services, carbon sequestration; TEEB, 2010). Unprotected status also might increase hunting, especially illegal hunting (poaching), given that unprotected land typically translates into less regulated land, which means less legal grounding to monitor and punish such activities. Moreover, landowners with an interest in logging or forest conversion have little incentive to prevent poaching as they would bear the costs of prevention but not accrue the benefits.

Despite these challenges, designation of additional forestland as protected has occurred in the tropics. From 1990 to 2010, the area of forest included in protected areas in tropical Africa, Latin America, and Asia increased by 4.5 million ha per year (FAO, 2010, p. 61). Malaysia is an example of this trend. This Southeast Asian nation's forestland has been logged, mined, and converted to rubber and oil palm plantations and other nonforest land uses for more than a century (Vincent & Yusuf, 1993; Vincent & Rozali, 2005). In 2007, however, Malaysia's Perak

state established a new 117,500-ha forest park, the Royal Belum State Park. Royal Belum is the second-largest protected area in Peninsular Malaysia after Taman Negara (431,435 ha), which was established during British rule in 1939. It is larger than 85% of all the protected areas in the world classified by the International Union for Conservation of Nature (IUCN) as strict nature reserves, wilderness areas, or national parks, and it is larger than 90% of such protected areas created after 2006.¹

While the designation of a large forested region as a state park is not unprecedented in Malaysia, it is not very common either, and it takes significant time, resources, and coordination to accomplish. The idea of protecting land in the area now covered by Royal Belum dates back to a late 1960s report on wildlife management commissioned by the Malaysian Federal Game Department (now the Department of Wildlife and National Parks; Stevens, 1968), and it was first officially considered by the Perak state government in 1971 (Suksuwan & Kumaran, 2003). Yet, Royal Belum was not established until nearly 40 years later.

This paper examines the factors that influenced the formation of Royal Belum, and it offers insights into how land becomes protected in the social and political environment of Malaysia. It also examines the conservation issues that remain for Royal Belum even though protected status has been achieved. It begins with background information on biodiversity in the forested region of Peninsular Malaysia where Royal Belum is located—the Belum-Temengor forest complex—and the major challenges facing efforts to preserve that biodiversity. One of those challenges is generic to biodiversity protection in Malaysia (state rights), while the other two are specific to Belum-Temengor's location. The paper then analyzes the factors that contributed to the decision to protect part, but not all, of Belum-Temengor as Royal Belum, focusing on incentives and disincentives for protection as viewed by the legal landowner, the

Perak state government. Next, it highlights several unresolved issues affecting ongoing efforts to preserve biodiversity in Belum-Temengor. The paper concludes by recapping the salient ingredients that were necessary to establish Royal Belum and are needed to address the continuing issues facing it and Belum-Temengor more broadly.

Although the paper presents a case study of just one particular protected area in one particular country, an understanding of the forces that led to the creation of Royal Belum may provide lessons for the future protection of large tracts of forestland in other tropical nations. Tensions between conservation and development, and a mismatch in incentives for forest protection between national and subnational governments, are key features of the Royal Belum story, and they are not unique to Malaysia.

The paper is based on two sources of information: published and unpublished documents that are cited throughout the paper, and discussions with representatives of the agencies and organizations that are mentioned in the paper. During 2007–2012, the authors collaborated with the Forest Research Institute Malaysia on an interdisciplinary research project funded by the Global Environment Facility (GEF) through the United Nations Development Program (UNDP MAL/04/G31). The project's objective was to develop improved methods for assessing and valuing biodiversity in tropical rainforests and integrating information on biodiversity into landscape-level forest planning processes. Preparatory activities for the project began in 2000, and Belum-Temengor was a primary field site during both project preparation and implementation. Over the dozen years spanned by the two project phases, the authors participated in numerous meetings with state and federal government officials, leaders of nongovernmental environmental organizations, and representatives of the timber and ecotourism industries that were held in various locations, including Malaysia's legislative and administrative

capitals (Kuala Lumpur, Putrajaya), the state capital of Perak (Ipoh), and locations within Belum-Temengor (the district capital, Gerik; the Belum Rainforest Resort). These meetings afforded opportunities to observe closely many of the events reported in this paper as they unfolded, discuss them with individuals involved in the events, and learn from those individuals about the historical context for the events. The authors were not directly involved in the effort to create Royal Belum, however, and so the account in this paper is intended to be an objective analysis of the factors that led to Royal Belum's creation and the roles played by different governmental and nongovernmental actors.

The Belum-Temengor Forest Complex

Royal Belum is located in the northern part of the Malaysian state of Perak, bordering Thailand (Figure 1). It occupies nearly all of the former Belum Forest Reserve (132,133 ha), excluding a narrow strip on its southern margin that was subsequently renamed the Banding Forest Reserve. Together with the neighboring Temengor Forest Reserve (147,741 ha) and Gerik Forest Reserve (37,213 ha), Royal Belum and the Banding Forest Reserve form a 300,000-ha forested region known as the Belum-Temengor forest complex, or Belum-Temengor for short. If all of Belum-Temengor were protected and combined with two adjacent protected areas in Thailand—Hala-Bala Wildlife Sanctuary and Bang Lang National Park—the combined area would nearly match the size of Taman Negara.

< Figure 1 >

Belum-Temengor is estimated to be older than the forests of the Amazon and Congo basins (MNS, 2005). It consists mainly of primary forest—"forests of native species in which there are no clearly visible signs of past or present human activity" (FAO, 2010, p. 11)—although some parts have been logged. Its area of primary forest is the largest in Peninsular

Malaysia outside of Taman Negara. Primary tropical forests are usually rich in biodiversity (Gibson et al., 2011), and Belum-Temengor is no exception. Expeditions to Belum-Temengor led by the Malaysian Nature Society (MNS) in 1993–1994 and 1998 documented a wealth of biodiversity and discovered many new and endemic species (Davison et al., 1995, Latiff & Yap, 2000). Like forests throughout Malaysia, Belum-Temengor includes a high concentration of tree species in the family Dipterocarpaceae (Whitmore 1972), whose commercial value is responsible for Malaysia being the world’s largest exporter of tropical logs (ITTO, 2012). Its fauna include a large number of charismatic mammals, including the Asian elephant, Malayan tiger, Sumatran rhinoceros, Malayan gaur (a subspecies of the tallest species of wild cattle in the world), Malayan tapir, mainland serow (“goat antelope”), sun bear, and three gibbon species (MNS, 2005). Thirteen of its mammal species are globally threatened with extinction, and another fourteen are near-threatened. The many other organisms found in it include all ten of Malaysia’s hornbill species as well as at least seven turtle species, 13 amphibian species, 29 fish species, 95 leaf-beetle species, 168 butterfly species, 252 moth species, and 3,000 species of flowering plants, including three species of rafflesia (the world’s largest flower), 30 ginger species, and 46 palm species. Some of its species are found nowhere else in the world (e.g., 15 palm species).

Belum-Temengor’s hilly terrain and moderate to high elevation—nearly all of it is above 300 m, with peaks reaching 1,500 m—have impeded agricultural expansion, thus reducing the risk of deforestation. Many of its species are threatened with local extinction, however, due to poaching and logging. At least 400 animals were poached in Belum-Temengor during 2009–2011; a number of these were endangered species, including the Sumatran rhinoceros and Malayan tiger, while others included the Asian elephant, Malayan gaur, mainland serow, sambar deer, and pangolin (Abdullah et al., 2011). Poachers also illegally cut down agarwood trees,

whose wood (“gaharu”) can be sold for high prices (Lim & Noorainie, 2010).

Many of the large vertebrates in Belum-Temengor require significant territory to survive and are negatively affected by habitat fragmentation and degradation caused by logging (Putz et al., 2001; Gibson et al., 2011). For example, due to the combination of poaching and habitat degradation, the rhinoceros population in Belum-Temengor may have already diminished to an unsustainable level: an intensive field survey and camera-trapping campaign during 2010–2011 found just one rhinoceros track and did not record any images of the species (WWF-Malaysia & PSPC, 2011). The large number of at-risk species that occur in Belum-Temengor has put the region at the top of the conservation agenda of MNS and Malaysia’s other leading nongovernmental conservation organization, the Worldwide Fund for Nature-Malaysia (WWF-Malaysia).

Aside from logging, economic activities are limited within Belum-Temengor. Running north-south through the forest is a 150-km² reservoir, Tasik (Lake) Temengor, which was formed in 1978 when a 127-meter-high hydropower dam was completed on the Perak River, the second-longest river in Peninsular Malaysia (Suksuwan & Kumaran, 2003). Running east-west through it, and paralleling the southern boundary of Royal Belum, is the East-West Highway. This road provides a northern connection between the two coasts of Peninsular Malaysia. It was constructed in the 1970s by the federal government during the Malaysian Communist Party’s occupation of the region (Lim, 2010). It provided the Malaysian military with easier access to the guerillas, who eventually left the region in 1989 after signing a peace treaty with the federal government (Lim, 2010). The highway also provided access for constructing the Temengor Dam, which was the only major development project in the region during the communist insurgency.

Belum-Temengor contains no major settlements, in part because the federal government

relocated many of the inhabitants out of the region during the insurgency. Approximately 200 aboriginal (Orang Asli) families, comprised mostly of the Jahai and Temiar ethnic groups, live within Royal Belum (Suksuwan & Kumaran, 2003; WWF-Malaysia & PSPC, 2011). The largest nearby town, Gerik, is located on the East-West Highway west of the forest and had a population of just 31,291 in 2010. Most of the logging in Belum-Temengor is on the southern side of the highway, which provides access to local mills, mainly in Gerik.

Challenges to Biodiversity Protection in Belum-Temengor: State Rights and Location

Several factors have challenged Malaysia in its efforts to sustain the biodiversity in its forests, including Belum-Temengor. Land development is the most obvious one, with politics at the state level playing a central role. In the case of Belum-Temengor, additional challenges come from two locational features, its proximity to the East-West Highway and the Thai border. We review these challenges in this section, to provide context for a more detailed analysis of the political dynamics of Royal Belum's creation in the next section.

Much of the land in Malaysia that was once natural habitat has been converted to nonforest systems, mainly rubber and oil palm plantations. The process of forestland conversion accelerated following independence from the United Kingdom in 1957, as the states comprising the new nation—initially named Malaya, and then Malaysia following a 1963 merger with two former British territories on Borneo, Sabah and Sarawak—degazetted (i.e., changed the legal status of) significant swaths of land that were previously classified as forest reserves (Vincent & Rozali, 2005, Ch. 4). Forestland fell from 68% of Peninsular Malaysia's area in 1966–1967, the date of the country's first land-use survey, to 57% in 1984–1985 and 44% in 2006–2007.²

The Malaysian Constitution assigns jurisdiction over forestland to state governments, not

the federal government or, for that matter, local communities or private parties. States classify their forestland into two categories: stateland forests, which are intended to be converted to nonforest land uses, and forest reserves, which are intended to remain as forest. Within Perak, the latter are managed by the Perak State Forestry Office with administrative and technical support from the federal Forestry Department Peninsular Malaysia.³ Although logging is permissible in forest reserves, conversion to nonforest uses is not; yet, state governments have the right to change the legal status of forest reserves to stateland forests, thereby allowing conversion to occur. Article 83 of the Constitution does provide for the acquisition of land by the federal government if it is in the nation's interest to do so, but the federal government has rarely used this authority in cases involving forestland (Aiken, 1994).

The Malaysian federal government strongly supported states' interest in land-development schemes in Peninsular Malaysia during the initial decades after independence (Vincent & Yusuf, 1993; Vincent & Rozali, 2005, Ch. 5). Agencies such as the Federal Land Development Authority (FELDA), Federal Land Consolidation and Rehabilitation Authority (FELCRA), and Rubber Industry Smallholders' Development Authority (RISDA) provided administrative, financial, and technical assistance that was instrumental in the expansion of rubber and oil palm plantations in Peninsular Malaysia. This resulted in the loss of most of the Peninsula's lowland rainforests, prompting the Forestry Department Peninsular Malaysia to press for greater restrictions on degazetting forest reserves. By the late 1970s, remaining forest reserves were mainly in hilly areas that were less suitable for rubber and oil palm, which made the federal government more willing to take up the Forestry Department's concerns with the states. Its key actions were the National Forestry Policy (1978) and the National Forestry Act (Vincent & Rozali 2005, Ch. 4).

The National Forestry Policy (NFP) had as its core objective the establishment of a Permanent Forest Estate with sufficient area to provide: (i) an economic resource to supply timber and other forest produce in perpetuity, referred to as Production Forests; (ii) the biophysical structure to help maintain Malaysia's land and environmental quality, especially its water quality, referred to as Protection Forests; and (iii) areas for recreation, education, research, and habitat for the nation's flora and fauna, referred to as Amenity Forests (Vincent & Rozali, 2005, Ch. 4). Under the NFP, states decided which of their forest reserves to include in the Permanent Forest Estate, and they retained the ability to withdraw such land at any time with minimal consultation with the federal government. The Permanent Forest Estate was thus more permanent in concept than in practice.

The federal government enacted the National Forestry Act in response to the continued loss of forestland that occurred under the National Forestry Policy. The Act helped standardize and unify states' efforts to protect forest resources. It included a "no net loss" clause, which stipulated that states that withdrew land from the Permanent Forest Estate must offset it by designating an equal amount of other land as part of the Estate. While all the Peninsular states made a commitment to abide by the Act, the Act included provisions they could invoke to bypass this clause with little recourse from the federal government. Those provisions remain in place. Indeed, during 1999–2004, the area of the Permanent Forest Estate across the Peninsular states fell by nearly 5%, with the largest loss occurring in Perak (Lim & Sukswan, 2007).

The Belum, Temengor, and Gerik Forest Reserves were added to the Permanent Forest Estate in 1991–1992 as Production Forests (MNS, 1995). As of today, Royal Belum is the only part of the three reserves with park status, which prohibits logging throughout its area, but this status is not fully secure. The Perak state government established Royal Belum under the Perak

State Parks Corporation Enactment of 2001, which includes the clause, “The State Authority may at any time when it is found necessary cancel or change the reservation of any area or part thereof as State Park” (Suksuwan & Kumaran, 2003, p. 15). Were this to happen, Royal Belum would revert to Production Forest status and thus be open to logging.

Two aspects of Belum-Temengor’s location create additional challenges for biodiversity conservation. One is the East-West Highway. After the 1989 peace treaty with the communist guerillas, the highway facilitated the expansion of logging and, inadvertently, poaching (Abdullah et al., 2011). Moreover, many of the large mammals in the region have large territories, and the bisection of Belum-Temengor by the highway reduces their ability to roam freely without the risk of fatal encounters with humans and vehicles (MNS, 2005). Making matters worse from an ecological standpoint, when the highway was built, a 3-km-wide corridor of land along it was designated as stateland forest, which gave the Perak state government the right to convert the land to nonforest uses. Such conversion would further isolate the northern and southern halves of Belum-Temengor and reduce the effective size of habitat for the species in it.

The second aspect is the border with Thailand. Although land uses on the Thai side include protected areas, the international border complicates efforts to combat poaching (Or & Tang, 2011). Effective control of poaching along an international border requires cooperation among the various governments involved, which in the case of Belum-Temengor means not only the two national governments but also the corresponding state and provincial governments in the two countries. Writing before Royal Belum was established, Suksuwan and Kumaran (2003) reported that the Department of Wildlife and National Parks had established a cooperative relationship with Thai authorities but that a closer working relationship was required. Nearly a

decade later, WWF-Malaysia & PSPC (2011, p. 46) gave little indication that the situation had changed substantially, reporting that poachers included both locals and foreigners, “most notably Thais.”

Establishment of Royal Belum State Park

The Perak state government had heard calls to protect Belum-Temengor for nearly forty years before it established Royal Belum. While the presence of charismatic, endangered species provided the rationale for protection, the establishment of Royal Belum resulted from a confluence of factors: a previous successful conservation campaign led by a national NGO, MNS; pressure from the general public and respected public figures; and a perceived opportunity for the Perak state government to offset the “sacrifice” of one forest use (timber) by creating a potentially more favorable economic future based on another (ecotourism). Figure 2 provides a timeline of key events related to these and other factors.

< Figure 2 >

The establishment of a protected area in Belum-Temengor was first proposed in 1968 by wildlife biologist W.E. Stevens, who documented the presence of large mammals in the region and suggested that an area as large as 220,000 ha be converted into a wildlife reserve (Stevens, 1968; Suksuwan & Kumaran, 2003). A wildlife reserve was approved by the Perak state government three years later, but it covered only 54,000 ha and was abandoned due to construction of the Temengor Dam. Belum-Temengor experienced little exploration, exploitation, or commercial use during the communist insurgency due to restrictions on access. This had the inadvertent effect of keeping its forests and biodiversity more intact than in most parts of the Peninsula and resulted in the scientific community knowing little about it.

The major push to protect the region began in the 1990s with two scientific expeditions

led by MNS, the first to the Temengor Forest Reserve in 1993–1994 and the second to the Belum Forest Reserve in 1998. The expeditions to Belum-Temengor surveyed the unexplored land and assessed the biodiversity in it (Davison et al., 1995; Latiff & Yap, 2000; MNS, 2007). The Department of Wildlife and National Parks conducted subsequent wildlife inventories in the region, in 1997 and 2001. These expeditions and inventories resulted in the discovery of many new species, including several subspecies of endangered hornbills (Davison et al., 1995; Latiff & Yap, 2000; MNS, 2007). They solidified the status of Belum-Temengor as ecologically unique, with a high degree of biodiversity.

The MNS expeditions occurred not long after a protracted dispute over the protection of the Endau-Rompin forest complex, and MNS's experience with that case influenced its strategy for protecting Belum-Temengor. Endau-Rompin is found in the southern part of the Peninsula, on the border of the states of Johor and Pahang. The Third Malaysia Plan, which detailed the federal government's priorities for 1976–1980, listed Endau-Rompin as a future national park, and the Department of Wildlife and National Parks drafted a prospective management plan for it. Despite these indications of federal interest, the two states opened the area for large-scale logging in the late 1970s. The federal-state disagreement over Endau-Rompin exposed the need for legislation to create new national parks, and in response Parliament passed the National Parks Act in 1980. This act interjected a federal hurdle into the degazetting process: if land is gazetted as a national park under the act, it “cannot be subsequently revoked by the State authority except with written concurrence of the Federal Minister” (Aiken & Leigh, 1984, p. 267).⁴ Soon after, MNS, Friends of the Earth Malaysia, and the Department of Wildlife and National Parks called on the Johor and Pahang state governments to cease logging and designate approximately 93,000 ha of the Endau and Rompin Forest Reserves as a national park under the act.

MNS led a scientific expedition to Endau-Rompin in 1985 to spur interest in protecting it. It touted the expedition as the first of its kind in Malaysia: “the first scientific expedition organized by Malaysians in Malaysia for Malaysia” (Davison, 1988, p. 6). MNS arranged for the expedition to be officially launched by the revered Tunku Abdul Rahman, the leader of the country’s independence movement and its first prime minister. The expedition was successful both scientifically and from the perspective of generating public pressure for protection (Aiken, 1994). In 1986, the Pahang state government agreed to gazette 40,197 ha of the Rompin Forest Reserve as a state park—not a national park. The Johor state government followed suit in 1993, gazetting 48,905 ha of the Endau Forest Reserve as a state park. The combined area of the two state parks nearly equaled the amount originally requested by MNS, Friends of the Earth Malaysia, and the Department of Wildlife and National Parks in the early 1980s, and it represented the largest protected area established in Peninsular Malaysia since independence. This was considered a significant victory for the Malaysian conservation movement, even though the result was not a national park established under the National Parks Act.

Following the gazettelement of the Endau and Rompin Forest Reserves as state parks, it is not surprising that MNS focused its sights on Belum-Temengor, Endau-Rompin’s northern analogue. In 1995, soon after the scientific expedition to Temengor Forest Reserve, MNS issued a position statement calling for the establishment of a state park to protect the entire Belum-Temengor region (MNS, 1995). Success did not come as quickly as in the case of Endau-Rompin, however. The Perak state government did not pass the Perak State Parks Corporation Enactment, which gave it the legal authority to create state parks, until 2001, and it did not immediately exercise this authority to create a new park in Belum-Temengor.

In response to the slow progress by the state government after it passed the Perak State

Parks Corporation Enactment, MNS enlisted the support of another public figure, this time one who was especially revered in Perak: Sultan Azlah Shah. Malaysia is a constitutional monarchy, and the position of national head of state rotates among the sultans of Perak and eight of the country's other states. Sultan Azlah Shah was the first Sultan of Perak to serve in this position. His term as national head of state (1989–1994) had overlapped with the successful conclusion of MNS's campaign to protect Endau-Rompin and the MNS expedition to the Temengor Forest Reserve, which he had officially launched. In 2003, he declared the proposed but still unapproved park in the Belum Forest Reserve to be "Royal Belum State Park." Though purely symbolic, this action increased pressure on the state government to protect the forest reserve as a state park.

MNS followed the Sultan's declaration with a series of actions aimed at keeping Belum-Temengor in the spotlight locally, nationally, and internationally. In 2005, it published an updated position statement urging the state government not only to gazette Royal Belum as a state park but also to extend state park status to the Temengor Forest Reserve and to protect the 3-km-wide corridor of stateland forest along the East-West Highway (MNS, 2005). To help achieve these objectives, it launched two major initiatives, the Hornbill Conservation Project in 2004 (MNS, 2013a) and the Belum-Temengor Postcard Campaign in 2006 (MNS, 2013b). The Hornbill Project, which continues today, monitors hornbill nests and gathers data on the birds' breeding cycle, ecology, and behavior. It also includes a public campaign on sustainability, with outreach to schools on hornbills, their habitat, and the need to protect these threatened species (Yeap, 2013). The Hornbill Project led Birdlife International to declare Belum-Temengor an "Important Bird Area," which helped strengthen public support for its conservation.

The Belum-Temengor Postcard Campaign lasted six months and focused on garnering

public support for the protection of Royal Belum and the rest of Belum-Temengor. Partnering with an international cosmetic company, Body Shop Malaysia, and local celebrities, MNS collected postcards bearing the signatures of more than 80,000 people from all over the world. One was the signature of the Malaysian federal Minister of Natural Resources and Environment.

Although MNS spearheaded the public effort to protect Belum-Temengor, WWF-Malaysia also played a major role, both scientifically and in rallying public support. WWF-Malaysia drew particular attention to two of the region's most endangered and iconic species, the Malayan tiger—a pair of which appear on the nation's coat of arms—and the Sumatran rhinoceros. It monitored the occurrence of these species through field surveys and camera trapping. It also developed a management plan for Royal Belum (Suksuwan & Kumaran, 2003).

MNS and WWF-Malaysia coordinated their actions. MNS was the more public face of the campaign, while WWF-Malaysia collaborated more directly with government agencies, a role it had successfully played in Malaysia for many years. The latter role was exemplified by the Prime Minister's Department contracting it to draft the country's first National Conservation Strategy in 1993. WWF-Malaysia's other governmental partners on various activities in Belum-Temengor included the federal Ministry of Tourism and Culture, Department of Wildlife and National Parks, Forestry Department Peninsular Malaysia, and Perak State Parks Corporation.

The Perak state government finally gazetted Royal Belum State Park in May 2007. The head of the Perak state government at the time, Chief Minister Tajol Rosli Ghazali, stated that “the purpose of gazetting the area is for forest conservation, including its flora and fauna, and making it into an environmental tourist attraction in Perak” (Anon., 2007). In July 2007, MNS delivered the 80,000 signed postcards to the Chief Minister, underscoring public support for the park.

Although the state government's decision could be viewed as bowing to pressure from the public and other sources, the reference to tourism at the end of the Chief Minister's statement suggests that it can also be viewed as having an economic basis, a rational calculation by the state government that tourism could become a more valuable economic activity than logging. At first glance, this interpretation might seem unlikely. State governments in Malaysia receive most of their revenue from land and natural resources, including timber. Most of the fiscal revenue generated by logging accrues to them, not the federal government. States receive the full amount of the two major categories of timber fees: royalties, which are assessed on the volume of timber harvested, and premiums, which are assessed on the area harvested. By establishing Royal Belum, the Perak state government gave up the immediate opportunity to obtain revenue from those fees.

This opportunity cost was mitigated by several factors, however. First, Royal Belum covers barely a third of Belum-Temengor. The state government retains the right to issue logging permits in the remainder, a right it has exercised and made clear it intends to retain. In September 2010, Tajol Rosli Ghazali's successor as Chief Minister, Zambry Abdul Kadir, declared, "Logging cannot be stopped completely because it is one of the major industries in the state" (Samah, 2010). Second, Royal Belum is more rugged and less accessible than much of the rest of Belum-Temengor, which increases logging costs and thereby reduces the potential timber revenue the state sacrificed when it established the park. Third, the most accessible forests in the area now within Royal Belum's boundaries were along the Perak River, but those forests were logged before Tasik Temengor filled up in the late 1970s. The state government had thus already cashed in the most valuable forests in Royal Belum. The value of timber in these now-inundated forests is indicated by the fact that trees that were not harvested before the waters rose were still

being harvested by underwater logging in the early 2000s. Finally, by following the example of Pahang and Johor and gazetting Royal Belum as a state park instead of a national park, the Perak state government retained greater autonomy to restore the park to a Production Forest in the future. Consequently, it did not permanently forgo the possibility of deriving future timber revenue from it.

In sum, the costs of establishing Royal Belum in terms of forgone state revenue from timber were less than they might initially appear. On the flip side, the state government also believed that the new park could generate economic benefits from ecotourism, as indicated by Chief Minister Tajol Rosli Ghazali's 2007 comment. The potential for ecotourism development in Belum-Temengor had been promoted to the state government for years. In 1994, soon after the MNS expedition to the Temengor Forest Reserve, the federal Department of Wildlife and Natural Parks and the Universiti Pertanian Malaysia prepared guidelines for ecotourism development in the region. Not long after that, the 1996 National Ecotourism Plan, which was issued by the federal Ministry of Tourism and Culture and prepared with heavy input by WWF-Malaysia, labelled Belum-Temengor as having "tremendous ecotourism potential" (Suksuwan & Kumaran, 2003, p. 1). WWF-Malaysia's 2003 proposed management plan for Royal Belum endorsed the 1994 ecotourism development guidelines (Suksuwan & Kumaran, 2003).

Unresolved Issues

Even with Royal Belum having attained state park status, the management of Belum-Temengor for biodiversity conservation continues to face three major issues. The biggest one is the need for actions that would strengthen the protection status of Royal Belum and expand protection to include not only the rest of Belum-Temengor but also, at a larger scale, forests that connect it to Taman Negara and Endau-Rompin. The other two issues are the ongoing loss of flora and fauna

to poaching, and the development of ecotourism in a way that is environmentally, economically, and socially sustainable.

Strengthening and Expanding Protection

Gazetting Royal Belum under the National Parks Act would reduce the ability of the Perak state government to reopen it for logging. This seems unlikely to occur, however. State governments have little incentive to cede their authority over land-use decisions. In recognition of this, states that agree to gazette land as national parks under the National Parks Act receive compensatory payments of rents and other fees from the federal government (Aiken & Leigh, 1984). States clearly do not find this to be a good deal: in the 30 years since the act came into law, only one national park in Peninsular Malaysia has been established under it, the very small (2,563-ha) Pulau Pinang National Park, which was gazetted in 2003.

This political reality explains why MNS did not advocate gazetting Belum-Temengor as a national park in either its 1995 proposed management guidelines (MNS, 1995) or its 2005 position statement (MNS, 2005; Loh, 2007). Similarly, a draft management plan for Royal Belum prepared by WWF-Malaysia and the Perak State Parks Corporation (PSPC) in 2011 does not argue that national park status is required, but it does recommend that the state government should make any prospective modification of its protection status more “consultative” and “participatory” (WWF-Malaysia & PSPC, 2011, p. 65). WWF-Malaysia & PSPC (2011) cite as a model a requirement adopted by the state of Perlis, where any proposal to change the status of Perlis State Park requires at least three public hearings. With national park status unlikely, the most practical step toward stronger protection of Royal Belum is probably to amend the Perak State Parks Corporation Enactment to require a public review process before any part of the park can be degazetted.

While designation as a state park (or even a national park) does not guarantee avoidance of habitat loss, there is evidence that it results in less loss than other designations. Forrest et al. (2013) reported that from 2000 to 2010, forests in Malaysia that were in state or national parks experienced a 0.28% reduction in total area while those with no protection status or some other type of protection status experienced 0.96% and 0.37% reductions, respectively. This argues for expanding state park status to include the adjacent forest reserves that constitute the rest of Belum-Temengor. The current classification of these reserves as Production Forests allows them to be logged, and their inclusion in the Permanent Forest Estate does not prevent the Perak state government from reclassifying them as stateland forest and allowing nonforest uses.

Protecting a larger area against logging and conversion is important because Belum-Temengor includes many species with home ranges that expand beyond Royal Belum. So, while Royal Belum may be protected from logging, logging in adjacent forest reserves can have significant impacts on the whole ecosystem and the survival of the species within it. For example, the globally threatened plain-pouched hornbill is documented as using the entire region. It may nest in one part of Belum-Temengor and feed in another; hence, disruption of either of these areas may impact its survival. Surveys of hornbills in Belum-Temengor show a marked reduction in numbers of individuals in areas that have been logged (MNS, 2005). The National Forestry Act provides protection options that do not require gazettement of additional land as state or national parks. For example, the Perak state government could classify areas of high conservation value as Virgin Jungle Reserves (VJRs), which prohibit logging (WWF-Malaysia & PSPC, 2011). Less than 7,000 ha in the entire state have this designation, and none are in Belum-Temengor. Research has shown that VJRs contain substantial amounts of biodiversity (Laidlaw, 1999; Nur Zati et al., 2011; Salim et al., 2012; Lam et al., 2014; Doll et al., *in press*)

and may aid in conserving biodiversity in timber production forests (Laidlaw, 1999). Establishing additional VJRs in the forest reserves surrounding Royal Belum might be a more feasible, albeit partial, step toward protecting those reserves than gazettement as state parks.

Significant progress has been made on another aspect of forest protection in the region. In May 2013, the Perak state government agreed to reclassify the 3-km-wide corridor of stateland forest along the East-West Highway, approximately 19,000 ha, as a new forest reserve, the Amanjaya Forest Reserve.⁵ MNS had called for protection of this corridor, which connects Royal Belum to the Temengor Forest Reserve, in its 2005 position statement (MNS, 2005). Although forest reserve status does not provide the level of protection that state or national park status would (in particular, against logging), it does reduce the immediate threat of conversion to nonforest land uses. There had been concern that forests along the highway would be converted to timber plantations of exotic tree species, as has happened along the North-South Highway in the southwestern part of the state.

At a larger scale, beyond connecting Royal Belum to the Temengor Forest Reserve, the National Tiger Action Plan (DWNP, 2008) and National Elephant Conservation Action Plan (DWNP, 2013a) emphasize the importance of retaining forests that connect Belum-Temengor to the two other large protected areas in the Peninsula, Taman Negara and Endau-Rompin. Current estimates place the number of tigers in Malaysia at approximately 500, all in Peninsular Malaysia and with 163 in protected areas (Chundawat et al., 2011). Of those 163, perhaps as few as 50 are in Belum-Temengor, which is below the estimated minimum viable population size of 80 (Lai, 2013). The elephant population in Peninsular Malaysia was estimated at 1223–1677 during 2002–2008 (Saaban et al., 2011); no estimate is available for Belum-Temengor, but it likely accounts for a good portion of the 230–280 elephants in Perak (Saaban et al., 2011).

Maintaining habitat connectivity at this larger scale would promote conservation of these large mammals by reducing the isolation of their remaining populations. However, ensuring the establishment and on-going protection of wildlife corridors at this scale will require coordination between the federal government and multiple state governments.

Combatting Poaching

MNS and, especially, WWF-Malaysia have taken the lead in developing better information on the poaching problem in Belum-Temengor and devising strategies to address it. One example is the Rhino Rescue Project (WWF-Malaysia, 2007). This was a five-year project initiated in 2007 by WWF-Malaysia and Honda Malaysia, with the latter company contributing approximately US\$1.5 million of funding (Honda, 2013). The project spanned multiple states in Malaysia and aimed at developing reliable estimates of the rhinoceros population and the effects of poaching on it. It included surveys of the rhinoceros population in Royal Belum through cameras and other surveillance methods. WWF-Malaysia partnered with the Department of Wildlife and National Parks, Perak State Parks Corporation, and another NGO, SOS Rhino Malaysia, on the project.

WWF-Malaysia has also cooperated with TRAFFIC, a global organization that monitors the illegal trade of wildlife, in assisting the Perak State Parks Corporation, the Department of Wildlife and National Parks, and the Forestry Department Peninsular Malaysia in patrolling Belum-Temengor for snares and poachers. The penalties for poaching in Malaysia are potentially quite large—up to RM 500,000 (approximately US\$166,600) or five years in prison (Khan, 2011)—but poachers are rarely caught and seldom punished with large fines or prison time (Or & Tang, 2011). According to TRAFFIC, only five cases of tiger poaching were pursued by the Perak state government during 2003–2009, and full punishments were not applied in any of them (Or & Tang, 2011). Since 2010, however, the number of patrol units has broadened to include

units from the Perak State Parks Corporation, the Department of Wildlife and National Parks, the Forestry Department Peninsular Malaysia, the Malaysian Armed Forces, the Malaysian Royal Police, Marine Police, Malaysian Royal Customs (Anti-Smuggling Unit), District Security Council, and paramilitary volunteers. In May 2010, Perak Chief Minister Zambry Abdul Kadir announced plans to increase the number of patrol officers and rangers in the region (Anon., 2010).

The federal government has also taken legislative action. As part of the Fourth National Report to the Convention on Biological Diversity (MNRE, 2009), the Department of Wildlife and National Parks considered new legislation to strengthen the 1972 Wildlife Protection Act, with an emphasis on raising penalties for poaching and smuggling by 10 to 30 times and imposing mandatory jail sentences for some offenses. In June 2011, these new rules were passed as part of the 2010 Wildlife Conservation Act. The new rules include a “presumptions under the law” clause, which makes the mere possession of certain types of equipment a punishable offense. For example, possession of snares “would now automatically ... imply the intention to hunt, trap and/or kill wildlife ... punishable by a fine up to MYR 100,000 (USD 34,000) and a prison term of up to two years” (Khan, 2011, p. 82). As noted above, however, weak enforcement has undermined the impact of these stiffer penalties.

Better access to federal resources for protecting Belum-Temengor against poaching is one of the strongest arguments for establishing a national park in the region under the National Parks Act. The federal government would assume responsibility for managing and protecting the park, and it would fund recurring costs for park operations and personnel and the costs of park-improvement projects. Federal responsibility also makes sense given the need to coordinate with Thailand in combatting cross-border smuggling and poaching.

Developing Ecotourism

Without the additional federal funding that national park status would bring, the Perak state government needs to cover the costs of managing Royal Belum largely from its own resources. Ecotourism is the principal means it has considered for generating revenue to cover these costs. Ecotourism as a development strategy has been gaining popularity in Malaysia for some time, especially since the 1996 National Ecotourism Plan (Marker et al., 2008). As noted earlier, this plan listed Belum-Temengor as a priority site for ecotourism, and WWF-Malaysia highlighted ecotourism in its 2003 management plan for Royal Belum. The updated 2011 management plan prepared by WWF-Malaysia and the PSPC provided detailed recommendations for improving the ecotourism experience at the park (WWF-Malaysia & PSPC, 2011). These sentiments have continued with the federal government's New Economic Model, which states that "Malaysia's rich biodiversity can be harnessed to generate economic benefits from tourism, recreation" (National Economic Advisory Council, 2009, p. 9)

Under an optimistic scenario, a thriving ecotourism industry at Royal Belum would provide not only a new source of revenue (and jobs) to Perak, but it would also make the state government more willing to extend park status to more of Belum-Temengor, in order to expand the industry. There would be a virtuous circle, with economics and conservation reinforcing each other. Furthermore, if all of Belum-Temengor were protected and managed in accordance with IUCN guidelines (Dudley, 2008), it could potentially join Gunung Mulu National Park in Sarawak and Kinabalu Park in Sabah as the third Malaysian natural area designated as a UNESCO World Heritage Site. A Belum-Temengor World Heritage Site could help brand Belum-Temengor as an international ecotourism destination.

Whether this optimistic scenario can occur remains to be seen. The Perak state

government has taken several steps to enhance the tourism potential of Royal Belum. Soon after the creation of the park, it awarded more than 100 ha on Banding Island, an island that straddles the East-West Highway where it crosses Tasik Temengor, to the EMKAY Development Group to transform the island into an ecotourism resort. The EMKAY Group refurbished an existing hotel on the island and renamed it the Belum Rainforest Resort. It also built an Orang Asli cultural village and a research center, the Pulau Banding Rainforest Research Center, which facilitates wildlife and forest research and promotes public awareness of conservation in the region (Kaur, 2008).

The state government has also promoted ecotourism by partnering with the Northern Corridor Implementation Authority, a federal statutory agency responsible for strategic and sustainable socioeconomic development of northern Peninsular Malaysia. In 2012, this agency prepared a blueprint for low-impact development in the Belum-Temengor region that would improve access to the region and promote ecotourism (Dermawan, 2013). Facility development as outlined in the blueprint is expected to receive approximately RM17 (US\$5.5) million in funding, with some of this money earmarked for extending a local airstrip to increase the number of chartered flights. Approximately RM4.7 million (US\$1.5 million) of this money has been allocated to upgrade three of the existing four camp sites within Royal Belum, including construction of new chalets, roofed camp sites, public toilets, multipurpose kitchens, and a reception hall.

Despite these efforts, Royal Belum is not yet a “name” destination for international ecotourists. The state government hopes that its investments will attract visitors from Europe and North America, but most of the current visitors are Malaysians (WWF-Malaysia & PSPC, 2011). One problem is the location of the Belum Rainforest Resort: it is situated directly under high-

voltage lines from the Temengor Power Station, which reduces the feeling of being in nature.

The development of ecotourism at Royal Belum also raises two other issues. One is that it might negatively affect conservation efforts (Stecker 1996; Wilcove et al., 1998; Czech et al., 2000; WWF-Malaysia & PSPC, 2011). Stecker (1996) investigated the impacts of tourism on the environment in Taman Negara and Endau-Rompin and concluded that while the impacts were likely less than the impacts of other forest uses, such as logging, they could still be negative and significant. WWF-Malaysia & PSPC (2011) suggest that effective management can minimize the environmental impacts of tourism, and they recommend, among other actions, that tourism activities be limited to particular seasons to allow for the rehabilitation of natural resources, that the development of remote areas be restricted, and that developed areas be highly regulated.

The second issue is the impact of ecotourism development on the local indigenous community. The Orang Asli villagers in and around Royal Belum believe that Royal Belum is part of their heritage, and it is the primary source of their livelihood. They mostly practice shifting cultivation, nontimber forest product collection, and fishing. It would seem that possibilities exist for economic benefits of ecotourism to flow to them, through receipts from tours of their villages and employment as tour operators, trekking and fishing guides, park attendants, and monitors that help police the park for poachers (WWF-Malaysia & PSPC, 2011). In a global review of the early literature on parks and local people, however, Stevens (1977, p. 4) observed that historically “the establishment of national parks and other protected areas has [instead] been a major threat to the sovereignty and cultural survival of indigenous peoples.” Gomes (2004) echoes this sentiment for Malaysia, suggesting that the Orang Asli’s forest access and livelihoods were historically threatened by commercial agriculture and logging but more recently have been threatened by the protection of forests and the creation of forest parks for

recreation.

Writing about India, Kothari et al. (1995) noted that protection strategies that alienate local communities are not only unjust and disrespectful of human rights but can actually cause conservation efforts to fail. An early review of Indonesia's experience with integrated conservation and development projects (ICDPs), which attempt to benefit local communities by involving them in park activities, concluded that "most of the attempts to enhance biodiversity conservation in Indonesia through ICDPs are unconvincing and unlikely to be successful under current conditions" (Wells et al., 1999, p. 3). A recent review of global experience with IDCPs reported that "the number of rigorous impact studies is very small, with the evidence suggesting no impact from the interventions (Miteva et al., 2012, p. 77).

Concluding Remarks

The challenges confronting Malaysia's federal and state governments, its conservation organizations, and its citizens on how to allocate its forestland are not uncommon in tropical developing countries. As pointed out in the *Global Forest Resources Assessment 2010* (FAO, 2010, p. 49), "While timber production often dominated the way in which forests were managed in the twentieth century, new pressures in the twenty-first century demand a more balanced approach...consistent with the conservation of biological diversity." This paper illustrates how the transition from timber production to biodiversity conservation, and the conflicts it generates, have played out—so far—in Belum-Temengor. On one hand is the state of Perak, which under the Malaysian constitution has the legal right to use its forestland as it desires. Logging is one of its major industries and a major source of revenue for the state government. On the other hand, there are the conservation groups and the federal government, which would like to see more land set aside for conservation. These competing interests resulted in the creation of Royal Belum

State Park, with conservation interests gaining a major new protected area, and the state government retaining the right to harvest timber in the remaining two-thirds of Belum-Temengor and not permanently surrendering the right to do so in the area classified as a park.

Malaysia's two leading conservation organizations, MNS and WWF-Malaysia, were key players in the creation of Royal Belum. They mounted an array of efforts, from providing technical information on the importance of the biological resources that require protecting to rallying public support through editorials, postcard and other outreach campaigns, endorsement by respected public figures, and partnerships with private companies with global exposure. They made the public aware of the potential consequences of no action (e.g., loss of the Sumatran rhinoceros, Malayan tiger, and many hornbill species), and they highlighted the international significance of the region from a biodiversity perspective. Progress by the Perak state government was publicly acknowledged by these organizations, albeit always with a rider that more action was needed.

Another significant ingredient was that the Malaysian federal government favored protection. As Aiken and Leigh (1986) would suggest, this put the issue on the national public agenda and gave it legitimacy. The involvement of the Department of Wildlife and National Parks in the effort to protect Belum-Temengor and, before it, Endau-Rompin is the most obvious manifestation of the federal government's support for forest protection. The federal support existed partly because the federal government is less dependent on timber revenue than state governments are, and partly because Belum-Temengor was not well-suited for the rubber and oil palm plantations that the federal government had aggressively promoted in the lowlands of the Peninsula. In addition, it existed because the federal government is responsible for upholding Malaysia's responsibilities to the international environmental agreements to which it is a

signatory. One of those agreements is the UN Convention on Biological Diversity, which was opened for signature on June 5, 1992 at the “Earth Summit” in Rio and entered into force in 1993 after receiving the required number of signatures (including Malaysia’s, on June 12, 1992). Signatories commit to protecting at least 10% of their land area. In its 2003 management plan for the still-unofficial Royal Belum State Park, WWF-Malaysia pointed out that creation of the park would help Malaysia hit this target, and it drew attention to the fact that only 5.7% of the total land area of Peninsular Malaysia was protected as of 1996 (Suksuwan & Kumaran, 2003, p. 17).

Many developing countries besides Malaysia have federal systems, with authority over forests vested in state or provincial governments. These countries face issues similar to Malaysia regarding forest protection, with forests and the biodiversity in them at risk of being sacrificed for development projects that provide mainly state-level benefits. Implicit in the comments by the Chief Minister of Perak, Zambry Abdul Kadir, the question of whether forests will be protected or not often boils down to an economic issue that involves weighing revenues generated against costs incurred. To the extent that the services provided by forest preservation provide a public good to society in general, national support should be made available to provide economic incentives for states to protect forests that are nationally important. Some of the support by the conservation groups and the federal government has served to lower park management costs to the Perak state government, particularly with respect to protection against poaching. Various federal bodies, including the Malaysian armed forces, have participated in the anti-poaching effort. This is important because, while logging has been stopped in Royal Belum, widespread poaching continues, leading to fears that Royal Belum may be a “paper park,” more real on the map than on the ground. Converting it from a state park to a national park under the 1980 National Parks Act would shift a broader share of management costs to the federal tab, but

the Perak state government has so far shown no willingness to accept the reduced authority over future use of Royal Belum that this step would entail. Even MNS and WWF-Malaysia do not call openly for national park status, recognizing that it is a political nonstarter at the state level.

A recent household survey indicates that the Malaysian public would be willing to foot the bill for complete protection of not only Royal Belum but the rest of Belum-Temengor, too. Vincent et al. (2014) used a stated preference survey of nearly 1,300 Malaysian households to elicit willingness to pay for varying levels of logging and poaching protection within Belum-Temengor. Projecting the results to all households in just part of the country (the legislative capital, Kuala Lumpur, and the adjacent state of Selangor), they found that the aggregate willingness to pay for protecting the entire Belum-Temengor forest complex against both poaching and logging greatly exceeds the costs associated with such protection. Their cost estimates included both the direct costs of management, including hiring game wardens to combat poaching, and the opportunity cost associated with the loss of timber revenue to the Perak state government. The authors also presented evidence that domestic public demand for forest protection exceeds government actions to protect forests in other upper-middle-income tropical countries, not just Malaysia. They observed that this suggests an opportunity to help close the funding gap for tropical conservation, by coupling international carbon payments made to those countries under the UN Collaborative Program on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) with supplementary biodiversity payments funded by the countries themselves.

Malaysia's conservation organizations and federal government have sought to improve the economics of protection for the state of Perak by promoting ecotourism as a substitute for logging as a source of revenue. WWF-Malaysia has long championed ecotourism both for

Malaysia as a whole and for Belum-Temengor in particular, and it offered the state government detailed advice on promoting ecotourism in its proposed management plans for Royal Belum. Through the Northern Corridor Implementation Authority, the federal government has provided support for park improvements and infrastructure that are intended to increase the region's accessibility and attractiveness for ecotourists, especially ones from abroad. The federal government's commitment to ecotourism is indicated by its Tenth Malaysia Plan (2011–2015), which sets a goal of improving Malaysia's position from sixteenth to tenth globally in terms of tourism receipts, with ecotourism and the country's natural assets explicitly identified as a means to achieve these goals (EPU, 2010). The federal government's New Economic Model also emphasizes ecotourism.

Royal Belum was not created overnight. Malaysia's federal government, under its 1972 Wildlife Protection Act and 1978 National Forestry Policy, began setting up the institutional structure that could facilitate the management of the abundant biological resources within Belum-Temengor forty years ago, while its conservation NGOs, along with the federal Department of Wildlife and National Parks, have been researching its species and habitat for twenty years. Based on the response from Malaysia's citizens and some of its leading global businesses (e.g., Honda, BodyShop) during the NGOs' campaigns, as well as recent survey work (Vincent et al., 2014), the desire by the public at large for protecting the region seems to be significant and growing. The case of Royal Belum illustrates how the confluence of these factors, cleverly harnessed by advocates of protection when they could, can induce a governmental owner of forestland to protect a significant portion of that land.

Important issues and concerns remain. As indicated above, the protection status of the Royal Belum is still in the hands of the Perak state government and does not enjoy the more

secure protection that would be provided by the National Parks Act. Second, the ability of Royal Belum to reach its conservation potential is influenced by land uses in the forest reserves that surround it. Although those reserves are included in the Permanent Forest Estate, they can be (and are being) logged, and the state government has the authority to reclassify them as stateland forests, which would allow conversion to nonforest uses. Finally, while the effort to deter poaching has increased (added patrol units, increased fines, greater coordination across agencies), the success of this effort will depend on how it is implemented. As the federal Ministry of Natural Resources and the Environment has cautioned, the designation of an area as protected does “not guarantee protection for the biodiversity, environmental, and cultural features that it contains but is very much dependent on management effectiveness” (MNRE, 2006; p. 4).

NOTES

¹ Based on authors' analysis of data on protected areas downloaded from <http://www.protectedplanet.net/>.

² These estimates are based on unpublished data from the Malaysian Department of Agriculture. We defined forest area as the sum of three categories in the Department's land-use surveys: category 7F, "Hutan" (Forest); category 7C, "Kawasan Timbunan Balak" (Log Landing); and category 8, "Hutan Paya/Bakau" (Peat-Swamp Forest/Mangrove). Had we also included a fourth category, 7S, "Belukar" (Scrub) or "Semak" (Bush; the name differs from survey to survey), the totals would have been 73% in 1966–1967, 60% in 1984–1985 and 51% in 2006–2007.

³ The federal forestry department's authority spans only Peninsular Malaysia. Sabah and Sarawak have their own, independent forestry departments.

⁴ The inclusion of "National" in a park's name in Malaysia does not necessarily indicate that the park was created under the National Parks Act. Most "national" parks in Malaysia are actually state parks from a legal standpoint (DWNP, 2013b).

⁵ It also agreed to create natural corridors between Royal Belum and the Temengor Forest Reserve that would enable animal crossings (Sharma, 2013). Recent research on faunal underpasses in tropical forests suggests that they can reduce collisions between animals and motor vehicle, although there is concern about concentrating animals when poaching is a risk (Goosem et al., 2006; Clements et al., 2012).

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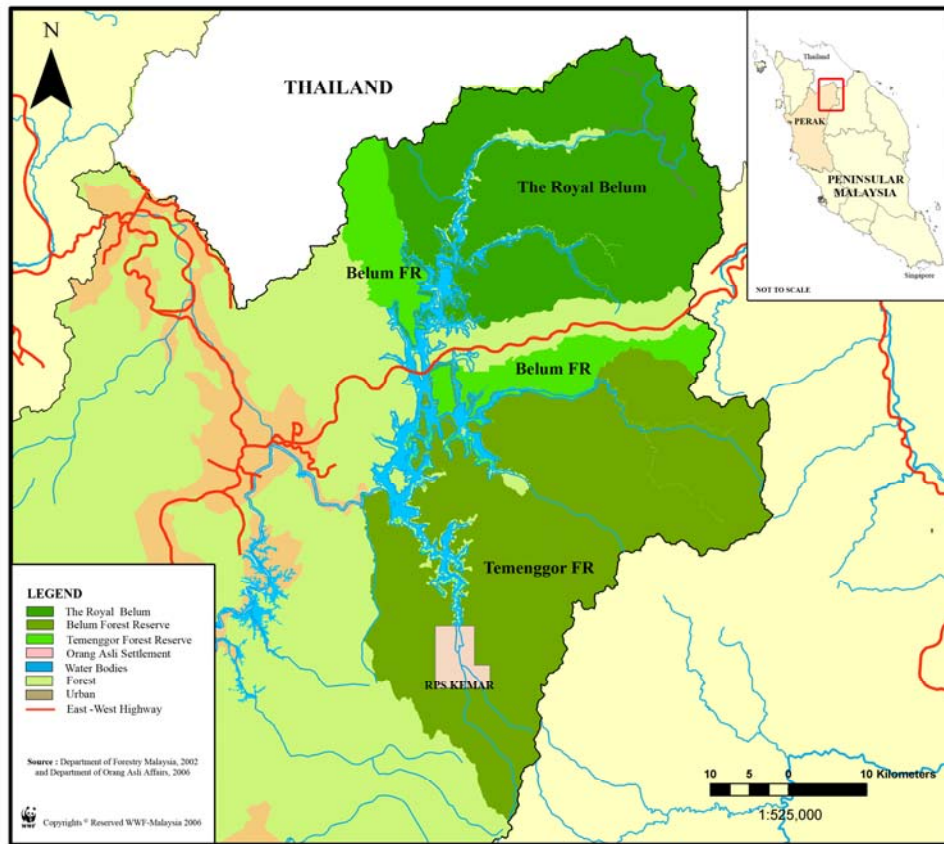


Figure 1. *Belum-Temenggor Forest Complex.* Tasik Temenggor is the large blue reservoir in the middle of the map. The map does not show the Gerik Forest Reserve, which is located west of the reservoir and straddles the East-West Highway. Royal Belum State Park was originally part of the Belum Forest Reserve; the strip labeled “Belum FR” south of the East-West Highway has been renamed the Banding Forest Reserve.

[Source: WWF-Malaysia]

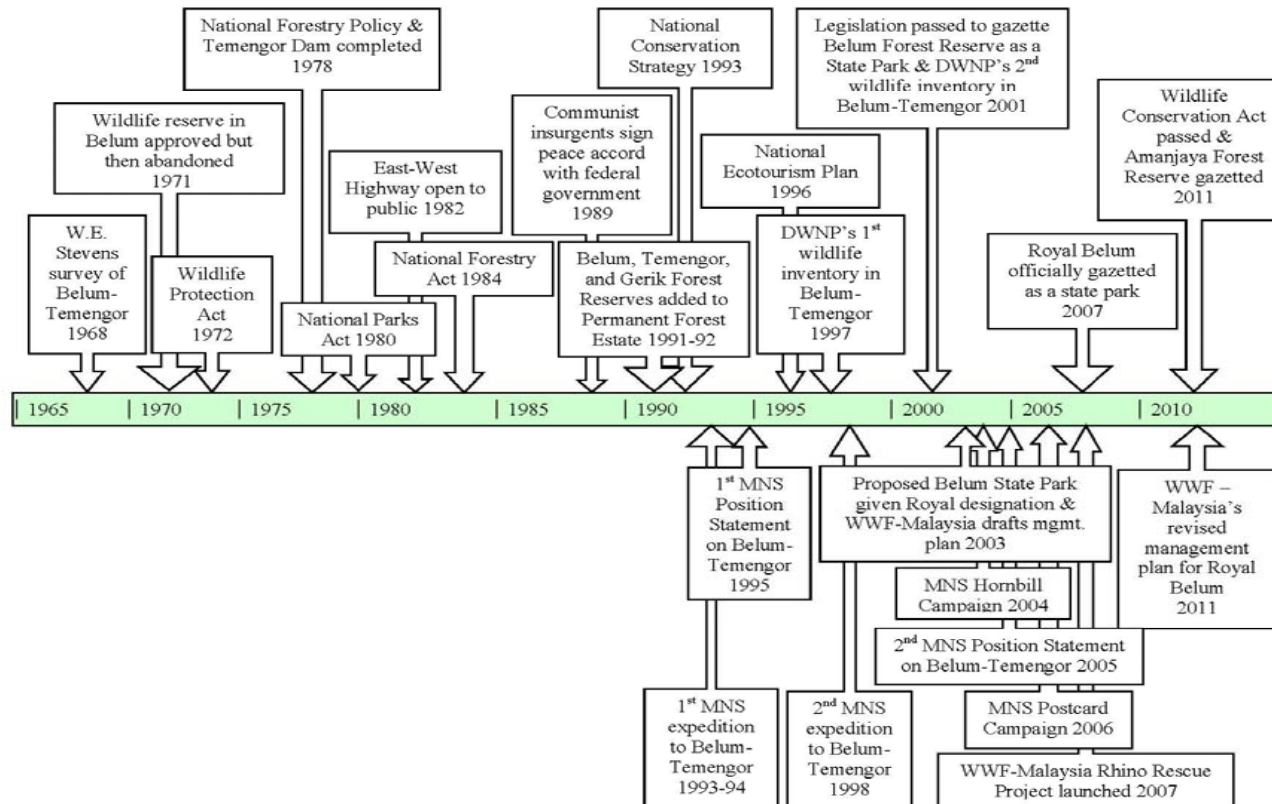


Figure 2. Events Surrounding Protection of Belum-Temengor Forest Region. Text above the line indicate state and federal government-related actions; text below the line indicate NGO-related actions.