Range-wide Mapping Workshop for Asian Elephants (*Elephas maximus*) Cambodia, October 2008

A report to the U.S. Fish & Wildlife Service
On Assistance Award No: 98210-6-G232

This report represents a description of the activities done in preparation for, and while at a pair of back-to-back workshops on Asian Elephants in Phnom Penh, October 2008. The first workshop, funded in large part under USFWS-AsECF award number 98210-6-G232 to the Wildlife Conservation Society (WCS), emphasized mapping and compiling information about all Asian Elephants populations, with the participation of experts from across the range of Asian Elephants, some of whom hold government positions, others from outside governments, and also included experts from both within and outside the IUCN Asian Elephant Specialist Group (AsESG). The second workshop, funded by the AsESG, WWF/AREAS, and WCS attempted to use the recently completed IUCN guidelines for species conservation planning to begin drafting a conservation strategy for Asian Elephants. Neither workshop nor this report to the USFWS on the mapping component should be considered in any manner as a formally endorsed pronouncement on Asian Elephants by any legal body. Other than as a requirement of USFWS award number 98210-6-G232 this report and its contents have no legal standing with any government nor with the IUCN: in that spirit this report was prepared by WCS's Simon Hedges, Kim Fisher, and Rob Rose.

An earlier report on the two October 2008 workshops was circulated to all participants in November 2008, with a call for comments. The GIS data from the mapping workshop have been made freely available to anybody who wants them on signature of a data-sharing agreement, which was also circulated to all participants in November 2008 (see Appendix 8 of this report). To date, a number of people from several organizations including WWF, the Smithsonian Institution, WCS, and FFI as well as a number of interested individuals have asked for and been sent these GIS data.

SUMMARY

Two back-to-back Asian Elephant conservation workshops were held in Phnom Penh, Cambodia, October 20–24th, 2008. The first workshop, which was coordinated by WCS and funded by WCS and the USFWS/AsECF, is the subject of this report and focused on a range-wide status review and population assessment, during which all Asian Elephant populations were mapped and a core (or high priority) set of populations for conservation action was identified using primarily biological criteria. The second workshop, which was coordinated by the IUCN/SSC Asian Elephant Specialist Group (AsESG) (and funded by the AsESG, WWF/AREAS, and WCS) took these "where to save the species" data and used them to inform a conservation strategy for Asian Elephants throughout their range (i.e. "how to save the species"). The process used at both workshops was designed to be fully participatory and representatives from all 13 Asian Elephant range States attended the workshops, as did other elephant conservationists from outside these States.

During the first workshop, the participants reviewed the existing maps and data, mapped and characterized known populations of Asian Elephants, as well as areas that may sustain populations but where recent survey data are lacking. During the mapping process the elephant's range was categorized into Confirmed, Possible, and Recoverable areas (polygons). The participants also identified land which may act as linkages between known populations, and areas where the species might be restored in future. Finally, the participants selected a core set of elephant populations based on biological criteria that would meet a largely biological definition of what it will take to "save Asian Elephants" (see "Developing a synthetic spatially explicit biological vision for saving Asian Elephants" below).

The workshop participants agreed that the following values should inform a 100-year Asia-wide vision for Asian Elephant conservation: representation across ecological and genetic "settings"; resiliency and functionality; replication to avoid catastrophic loss; and human needs and aspirations. In discussions about how to turn the agreed vision components (i.e. the "values" listed above) into an operational version of the Vision, a key point was the question of how to best incorporate replication across the different habitat types (ecological "settings") occupied by Asian Elephants. The participants agreed to use the WWF Global 200 Ecoregions/Biomes as a practical classification of habitat types. The workshop participants also agreed to recognize three subspecies: the Asian mainland plus Sri Lanka (*Elephas maximus indicus*), Sumatra (*E. m. sumatranus)*, and Borneo (*E. m.* subsp.), notwithstanding the doubts expressed recently by Cranbrook et al. about the origin of the putative Bornean subspecies.

The data compiled during the first of the two back-to-back workshops was used to identify which elephant population populations would be selected if the following rules were adopted:

- Include at least 1 population in every range State (a political, not biological value);
- Include all subspecies;
- Include all populations known or suspected to contain >100 elephants per Global 200 Ecoregion/Biome (or include the 2 largest populations if none >100);
- Include at least 2 populations per Global 200 Ecoregion/Biome;
- Include all Confirmed Range polygons that are contiguous to the polygons selected using the above rules.

Using these rules the elephant populations listed in Table 1 and shown in Figures 1–8 were identified. In summary, the rules (which are an attempt to help define what the Vision Statement means in practical operational terms) give a set of populations that:

- Encompass 53 populations (Table 1);
- Represent 50.3% of the current Confirmed, Possible, and Recoverable range of Asian Elephants (Table 2);
- Represent (very) approximately 75% of the global population of Asian Elephants;
- Represent 22 different ecological settings (Global 200 Ecoregions/"Biomes"), which are all those currently occupied by Asian Elephants (Figure 2; Table 2);
- Include – by definition – all 13 Range States and all three subspecies (Sumatra, Borneo, and mainland Asia + Sri Lanka; Table 3).

These populations can be thought of as a core, or minimum, set of populations that will need to be conserved if we are to be able to say that we have fulfilled the biological components of the Vision Statement.

The data compiled at the workshop and the subsequent analyses paint a rather dire picture of the status of Asian Elephants. The 878,639 km² that represents the sum of all the Confirmed, Possible, and Recoverable range polygons combined represents only 10.2% of the 8,613,003 km² historical range for the species. Thus almost 90% of the species' historical range has been lost. Only 29.1% of the entire range (Confirmed, Possible, and Recoverable categories) is within protected areas (PAs) as defined by IUCN (Table 4).

In earlier work, Sukumar estimated the minimum viable area for long-term conservation of an elephant population (defined as 500 breeding individuals, a 1:5 male:female sex ratio, and a density of 0.5 elephants/km²) to be 4,400 km². Notwithstanding the acknowledged difficulties of estimating minimum viable population areas, only 20 of the 53 core populations identified during the workshop have areas larger than this minimum and 7 of these are transnational populations (which brings both opportunities and challenges for management; Table 5).

In terms of elephant numbers, with a small number exceptions discussed in the report, all we really know about the status of Asian Elephants is the location of some (probably most) populations. The conservation community still has very little idea about the size (and almost no formal measure of the trend) of most elephant populations, including the great majority of the core populations identified during the October 2008 workshop. Thus the oft-repeated global population 'estimate' of about 30,000 to 40,000 or 50,000 Asian Elephants is in reality no more than a crude guess, which has been accepted more or less unchanged for a quarter of a century despite major loss of elephant habitat over this period. Indeed, for a large part of the species' range we do not even know where the populations are, or indeed if they are still extant, and this is clearly shown by the large areas of Possible Range identified during the workshop. This problem is most acute in the following ecological settings ("Biomes"): Kayah-Karen/Tenasserim moist forests; Naga-Manapuri-Chin Hills moist forests; North Indochina subtropical moist forests; Tropical & Subtropical Moist Forests; Tropical Moist Deciduous & Semi-Evergreen Forests; and in the following Range States, Myanmar, Bangladesh, and Cambodia. All these areas are therefore priorities for surveys. In addition, another high priority is to assess through surveys whether those areas of Possible Range and Recoverable Range apparently forming links between Confirmed Range polygons do in fact still constitute elephant habitat because if they do they will help reduce the fragmented nature of much of the species' range (especially that in Thailand and Indochina).

INTRODUCTION

Two back-to-back Asian Elephant conservation planning workshops

Two back-to-back Asian Elephant conservation workshops were held in Phnom Penh, Cambodia, October 20–24th, 2008[1]. The first workshop, which was coordinated by WCS and funded by WCS and the USFWS/AsECF, is the subject of this report and focused on a range-wide status review and population assessment, during which all Asian Elephant populations were mapped and a core (or high priority[2]) set of populations for conservation action was identified using primarily biological criteria. The second workshop, which was coordinated by the IUCN/SSC Asian Elephant Specialist Group (AsESG) (and funded by the AsESG, WWF, and WCS) took these "where to save the species" data and used them to inform a conservation strategy for Asian Elephants throughout their range (i.e. "how to save the species").

The process used at both workshops was designed to be fully participatory and representatives from all 13 Asian Elephant range States attended the workshops, as did other elephant conservationists from outside these States. Government representatives from 10 of the 13 range States participated in the two workshops; there were to have been representatives from all 13 range States governments but some last minute problems including a border conflict between Thailand and Cambodia led to some people including several government staff cancelling.

In the first workshop, the participants mapped and characterized known populations of Asian Elephants, as well as areas that may sustain populations but where recent survey data are lacking. Participants also identified land which may act as linkages between known populations, and areas where the species might be restored in future. Preliminary maps were developed before the workshops, and then refined at the workshops. The participants identified, through a consensual process, a core set of populations for conservation action covering the major ecological and genetic "settings" in which Asian Elephants occur.

In the second workshop, which is only touched on here as it was not the funded through AsECF Assistance Award No. 98210-6-G232, the focus was on strategic planning using the new IUCN/SSC Species Conservation Planning Task Force's Guidelines (IUCN 2008b; launched at the World Conservation Congress in Barcelona immediately before the workshops in Phnom Penh). The participants thus used the status review and maps developed in the first workshop to develop a draft outline conservation strategy for Asian Elephants, again within a participatory process. The draft strategy identified a vision, goals, and objectives together with appropriate actions aimed at mitigating and eliminating threats to elephants. The AsESG is completing the draft outline strategy through a process of wider consultation, review, and revision than is possible in a single workshop setting. Our hope is that this process will be of value to all those engaged with the conservation of this important and charismatic species, including national governments and local and international NGOs.

[1] The original WCS-run Range-wide Priority Setting Workshop for Asian Elephants was to have been held in Indonesia in 2007 but unavoidable logistical difficulties resulted in the workshop being postponed to 2008.

[2] "Core set of populations" rather than "priority populations" is used throughout this report because the term better reflects the fact that the populations identified are those needed to "save the species" according to the biological criteria agreed during the workshop.

The final strategy will be relatively high-level, but will be devised in such a way that it can easily be used within a national conservation planning process, and hence help promote and aid national implementation of range-wide and regional goals and objectives. Recent successful examples of this approach include the regional strategies and associated national action plans developed for African Elephants (IUCN 2005a, 2005b), Cheetahs and African Wild Dogs (IUCN 2008a), and Asian Wild Cattle and Buffaloes (IUCN in press). The national action-planning workshops are a vital part of the process since most conservation action is planned and implemented at the national or local level. We hope, therefore, that the October 2008 range-wide workshops will be followed by a series of national workshops, with the support of the AsESG and conservation partners such as USFWS, WWF, FFI, and WCS, and so promote on the ground conservation action for elephants across Asia. This process has, in fact, already begun with a WWF-, AsESG-, and WCS-supported National Action Plan for the Lao PDR currently in development with the Government of Lao.

Range-wide Mapping Workshop Goals and Objectives

Goals

The goals of the Asian Elephant Range-wide Mapping Workshop were to help the elephant conservation community focus efforts for Asian Elephant conservation more systematically and effectively, build a consensus for conservation action, and identify (and generate) funding opportunities.

Main objectives

- To develop a synthetic and spatially explicit summary of the status and distribution of the species across its historical range.
- To identify a core set of populations for conservation action covering the major ecological and genetic “settings” in which Asian Elephants occur.
- To arrive at that core set of populations through a consensual process involving all the major current data holders and active conservation agencies/groups working on the species.

CURRENT PROJECT STATUS

Project Objective 1: To develop a synthetic, spatially explicit summary of the status and distribution of the species across its historical range

Project Objective 2: To establish biological conservation priorities for the species in all the major, ecologically distinct settings in which it occurs

Project Objective 3. To arrive at those priorities through a consensual process involving all the major current data holders and active conservation agencies/groups working on the species

Please note that the three inter-linked objectives listed above are considered together in the report that follows.

Activities undertaken, results achieved, and products generated

The workshop process

WCS's Conservation Support Division's geographer/GIS staff (initially Tim Bean, then Kim Fisher, Rob Rose, and Etienne Delattre) assisted Simon Hedges (WCS's Asian Elephant Coordinator) prepare the initial maps, collate and analyzing the data, organize and run the workshop, and distribute the results.

Before the workshops a number of people, including but not limited to participants at the workshops, submitted maps and data on the distribution of Asian Elephants. The recent IUCN Global Mammal Assessment (GMA) data set for Asian Elephants, prepared by the AsESG, was also available for review at the workshops. During the first workshop, the participants reviewed the existing maps and data, mapping and characterizing known populations of Asian Elephants, as well as areas that may sustain populations but where recent survey data are lacking. The participants also identified land which may act as linkages between known populations, and areas where the species might be restored in future. Finally, the participants selected a core set of elephant populations based on biological criteria that would meet a largely biological definition of what it will take to "save Asian Elephants" (see "Developing a synthetic spatially explicit biological vision for saving Asian Elephants" below).

Since Asian Elephant distribution and status is imperfectly known across the species' range, the mapping process identified six types of range: Confirmed Range, Possible Range, Doubtful Range, Former Range, Recoverable Range, and Unknown Range (see Annex 1 Table 1 for definitions and criteria). The evidence codes used to assign these range types is shown in Annex 1 Table 2. Both point location data and polygon data were mapped, and a detailed datasheet compiled for each point location and polygon. Data on population size and trend and the survey methods used to obtain these data (Annex 2), as well as on the threats to populations, the land tenure systems of the area inhabited by the populations (Annex 3), and conservation actions were also collated (Annexes 4 and 5).

Threats analysis

Two working groups, one for South Asia and one for Southeast Asia, identified (1) threats to Asian Elephants, (2) gaps in our knowledge about Asian Elephants and their conservation and management, and (3) constraints to effective Asian Elephant conservation. These two lists were then compiled into the following overall range-wide list:

Threats to Asian Elephants

- Conversion and degradation of elephant habitat
    - Habitat loss due to legal activities (settlements; agriculture; development activities such as dams and mining) and illegal activities (e.g. encroachment, mining).
    - Habitat fragmentation (loss or disturbances from linear and other developments, e.g. settlements, roads, railways, canals, etc.).
    - Habitat degradation due to the presence of domestic livestock (competition, over-grazing, and resource competition), invasive plants, overly frequent and/or extensive fires, fodder and fuel wood collection, or human activities that reduce water quality (e.g. mining).
    - Habitat degradation due to people exacting revenge for crop depredations by elephants (or other wildlife), e.g. by setting fires, destroying water sources, etc.
- Legal and illegal killing of elephants
    - Illegal killing (poaching or killings related to human–elephant conflict, e.g. revenge killings).
    - Accidental killing (e.g. due to railways, roads, wells, and land mines).
- Illegal captures of elephants
    - Capture of elephants, for example, for circuses or other tourist attractions or to act as working elephants (e.g. in the logging industry or as transport animals).
- Inappropriate or poorly executed management activities that pose threats to Asia Elephants
    - Translocations.
    - Electric fences (restrict elephant movements).
    - Removal from the wild through legal but poorly executed and/or unnecessary capture operations.
    - Culling. [Is this really a threat to Asian Elephants?
- Small population size, which acts as a threat through the reduced likelihood of small populations surviving environmental catastrophes or disease and through stochastic threats (e.g. chance leading to highly skewed sex ratios), etc.
- Disease
    - Natural (most likely to be a threat to small populations).

    - Transmitted from livestock.
    - Transmitted from captive elephants.

- Direct disturbances to Asian Elephants

    - Civil unrest (leading to large numbers of people entering elephant habitat).
    - Refugees (leading to large numbers of people entering elephant habitat).
    - Collection of non-timber forest products in elephant habitat (may drive elephants away from water holes or salt licks for example).

Gaps in our knowledge about Asian Elephants and their conservation

- Lack of knowledge about basic Asian Elephant biology (genetics, behaviour, ecology, demography), distribution and population status, the socio-economic context of elephant conservation, disease (e.g. the significance of the disease risk posed by captive elephants and livestock is poorly understood) and other threats (including human–elephant conflict and the significance and dynamics of trade in elephants and elephant body parts including ivory).
- Lack of viable well-tested solutions to many of the threats to elephants.
- Limited monitoring makes assessing the effectiveness or otherwise of conservation interventions difficult or impossible.

Constraints on effective Asian Elephant conservation

- A lack of political will for elephant conservation at all levels of government.
- The lack of specific elephant conservation/management policies in most range States.
- Poor and/or conflicting government policies and laws.
- Poor administration by government agencies including both limited intra- and inter-national cooperation.
- Poor enforcement of existing legislation.
- A low willingness by the commercial sector to engage with elephant conservationists (including government agencies charged with conservation).
- Limited appreciation by many stakeholders of the value of Asian Elephants (e.g. their biological, cultural, and economic values are poorly appreciated) so the need to conserve wild elephants is not widely understood.
- A lack of resources (i.e. a lack funds).
- Low capacity (i.e. limited human and technical resources in government agencies and NGOs).
- Security issues (e.g. the presence of land mines in some areas of elephant habitat prevents management action).

<u>Developing a synthetic spatially explicit biological vision for saving Asian Elephants</u>

The new IUCN/SSC Species Conservation Planning Guidelines (IUCN 2008b) define a Vision as an inspirational and relatively short statement describing the desired future state for the species. Hence, the Vision describes, in broad terms, the desired range and abundance for the species, its ecological role, and it relationship with humans. The Vision is an essential part of the new SCS process, which requires those writing a Conservation Strategy to discuss explicitly what it means to save a species, and to use the answer to this question to develop Goals. The Vision, therefore, should be derived from an analysis of a species' status, and from a detailed

consideration of the long-term and range-wide (or regional) conservation needs of the species (informed by the threat analysis). The Vision should be as ambitious and as inclusive as possible. The status review part of the IUCN process is very similar to the WCS Range-wide Priority Setting (RWPS) process and it was decided during the October 2008 workshop to use the range-wide mapping approach to compile and analyze the status review. It was also agreed at the workshop in Phnom Penh to prepare a 100-year Asia-wide Vision for Asian Elephant conservation.

Values that should inform the vision statement for Asian Elephant conservation

The workshop participants agreed that the following values should inform our 100-year Asia-wide vision for Asian Elephant conservation even if they were not explicitly included in the final vision statement:

- **Representation** – we want Asian Elephant populations to be present in all the major ecological settings in which the species was once found, and we also want all subspecies or other significant genetic units to be represented. It was understood that this might require re-establishing elephant populations in areas of former range.
- **Resiliency and functionality** – we want Asian elephant populations to be large enough, and in areas large enough, to support self-sustaining, viable, and ecologically functioning populations in ecologically healthy landscapes (with appropriate legal protection for the elephants and their habitat).
- **Replication** – we want Asian Elephant populations to be replicated within ecological settings (i.e. there should be more than one population within each ecological setting) to avoid catastrophic loss. It was understood that this might require re-establishing elephant populations in areas of former range.
- **Human needs and aspirations** – we want the cultural, social, and economic needs of people associated with the species to be addressed.

Vision statement

Recognizing the need for a short "punchy" phrase giving our vision for Asian Elephant conservation, the workshop participants condensed the values identified above into the following 100-year Asia-wide vision statement:

"Wild Asian elephants thrive across their current and recoverable range while co-existing with people in ecologically functioning landscapes."

Turning the biological vision into operation goals: identifying a core set of populations needed to save Asian Elephants across the species' range

Goals

While Vision statements of the type described above are inspiring encapsulations of what needs to be achieved in order to save a species, a more detailed set of range-wide high-level Goals are also needed. Therefore the new IUCN/SSC Species Conservation Planning Guidelines (IUCN 2008b) treat Goals as the Vision re-defined in operational terms. Thus Goals specify, for example, the desired number of ecologically functioning populations to achieve replication per major habitat type, or whether restoration (reintroduction) is needed. Goals thus have the same long-term time frame (100 years in this case) and wide spatial (range-wide) scale as the Vision,

and they are developed using the same criteria for what it means to save a species that were agreed when developing the Vision (e.g. striving to achieve ecologically functioning populations).

In discussions about how to incorporate the agreed vision components (i.e. the "values" of representation, resiliency and functionality, replication, and human needs and aspirations) into an operational re-definition of the Vision, a key point was the question of how to best incorporate replication across the different habitat types occupied by Asian Elephants. The participants agreed to use the WWF Global 200 Ecoregions/Biomes (Olson et al. 2001) as a practical classification of habitat types.

The most recent taxonomic treatment of *Elephas maximus* (Shoshani & Eisenberg 1982) recognized three subspecies: *E. m. indicus* on the Asian mainland, *E. m. maximus* on Sri Lanka, and *E. m. sumatranus* on the Indonesian island of Sumatra. Borneo's elephants were traditionally included in *E. m. indicus* (Shoshani & Eisenberg 1982) or *E. m. sumatranus* (Medway 1977). These subspecies designations were based primarily on body size and minor differences in coloration, plus the fact that *E. m. sumatranus* has relatively larger ears and an extra pair of ribs (Shoshani & Eisenberg 1982). The Sri Lankan subspecies designation is only weakly supported by analysis of allozyme loci (Nozawa & Shotake 1990) and not by analysis of mitochondrial DNA (mtDNA) sequences (Hartl et al. 1996; Fernando et al. 2000; Fleischer et al. 2001), and so was not recognized for the purposes of this project. Current patterns of mtDNA variation suggest that the Sumatran subspecies is monophyletic (Fleischer et al. 2001), and consequently this taxon could be defined as an evolutionarily significant unit (ESU). Borneo's elephants were traditionally considered to be descended from tame animals introduced in the 16th–18th centuries (which would make them an introduced feral population), but were shown to be a distinct indigenous ESU by Fernando et al. (2003). However, more recently, it has been argued that Borneo's elephants were in fact introduced, via what is now the Philippines, from a now extinct race of elephants on the island Java (Cranbrook et al. 2008). A definitive subspecific classification awaits a detailed range-wide morphometric and genetic study. After some discussion, the workshop participants (who included Fernando) agreed to recognize three subspecies: the Asian mainland plus Sri Lanka (*E. m. indicus*), Sumatra (*E. m. sumatranus)*, and Borneo (*E. m.* subsp.), notwithstanding the doubts expressed recently by Cranbrook et al. about the origin of the putative Bornean subspecies.

More generally, the participants also decided to use the data compiled during the first of the two back-to-back workshops to identify which elephant population populations would be selected if the following rules were adopted:

- Include at least 1 population in every range State (a political, not biological value);
- Include all subspecies;
- Include all populations known or suspected to contain >100 elephants per Global 200 Ecoregion/Biome (or include the 2 largest populations if none >100);
- Include at least 2 populations per Global 200 Ecoregion/Biome;
- Include all Confirmed Range polygons that are contiguous to the polygons selected using the above rules.

Using these rules we identified the elephant populations listed in Table 1 and shown in Figures 1–8. In summary, the rules (which are an attempt to help define what the Vision Statement means in practical operational terms) give a set of populations that:

- Encompass 53 populations (Table 1);
- Represent 50.3% of the current Confirmed, Possible, and Recoverable range of Asian Elephants (Table 2);
- Represent (very) approximately 75% of the global population of Asian Elephants;
- Represent 22 different ecological settings (Global 200 Ecoregions/"Biomes"), which are all those currently occupied by Asian Elephants (Figure 2; Table 2);
- Includes – by definition – all 13 Range States and all three subspecies (Sumatra, Borneo, and mainland Asia + Sri Lanka; Table 3).

These populations can be thought of as a core, or minimum, set of populations that will need to be conserved if we are to be able to say that we have fulfilled the biological components of the Vision Statement. However, conserving this core set of populations is just one of the Goals that need to be derived from the Vision and furthermore, because it is a minimum set, the conservation community should also encourage the conservation of additional Asian Elephant populations.

The status of Asian Elephants

The data compiled at the workshop and subsequent analyses paint a rather dire picture of the status of Asian Elephants. The 878,639 km² that represents the sum of all the Confirmed, Possible, and Recoverable range polygons combined represents only 10.2% of the 8,613,003 km² historical range for the species defined by Santiapillai & Jackson (1990). Thus almost 90% of the species' historical range has been lost. Only 29.1% of the entire range (Confirmed, Possible, and Recoverable categories) is within protected areas (PAs) as defined by IUCN (Table 4). Moreover, many protected areas are in fact paper parks, affording little protection for elephants or their habitat (Kramer et al. 1997).

Interestingly, Sukumar (2003) gives an estimate of 486,800 km² for the total area of Asian Elephant range remaining, which is very substantially smaller than the 878,640 km² that is the sum of all the Confirmed, Possible, and Recoverable range polygons mapped during the October 2008 workshop (Table 4). Even if we confine our comparison to just the Confirmed range polygons mapped at the workshop, the total area – 526,083 km² – is still significantly larger than the total range area given by Sukumar. In part, the explanation for this difference may be the "broader brush" approach to mapping elephant range in South Asia (especially in India and Sri Lanka) adopted by the workshop's participants. This broad brush approach will need to be revised in the near future through a combination of more precise mapping and additional field surveys (see below). However, the difference is also partly due to the better state of knowledge about Southeast Asian elephant distribution, which we now have as a result of the much increased number of Asian Elephant projects since 2000 (many funded by the USFWS/AsESCF).

Sukumar (1992) estimated that the minimum viable area for long-term conservation of an elephant population (defined as 500 breeding individuals, a 1:5 male:female sex ratio, and a density of 0.5 elephants/km²) was 4,400 km². Notwithstanding the acknowledged difficulties of estimating minimum viable population areas, only 20 of the 53 core populations identified during the workshop have areas larger than this minimum and 7 of these are transnational populations (which brings both opportunities and challenges for management; Table 5). In an earlier range-wide analysis, Leimgruber et al. (2003) came to similar conclusions.

Turning now to Asian Elephant population size: Duckworth & Hedges (1998) concluded that there were insufficient data to estimate national elephant population sizes in Indochina [Cambodia, Laos, Vietnam, and Yunnan (China)]; Sukumar (1992, 2003) was able only to provide a general overview for the Indian subcontinent; and Hedges et al. (2005) argued that there are no reliable elephant population estimates for Indonesia outside of one province in southern Sumatra, and consequently no meaningful estimate of Indonesia's national elephant population could be made. From the data compiled for the October 2008 workshop it is obvious that rather little has changed since these statements were made: in addition to the elephant population estimates discussed above, we now have estimates for the Seima Biodiversity Conservation Area (SBCA) in eastern Cambodia, the Nakai Plateau in Laos, and Taman Negara and Endau Rompin areas in Peninsular Malaysia (all as a result of WCS teams working in partnership with the relevant Range State authorities). There should soon also be population estimates for Kaeng Krachan National Park in Thailand (from WCS and Government of Thailand), the Cardamon area of Cambodia (from FFI and the Government of Cambodia), and Phnom Prich Wildlife Sancturary (from WWF and the Government of Cambodia). Other than these few areas, the conservation community still has very little idea about the size (and almost no formal measure of the trend) of most elephant populations, including the great majority of the core populations identified during the October 2008 workshop (Table 1). Thus the oft-repeated global population 'estimate' of about 30,000 to 40,000 or 50,000 Asian Elephants is in reality no more than a crude guess, which has been accepted more or less unchanged for a quarter of a century despite major loss of elephant habitat over this period. With those few exceptions discussed above, all we really know about the status of Asian Elephants is the location of some (probably most) populations (Duckworth & Hedges 1998; Blake & Hedges 2004; Hedges et al. 2005; Hedges 2006). Blake & Hedges (2004) and Hedges (2006) argued that for a large part of the species' range we do not even know where the populations are, or indeed if they are still extant, and this is clearly shown by the large areas of Possible Range shown on Figures 1, 3, 5, & 7 and in Tables 2 & 3. This problem is most acute in the following ecological settings ("Biomes"; Figures 2, 4, 6, & 8, Table 2):

- (10) Kayah-Karen/Tenasserim moist forests;
- (12) Naga-Manapuri-Chin Hills moist forests;
- (13) North Indochina subtropical moist forests;
- (22) Tropical & Subtropical Moist Forests;
- (23) Tropical Moist Deciduous & Semi-Evergreen Forests;

and in the following Range States (Figures 1 & 5, Table 3):

- Myanmar (as was also noted by Leimgruber et al. (2003));
- and, but to a significantly lesser extent, Bangladesh and Cambodia.

Why elephant surveys and monitoring programs are needed

Obtaining a better understanding of range-wide status and trends is critical because the crude data (such as most current estimates of Asian Elephant population size) that have been informing conservation priorities, to date, can, and indeed do, lead to the misdirection of funds and overlooked conservation opportunities (Blake & Hedges 2004). For example, how can scarce resources be allocated appropriately when so little is known about the status and distribution of Asian Elephants? Should we just concentrate on those few populations that we know without any doubt are large and thus likely viable over the long-term? If so, that would

restrict Asian Elephant conservation activities to a handful of sites, most of which are in southern India. Relatively large populations like that identified in Sumatra's Bukit Barisan Selatan National Park in 2001 (see Table 1) would be excluded because of guesses of the kind that say elephants are 'present in small numbers' (Blake & Hedges 2004:1197).

More generally, it is essential that management objectives be clearly defined for both protected and unprotected areas of elephant range. Information on elephant distribution and abundance and the trends in these parameters are needed to set appropriate goals and to monitor the effectiveness of management actions, as well as to inform local people and other stakeholders (Lindsay 1993; Blanc et al. 2003; Sutherland et al. 2004). Nevertheless, conservation action must not wait on population surveys: both are needed now and the conservation community needs to make advances on both fronts simultaneously. There are plenty of clear priorities for action even in those areas of Asia where our knowledge of the status of elephants is the weakest (Blake & Hedges 2004, in press; Hedges 2006). Examples of such priorities were provided by Santiapillai & Jackson (1990), many of which are still relevant today. In addition, the participants at second of the two-back-to-back workshops held in October 2008 began the process of drafting a conservation strategy for Asian Elephants informed by the range-wide mapping and core population identification process described in this report; an outline of that strategy, which is still in development, is provided on pages 37–45 of this report.

Survey priorities identified as a result of the range-wide analysis described in this report

Because the core population selection process described above and thus the range-wide conservation planning process it informs are highly dependent on knowing where elephants occur (even if little is known about how many elephants actually exist in the range polygons that are ultimately mapped) there is an obvious need to reduce the disturbingly high proportion of Possible Range (Table 2 & 3). As already discussed above, the highest priorities are the very large areas of Possible Range in the following ecological settings ("Biomes"; Figures 2, 4, 6, & 8; Table 2):

- (10) Kayah-Karen/Tenasserim moist forests;
- (12) Naga-Manapuri-Chin Hills moist forests;
- (13) North Indochina subtropical moist forests;
- (22) Tropical & Subtropical Moist Forests;
- (23) Tropical Moist Deciduous & Semi-Evergreen Forests;

and in the following Range States (Figures 1 & 5; Table 3):

- Myanmar;
- and, but to a significantly lesser extent, Bangladesh and Cambodia.

In addition, areas of Possible Range and Recoverable Range abutting the selected core populations (Figures 3, 5, & 7; Table 1) are also high priorities for survey work because it is likely that such surveys will reveal that there are, in reality, more than 20 core populations with ranges larger than 4,400 km² (Table 5). Identifying additional large core populations is important because it is these areas that are most likely to be viable in the long-term, at least if the nature of the landscape is amenable to long-term conservation management, which the surveys should

also aim to identify. Such surveys will help facilitate elephant conservation through the Managed Elephant Range (MER) concept[3].

More generally, another high priority is to assess whether those areas of Possible Range and Recoverable Range apparently forming links between Confirmed Range polygons do in fact still constitute elephant habitat (Figures 3, 5, & 7), because if they do they will help reduce the fragmented nature of much of the species' range (especially that in Thailand and Indochina; Figure 5).

[3] The Managed Elephant Range (MER) concept provides a landscape-level approach in which planners assess the habitat requirements of elephants over large areas and allow for compatible human activities such as reduced-impact forestry, slow rotation shifting cultivation, and controlled livestock grazing. MERs are typically established as extensions to existing protected areas and often include habitat corridors linking protected areas. The MER concept is particularly attractive where protected areas consist of steep, hilly terrain (as in, say, Laos and Sumatra) and the surrounding, lower-elevation areas are disproportionately important to elephants but contain agriculture or villages: in such situations the elephant-compatible human activities listed above would be encouraged in the lower-elevation areas adjacent to the strictly-protected areas. However, the full potential of MERs to promote elephant-compatible land use has yet to be properly evaluated (Blake & Hedges in press).

Figure 1: Asian Elephant range showing all Confirmed, Possible, and Recoverable range categories, the selected core populations ("Candidate populations") and the historical range.

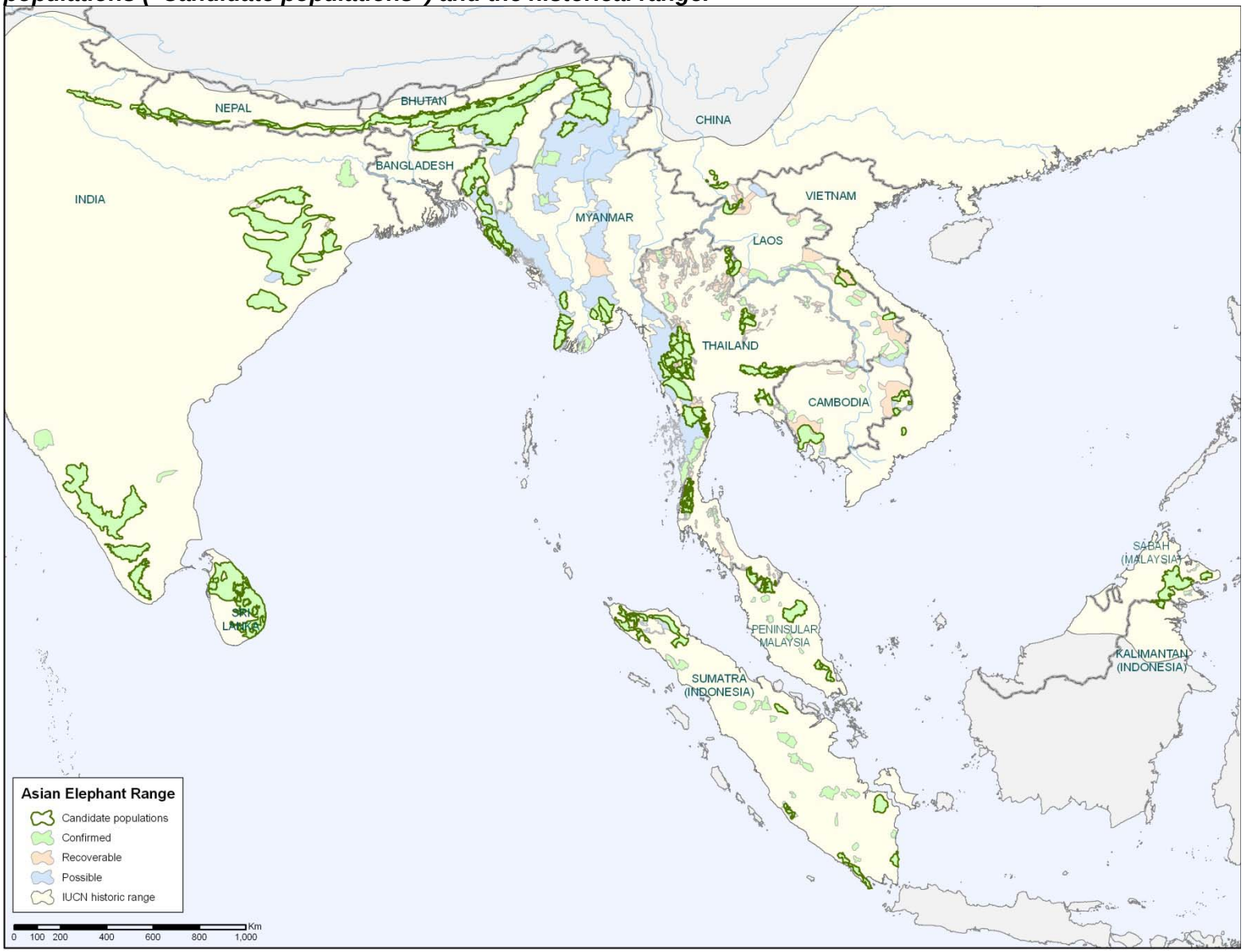

Figure 2: Asian Elephant range showing all selected core populations ("Candidate populations") and the ecological settings ("Candidate Biomes") covered by these populations.

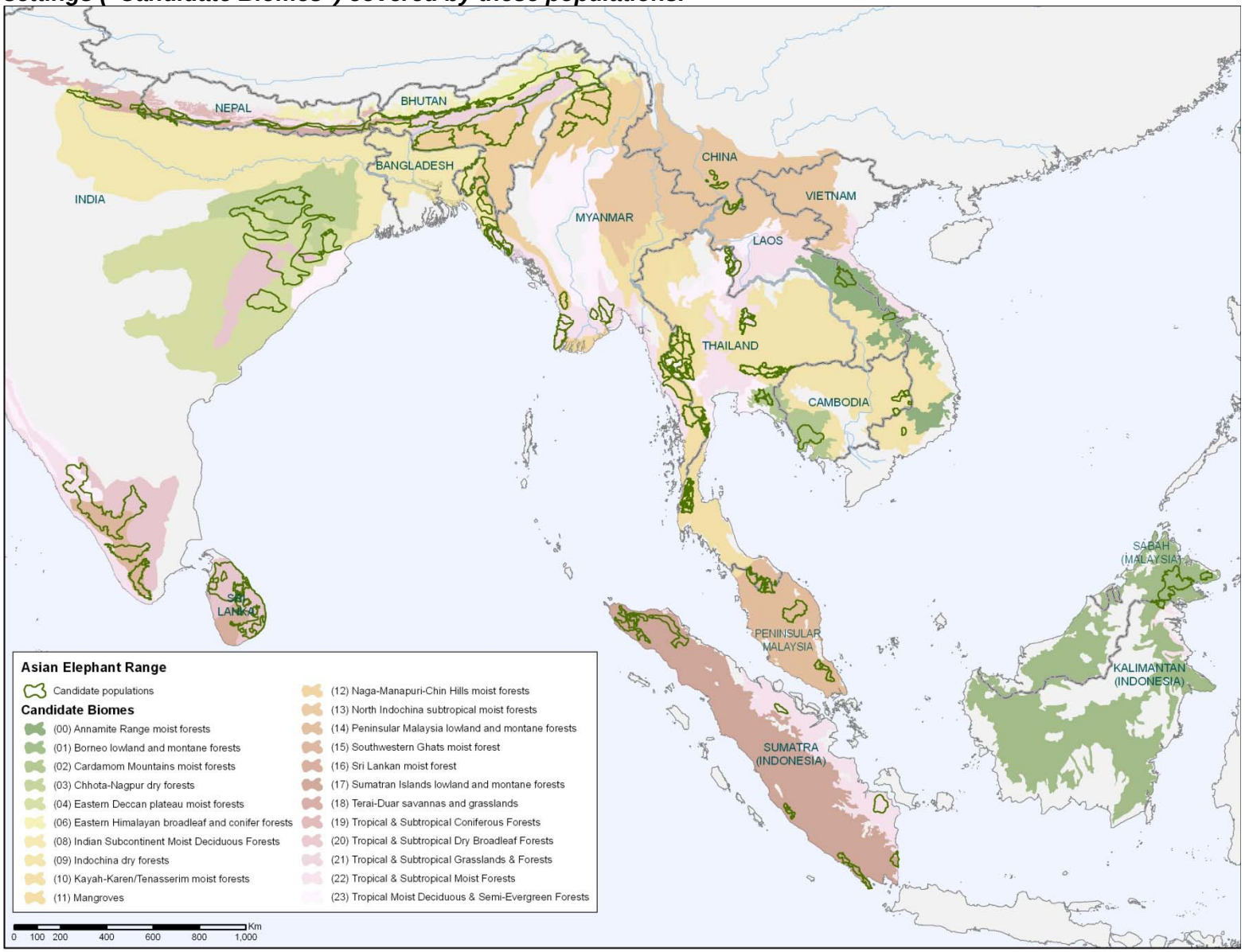

Figure 3: Asian Elephant range in South Asia showing all Confirmed, Possible, and Recoverable range categories, the selected core populations ("Candidate populations"), and the historical range.

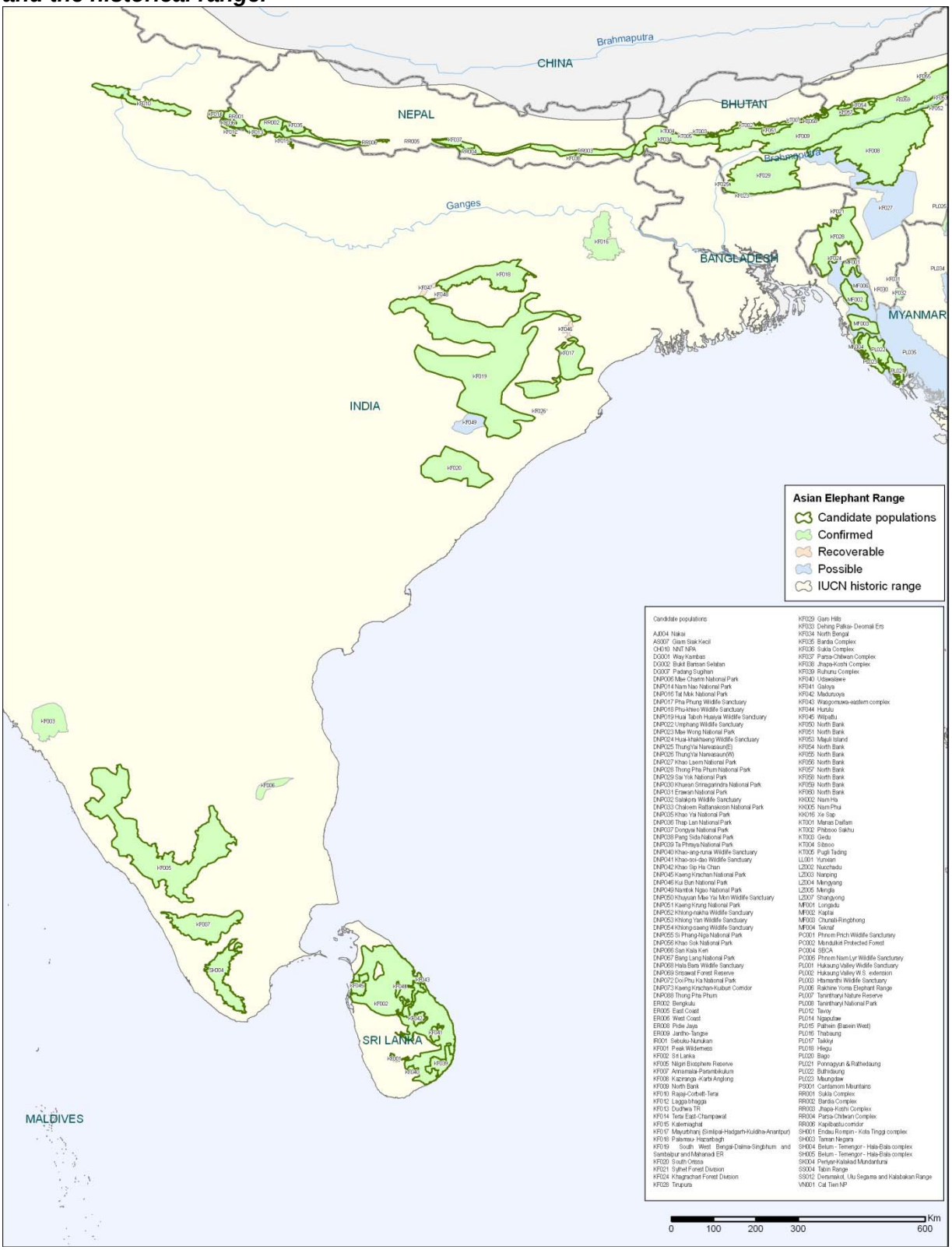

Figure 4: Asian Elephant range in South Asia showing all selected core populations ("Candidate populations") and the ecological settings ("Candidate Biomes") covered by these populations.

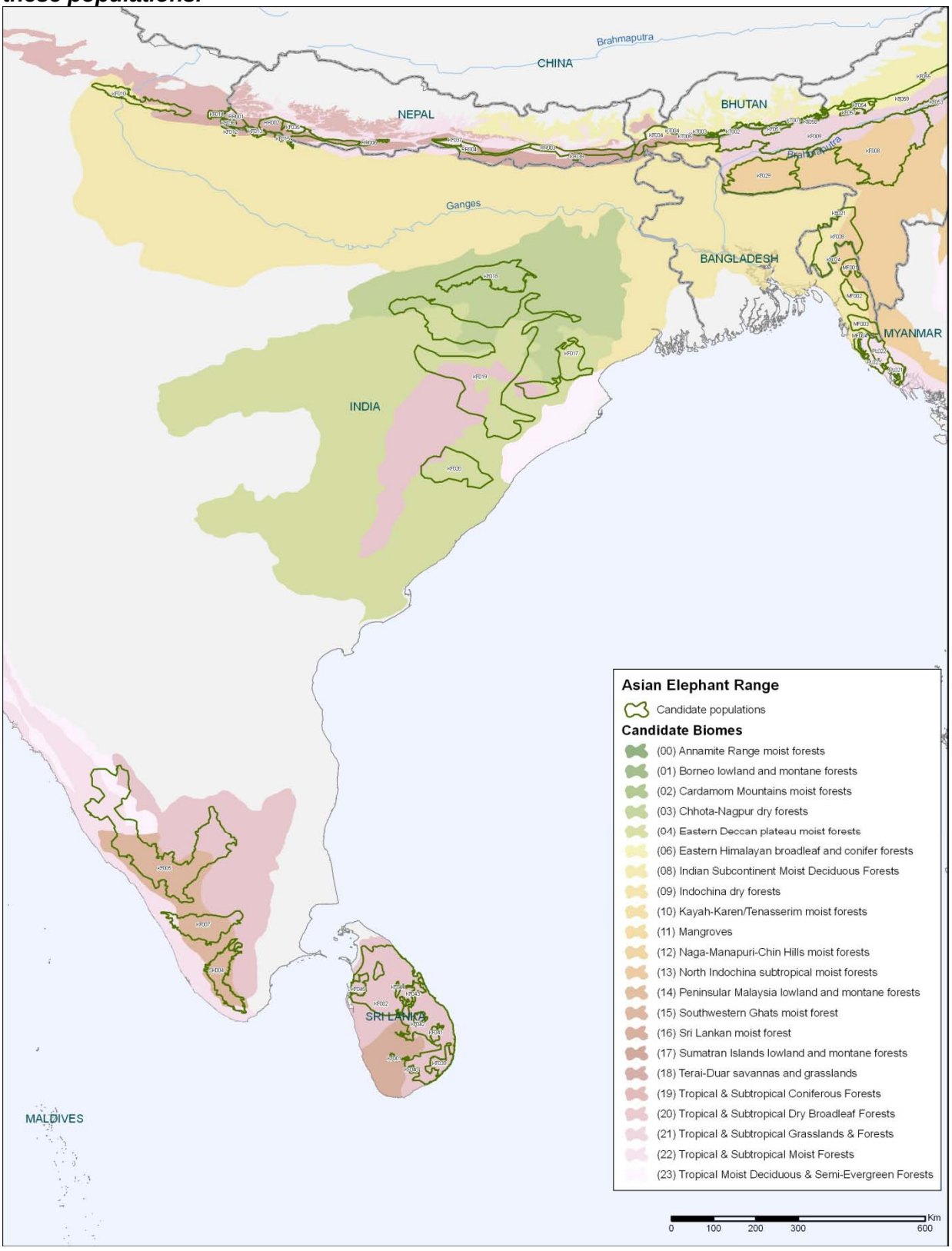

Figure 5: Asian Elephant range in mainland Southeast Asia showing all Confirmed, Possible, and Recoverable range categories, the selected core populations ("Candidate populations"), and the historical range.

Figure 6: Asian Elephant range in mainland Southeast Asia showing all selected core populations ("Candidate populations") and the ecological settings ("Candidate Biomes") covered by these populations.

Figure 7: Asian Elephant range in insular Southeast Asia showing all Confirmed, Possible, and Recoverable range categories, the selected core populations ("Candidate populations"), and the historical range.

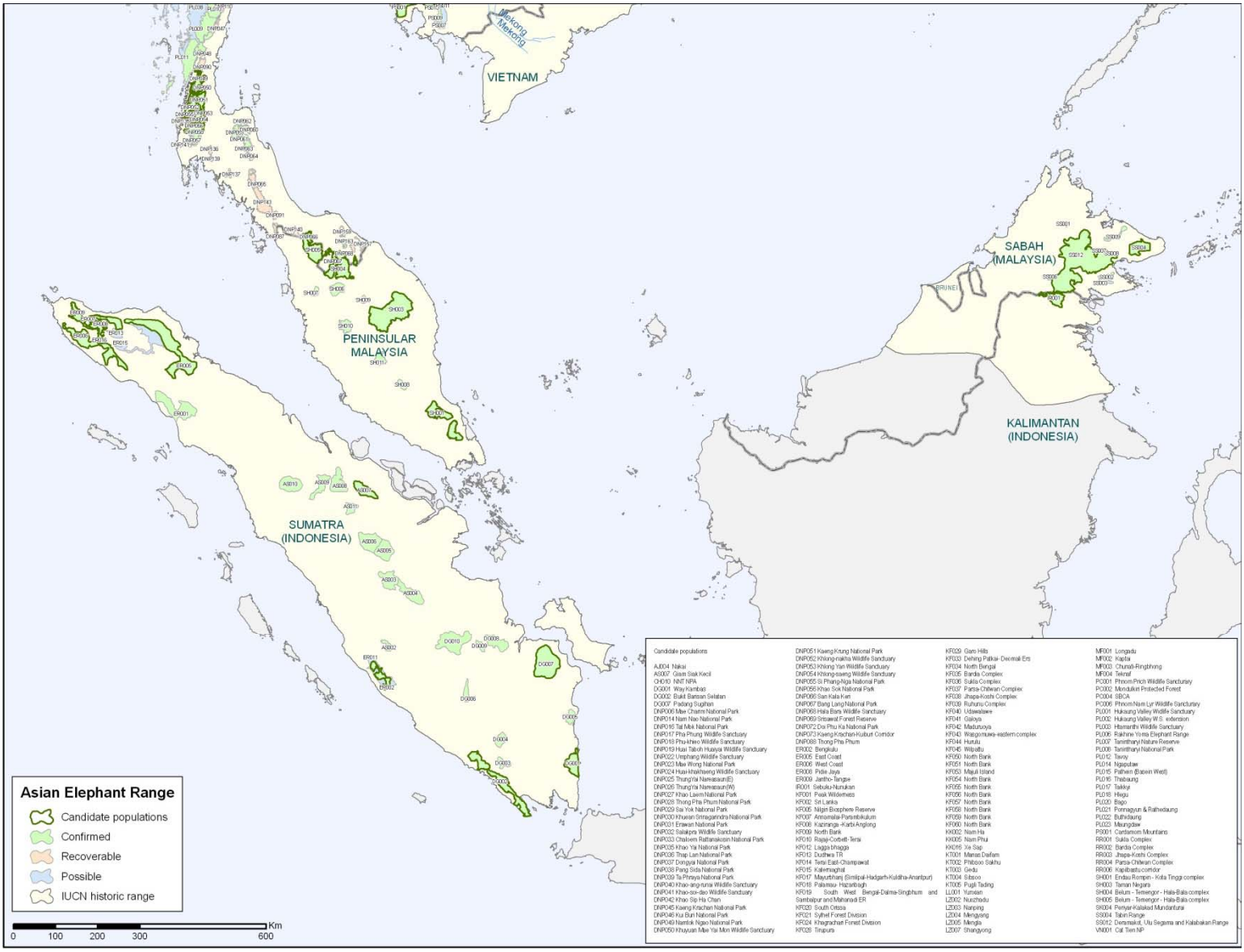

Figure 8: Asian Elephant range in insular Southeast Asia showing all selected core populations ("Candidate populations") and the ecological settings ("Candidate Biomes") covered by these populations.

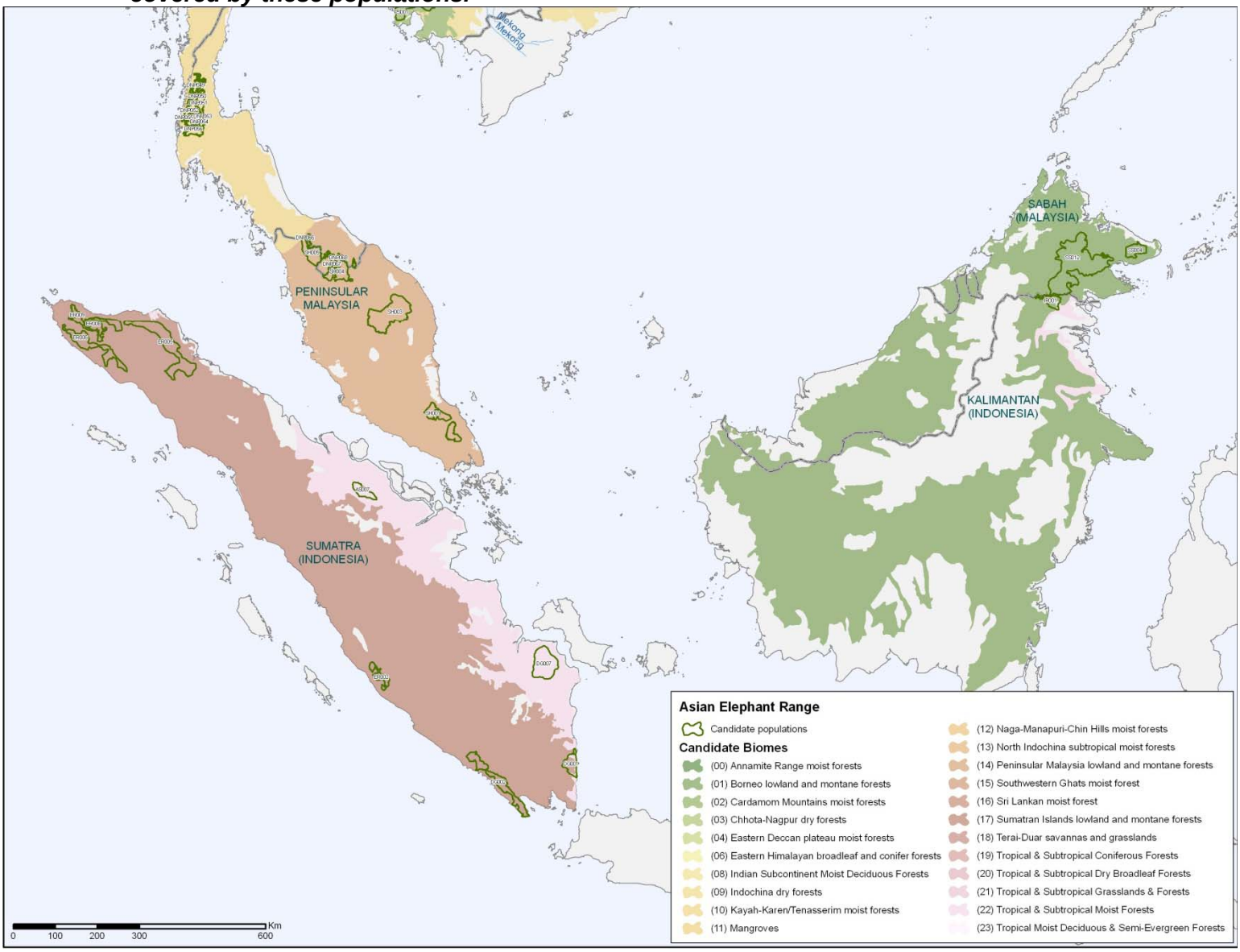

Table 1. The core set of Asian Elephant populations selected at the range-wide mapping workshop in October 2008 (using the process described on pg 9; PA = protected area)

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
KF021	Sylhet Forest Division	Western Myanmar - SE Bangladesh	Bangladesh	118	0	118	0.0%	10-12

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
KF024	Khagrachari Forest Division	Western Myanmar - SE Bangladesh	Bangladesh	159	1	161	0.8%	23-35
MF001	Longadu	Western Myanmar - SE Bangladesh	Bangladesh	953	208	1,161	17.9%	35-45
MF002	Kaptai	Western Myanmar - SE Bangladesh	Bangladesh	2,308	11	2,320	0.5%	70-90
MF003	Chunati-Ringbhong	Western Myanmar - SE Bangladesh	Bangladesh	1,528	417	1,945	21.5%	90-110
MF004	Teknaf	Western Myanmar - SE Bangladesh	Bangladesh	338	128	466	27.5%	25-40
KT001	Manas Daifam	Assam - Bhutan Complex	Bhutan	717	648	1,366	47.5%	100-150
KT002	Phibsoo Sakhu	Assam - Bhutan Complex	Bhutan	495	238	733	32.5%	60-120
KT003	Gedu	Assam - Bhutan Complex	Bhutan	61	0	61	0.0%	8
KT004	Sibsoo	Assam - Bhutan Complex	Bhutan	70	0	70	0.0%	45-50
KT005	Pugli Tading	Assam - Bhutan Complex	Bhutan	77	0	77	0.0%	15-20
PS001	Cardamom Mountains	Cardamoms Complex	Cambodia	4,322	2,107	6,429	32.8%	Unknown
PC001	Phnom Prich Wildlife Sancturary	Mondulkiri Complex	Cambodia		1,126	1,126	100.0%	unknown
PC002	Mondulkiri Protected Forest	Mondulkiri Complex	Cambodia	0	407	408	100.0%	unknown
PC004	SBCA	Mondulkiri Complex	Cambodia	513	107	620	17.3%	116 +/- 9

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
PC006	Phnom Nam Lyr Wildlife Sancturary	Mondulkiri Complex	Cambodia	1	151	153	99.0%	unknown
LL001	Yunxian	Xishuangbanna Complex	China	311	0	311	0.0%	4
LZ002	Nuozhadu	Xishuangbanna Complex	China	66	0	66	0.0%	7
LZ003	Nanping	Xishuangbanna Complex	China	244	0	244	0.0%	5
LZ004	Mengyang	Xishuangbanna Complex	China	756	387	1,143	33.8%	26
LZ005	Mengla	Xishuangbanna Complex	China	56	140	196	71.6%	37
LZ007	Shangyong	Xishuangbanna Complex	China	244	115	358	32.0%	38
KF007	Annamalai-Parambikulum	Annamalai-Parambikulum	India	5,976	1,683	7,659	22.0%	1,500-2,700
KF009	North Bank	Assam - Bhutan Complex	India	34,125	1,481	35,606	4.2%	2,504
KF033	Dehing Patkai-Deomali Ers	Assam - Bhutan Complex	India	3,067	3,158	6,224	50.7%	1,126
KF050	North Bank	Assam - Bhutan Complex	India	744	74	818	9.0%	2,504
KF051	North Bank	Assam - Bhutan Complex	India	328	543	872	62.3%	2,504
KF053	Majuli Island	Assam - Bhutan Complex	India	1,501		1,501	0.0%	81
KF054	North Bank	Assam - Bhutan Complex	India	881	367	1,248	29.4%	2,504
KF055	North Bank	Assam - Bhutan Complex	India	162		162	0.0%	2,504
KF056	North Bank	Assam - Bhutan Complex	India	64	116	180	64.6%	2,504

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
KF057	North Bank	Assam - Bhutan Complex	India	186	143	329	43.4 %	2,504
KF058	North Bank	Assam - Bhutan Complex	India	9	16	25	63.7 %	2,504
KF059	North Bank	Assam - Bhutan Complex	India	88	48	137	35.2 %	2,504
KF060	North Bank	Assam - Bhutan Complex	India	71	213	284	75.0 %	2,504
KF029	Garo Hills	Garo Hills	India	11,963	37	12,001	0.3%	1,500
KF008	Kaziranga -Karbi Anglong	Kaziranga - Karbi Anglong	India	24,374	973	25,348	3.8%	2,132
KF012	Lagga bhagga	Lagga Bhagga - Bardia Complex	India	348	0	348	0.0%	5
KF013	Dudhwa TR	Lagga Bhagga - Bardia Complex	India	102	616	718	85.8 %	10-15
KF014	Terai East-Champawat	Lagga Bhagga - Bardia Complex	India	559	0	559	0.0%	57
KF015	Katerniaghat	Lagga Bhagga - Bardia Complex	India	129	252	380	66.2 %	3-5
KF005	Nilgiri Biosphere Reserve	Nilgiri Biosphere Reserve	India	25,342	6,873	32,215	21.3 %	7,100-10,550
KF034	North Bengal	Parsa - Chitwan - Jhapa - North Bengal Complex	India	5,009	348	5,356	6.5%	290-300
SK004	Periyar-Kalakad Mundanturai	Periyar - Kalakad Mundanturai	India	3,724	2,312	6,036	38.3 %	1,500-2,500
KF010	Rajaji-Corbett-Terai	Rajaji - Corbett - Terai	India	2,818	1,315	4,134	31.8 %	1,450

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
KF017	Mayurbhanj (Simlipal-Hadgarh-Kuldiha-Anantpur)	West Bengal - Orissa - Jharkand Complex	India	5,180	2,486	7,667	32.4%	560-580
KF018	Palamau-Hazaribagh	West Bengal - Orissa - Jharkand Complex	India	7,891	784	8,675	9.0%	210-220
KF019	South West Bengal-Dalma-Singbhum and Sambalpur and Mahanadi ER	West Bengal - Orissa - Jharkand Complex	India	46,848	1,994	48,842	4.1%	1,300-1,320
KF020	South Orissa	West Bengal - Orissa - Jharkand Complex	India	8,612	542	9,154	5.9%	170-180
KF028	Tirupura	Western Myanmar - Se Bangladesh	India	7,796	1,071	8,868	12.1%	80-90
ER002	Bengkulu	Bengkulu	Indonesia (Sumatra)	606	265	872	30.4%	125
DG002	Bukit Barisan Selatan	Bukit Barisan Selatan	Indonesia (Sumatra)	0	2,981	2,981	100.0%	498 (95% CI = [373, 666]) in 2001
AS007	Giam Siak Kecil	Giam Siak Kecil	Indonesia (Sumatra)	1,061	10	1,071	1.0%	37
ER005	East Coast	Gunung Leuser Complex	Indonesia (Sumatra)	1,115	3,962	5,077	78.0%	140-200
ER006	West Coast	Gunung Leuser Complex	Indonesia (Sumatra)	2,307	556	2,864	19.4%	100-150

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
ER008	Pidie Jaya	Gunung Leuser Complex	Indonesia (Sumatra)	1,729		1,729	0.0%	40-70
ER009	Jantho-Tangse	Gunung Leuser Complex	Indonesia (Sumatra)	704	158	862	18.3%	60
DG007	Padang Sugihan	Sugihan	Indonesia (Sumatra)	2,556	833	3,389	24.6%	unknown
IR001	Sebuku-Nunukan	Ulu Segama - Sebuku Complex	Indonesia (Kalimantan)	928		928	0.0%	60-100
DG001	Way Kambas	Way Kambas	Indonesia (Sumatra)	139	1,178	1,317	89.4%	180 (95% CI = [144-225]) in 2002
AJ004	Nakai	Nakai Complex	Laos	587	703	1,290	54.5%	132 (95% CI=[120,149]) in 2006
CH010	NNT NPA	Nakai Complex	Laos	0	2,959	2,959	100.0%	<10
KK002	Nam Ha	Nam Et Complex	Laos	904	663	1,567	42.3%	<20
KK005	Nam Phui	Nam Phui - Doi Phu Ka Complex	Laos	275	1,398	1,673	83.5%	<100
KK016	Xe Sap	Xe Sap	Laos	200	1,085	1,286	84.4%	<30
SH004	Belum - Temengor - Hala-Bala complex	Belum - Temengor - Hala-Bala Complex	Malaysia (Peninsular)		1,755	1,755	100.0%	unknown
SH005	Belum - Temengor - Hala-Bala complex	Belum - Temengor - Hala-Bala Complex	Malaysia (Peninsular)	0	1,579	1,579	100.0%	unknown
SH001	Endau Rompin - Kota Tinggi complex	Endau Rompin - Kota Tinggi Complex	Malaysia (Peninsular)		2,057	2,057	100.0%	135 (95% CI=[80, 225]) in 2008
SS004	Tabin Range	Tabin	Malaysia (Sabah)	41	1,133	1,174	96.5%	248-490
SH003	Taman Negara	Taman Negara Complex	Malaysia (Peninsular)	18	5,157	5,175	99.7%	631 (95% CI=[436, 915]) in 2007

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
SS012	Deramakot, Ulu Segama and Kalabakan Range	Ulu Segama - Sebuku Complex	Malaysia (Sabah)	9,130	584	9,714	6.0%	628-785
PL020	Bago	Bago	Myanmar	2,631	160	2,792	5.7%	20
PL018	Hlegu	Hlegu	Myanmar	2,056	0	2,056	0.0%	42
PL003	Htamanthi Wildlife Sanctuary	Htamanthi Wildlife Sanctuary	Myanmar	735	1,801	2,537	71.0%	49-245
PL001	Hukaung Valley Widlife Sanctuary	Hukuang Valley	Myanmar	722	5,758	6,480	88.9%	100-120
PL002	Hukaung Valley W.S. extension	Hukuang Valley	Myanmar	14,309	708	15,017	4.7%	included in above
PL008	Taninthar yi National Park	Kaeng Krachan - Tanintharyi Complex	Myanmar	1,447	2,232	3,679	60.7%	unknown
PL017	Taikkyi	Taikkyi	Myanmar	1,045	0	1,045	0.0%	80
PL007	Taninthar yi Nature Reserve	WEFCOM	Myanmar	1,613	7	1,620	0.4%	10
PL012	Tavoy	WEFCOM	Myanmar	6,226	22	6,247	0.3%	30
PL006	Rakhine Yoma Elephant Range	Western Myanmar - SE Bangladesh	Myanmar	266	1,444	1,710	84.5%	100-125
PL014	Ngaputaw	Western Myanmar - SE Bangladesh	Myanmar	2,834	21	2,854	0.7%	150-200 across three townships
PL015	Pathein (Basein West)	Western Myanmar - SE Bangladesh	Myanmar	1,620	0	1,620	0.0%	150-200 across three townships
PL016	Thabaung	Western Myanmar - SE Bangladesh	Myanmar	1,772	0	1,772	0.0%	150-200 across three townships

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
PL021	Ponnagyun & Rathedaung	Western Myanmar - SE Bangladesh	Myanmar	1,438	0	1,438	0.0%	40-60
PL022	Buthidaung	Western Myanmar - SE Bangladesh	Myanmar	2,077	0	2,077	0.0%	80
PL023	Maungdaw	Western Myanmar - SE Bangladesh	Myanmar	1,566	76	1,642	4.6%	80
KF035	Bardia Complex	Lagga Bhagga - Bardia Complex	Nepal	0	909	909	100.0%	Ca. 45
KF036	Sukla Complex	Lagga Bhagga - Bardia Complex	Nepal	0	369	369	100.0%	17-20
RR001	Sukla Complex	Lagga Bhagga - Bardia Complex	Nepal	1,307	4	1,311	0.3%	17-20
RR002	Bardia Complex	Lagga Bhagga - Bardia Complex	Nepal	2,925	610	3,535	17.3%	Ca. 45
RR006	Kapilbastu corridor	Lagga Bhagga - Bardia Complex	Nepal	360	0	360	0.0%	unknown
KF037	Parsa-Chitwan Complex	Parsa - Chitwan - Jhapa - North Bengal Complex	Nepal	2	1,090	1,093	99.8%	20-30
KF038	Jhapa-Koshi Complex	Parsa - Chitwan - Jhapa - North Bengal Complex	Nepal	36	155	191	81.0%	70-80
RR003	Jhapa-Koshi Complex	Parsa - Chitwan - Jhapa - North Bengal Complex	Nepal	3,274	0	3,274	0.0%	70-80

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
RR004	Parsa-Chitwan Complex	Parsa - Chitwan - Jhapa - North Bengal Complex	Nepal	1,282	295	1,577	18.7%	20-30
KF041	Galoya	Galoya	Sri Lanka	0	668	668	100.0%	200
KF044	Hurulu	Hurulu	Sri Lanka	0	256	256	99.9%	100
KF042	Maduruoya	Maduruoya	Sri Lanka	0	590	590	100.0%	300
KF001	Peak Wilderness	Peak Wilderness	Sri Lanka	0	239	239	100.0%	15
KF039	Ruhunu Complex	Ruhunu Complex	Sri Lanka	41	1,951	1,991	98.0%	700
KF040	Udawalawe	Udawalawe	Sri Lanka	0	318	318	100.0%	300
KF043	Wasgomuwa - Eastern Complex	Wasgomuwa - Eastern Complex	Sri Lanka	6	1,603	1,609	99.6%	400
KF045	Wilpattu	Wilpattu	Sri Lanka	66	1,262	1,328	95.1%	100
DNP066	San Kala Keri	Belum - Temengor - Hala-Bala Complex	Thailand	3	222	225	98.7%	20-30
DNP067	Bang Lang National Park	Belum - Temengor - Hala-Bala Complex	Thailand	15	274	289	94.9%	30-50 (DNP067+068)
DNP068	Hala-Bala Wildlife Sanctuary	Belum - Temengor - Hala-Bala Complex	Thailand	20	402	422	95.4%	30-50 (DNP067+068)
DNP040	Khao-ang-runai Wildlife Sanctuary	Eastern Chanthaburi Complex	Thailand	88	989	1,077	91.8%	250-300 (DNP040+042+041)
DNP041	Khao-soi-dao Wildlife Sanctuary	Eastern Chanthaburi Complex	Thailand	59	726	786	92.4%	250-300 (DNP040+042+041)
DNP042	Khao Sip Ha Chan	Eastern Chanthaburi Complex	Thailand	116	1	117	0.6%	250-300 (DNP040+042+041)

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
DNP045	Kaeng Krachan National Park	Kaeng Krachan - Tanintharyi Complex	Thailand	28	2,011	2,040	98.6 %	350-450 (DNP044+045)
DNP046	Kui Buri National Park	Kaeng Krachan - Tanintharyi Complex	Thailand	42	941	983	95.8 %	150
DNP073	Kaeng Krachan-Kuiburi Corridor	Kaeng Krachan - Tanintharyi Complex	Thailand	34	0	35	0.1%	unknown
DNP035	Khao Yai National Park	Khao Yai Complex	Thailand	106	2,152	2,259	95.3 %	300
DNP036	Thap Lan National Park	Khao Yai Complex	Thailand	61	2,191	2,252	97.3 %	200-300 (DNP036+037+038+039)
DNP037	Dongyai National Park	Khao Yai Complex	Thailand	124	299	424	70.6 %	200-300 (DNP036+037+038+039)
DNP038	Pang Sida National Park	Khao Yai Complex	Thailand	16	841	857	98.2 %	200-300(DNP036+037+038+039)
DNP039	Ta Phraya National Park	Khao Yai Complex	Thailand	10	609	620	98.3 %	200-300 (DNP036+037+038+039)
DNP006	Mae Charim National Park	Nam Phui - Doi Phu Ka Complex	Thailand	1	436	437	99.7 %	unknown
DNP072	Doi Phu Ka National Park	Nam Phui - Doi Phu Ka Complex	Thailand	0	1,694	1,694	100.0%	unknown
DNP017	Pha Phung Wildlife Sanctuary	Pha Phung Wildlife Sanctuary	Thailand	15	173	188	92.0 %	unknown
DNP014	Nam Nao National Park	Phu Kheo Complex	Thailand	15	959	974	98.4 %	150-200 (DNP014+019+018)
DNP018	Phu-khieo Wildlife Sanctuary	Phu Kheo Complex	Thailand	5	1,564	1,569	99.7 %	150-200 (DNP014+019+018)
DNP019	Huai Taboh Huaiyai Wildlife Sanctuary	Phu Kheo Complex	Thailand	12	645	657	98.2 %	150-200 (DNP014+019+018)

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
DNP049	Namtok Ngao National Park	Southern Thai Peninsula Complex	Thailand	7	692	700	99.0 %	20?
DNP050	Khuyuan Mae Yai Mon Wildlife Sanctuary	Southern Thai Peninsula Complex	Thailand	26	443	468	94.5 %	100-150 (DNP050+051+052+053+054+055+056)
DNP051	Kaeng Krung National Park	Southern Thai Peninsula Complex	Thailand	5	545	550	99.2 %	100-150 (DNP050+051+052+053+054+055+056)
DNP052	Khlong-nakha Wildlife Sanctuary	Southern Thai Peninsula Complex	Thailand	47	479	526	91.0 %	100-150 (DNP050+051+052+053+054+055+056)
DNP053	Khlong Yan Wildlife Sanctuary	Southern Thai Peninsula Complex	Thailand	6	498	504	98.7 %	100-150 (DNP050+051+052+053+054+055+056)
DNP054	Khlong-saeng Wildlife Sanctuary	Southern Thai Peninsula Complex	Thailand	5	871	876	99.5 %	100-150 (DNP050+051+052+053+054+055+056)
DNP055	Si Phang-Nga National Park	Southern Thai Peninsula Complex	Thailand	11	239	249	95.7 %	100-150 (DNP050+051+052+053+054+055+056)
DNP056	Khao Sok National Park	Southern Thai Peninsula Complex	Thailand	20	720	740	97.3 %	100-150 (DNP050+051+052+053+054+055+056)
DNP016	Tat Mok National Park	Tat Mok National Park	Thailand	2	285	287	99.1 %	unknown
DNP022	Umphang Wildlife Sanctuary	WEFCOM	Thailand	157	2,432	2,589	93.9 %	700-800 (DNP022+023+025+026+024+030+031)
DNP023	Mae Wong National Park	WEFCOM	Thailand	11	885	897	98.7 %	700-800 (DNP022+023+025+026+024+030+031)
DNP024	Huai-khakhaeng Wildlife Sanctuary	WEFCOM	Thailand	16	2,803	2,818	99.4 %	284
DNP025	ThungYai Nareasaun(E)	WEFCOM	Thailand	0	1,572	1,572	100.0%	700-800 (DNP022+023+025+026+024+030+031)
DNP026	ThungYai Nareasaun(W)	WEFCOM	Thailand	3	2,120	2,123	99.8 %	700-800 (DNP022+023+025+026+024+030+031)

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
DNP027	Khao Laem National Park	WEFCOM	Thailand	19	1,473	1,493	98.7 %	100-150 (DNP027+028+029)
DNP028	Thong Pha Phum National Park	WEFCOM	Thailand	21	1,223	1,245	98.3 %	100-150 (DNP027+028+029)
DNP029	Sai Yok National Park	WEFCOM	Thailand	17	932	949	98.2 %	100-150 (DNP027+028+029)
DNP030	Khuean Srinagarindra National Park	WEFCOM	Thailand	11	1,834	1,845	99.4 %	700-800 (DNP022+023+025+026+024+030+031)
DNP031	Erawan National Park	WEFCOM	Thailand	10	520	530	98.0 %	700-800 (DNP022+023+025+026+024+030+031)
DNP032	Salakpra Wildlife Sanctuary	WEFCOM	Thailand	6	852	858	99.3 %	100-120
DNP033	Chaloem Rattanakosin National Park	WEFCOM	Thailand	1	58	59	97.9 %	combines with Salakpra
DNP069	Srisawat Forest Reserve	WEFCOM	Thailand	200	1	201	0.4%	unknown
VN001	Cat Tien NP	Cat Tien	Vietnam	164	331	495	66.9 %	15
TOTALS		45 population if Sri Lanka treated as 1 population; 45 + 8 = 53 populations if the 8 Sri Lanka PAs are included and Sri Lanka outside the PAs is treated as another population		286,730	124,142	410,872	30.2 %	

ID code	Polygon name	Population name	Range State	Area not in PA (km²)	Area in PA (km²)	Total area (km²)	% within PA	Population size (unless confidence interval is given the figure is based on expert opinion)
KF002	Sri Lanka	Whole island treated as 1 population	Sri Lanka	21,528	8,083	29,611	27.3 %	4,000-6,000

Table 2. Summary of Asian Elephant range by ecological setting

Ecological setting ("Biome")	Total area of "biome" (km²)	Total range: recoverable, possible, & confirmed (km²)	Recoverable range (km²)	Possible range (km²)	Confirmed range (km²)	Number of candidate population polygons or part polygons	Area of candidate populations polygons (km²)	% total range covered by candidate polygons
(00) Annamite Range moist forests	91,773	20,721	11,173	268	9,280	3	5,534	26.7%
(01) Borneo lowland and montane forests	424,448	12,979	0	305	12,674	3	11,711	90.2%
(02) Cardamom Mountains moist forests	43,350	17,985	5,899	1,093	10,992	4	8,327	46.3%
(03) Chhota-Nagpur dry forests	122,138	25,537	873	0	24,664	3	19,439	76.1%
(04) Eastern Deccan plateau moist forests	340,187	43,289	321	695	42,273	3	42,118	97.3%
(06) Eastern Himalayan broadleaf and conifer forests	97,485	20,161	0	1,611	18,549	16	18,549	92.0%
(08) Indian Subcontinent Moist Deciduous Forests	516,168	19,258	0	4,257	15,000	15	13,879	72.1%
(09) Indochina dry forests	424,500	46,880	22,296	7,167	17,416	16	9,901	21.1%
(10) Kayah-Karen/Tenasserim moist forests	214,629	94,169	22,927	24,133	47,109	28	35,503	37.7%
(11) Mangroves	9,323	3,267	27	427	2,814	6	670	20.5%
(12) Naga-Manapuri-Chin Hills moist forests	230,656	148,475	0	85,878	62,597	13	58,346	39.3%
(13) North Indochina subtropical moist forests	435,937	29,092	8,375	14,617	6,099	7	3,885	13.4%
(14) Peninsular Malaysia lowland and montane forests	133,534	14,799	492	0	14,307	7	11,502	77.7%
(15) Southwestern Ghats moist forest	46,224	27,040	0	0	27,040	3	27,040	100.0%
(16) Sri Lankan moist forest	15,567	820	0	0	820	2	820	100.0%
(17) Sumatran	317,945	35,500	0	4,143	31,357	7	15,251	43.0%

Islands lowland and montane forests								
(18) Terai-Duar savannas and grasslands	34,528	13,322	0	74	13,248	18	13,307	99.9%
(19) Tropical & Subtropical Coniferous Forests	51,654	2,283	0	4	2,279	8	2,283	100.0%
(20) Tropical & Subtropical Dry Broadleaf Forests	188,304	58,915	0	1,827	57,088	14	57,088	96.9%
(21) Tropical & Subtropical Grasslands & Forests	56,614	39,923	0	4	39,919	15	39,907	100.0%
(22) Tropical & Subtropical Moist Forests	405,612	88,964	5,412	28,528	55,025	46	41,825	47.0%
(23) Tropical Moist Deciduous & Semi-Evergreen Forests	262,106	87,345	13,633	62,073	11,639	16	4,998	5.7%
Totals	**4,490,599**	**878,641**	**94,911**	**257,645**	**526,082**	**268**	**442,013**	**50.3%**

Table 3. Summary of Asian Elephant range by Range State

Range State	Total area of range state (km²)	Total range: recoverable, possible, & confirmed (km²)	Recoverable range (km²)	Possible range (km²)	Confirmed range (km²)	Number of candidate population polygons or part polygons	Area of candidate populations polygons (km²)	% total range covered by candidate polygons
Bangladesh	136,509	14,336	0	7,743	6,593	10	6,252	43.6%
Bhutan	39,714	2,332	0	0	2,332	9	2,332	100.0%
Cambodia	181,713	36,130	16,670	6,475	12,985	6	8,731	24.2%
China	9,373,940	4,545	2,183	0	2,362	7	2,317	51.0%
India	3,153,013	260,461	1,194	19,917	239,351	42	225,360	86.5%
Indonesia (Sumatra + Kalimantan)	1,903,558	45,536	0	4,143	41,393	10	21,088	46.3%
Laos	230,008	50,452	22,908	5,041	22,503	8	8,773	17.4%
Malaysia – Peninsular	131,795	13,400	14	0	13,385	7	10,556	78.8%
Malaysia – Sabah	197,929	12,157	0	305	11,852	3	10,889	89.6%
Myanmar	668,183	292,334	7,159	213,386	71,789	25	54,726	18.7%
Nepal	147,046	12,665	0	487	12,178	13	12,538	99.0%
Sri Lanka	66,544	36,611	0	0	36,611	9	36,611	100.0%
Thailand	516,297	97,130	44,766	118	52,245	49	41,330	42.6%
Vietnam	327,732	551	16	30	505	6	509	92.4%
Totals	**17,073,981**	**878,640**	**94,910**	**257,645**	**526,084**	**204**	**442,012**	**50.3%**

Table 4: Proportion of different range categories in protected areas (PAs) as defined by IUCN.

Range category	Area (km^2)	%
Total area (Confirmed + Possible + Recoverable) range	**878,639**	**100.0%**
Area of total range within PAs	255,955	29.1%
Area of total range not within PAs	622,684	70.9%
Total area of confirmed range	**526,083**	**100.0%**
Area of confirmed range within PAs	359,590	68.4%
Area of confirmed range not within PAs	166,492	31.6%
Total area of possible range	**257,646**	**100.0%**
Area of possible range within PAs	28,749	11.2%
Area of possible range not within PAs	228,897	88.8%
Total area of recoverable range	**94,910**	**100.0%**
Area of recoverable range within PAs	60,714	64.0%
Area of recoverable range not within PAs	34,197	36.0%

Table 5: Those core populations identified during the workshop with areas larger than 4,400 km².

Polygon ID codes	Population name	Range State(s)	Total area (km²)
KT001, KT002, KT003, KT004,KT005, KF009, KF033, KF050, KF051, KF053, KF054, KF055, KF056, KF057, KF058, KF059, KF060	Assam - Bhutan Complex	Bhutan/India	49,692
PS001	Cardamoms Complex	Cambodia	6,429
KF007	Annamalai-Parambikulum	India	7,659
KF029	Garo Hills	India	12,001
KF008	Kaziranga - Karbi Anglong	India	25,348
KF005	Nilgiri Biosphere Reserve	India	32,215
SK004	Periyar - Kalakad Mundanturai	India	6,036
KF017, KF018, KF019, KF020	West Bengal - Orissa - Jharkand Complex	India	74,338
KF012, KF013, KF014, KF015, KF035, KF036,RR001, RR002, RR006	Lagga Bhagga - Bardia Complex	India/Nepal	8,490
KF034, KF037, KF038, RR003, RR004	Parsa - Chitwan - Jhapa - North Bengal Complex	India/Nepal	11,491
ER005, ER006, ER008, ER009	Gunung Leuser Complex	Indonesia (Sumatra)	10,531
SH003	Taman Negara Complex	Malaysia (Peninsular)	5,175
IR001, SS012	Ulu Segama - Sebuku Complex	Malaysia (Sabah) / Indonesia (Kalimantan)	10,642
PL001, PL002	Hukuang Valley	Myanmar	21,497
KF021, KF024, MF001, MF002, MF003, MF004, KF028, PL006, PL014, PL015, PL016, PL021, PL022, PL023	Western Myanmar - SE Bangladesh	Myanmar/Bangladesh /India	28,151
KF002	Sri Lanka (whole island treated as 1 population)	Sri Lanka	29,611
DNP035, DNP036, DNP037, DNP038, DNP039	Khao Yai Complex	Thailand	6,410
DNP049, DNP050, DNP051, DNP052, DNP053, DNP054, DNP055, DNP056	Southern Thai Peninsula Complex	Thailand	4,613
PL008, DNP045, DNP046, DNP073	Kaeng Krachan - Tanintharyi Complex	Thailand/Myanmar	6,736
PL007, PL012, DNP022, DNP023, DNP024, DNP025, DNP026, DNP027, DNP028, DNP029, DNP030, DNP031, DNP032, DNP033, DNP069	WEFCOM	Thailand/Myanmar	25,046

Project Objective 4: To identify priority actions and to seek to identify organizations and individuals who can implement high priority projects

Activities undertaken, results achieved, and products generated

Development of Conservation Objectives

During the second of the two back-to-back workshops, a set of Objectives was developed to address the main threats to the species and the other constraints on achieving the Vision and Goals. In a sense, Objectives can be thought of as the inverse of the key threats and constraints. For example, if a lack of capacity is a constraint then an appropriate objective would be to build capacity. Ideally, each Objective should also have a SMART Objective Target. The acronym "SMART' indicates that Targets should be Specific, Measurable, Achievable, Realistic, and Time-bound. Since the Conservation Strategy, including the Objectives, was the subject of the second (AsESG-led) workshop and is still in development, it is only summarized in outline form in this report on the first range-wide mapping workshop.

Using the threats analysis described above, the following themes were identified: human–elephant conflict (HEC); information needs; trans-boundary cooperation; awareness and advocacy; capacity development; policy; legislation; land use planning and habitat protection; illegal trade and killing; national action planning; monitoring and evaluation of implementation.

These themes and their associated threats were then used to develop the following Objectives:

- Objective 1: Develop and implement effective strategies to minimize human–elephant conflict. (From the human–elephant conflict theme.)
- Objective 2: Gather and share relevant baseline data and establish monitoring programs for elephant distribution, status, threats, habitat, behavior, ecology, population demography and health (including diseases) and other aspects of elephant biology for providing management inputs. (From the information needs theme.)
- Objective 3: Develop linkages to manage elephant populations. (From the trans-boundary cooperation theme.)
- Objective 4: Increase awareness and develop support for elephant conservation among public, politicians and administrators. (From the awareness and advocacy theme.)
- Objective 5: Strengthen human, financial, and management systems for conserving elephants in collaboration with stakeholders. (From the capacity development theme.)
- Objective 6: Review, revise and develop national (and sub-national, including local) policies for elephant conservation and management. (From the policy theme.)
- Objective 7: Review, harmonize, and enforce existing legislation, and, where necessary, revise and develop new legislation, for elephant conservation/management at local, national, and international levels. (From the legislation theme.)
- Objective 8: Develop cross-sectoral linkages to bring about compatible land use planning that includes protection of elephant populations and habitats. (From the land

use planning and habitat protection theme.) [NB: habitat protection in, for example, protected areas is not really included in the present text so this objective will probably need to be reworded.]

- Objective 9: Review, revise/develop and implement enforcement mechanisms to ensure wild elephants are not captured, traded, and killed illegally. (From the illegal trade and killing theme.)

- Objective 10: Develop, revise, and implement effective national action plans informed by this range-wide strategy. (From the national action planning theme.)

- Objective 11: Create a body to monitor the implementation and effectiveness of the strategy (and national plans?). (From the monitoring and evaluation of implementation theme.)

Development of Objectives Targets and Actions

Objectives summarize the broad approaches to be taken in working towards the Vision and Goals, while Objective Targets provide more detailed definitions of what needs to be done, and by what date. Objective Targets help to group related Actions into logically related clusters, which helps to promote implementation. The timelines associated with Objective Targets can also be used as a way of prioritizing different clusters of Actions; for example, if a particular threat requires urgent Action, its associated Objective Targets might have short timelines. Actions are the activities which need to be performed in order to achieve the Objectives, Goals, and, ultimately, the Vision. Range-wide Conservation Strategies, like that being developed by the AsESG, involve implementation by diverse management authorities will typically include a number of recommended Actions which are fairly broad in their scope. By contrast, the national or local Action Plans, which we hope will be informed by this range-wide strategy, will include Actions which are much more specific. Again, since the Conservation Strategy, including the Objective Targets and associated Actions, was the subject of the second (AsESG-led) workshop and is still in development, it is only summarized in outline form in this report on the first (range-wide mapping and population assessment) workshop.

Objective 1: Develop and implement effective strategies to minimize human–elephant conflict.

Objective target 1.1: Improved understanding of human–elephant conflict – where, how severe, why (within 2 to 3 years).

- Action 1.1.1: Map human–elephant conflict – show extent and intensity (actors: ?; timeline: ?).

- Action 1.1.2: Identify causes of human–elephant conflict (actors: ?; timeline: ?).

- Action 1.1.3: Identify and obtain data on existing mitigatory actions (with a list of methods employed) (actors: ?; timeline: ?). [NB: the conducted a review of HEC mitigation measures in Asia in the months after the October 2008 workshop, culminating in a workshop in Beijing in July 2009 immediately before the Society for Conservation Biology's Annual Meeting.]

Objective target 1.2: Develop strategies and actions for HEC mitigation based on data (within x years).

- Action 1.2.1: Assess effectiveness of existing HEC mitigation methods and develop new methods as appropriate (actors: ?; timeline: ?). [NB: the conducted a review of HEC mitigation measures in Asia in the months after the October 2008 workshop, culminating in a workshop in Beijing in July 2009 immediately before the Society for Conservation Biology's Annual Meeting.]

- Action 1.2.2: Develop site specific HEC mitigation strategies (actors: ?; timeline: ?).

Objective target 1.3: Implement actions (within x years).

- Action 1.3.1: Reduce or reverse factors that cause or increase HEC (actors: ?; timeline: long-term, 10 years).

- Action 1.3.2: Contain HEC using best practices for mitigation (actors: ?; timeline: short and long term, 5 years).

- Action 1.3.3: Involve all stakeholders in planning and implementing action (actors: ?; timeline: short and long term).

- Action 1.3.4: Monitor and evaluate HEC mitigation actions (actors: ?; timeline: ?).

Objective 2: Gather and share relevant baseline data and establish monitoring programs for elephant distribution, status, threats, habitat, behavior, ecology, population demography and health (including diseases) and other aspects of elephant biology for providing management inputs. [NB: Information about trade dynamics required.]

Objective target 2.1: Data collated and gaps identified (within 2 years).

- Action 2.1.1: Organize national workshops (actors: ?; timeline: ?). [See Objective 10 also.]

- Action 2.1.2: Create standardized database (actors: ?; timeline: ?). [NB: This activity was started at the workshop in Phnom Penh in October 2008, see Sections 2.1 and 2.2.]

Objective target 2.2: Data required to fill gaps gathered (within 10 years).

- Action 2.2.1: Identify existing standardized methods and develop standardized methods where needed (actors: ?; timeline: ?).

- Action 2.2.2: Find resources to collect data (actors: ?; timeline: ?).

Objective target 2.3: Information shared (ongoing process).

- Action 2.3.1: Establish network for data sharing (actors: ?; timeline: ?).

Objective 3: Develop linkages to manage elephant populations.

Objective target 3.1: Routine interaction between states with cross border populations established (within 2 years).

- Action 3.1.1: Initiate a process to establish such interactions (actors: ?; timeline: ?).

Objective target 3.2: Issues related to cross border populations addressed at relevant levels (within 5 years).

- Action 3.2.1: Organize regular meetings/workshops between states that share cross border populations (actors: ?; timeline: ?).
- Action 3.2.2: Establish protocols for information sharing including sharing of national action plans across borders (actors: ?; timeline: ?).
- Action 3.2.3: Establish mechanisms for developing compatible plans for cross border populations and coordinated field action (actors: ?; timeline: ?).

Objective 4: Increase awareness and develop support for elephant conservation among public, politicians, and administrators. [NB: Ensure demand-reduction (e.g. for ivory) is addressed]

Objective target 4.1: Values that elephant conservation brings to humans identified and used for advocacy (within 3 years)

- Action 4.1.1: Assess the species' conservation values (e.g. to tourism, links to biodiversity conservation, cultural values, etc.) (actors: ?; timeline: ?).
- Action 4.1.2: Assess the value of ecosystem services provided by elephant habitat (e.g. water, carbon sequestering, pollination, moderating climate change, etc.) (actors: ?; timeline: ?).
- Action 4.1.3: Awareness-raising addressing key threats (actors: ?; timeline: ?).

Objective target 4.2: Information disseminated (ongoing)

- Action 4.2.1: Identify key target groups (actors: ?; timeline: ?).
- Action 4.2.2: Develop communication aids for various target groups (actors: ?; timeline: ?).

- Action 4.2.3: Develop mechanisms for coordinated advocacy actions (actors: ?; timeline: ?).

Objective 5: Strengthen human, financial, and management systems for conserving elephants in collaboration with stakeholders

Objective target 5.1: Capacity needs assessed for various sectors (within 2 years)

- Action 5.1.1: Organize workshops of all stakeholders (actors: ?; timeline: ?).

Objective target 5.2: Capacity-building needs addressed (within 5 years)

- Action 5.2.1: Strengthen infrastructure for enforcement and management (actors: ?; timeline: ?).
- Action 5.2.2: Develop and support regional and national training centers (actors: ?; timeline: ?).
- Action 5.2.3: Develop appropriate mechanisms to strengthen the capacity of all stakeholders (actors: ?; timeline: ?).
- Action 5.2.4: Synergize developmental fund flow mechanisms in a manner that is compatible and complimentary to elephant conservation (actors: ?; timeline: ?).
- Action 5.2.5: Identify new opportunities for increased and long-term funding for Asian Elephant conservation (actors: ?; timeline: ?).

Objective 6: Review, revise, and develop national (and sub-national, including local) policies for elephant conservation and management.

Objective target 6.1: National policies developed for all range states (within 2 years)

- Action 6.1.1: Governments lobbied for development of national elephant policy (actors: ?; timeline: ?).
- Action 6.1.2: Identify all stakeholders (actors: ?; timeline: ?).
- Action 6.1.3: Organize stakeholder interactions/workshops to prepare policies (actors: ?; timeline: ?).
- Action 6.1.4: Ensure range State governments endorse policies (actors: ?; timeline: ?).

Objective 7: Review, harmonize, and enforce existing legislation, and, where necessary, revise and develop new legislation, for elephant conservation/management at local, national, and international levels. [NB: Greater detail needed particularly with respect to improved laws for protected areas.]

Objective target 7.1: National legislations reviewed and modifications suggested if necessary (within 2 years)

- Action 7.1.1: Assess effectiveness of current legislations in conserving elephants (actors: ?; timeline: ?). [NB: Do not forget to include reference to feral elephants.]

- Action 7.1.2: Identify within which range States legislation changes/review are necessary to better conserve elephants (actors: AESG, NGOs; timeline 2 years). Action 7.1.3: Identify areas where there are conflicting legislations (e.g. mining, industry, etc.) (actors: ?; timeline: ?).

- Action 7.1.4: Revise and develop laws where necessary (actors: governments (with help from NGO where appropriate); timeline: ?).

Objective target 7.2: Cross-sectoral linkages with all law enforcement agencies established (within 5 years)

- Action 7.2.1: Develop mechanisms to bring about such linkages (actors: ?; timeline: ?). [NB: Need to define what these linkages will be and what they are intended to achieve.]

- Action 7.2.2: Workshops to identify areas of cooperation (actors: ?; timeline: ?).

- Action 7.2.3: Sensitize law enforcement agencies to the need for elephant conservation and their role in such conservation (build capacity, raise awareness, etc.) (actors: ?; timeline: ?).

Objective 8: Develop cross-sectoral linkages to bring about compatible land use planning that includes protection of elephant populations and habitats. [NB: habitat protection in, for example, protected areas is not really included in the present text so this objective will probably need to be reworded.]

Objective target 8.1: Identify and prioritize large intact elephant landscapes requiring improved protection and management within 6 months.

- Action 8.1.1: Review, revise, and finalize elephant distribution maps from the Phnom Penh workshop of October 2008 (actors: AsESG, national bodies, NGOs, and universities (coordinated by the AsESG); timeline: 18 months).

- Action 8.1.2: Obtain current land use maps for elephant-occupied areas (actors: AsESG, national bodies, NGOs, and universities; timeline: 2 years).

- Action 8.1.3: Identify linkages between major elephant landscapes and compare against current land use plans (actor: AsESG, national bodies, NGOs, and universities; timeline: 6 months).

- Action 8.1.4: Identify elephant populations in secure and non-secure sites (actor: AsESG, national bodies, NGOs, and universities; timeline: 18 months).

- Action 8.1.5: Identify opportunities for new protected areas (actor: AsESG, governments, national bodies, NGOs, and universities; timeline: 3 years)

Objective target 8.2: Cross-sectoral linkages established to harmonize development and conservation activities in and around elephant habitat (within x years).

- Action 8.2.1: Identify international and national level infrastructural and development agencies across elephant ranges (actors: ?; timeline: ?).

- Action 8.2.2: Identify existing and future developmental project that are likely to impact elephant habitat (actors: ?; timeline: ?).

- Action 8.2.3: Develop environmental impact analysis (EIA) protocols that are specific to elephants (actors: ?; timeline: ?).

- Action 8.2.4: Work with governments and private sectors to identify and implement activities and management strategies in key areas which are compatible and beneficial to elephant conservation (e.g. identify “High Conservation Value Ecosystems” (HCVEs) through engaging private sectors in concessions; management of invasive species; fire management) (actors AsESG, researchers, governments, private sector; timeline 5 years).

- Action 8.2.5: Develop an MOU between the IUCN/SSC AsESG (or IUCN on behalf of its specialist groups) and major developmental agencies/investors (World Bank, ADB, etc.) to consult each other on investments in elephant ranges (actors: ?; timeline: ?).

Objective target 8.3: Improved habitat protection through enforcement and improved protected legal status across all range States by 2015.

- Action 8.3.1: Enforcing current laws within protected areas and other protected habitat (actors: governments; timeline continuous).

- Action 8.3.2: Improve protection of appropriate land for improved elephant conservation status (actors: governments, private sector, NGOs; timeline 6 years).

Objective 9: revise/develop and implement enforcement mechanisms to ensure wild elephants are not captured, traded, and killed illegally

Objective target 9.1: Develop and implement mechanisms to control illegal trade of live elephants and capture of live elephants within 4 years.

- Action 9.1.1: Review, revise and/or establish timely registration system and database for individual identification of captive elephants (including young animals) in all range countries (actor: AsESG, national bodies, and partners; timeline: 4 years).

- Action 9.1.2: Assist improved and coordinated management of wild and captive elephants by government authorities with a long term goal of integrated conservation-orientated management (actor: AsESG, national bodies, and partners; timeline: 4–10 years).

- Action 9.1.3: Assist the implementation of national laws to control illegal trade of live elephants and capture of live elephants (Actor: National bodies and partners; Timeline: indefinite)

Objective target 9.2: Review, develop and implement mechanisms to control illegal killing of elephants (review within x years, implement within y years).

- Action 9.2.1: Review, revise where necessary, and assist the implementation of national laws to control illegal killing of elephants (e.g. funding, motivating and training of patrol teams; participation by NGOs/others in patrol teams where appropriate; providing assistance to the legal process) (actor: national bodies, CITES/MIKE, ASEAN-WEN and other partners; timeline: indefinite).

Objective target 9.3: Review, develop and implement mechanisms to control trade in elephant parts nationally and internationally (review within x years, implement within y years).

- Action 9.3.1: Review, revise where necessary, and assist the implementation of national laws to control illegal trade of elephant parts (e.g. funding, motivating, training and equipping enforcement teams; assisting the legal process) (actor: national bodies, CITES/MIKE, ASEAN-WEN and other partners; timeline: indefinite). [NB: keep in mind linkage between captive elephants and ivory trade.]

- Action 9.3.2: Identify opportunities for establishing genetic databases for geographical identification of ivory origin in all range countries (actor: AsESG, ETIS, national bodies and other partners; timeline: 6 months).

- Action 9.3.3: Facilitate establishment of genetic databases, particularly through the provision of genetic material to participating laboratories (actor: AsESG, ETIS, national bodies and other partners; timeline: contingent on action 9.3.2).

- Action 9.3.4: Identify opportunities for improved ivory stock management (actor: AsESG, ETIS, national bodies and other partners; timeline: 18 months). [NB: exchange visits for SE Asian countries with e.g. South Africa and Namibia were discussed at the CITES CoP in the Hague in 2007.]

Objective 10: Develop, revise, and implement effective national action plans informed by this range-wide strategy.

Objective target 10.1: All countries have current national action plans after 4 years.

- Action 10.1.1: Review and revise existing wild elephant actions plans (actor: national government bodies, the AsESG, and NGOs; timeline: 4 years).

- Action 10.1.2: Develop wild elephant action plans where needed (actors: national government bodies, the AsESG, and NGOs; timeline: 4 years).

- Action 10.1.3: Disseminate action plans to partners and stakeholders in a timely fashion (actor: national government bodies and partners; timeline: within 6 months of final action plans' completion).

Objective 11: Create a body to monitor the implementation and effectiveness of the strategy (and national plans?).

Objective target 11.1: Mandate the AsESG to monitor the implementation and effectiveness of this strategy (and national plans?) as soon as possible.

- Action 11.1.1: Seek wider agreement that the AsESG should to monitor the implementation and effectiveness of this strategy (and national plans?) (actor: AsESG; timeline: by end of January 2010).

Objective target 11.2: Ensure monitoring and evaluation (M&E) workshops are held every 4 years to assess implementation of this strategy.

- Action 11.2.1: Develop, disseminate, and discuss M&E protocols within 18 months' of workshop (actor: AsESG; timeline: by 24 April 2010).

- Action 11.2.2: Update status review database and distribution maps (actor: AsESG and partners; timeline: continuous).

- Action 11.2.3: AsESG convene workshops incorporating governments and other stakeholders to review Asian elephant status and implementation of strategy (

Project Objective 5: To generate funds

Activities undertaken, results achieved, and products generated

The range-wide mapping workshop's results, which are reported on here, will be converted into both a multi-author peer-reviewed paper (see Annex 8) and an illustrated prospectus, which will be used as a fund-raising aid. It is expected that the Asian Elephant Conservation Strategy will also be used to raise funds.

ASSESSMENT OF THE PROJECT'S IMPACT

The project executants successfully (1) hosted and facilitated a range-wide mapping workshop in Cambodia in October 2008; and (2) achieved "buy-in" for the core areas/populations across the range of Asian Elephants and within the major ecological settings within which the species occurs, which recognizes but is not bound by political, cultural, or scientific divides. We hope, therefore, that the Range-wide Mapping and Conservation Strategy Workshops for Asian Elephants will help focus efforts for elephant conservation systematically while helping to build a consensus for conservation action. We also hope that the process will facilitate identification of major funding opportunities for Asian Elephant conservation. Finally, the range-wide mapping and planning process, and especially the workshops, are by their very nature highly interactive and from previous experience we expect they will foster collaborative ties among the participants and a shared feeling of purpose for conservation of the species.

COOPERATION AND COLLABORATION

The Wildlife Conservation Society (WCS) was the grantee for the range-wide mapping workshop. WCS's Asian Elephant Coordinator identified the workshop participants, who were drawn from across the range of the Asian Elephant, in consultation with the IUCN/SSC Asian Elephant Specialist Group (AsESG; which Hedges co-chairs), Range State wildlife agencies, and conservation organizations working on Asian Elephants (WWF, FFI, the Smithsonian Institution, Conservation International, and WildAid). Representatives from all these agencies and organizations attended the workshop (Annex 6). In addition, every effort was made to integrate the mapping workshop with the AsESG's effort to prepare an IUCN/SSC Asian Elephant Conservation Strategy. Specifically, the intention is to continue to use new IUCN/SSC Species Conservation Planning guidelines (IUCN 2008b), to develop and promote effective conservation National Action Plans for Asia's elephants.

An earlier report on the two October 2008 workshops was circulated to all participants in November 2008, with a call for comments. The GIS data from the mapping workshop have been made freely available to anybody who wants them on signature of a data-sharing agreement, which was also circulated to all participants in November 2008 (Appendix 8). To date, a number of people from several organizations including WWF, the Smithsonian Institution, WCS, and FFI as well as a number of interested individuals have asked for and been sent these GIS data.

EQUIPMENT PURCHASED

None.

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ANNEX 1: RANGE CATEGORIES AND EVIDENCE CODES

Table 1: Elephant range categories	
Range category	**Definitions and criteria**
Confirmed Range **January 2003 to present** (Red, solid line) **January 1998 to 2002** (Red, broken line)	An area in which there is no reasonable doubt that wild Asian Elephants occur based on confirmed reports defined thus: CONFIRMED REPORTS • Direct field sightings which clearly were of wild Asian Elephants • Telemetry locations for wild Asian Elephants • Wild Asian Elephant carcasses/remains found in the field • Photographs of wild Asian Elephants (including camera-trap photos) clearly from the site in question and for which unambiguous dates are available • Remains held by local people where origin (site and approx. date of collection) was established • Signs (footprints and/or dung-piles) when presented in credible reports with sufficient details of methodology and explanation of why signs could not have been made by domestic Asian Elephants (or in the case of dung-piles, could not have been made by domestic Asian Elephants or other large mammal species)
Possible Range (Green)	An area within the established/well-documented historical range, in which either (1) wild Asian Elephants are thought to occur based on confirmed reports (as defined above) BUT which predate January 1998 and where there are no subsequent data to rule out the presence of Asian Elephants **OR** (2) unconfirmed reports which are defined thus: UNCONFIRMED REPORTS • Those presented as provisional or unconfirmed in the original reports • Sightings which do not meet the criteria for "Confirmed" reports (see above) • Photographs (including camera-trap photos) which are not clearly from the site in question and/or are undated • Specimens or other remains lacking detailed and convincing dates and locality data • Signs (foot prints or dung-piles) where details not given or if the report suggests there are doubts about the identification • All reports from local people (e.g. from interview data) • Reports with no indication of the type of evidence • Extrapolation (i.e. presence of Asian Elephants is judged possible based on their occurrence in surrounding areas)
Doubtful Range (Blue)	Areas where there are reasons (e.g. extensive habitat conversion) to believe that Asian Elephants are no longer present, but which have not been formally surveyed. If further corroborative evidence is obtained, areas of **Doubtful Range** are reclassified as **Former Range** or **Confirmed Range** as appropriate.
Former Range (extirpated) (Black, solid line)	Evidence of past occurrence but extensive work has failed to find the species or its sign, or the site is obviously no longer suitable. Identify if **Recoverable Range** (black, solid line, with hatching if still likely suitable habitat or black, solid line, with cross hatching if area already converted to e.g. oil palm plantation) which is land where habitat remains over sufficiently large areas that either natural or assisted recovery of the species might be possible within the next 10 years.
Unknown Range (Purple)	Land where the species' status is currently unknown

ANNEX 1 (CONTD): RANGE CATEGORIES AND EVIDENCE CODES

Table 2: Evidence codes for range classification categories	
Evidence code	**Criteria**
Evidence unknown. Use the following code: **Unknown**	• Includes reports (often secondary sources) which do not indicate what evidence was gathered
Extrapolation. Use the following code: **Extrapol.**	• Presence possible based on occurrence in surrounding areas (give details in remarks section)
Local report(s). Coded as: **Local report(s)**	• Information given by villagers, hunters, park rangers, etc. during interviews; and similar reports
Footprints. Coded as **Footprints**	• Self-explanatory (but see criteria for "Confirmed Reports" and Unconfirmed Reports" above)
Dung-piles. Coded as **Dung-piles**	• Self-explanatory (but see criteria for "Confirmed Reports" and Unconfirmed Reports" above)
Photographs. Code as Photographs	• Generally self-explanatory, but a report based on photographs alone cannot be classed as "Confirmed" unless the photographs were clearly taken at the site/area in question, and dates are available (e.g. '15 January 1998' or 'definitely in the late-1980s' with convincing detail backing the assertion)
Remains/trophies/specimens. Code as: Remains	• Largely self-explanatory (but see remarks about remains in the "Confirmed Report" and "Unconfirmed Report" criteria sections above)
Sighting(s). Use the following code: Sighting(s)	• Self-explanatory (but see criteria for "Confirmed Reports" above)
Telemetry location(s). Use the following code: **Telemetry**	• Self-explanatory

ANNEX 2: SURVEY METHOD CODES

Table 3: Survey method codes	
Survey method code	**Definitions and criteria**
DC1	Population estimate based on a dung count that meets the following standards [CITES/MIKE Standards (Hedges & Lawson 2004)]: • Dung-pile density estimated using a peer-reviewed sampling-based method (e.g. line transects) • On-site monitoring of dung-pile decay rates in the period leading-up to the dung-pile density survey starting sufficiently in advance of the survey for the first cohorts of monitored dung-piles to have disappeared by the time of the survey • Appropriate defecation rate used (with justification provided)
DC2	Population estimate based on a dung count that does not meet the criteria for DC1
DCR	Population estimate from a fecal DNA based capture–recapture survey method
SLT	Population estimate based on sightings along line transects (terrestrial)
SST	Population estimate based on sightings along strip transects (terrestrial)
SCR	Population estimate based on sightings and capture–recapture methods (terrestrial)
STC	Sighting-based total count (terrestrial)
ASL	Aerial sample count (e.g. population estimate based on an aerial transect survey)
ATC	Aerial total count
IGU	Informed guess: if no formal survey method was used but adequate justification for the population estimate is provided (e.g. informant worked in the area studying gibbons for last 10 years and frequently encountered wild Asian Elephants OR figure is based on extensive discussion with local hunters), then the estimate is considered an informed guess
OGU	Other guess: if the kind of information that defines an informed guess is not available
OTHER	Specify

ANNEX 3: LAND TENURE DEFINITIONS

Private ownership: Lands owned by private individuals or corporations.

Communally-owned: Lands owned by human groups, tribes, or communities

No effective ownership: Lands not owned by private individuals or corporations nor actively managed by any governmental body.

IUCN Protected Area Management Category I: *Strict Nature Reserve/Scientific Reserve*. Lands designated "to protect nature and maintain natural processes in an undisturbed state in order to have ecologically representative examples of the natural environment available for scientific study, environmental monitoring, education, and for the maintenance of genetic resources in a dynamic and evolutionary state."

IUCN Protected Area Management Category II: *National Park*. Lands designated "to protect outstanding natural and scenic areas of national or international significance for scientific, educational, and recreational use. These are relatively large natural areas not materially altered by human activity where extractive resource uses are not allowed."

IUCN Protected Area Management Category III: *Natural Monument/Natural Landmark*. Lands designated "to protect and preserve nationally significant natural features because of their special interest or unique characteristics. These are relatively small areas focused on protection of specific features."

IUCN Protected Area Management Category IV: *Managed Nature Reserve/Wildlife Sanctuary*. Lands designated "to assure natural conditions necessary to protect nationally significant species, groups of species, biotic communities, or physical features of the environment where these may require specific human manipulation for their perpetuation. Controlled harvesting of some resources can be permitted."

IUCN Protected Area Management Category V: *Protected Landscapes/Seascapes*. Lands designated "to maintain nationally significant natural landscapes which are characteristic of the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism within the normal life style and economic activity of these areas. These are mixed cultural/natural landscapes of high scenic value where traditional land uses are maintained."

ANNEX 4: FORM A – POINT LOCATIONS FOR WILD ASIAN ELEPHANT OBSERVATIONS

See accompanying PDF file.

ANNEX 5: FORM B – WILD ASIAN ELEPHANT POPULATIONS AREA-BASED (POLYGON) DATA SHEET

See accompanying PDF file.

ANNEX 6: LIST OF PARTICIPANTS

Gov or NGO/Uni	Name	Job Title	Organization Name	Email
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Gov	Kri Maphal	Staff	Wildlife Protection Office	Via Mark Gately
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ANNEX 7: AGENDA RANGE-WIDE MAPPING AND STRATEGIC CONSERVATION PLANNING WORKSHOPS FOR ASIAN ELEPHANTS, PHNOM PENH, 20–24TH OCTOBER 2008

– AGENDA –

SUNDAY 19TH OCTOBER 2008

Participants arrive in Phnom Penh.

20:30 Dinner
For those participants who arrive on Sunday

DAY 1 OF 5: MONDAY 20TH OCTOBER 2008

9:00 Official welcome and opening remarks
Director General of the Forestry Administration, Government of Cambodia

9:20 Welcome from workshop hosts/facilitators
Simon Hedges

9:30 Introductions
All participants

9:40 Presentation of the agenda, aims, and expected outputs for this meeting
Simon Hedges

9:50 IUCN/SSC's new strategic planning process for species conservation
Simon Hedges

10:40 COFFEE BREAK

11:10 Presentation of draft maps of Asian Elephant status and distribution; discussion of range categories and data coding.
Simon Hedges, Rob Rose

11:40 How to go about revising maps of Asian Elephant status and distribution.
Rob Rose/Kim Fisher/Simon Hedges

12:00 LUNCH

13:00 Discussion of vision for elephant conservation in Asia
All participants

13:30 Presentation on how the working groups will function
Simon Hedges

13:35 Split into three working groups:

Working Group 1	*Working Groups 2–14 (one per range State if necessary, fluid membership)*
Refine vision for Asian Elephant Conservation Strategy	Revise information on distribution and status of Asian Elephants

17:30 End of day's work – pre-dinner drinks

19:00 DINNER

DAY 2 OF 5: Tuesday 21th October 2008

8:30 Presentation of revised vision
Working Group 1

8:40 Discussion of revised vision
All participants

9:00 Working groups reconvene (group membership can vary within & between sessions)

Working Group 1	*Working Groups 2–14 (one per range State if necessary, fluid membership)*
Finalize vision for Asian Elephant conservation strategy (incorporating earlier discussions)	Continue mapping, synthesis of data on status of Asian Elephants; review of maps and population data

10:00 COFFEE BREAK

10:30 Presentation of finalized vision statement
Working Group 1

10:40 Discussion of goal-setting

11:00 Working groups reconvene (group membership can vary within & between sessions)

Working Group 1	*Working Groups 2–14 (one per range State if necessary, fluid membership)*
Start compiling data needed for goal-setting	Continue mapping, synthesis of data on status of Asian Elephants; review of maps and population data

12:00 LUNCH

13:00 Working groups reconvene (group membership can vary within & between sessions)

Working Group 1	*Working Groups 2–14 (one per range State if necessary, fluid membership)*
Continue compiling data needed for goal-setting	Continue mapping, synthesis of data on status of Asian Elephants; review of maps and population data

15:00 TEA BREAK

15:30 Working groups reconvene (group membership can vary within & between sessions)

Working Group 1	*Working Groups 2–14 (one per range State if necessary, fluid membership)*
Discuss and develop list of threats drawing on threat data contributed by participants	Continue mapping, synthesis of data on status of Asian Elephants; review of maps and population data

17:30 End of day's work – pre-dinner drinks

19:00 DINNER

DAY 3 OF 5: Wednesday 22nd October 2008

08:30 Presentation and review of finalized distribution maps. Draw attention to locations of populations relative to land cover, international borders, and protected areas.
Rob Rose, Kim Fisher, Simon Hedges and others as appropriate

09:15 Presentation of the data compilation needed for goal-setting for discussion/revision
Working Group 1

09:45 Discussion on setting goals and goal-targets

10:30 COFFEE

11:00 Develop Goals and Goal targets, in working groups if necessary

12:00 LUNCH

13:00 Brief presentations by each working group on progress with goals and goal targets
Working groups

13:30 Working groups reconvene to finalize goals and goal targets

14:30 Brief presentations by each working group on final goals and goal targets
Working groups

15:00 TEA BREAK

15:30 Presentation and discussion about threats to Asian Elephants
Working Group 1 from Tuesday, then all participants

16:15 Problem analysis: what hinders achieving the vision and goals?
All participants – split into working groups

17:30 End of day's work – pre-dinner drinks

19:00 DINNER

DAY 4 OF 5: Thursday 23rd October 2008

08:30 Presentation of problem tree and explanation of how to use the problem analysis to formulate objectives.
Facilitator

09:00 Split into working groups to develop first drafts of objectives
Working groups

09:30 Presentation and discussion of first drafts of objectives
Working groups

09:45 Split into working groups to develop second drafts of objectives
Working groups

10:15 Presentation of second draft objectives
Working groups

10:30 COFFEE BREAK

11:00 Explanation of how to use the objectives to formulate objective targets.
Facilitator

11:05 Working group for each objective develops list of objective targets
Working groups

12:00 LUNCH

13:00 Presentation of objective targets and discussion
All participants

14:00 Working groups finalize objectives and objective targets
All participants

14:30 Presentation of final objectives and objective targets
Working groups

15:00 TEA BREAK

15:30 Presentation on actions – what are they?

Facilitator

15:35 Identify and develop actions for each objective target in objective-based working groups
Working groups

17:30 End of day's work – pre-dinner drinks

19:00 DINNER

DAY 5 OF 5: Friday 24th October 2008

08:30 Present actions for each objective target, followed by discussion
Working groups

09:30 Working groups revisit and redraft actions informed by discussion, adding sites, actors, timelines, and indicators if and when appropriate
Working groups

10:30 COFFEE

11:00 Working groups continue redrafting actions informed by discussion, adding sites, actors, timelines, and indicators if and when appropriate
Working groups

12:00 LUNCH

13:30 Presentation of draft strategy for Asian Elephants, followed by discussion
Simon Hedges, Ajay Desai, and others as appropriate

16:00 Discussion of plans for moving forward, including national action planning
All participants

17:00 Official close of meeting
Deputy Director of the Wildlife Protection Office, Government of Cambodia

Night: Workshop participants depart from Phnom Penh.

SATURDAY 25TH OCTOBER 2008

All day: Workshop participants depart from Phnom Penh.

ANNEX 8: OCTOBER 2008 ASIAN ELEPHANT WORKSHOPS DATA SHARING/DATA-USE AGREEMENT

I/we/my organization will be bound by the following data sharing agreement to protect all contributor's personal data and/or their institution's data.

All raw data will remain the property of the contributor(s).

All data contributed to the October 2008 range-wide mapping and status review process will be held on a central database to be maintained by the IUCN/SSC Asian Elephant Specialist Group (AsESG) in its role as a neutral inter-governmental body trusted by governments [this is directly analogous to the African Elephant Database (AED), which is maintained by the IUCN/SSC African Elephant Specialist Group (AfESG)]. [The US Fish & Wildlife Service (USFWS) has already granted funds to IUCN to create and maintain a Global Elephant Database comprising the AED and an Asian Elephant Database – this will be a high-profile product that we anticipate will become standard reference (as is the AED) and will therefore be widely-used. Major contributors and funders, especially the Wildlife Conservation Society (WCS), WWF, and the USFWS, will be of course be prominently acknowledged with their logos on the cover of the periodic status reports that will be published (cf. the African Elephant Status Reports that result from the AED.]

The GIS database produced as a result of the range-wide mapping and status review process at the October 2008 workshop and subsequent review/revision process will be well-documented (using Federal Geographic Data Committee (FGDC) compliant metadata), easy to access, and with the data held in an open (public) and thus verifiable form. Nevertheless, if participants choose not to share their data or restrict the resolution of their data we will respect their wishes (although of course we hope that all participants will see the value of openly including their data in the database). It is anticipated that all data will be made publicly available soon after January 2009 (subject to the restrictions noted above).

Summary maps and data analyses will be made freely available to conservation planners, relevant individuals and organizations, and the wider world. Use of these maps, data, and analyses will be conditional on acknowledging (1) WCS, WWF, and the IUCN/SSC AsESG as the organizers/facilitators of the October 2008 workshops and (2) the participants at those workshops and other reviewers and contributors as appropriate.

It is anticipated that some of the data contributed to the range-wide mapping and status review process may be analysed by a smaller sub-group of the participants at the October 2008 workshops (and/or others as appropriate), but in such cases everyone who contributed the data used in the analyses should be given an opportunity to participate in the preparation of any resulting publications and to be listed as a co-author if they so participate.

All contributors and all funders must be acknowledged in all outputs/products (reports, publications, etc.).

EXPECTED OUTPUTS

Two main outputs are expected from the October 2008 workshops and the subsequent review process:

(1) an up-to-date database and atlas of the status and distribution of wild elephants across Asia. The authors will be everyone who participated in the October 2008 workshops (plus those people who contributed data but could not be present in Phnom Penh);

(2) a Conservation Strategy for Asian Elephants across their range, which will also serve as a tool for developing national Action Plans. The "author" will be IUCN, with all participants and other contributors, reviewers, etc. named as contributors/reviewers as appropriate.

Signed,

Name Institution Date

Form A: Point locations for wild Asian Elephant observations

Please indicate point locations of wild Asian Elephant observations on your map with a + symbol, using the appropriate colour marking pen. Each point location represents all wild Asian Elephant observations within a 10 km radius of the point. (Each point is assumed to contain all your wild Asian Elephant observations within a circle of approximately 314 km².) NOTE: for well delineated, intensively monitored populations (e.g. Way Kambas NP in Sumatra), we do not require hundreds of data points; please just provide polygon based data for the area (see Form B). MORE IMPORTANTLY, where possible, please provide data points for wild Asian Elephant observations outside such populations/polygons to better delineate occurrence of wild Asian Elephants in poorly known areas.

Species: **Date Form Completed:**

Your name(s):

Point Location Code	Date of observation (day/month/year)	X (Longitude or Easting coordinate*)	Y (Latitude or Northing coordinate*)	Confirmed or unconfirmed report	Evidence codes	Other comments including citation details for reports (continue overleaf if necessary)
P						
P						
P						
P						
P						
P						
P						

*if using coordinate system different from latitude/longitude, please fill out as completely as possible the following table:

Points using this coordinate system:	Projection:	Units:	Datum:
Other information (e.g. centre of projection, standard parallels, zones)			

Form B: Wild Asian Elephant populations – area-based (polygon) data sheet

Please indicate approximate range polygons on your map with the appropriate colour marking pen (see Annex 1 for colour codes).

Please use a separate form for each polygon.

Country:

State or Province:

Your name(s):

Date form completed:

ID code for this polygon:

Common name for polygon if appropriate (e.g. Way Kambas NP):

Area of polygon (km²; to be added by GIS analyst):

Vegetation type(s) in polygon (to be added by GIS analyst):

Range Category for this polygon (please circle one; **see Annex 1** for definitions and criteria): Confirmed Range / Possible Range / Doubtful Range / Former Range / Unknown

Evidence Codes for this polygon (see **Annex 1** state all that apply):

Number of person-days of active searching in this polygon (if known/appropriate):

Survey year:

Connectivity in terms of Asian Elephant dispersal potential to/from this polygon: Well connected / Limited connectivity / Isolated / Unknown

Estimated population size(s) with years for this polygon (give population confidence interval(s) if known); or unknown if no estimate is available:

Survey method code for population estimate(s) (see Annex 2):

Population trend and evidence (see Annex 2):

Citation details for population survey reports if available:

ID code for this polygon: **Country & State/Province:** **Your name(s):**

Threats to the species inside this range polygon:

Threat	**Yes or no?**	**Details**	**Evidence (include citation details if available)**	**Rank these threats to the species within the whole polygon, using 1 as the most important.**
Illegal killing (poaching)		Specify method(s) used for killing: Reason(s) for killing: Estimate intensity: low/medium/high (circle one)		
Legal killing (e.g. Problem Animal Control, PAC)		Estimate intensity of legal PAC: low/medium/high (circle one) *and* provide annual figures or range of figures if known:		
Human–elephant conflict (HEC)		Please give details:		
Small population size		See above	See above	
Habitat conversion		Specify new land use: Ongoing yes/no? Probability: Unlikely / Some degradation probable / Extensive degradation probable / Unknown		
Habitat degradation		Specify: Ongoing yes/no? Probability: Unlikely / Some degradation probable / Extensive degradation probable / Unknown		

ID code for this polygon:		**Country & State/Province:**	**Your name(s):**	
Interactions with captive / domestic elephants?		If a problem specify species involved Risk: low / medium / high / unknown		
Competition with domestic livestock		If a problem specify domestic species involved Extent of problem: low / medium / high / unknown		
Disease		Specify: Risk: low / medium / high / unknown		
Roads inside polygon?		Specify number if known and type:	Notes:	
Other threat 1		Specify:		
Other threat 2		Specify:		
Other threat 3		Specify:		

ID code for this polygon: **Country & State/Province:** **Your name(s):**

Land tenure classification for this polygon:

Legal Land Tenure System	**Estimate the percentage of this polygon under different land tenure systems and add any other relevant notes**
Private Ownership	
Communally Owned	
IUCN Category I Local Name:	
IUCN Category II Local Name:	
IUCN Category III Local Name:	
IUCN Category IV Local Name:	
IUCN Category V Local Name:	
No Effective Ownership: Lands not owned by private individuals or corporations nor actively managed by any government body	
Other (specify) Local Name:	

ID code for this polygon: **Country & State/Province:** **Your name(s):**

List predators present in polygon (give species names):

List competitors in polygon (give species names):

What if any benefits do local people gain from the species' presence in this polygon:

Do local people suffer from the presence of the species in the polygon?

List any planned or existing (relevant) conservation projects in this polygon:

Any additional comments about this polygon: